Durban Botanic Society.

REPORT

ON

NATAL BOTANIC GARDENS,

FOR THE

YEAR 1895,

BY

J. MEDLEY WOOD, A.L.S.,

Corresponding Member of the Pharmaceutical Society of Great Britain.

CURATOR.

DURBAN:

BENNETT & DAVIS, PRINTERS, 345, WEST STREET.

1896.

Durban Botanic Society.

REPORT

ON

NATAL BOTANIC GARDENS,

FOR THE

YEAR 1895,

BY

J. MEDLEY WOOD, A.L.S.,

Corresponding Member of the Pharmaceutical Society of Great Britain.

CURATOR.

DURBAN:

BENNETT & DAVIS, PRINTERS, 345, WEST STREET.

1896.

Durban Botanic Society.

COMMITTEE FOR 1895.

President:

B. W. Greenacre, Esq., M.L.A.

Hon. Sec.:

Mr. J. D. Ballance.

Hon. Treasurer:

Mr. M. S. Evans.

Hon. R. Jameson M.L.C. Mr. G. Rutherford, C.M.G.

Mr. C. A. Holwell.

Government Members:

Mr. J. S. Steel. Mr. F. Button.

Curator:

J. Medley Wood, A.L.S.

REPORT.

Botanic Gardens,
Berea, January, 1896.

To the President and Committee,
Durban Botanic Society.

Gentlemen,

I have much pleasure in presenting this my Fourteenth Annual Report on the Botanic Gardens, and the work connected therewith. As will be seen by the Abstract of Meteorological Observations, taken at the Observatory in the upper portion of the Garden ground, and kindly supplied, as usual, by the Government Astronomer, it will be seen that from May to September, inclusive, only 4·30 inches of rain was registered, while during the same period in 1894, no less than 14·28 inches fell. In November, again, the fall was below the average, but the fall in December was very welcome, bringing the total for the year to 51·50 inches, against 37·27 for 1894, and which is above the average for the last twenty years by 6·74 inches. I am glad to be able to say that we have suffered no damage of any consequence from either drought, flood, wind storms, or locusts.

The hands have been so fully employed during the year, that time could not be spared for any further extention of the ground in cultivation, except that a piece of land, about an acre in extent, has been cleared of bush and added to the Nursery, which was not only too small for our present requirements, but also required manuring and a rest. A small portion of the Nursery ground had been set apart for roses, being about the only portion of our ground which is nearly free from white ants, but the ground lies very low, and during the very wet weather of last year, the soil became so saturated with water, that almost the whole of the roses were killed. I think it likely that the stoppage of the pumping operations at Currie's Fountain, consequent upon the new water supply from Umbilo and Umlaas, has been the principal cause of this saturation of the ground in the vicinity, especially after heavy falls of rain.

During the heavy rainfall on December 14th, one of the dwarf walls of the Fernery fell in, but without doing much damage. It was erected again by our own staff, and this time the wall has been built 9 inches thick instead of $4\frac{1}{2}$ inches as before, the whole, with the exception of one wall, being now 9 inches thick.

As you are aware, the erection of the new Conservatory has not yet been commenced, for various reasons, but the plan, kindly drawn by Mr. W. E. Robarts, is now in the hands of the Hon. Secretary, and I hope that the work will soon be commenced, especially as considerable repairs are urgently needed to the existing house, which cannot well be undertaken until the new house is ready to receive the plants. I would also point out that the roof and outside wood work of the Curator's residence requires another coat of paint, the material used in coating the roof having evidently been of inferior quality, as is proved by the fact that the roof of the Gardener's office and store, which was painted by our own staff, still remains in perfect condition. Some part of the exposed wood work of the Curator's residence, not having been properly painted, is beginning to decay, and will have to be renewed.

The enamelled plant labels, alluded to in my last report, have so far been found quite satisfactory ; they are very conspicuous, neat and clean, and of considerable use to visitors as well as to ourselves, and I would suggest that further supplies be obtained year by year until all the trees and shrubs in the Gardens are furnished with them.

In my Report for 1893, it was stated that the heavy gale of September 28th, in that year had damaged or destroyed several trees in the Garden, but I am now pleased to be able to say that the most valuable of them have now quite recovered. *Cocos plumosa*, which lost its crown of leaves, is now looking as well as ever, also *Loxostylis alata*, the only tree we have of the species, and *Tectona grandis*, the " Teak " tree, in consequence of the removal of the large Acacia which quite overshadowed it, now looks better than ever, but will, I fear, never make a good tree, as our climate does not appear to be suited to it, still we are glad to have preserved the only specimen we have of the species.

Amongst the plants reported as having been put out in the Garden during 1894, were a number of Acacias, chiefly Australian species, reared from seed obtained from that country in response to my request. I regret now to have to report that a large number of them have been destroyed by white ants, and I fear that before long but few of them will be left. It seems, therefore, quite useless to plant either gums or acacias on ground so infested by white ants as the present site of the

Gardens. The only plants put out in the same year which have since died, are *Apios tuberosa*, *Benthamia fragifera*, and *Dacrydium cupressinum*.

In the early part of the year I have been accustomed to make a collecting trip into some suitable district of the Colony, but in the year just concluded I did not feel well enough to undertake the journey. Mr. Wylie, the head gardener, therefore, with the consent of the Committee, went in my stead, and, in addition to collecting a large number of specimens for the Colonial Herbarium, some of which proved to be new, he obtained numerous plants and seeds for distribution, and exchange with other institutions, some of which have already been sent away, and a large number are still on hand.

No change has been made in the European staff, and Mr. Wylie, the head gardener, with his assistants, Mr. J. Harmon and Mr. H. Rutter, continue to give complete satisfaction. I may say that Mr. Wylie and Mr. Harmon have completed 13 years' service, and Mr. Rutter nearly six years.

The following free grants of plants have been made during the year :—

	£	s.	d.
Sydenham Police Station ...	3	10	0
N.G. Railways	26	15	0
Adam's Mission Station ...	10	1	0
Bellair Cemetery	4	11	0
Berea College	8	2	0
	£52	19	0

Plants, fruit, flowers, etc., have been sold, sent away in exchange, and granted free to public institutions to the amount of a little more than £1,240.

Packets of seeds were received during the year as under :—

	PACKETS.
Royal Gardens, Kew	14
,, ,, Jamaica	2
Imperial Botanic Gardens, St. Petersburg ...	53
Botanic Gardens, Bangalore	12
,, ,, Grenada	5
,, ,, Madras	28
,, ,, Najpur	2
,, ,, Brisbane	54
,, ,, Hong Kong	6
,, ,, Melbourne	25
M. Max Cornu, Paris	6
Messrs. Reasoner Bros., Florida	8
,, Damman & Co., Naples	299

	PACKETS.
Agricultural Bureau, South Australia	14
M. Buysman, Middleburg	18
University of California	55
Acclimatisation Society, California	23
Baron F. v. Mueller, Melbourne	91
Mr. J. C. Harvey, California	12
Mr. Veith, Madagascar	1
General Lowther, England	4
Director, Museum, Sydney	1
M. Max Leichtlin, Baden-Baden	13
Messrs. Sander & Co., St. Albans	6
Mr. J. O'Brien, Harrow	2
Mr. A. White, Central Africa	1
His Excellency S. W. Hely-Hutchinson	2
Mr. W. Bull, London	3
Rev. A. S. McPhee, Berea	1
Mr. R. W. Adlam, Transvaal	9
Mr. A. Wilkinson, Ottawa	3
Mr. J. Geikie, Karkloof	1
R. Jameson, Durban	2
— Warwick, Maritzburg	1
W. T. Woods, Estcourt	1
E. J. Turner	6
H. Duboisee Picquetbourg, Umhlanga	1
Mrs. G. E. Robinson	1
O. R. Harvey, Duff's Road	1
E. E. Galpin, Queenstown	12
T. G. Colenbrander, New Guelderland	1
Total	800

The following plants were received ;—

Royal Gardens, Kew	36	plants of	31	species
Imperial Botanic Gardens, St. Petersburg	58	„	36	„
Agri-Horticultural Society of India	28	„	14	„
Messrs. Sander & Co., St. Albans	136	„	66	„
Messrs. Damman & Co., Naples	1	„	1	„
Baron F. v. Mueller, Melbourne	1	„	1	„
Messrs. Reasoner Bros., Florida	3	„	3	var.
Mrs. M. S. Evans, Durban ...	2	„	2	
Mr. R. Jameson, Durban ...	42	„	6	
	307	„	160	

Also the following :—

Messrs. Sander & Co., St. Albans	... 66 varieties of Roses.
H. Strauss, Germany	... 150 Caladiums
Royal Botanic Gardens, Mauritius	... A large case of Palm seeds

During 1894 we received 148 plants and 669 packets of seeds, with the following results :—

PLANTS.

Dead on arrival	38
Died afterwards from effects of voyage ...	18
Planted in Gardens	18
In pots	67
Already in stock	7
	148

SEEDS.

Failed to germinate	170
Germinated but died afterwards	61
Distributed	113
In stock	132
Still in pots or planted in Gardens ...	277
Annuals and weeds	26
Total	779

We sent away during the year packages of plants as follows :—

Royal Gardens, Kew	2 boxes posted
,, ,, Mauritius ...	1 Wardian case
,, ,, ,, ...	1 closed case
,, ,, Calcutta	1 Wardian case
Agri-Horticultural Society ,,	1 ,,
Imperial Botanic Gardens, Russia	1 closed case
Sander & Co , St. Albans ...	6 ,,
,, ,, ...	1 box posted
H. Strauss, Germany	2 closed cases
W. Bull, London	1 ,,
Damman & Co., Naples ...	4 ,,
Dr. Thompson, Gazaland ...	1 ,,
A. White, Zomba	2 ,,
J. O'Brien, Harrow	2 boxes posted
H. H. Arderne, Capetown ..	1 ,,
Gen. Lowther, England	1 ,,

Packets of seeds have been sent away as under :—

Royal Gardens, Kew	26
,, Hong Kong	39
,, Ceylon	39
,, Jamaica	62
,, Calcutta	17
,, Singapore	17
,, Mauritus	23
Botanic Gardens, British Guiana	17
,, Saharunpur	59
,, Grenada	17
,, Zurich	20
,, Madras	23
,, Trinidad	23
,, Melbourne	45
,, Port Darwin	39
,, Bangalore	16
,, Hobart	20
,, Adelaide	22
,, Sydney	22
,, Brisbane	18
Imperial Botanic Gardens, Russia	45
Acclimatisation Society, California	23
University Gardens, ,, ...	45
Agri-Horticultural Society of India	25
M. Max Cornu, Paris	40
Mr. J. C. Harvey, California	56
Messrs. Reasoner Bros, Florida	62
Mrs. R. D. Hoyt, ,, ...	24
Mr. Max Leichtlin, Baden Baden	7
Mr. A. Whyte, Zomba	57
Mr. Buysman, Middelburg	41
Messrs, Damman & Co., Naples	18
Messrs. Sander & Co., St. Albans...	1
To 12 Correspondents in the Colony	89
Total	1,136

The following publications have been received :—

Kew Bulletin	from Director
Bulletin, Royal Gardens, Jamaica ...	,,
,, ,, Trinidad ...	,,
,, ,, Singapore	,,
,, Botanic Gardens, Grenada	,,
Report, Royal Gardens, Ceylon ...	,,
,, ,, Singapore ...	,,
,, ,, Trinidad ...	,,
,, ,, Calcutta ...	,,

Report, Botanic Gardens, Bangalore ...	from Director
,, ,, Saharunpur	,,
,, ,, Graaf-Reinet	Superintendent
,, Imp. Botanic Gardens, Berlin	Director
,, Secretary for Agriculture, Nova Scotia	Sec. for Agri.
,, Botanical and Afforestation Dept., Hong Kong ...	Director
Transactions Queensland Acclimatisation Society	,,
Journal Agri-Horticultural Society of India	,,
,, ,, ,, Madras	Secretary
,, Pharmaceutical Society ...	,,
Agricultural Journal of the Leeward Islands	C. A. Barber, F.L.S.
Catalogue Botanic Gardens, Sydney	Director
Amount of salt in alkaline soils ...	U. States Govt.
Mayflower	Editor

PURCHASED.

Natal Farmers' Magazine
Tropical Agriculturist.

The undermentioned plants have flowered for the first time in the Gardens during the year:—

Name.	From whom received.
Acacia cavenia	Damman & Co.
,, *cornigera*	,, ,,
,, *holosericea*	Bot. Gardens, Adelaide.
,, *leucantha*	Damman & Co.
,, *pentadenia*	Royal Gardens, Kew.
,, *podalyriæfolia*	Bot. Gardens, Brisbane.
,, *strombolifera*	Damman & Co.
Allamanda magnifica	Sander & Co.
,, *Williamsi*... ...	,, ,,
Anigosanthus flavida	Bot. Gardens, Melbourne.
Aster indicus	M. Buysman.
Bauhinia picta...	Royal Bot. Garden, Jamaica.
Bougainvillea glabra Sanderina	Sander & Co.
Brownea coccinea	Royal Bot. Gardens Mauritius.
Clerodendron inerme	Bot. Gardens, Saharunpur.
,, *speciosum* ...	Sander & Co.
Coelogyne Dayana	,, ,,
Cratoxylon carneus	Royal Bot. Gardens, Calcutta.
Cross indra undulaefolia ...	Sander & Co.
Denrobium phalœnopsis Var ...	,, ,,
Dermatobotrys Saundersii ...	Collected

Dolichos lignosus	Damman & Co.
Eryngium serra	,, ,,
Eucharis Stevensi	Sander & Co.
Eulophia andamanica ...	Royal Bot. Gardens, Calcutta.
Gladiolus oppositiflorus ...	H. G. Flanagan.
,, *sp.* (Swaziland) ...	— Staines.
Homeria collina	J. Pardy.
Hippeastrum equestre major ...	Sander & Co.
Ixora "Prince of Orange" ...	Agri-Horti. Society, India.
Ipomœa, gossypioides	Damman & Co.
,, *imperialis*	,, ,,
,, *polyanthus*	Reasoner Bros.
,, *setifera*	Damman & Co.
,, *sp.*	J. C. Harvey.
Ixia conica	J. Pardy.
Lagerstrœmia regina	Bot. Gardens, Saharunpur.
Lathyrus laetiflorus	University of California.
,, *splendens*	,, ,,
,, *violaceus*	,, ,,
Leea coccinea	Sander & Co.
Lupinus propinquus	University of California.
Manihot palmata	Damman & Co.
Nerium rubrum plenum ...	Sander & Co.
Pancratium guianense	,, ,,
Pistachia lentiscus	Royal Bot. Gardens, Jamaica.
Prosopis spicigera	Bot. Gardens, Saharunpur.
Raphiolepis indica	,, ,,
Richardia Elliotiana	M. S. Evans.
Rhynchosia diversifolia ...	Damman & Co.
Satyrium coriifolium	J. Pardy.
Spigelia splendens	W. Bull.
Sisyrynchium bellum	University of California.
Stenospermatium multiovulatum	Sander & Co.
Swainsonia galegifolia Var ...	Bot. Gardens, Melbourne.
Tecoma Smithii	Sander & Co.
Vicia serratifolia	Imperial Grdns, St. Petersburg
Watsonia aletroides	J. Pardy.

The following plants have been put out during the year:—

Name	Native of
Achillea sericea	Europe.
Aegilops ovata	,,
Agati grandiflora coccinea	India.
Alcea sidœfolia	?
Aloysia lycioides	N. America.
,, *urticoides*	Brazil.
Aralia digitata	India.
,, *maculata*	?

Argyreia sp.	?
Aristolochia elegans	Brazil.
,, *ridicula*	,,
Aster indicus	India.
Atriplex leptocarpum	Australia.
Boehmeria japonica	Japan.
Bosea Yervamora	Canaries.
Bougainvillea glabra Sanderiana ...	Hort.
Callicarpa japonica	Japan.
Chorizema diversifolium	Australia.
Clerodendron siphonanthus	Malaya.
Convolvulus floridus	Teneriffe.
Crinum sp, ...	?
Dahlia imperialis Var...	Mexico.
Deeringia celosioides	Asia & Trop Australia.
Delphinium cardinale	N. America.
,, *puniceus*	Europe.
Dolichos lignosus	Tropics.
Diplarrhena latifolia	Tasmania
Eryngium serra	Brazil.
Erysimum cunescens	Cancasus.
Genista tinctoria	,,
Gladiolus oppositiflorus	Cape Colony.
Gloriosa superba	India.
Gouania domingensis	W. Indies.
Hibiscus Boryanus	Bourbon.
Hypericum assyrion ?	?
,, *tetrapterum*	Europe.
Inula helenium...	,,
Ipomœa crassipes	Natal.
,, *gossypioides*	Paraguay.
,, *imperialis*	?
,, *polyanthus*	E. Indies.
,, *setifera*...	Guiana.
Isatis tinctoria	Europe.
Isoplexis canariensis	Canaries.
Ixora Dixiana	India.
,, *illustris*	Hort.
,, *parviflora*	India.
,, *picturata*...	Hort.
,, *Prince of Orange*	,,
,, *rosea*	India.
,, *venusta*	Hort.
Jasione Jankæ	Europe.
Lathyrus lætiflorus	?
,, *splendens*	?
,, *violaceus*	?
Lavatera assurgentiflora	California

Lespedeza bicolor	China
Lettsomia sp.	?
Lophospermum erubescens	Mexico
Lupinus propinquus	?
Lycium chinensis	China
Melia azederach (continuous flowering)	?
Melianthus n. sp. J. M. Wood 4376	Natal
Mitraria coccinea	Chili
Nandina domestica alba	China
Negundo californica	California
Nerium rubrum plenum	?
Orthosiphon sp....	Natal
Passiflora manicata	Peru
Pavetta sp.	?
Physostegia virginica alba	N. America
Poterium sp.	Europe
Pterostyrax corymbosum	Japan
Pueraria Thunbergii	,,
Rhamnus californicus	California
Rhynchosia diversifolia	Paraguay
,, *lineata*	Brazil
Ribes glutinosum	N. America
Rubus nutkanus	,,
Rumex Berlandieri	Chili
Sisyrynchium bellum	N. America
Sphondylium lanatum...	,,
Spirea Lindleyana	Himalayas
Stevia odorata	
Strobilanthes sp.	Nilgiris
Swainsonia galegifolia alba	Australia
Trifolium rossidum	?
Uropappus leucocarpus	?
Vicia grandiflora	Europe
,, *serratifolia*	,,
Vitis Coignetia...	Japan

Amongst the plants enumerated in the foregoing lists, there are but few that seem to require further notice; the following remarks, however, may be useful:—

Atriplex leptocarpum.—This is one of the "Salt bushes" of E. Australia, and Baron F. v. Mueller says of it, "It will bear a great amount of drought, and if not too closely fed down, produces seed in abundance." Different species of *Atriplex* are found useful in Australia as sheep fodder, but as they require an alkaline soil for their successful cultivation, I fear that their success in Natal will be confined to very limited areas. All attempts to rear to maturity plants of *Atriplex* in these Gardens have, so far, been conspicuous failures.

Cola acuminata.—The receipt of seeds of this tree was mentioned in my Report for 1894, and I am now pleased to be able to say that the plants have, so far, done very well. Some have been sent away for trial, and we have still a few on hand. It is perhaps scarcely necessary for me to say that it is the tree which yields the "Cola" nuts of commerce, which have lately come so much into use in the form of chocolate and other ways.

Dipteryx odorata.—A large tree yielding the "Tonquin" or "Tonga" bean of commerce, which is used for scenting snuff, and also in perfumery. Four plants were received from Kew, and, so far, are doing well.

Gouania domingensis, "Chew Stick."—The twigs of this plant are used by the negroes in the West Indies for chewing, and they may frequently be seen with a piece projecting from their lips like a cigar. It is presumably used as a bitter, or for preservation of the teeth.

Isatis tinctoria, "Dyers' woad."—A tall herb, lasting for two years only. A blue dye is obtained from the fermented leaves, but the plant is scarcely likely to succeed in Natal, nor is it of much commercial value, though small quantities of the fermented and dried leaves are said to be used by dyers for mixing with indigo.

Lagerstrœmia regina.—A large timber tree, yielding a blood-red coloured wood, which is used in India for many purposes, and is said to be very durable under water. Its native name is "Jarool," and the root, bark and leaves are used medicinally. The flowers are much larger than those of the other species of the genus in cultivation, and known in Natal as "Pride of India," and are very ornamental.

Poterium sanguisorba, "Burnet."—Seed of this plant was given to us by Mr. W. T. Woods, of Estcourt, who advocates it very strongly as a forage plant. It is as yet too early to say how it will succeed in the coast districts. It is known at home as a useful fodder plant, and is also used in salads by the French people. The generic name, Poterium, is said to have been given in consequence of some of the species having been used as an ingredient in "cool tankards."

Theobroma cacao.—Twice during the past year we have received seeds of this plant, the first time, by the kindness of A. Whyte, Esq., of Zomba, Central Africa, who brought them from England, in the cool chamber of the steamer; the second time, by favour of His Excellency Sir Hely-Hutchinson, who obtained them from West Indies. In both cases the seeds were well and carefully packed, but I regret to say that not a single seed germinated, though every care was taken of them. I shall therefore make an effort to obtain plants from Mauritius, and hope to meet with better success, so that the plant may have a fair trial in the Colony.

Rheum officinale, "Turkey Rhubarb."—Seed of this plant was obtained in 1893, and a portion sent to Botanic Gardens, Maritzburg. Here, the plants did not succeed, and are now all dead, but the Curator of the Maritzburg Gardens informs me that plants reared from the seed sent by us to them for trial are doing fairly well, and have made good leaves and stems. It is quite possible that at a still higher altitude, say Howick to Nottingham Road, the plant might be found to succeed still better.

Carya oliviformis, "Peccan Nut."—Seeds of this tree were received from Mr. A. Wilkinson, of Ottawa, and some of them have germinated, and it is to be hoped the plant will succeed here. The wood is valuable, and the nuts are said to be excellent, and are exported in quantity from Texas.

Sweet Potato.—Roots of three varieties of this plant were received from Florida, and are said to be of very good quality. We have been fortunate in rearing plants of all three varieties, and a few cuttings will shortly be available for distribution. One of these varieties is an upright one, that is, the vines do not run along the ground. I have since been informed that we have already an upright variety in Natal, and cuttings of it were kindly sent to me by Mr. W. Cato, of Bellair. We shall, therefore, be enabled to compare them with each other during the present season.

In my Report for 1890, I gave a list of plants of economic value, which had been tried at the Gardens during the previous five years, and it was my intention to have given in the present Report a similar list of those tried during the five years that have elapsed since that time, but in consequence partly of the press of other work, and partly also because the plants imported during the past year cannot safely be reported on at present, I have decided to defer it until next year. During the past five years we have imported 3,473 packets of seeds, and 1,058 species of plants, but of this large number many are annuals, duplicates, or plants of ornamental value only, and these I do not propose to notice, since space would not admit of it, nor would their enumeration be of any real value. I shall therefore report only upon plants of some economic value, timber trees, &c., &c.

The following have been noted in previous reports:—

Polygonum sacchalinense, "Sacaline."—I have nothing further to report of this plant beyond the fact that it has been found to grow quite well here, and plants have been distributed to applicants. Its value as a fodder plant in Natal has yet to be proved.

Rumex hymenosepalus, "Canaigre."—In my Report for 1894, it was stated that this plant was under trial here, and I am now pleased to say that the trial has fully proved the

suitability of the plant to the coast soil and climate. In February last, 72 plants were put out, chiefly cuttings from apex of last year's roots, but with a few seedlings also. in consequence of want of room they were planted much too closely. They grew vigorously, and in September and October produced seed in abundance, which has been distributed to applicants. In November, the leaves having died down, the roots were dug, and found to weigh 57lb., the largest being 4lb., and several others 2lb. to 3lb. in weight, the remainder, being small, the roots lost about 12lb. in drying. The eyes were then removed for replanting, and the remainder, about 40lb. weight, has been sent to the Natal Tannery, the manager having promised to report on them as well as he can from so small a quantity. Further experiments will be made here, and reported in due course In the meantime, I take over the greater part of an article which appeared in the "American Journal of Pharmacy," of August, 1889, and also another article from Bulletin of Agricultural Experiment Station, Berkeley, California, October, 1894, and hope they will be found useful.

CANAIGRE. *

By Henry Trimble.

The following account of a tanning material, which had several times in the past few years been mentioned as new, or as a possibility for the tanner, is undertaken with a view of relating what has been done toward developing this source, and at the same time calling attention to the fact that if we encourage home production, we have in Canaigre a material which gives promise of superseding the uncertain and much-adulterated Gambier.

Canaigre is found in large quantity in the sandy soil on both sides of the Rio Grande and northwards over a large portion of Western Texas and New Mexico. Its history is briefly as follows:—It is said to have been used in tanning by the Mexicans for over two centuries. Our first information, however, dated from July 9th, 1868, when a package of these roots was forwarded for Mr. John James, of San Antonia, Texas, to the Agricultural Department, at Washington, together with a letter stating that Mr. F. Kalteyer, chemist in San Antonia, had found them to contain 32 per cent. of tannin. This sample mislaid or was overlooked until 1878, when it was reported on by the chemist. It was then found to yield 23·45 per cent. of tannin. A fresh sample was also procured, and the tannin estimated in the fresh root with almost identical results, after making due still

* From the "American Journal of Pharmacy," August, 1889.

allowance for difference of moisture. The other constituents reported at that time need not claim our attention at present, further than to notice a considerable amount of starch—18 per cent.

Previous to this publication by the Government, Mr. Rudolph Vœlcker, of Galveston, published an analysis of roots gathered in July, 1874. He found 23·16 per cent, tannin, and proved the presence of crysophanic acid and aporetin. He was not aware of the botanical origin of the plant, but supposed it to belong to the natural order Polygonaceæ.

In 1879, Mr. William Saunders, in his report on Canaigre, stated it was the *Rumex hymenosepalum* of Torrey, and furnished a lithographic plate of the plant in bloom.

At the New Orleans Exposition, 1885–6, in one corner of the section devoted to products from New Mexico were some of these roots, above which was the inscription, "A new tanning material." As will be shown later, this exhibit, insignificent as it appeared, attracted the attention of at least one person.

In 1886, a sample of a root sent to me from San Antonia, Texas, under the name of "Indian Root," was analysed, and the results published under the title of "Yerba del Indio," from the impression that it was the *Aristolochia fœtida* of the Mexican Pharmacopœia. This impression, however, was corrected by Professor J. M. Maisch, in the same issue, page 115.* He suggested, and it has since been found to be correct, that this "Rauz del Indio" was the Canaigre root. That analysis fixed the amount of tannin at 11·66 per cent., but it was found that the root, which was not analysed as soon as received, had commenced to decay, and, later, it was completely riddled by insects. In this respect my experience differed from that of the Government chemist, who found no change after ten years. Soon after the New Orleans Exposition, samples of two or three hundred pounds were sent to Chicago for experiments in a number of tanneries there. Mr. E. C. Denig, of that city, has devoted much time since then to studying this material, from its source in Texas and New Mexico to its application in the tanning of hides.

Canaigre consists of heavy globular and fusiform pieces from two to six inches long and one to three inches in diameter. Externally it is of a dark-reddish colour, becoming, by age, almost black; internally it is from a bright to a brownish-yellow, according to age and amount of exposure to atmosphere, When collected, the roots consist of clusters resembling sweet potatos. They are found near the surface, or sometimes on top of the ground, are rapidly dried, and, at a certain age, cut into small pieces. If allowed to get very dry, they become

* "American Journal of Pharmacy," 1886.

so hard as to resist any ordinary method of cutting. From samples of the whole and clipped roots, kindly furnished me by Mr. Denig, I have found 17·33 per cent. of tannin. This figure is rather lower than that obtained by other investigators, but the deficiency may be explained by my sample containing more moisture. Dr. E. Sturcke has found a total of 28·57 per cent. of tannin.

The ground root is at present used in a number of tanneries, and has been found to more closely resemble Gambier in its action than any other tanning material. An extract has also been prepared and used which contains from 40 to 60 per cent. tannin, and it is thought that in this form it will probably replace Gambier. Should the hopes and efforts of those who are engaged in the development of this material be realised, we shall have a source of tannin which is said to be inexhaustible, and which will be the means of either bringing a better Gambier into this market, or of driving it entirely out of use here. It is said that the dried and ground root can be delivered in any part of the United States at a price not exceding 3 cents per pound.

Thus after a delay of 20 years this root has reached that stage of practical application when a useful future may be predicted for it, and the persistent efforts of the past four years have every prospect of being rewarded." * * * *

The Director of the Royal Gardens, Kew, having obtained a specimen of the roots from the United States National Mnseum, submitted it to Mr. W. N. Evans F.C.S. for analysis, and his report is as follows :—

Mr. W. N. Evans, F.C.S. to Royal Gardens, Kew.

Dear Sir,

Your favour of the 12th came duly to hand, with sample of Canaigre roots, and I am glad to be able to enclose analysis of the same, which shows that the roots will be a valuable addition to our list of tanning products. It is very curious to notice the different results of previous analyses, but it is useless attempting to test any product until it is sufficiently dry to grind or pulverise.

I presume from its growing in Texas, that it will flourish in suitable soil in any temperate climate, and may be grown to any extent with but little attention. I trust it may be a great blessing to the trade, as just now our principal materials, such as Valonia and Gambier, are scarce and dear.

Of course it has yet to be tried in the tannery but there appears to be nothing, so far as we can see, that should prevent its full value being realised.

I remain &c.

(Signed) W. N. EVANS.

D. Morris, Esq.

(Enclosure).

Tanner's Laboratory, 66, Stackpole Road,
Bristol, March 17th 1893.

Copy of Analysis of Canaigre root received from the Royal Gardens, Kew.

Tannin	37.48
Organic matter	11.20
Water	12.07
Ash	0.20
Woody fibre	39.05
	100.00

Remarks. Original moisture very considerable, as much as 55.85 per cent. Had to be dried to grind. The above analysis taken in this condition yet shows 12.07 per cent of water.

The following extracts are taken from Bulletin No. 105 University of California Agricultural Experiment Station, and are by Mr. E. W. Hilgard Director and Chemist:

" The Canaigre is indigenous to southern California as far north as the Kern Valley, so far as known; it is more particularly at home, however, south of the Tehachipi mountains, in the sandy lands of the San Fernando and San Bernardino plains: also on the Gorgonio pass and on the border of the Colorado desert generally; also no doubt in the valleys of San Diego. Outside of California it is apparently most abundant in Arizona, and southern New Mexico, and in north western Texas; it reaches to Utah and the Indian Territory. Its abundant occurrence in New Mexico led to the establishment of a factory for preparing the tanning extract for shipment instead of the root, and similar establishments were proposed for Arizona. But it has quickly become apparent that the supply of the wild plant would soon become exhausted, and that in order to place the industry upon a permanent basis it would be necessary to grow it as a regular crop. Now that the value of the root for the tanning of fine leathers has been fully established, and a market is assured, the only remaining question is that of the best conditions for its cultivation, as to soil, climate, and mode of culture to ensure profitable returns.

As regards climate, it should be understood that in California the plant starts its growth from the root with the first rains, in October or November, reaches bloom about the end of January, or first part of February, perfects its seed about April, and dies down to the ground in May; varying according to the winter temperature, and the advent of spring warmth. It is not therefore to be expected that it will make a normal growth where the ground freezes in winter, although like some

other culture plants it may be able to adapt itself to a different régime so long as the root is not frosted. We have not as yet any definite data as to what amount of winter cold will kill the root

As to soil, the presumption is that, like other root crops, it will do best in light soils, which it seems to occupy naturally by preference. Yet it has made a good normal growth in the black heavy adobe of the Economic Garden at this station, which however has, of course, been kept well tilled. It appears therefore to be quite adaptable to a variety of soils; the New Mexico station reports "adobe soil" as its preferred ground, but the term is evidently used in a different sense, as designating the loams of the character actually used for building adobe houses; a use for which the average adobe of California would be inapplicable.

Propagation. The easiest way to obtain a stand of the canaigre is to plant the smaller roots obtained in harvesting the crop. These develop rapidly, and according to the observations made at the New Mexico station will, when irrigated, quadruple their weight in one season; they will also in that case produce seed abundantly. One marked peculiarity of the roots, remarked upon by all reports, is that when cut, the upper portion (the one having the root crown) will reconstruct its lower part by new growth which differs markedly from the older by its smoothness. Propagation by seed seems to occur quite rarely in Arizona and New Mexico, as well as in California south of the Tehachipi range. But with more abundant moisture as in the "Weed patch" of the Kern valley (an ancient channel still receiving some seepage) and at this station when early rains occur, the fallen seeds sprout abundantly; and we will the coming season be enabled to ascertain what advantage there may be in propagating by seed instead of devoting a portion of the root crop to replanting. The seed must be sown quite shallow and lightly covered, when the ground is moist.

When irrigated the roots will stand close planting, say nine or ten inches apart in rows thirty inches apart, as in the case of sugar beets, since the roots are on the average somewhat smaller than sugar beets; the average crops willl be somewhat less in weight

Canaigre roots will sometimes remain in the ground during several successive dry years without injury, growing as soon as the needful moisture comes. This indicates the mode of keeping the roots for seed, viz: in dry sand or loam, in a dry place. When kept in piles for any length of time the canaigre root heats and spoils even quicker than the sweet potato.

Cultivation will, it must be presumed, not differ materially from that of the sugar beet, except that there will be no thinning needed; and as in the case of the latter, only a few cultivations will be required to subdue the weeds, and to maintain good tilth in the rainless summer climates in which it is at home. The Arizona station prescribes that "to secure the "largest yield planting should be done before the first of "October (in that climate) and the soil moistened and plowed; "then the roots dropped and covered with a potato planter "adjusted to suit the case. The crops should be irrigated from "four to six times and some implement of the two horse culti-"vator style run through the rows after each irrigation."

The amount of irrigation that should be given will of course vary according to the kind of soil and the natural moisture. As it seems that too much water depresses the tannin percentage, while increasiug the weight of the crop, there is evidently a certain measure that cannot be profitably exceeded, but which must be established by experiment. At this station, with an average rainfall of 23 inches during the winter, irrigation is certainly not called for.

Harvesting can be done as in the case of beets, by means of a "digger" such as is used for potatoes and (in a modified form) for the sugar beet. A crop of ten tons per acre from roots planted as indicated above and properly cultivated for one season is probably a fair average expectation.

But it is not necessary to harvest the root at any particular time, since it not only does not deteriorate by remaining in the ground but actually increases its tannin-percentage about the time the buds for the season years growth begin to move; as has been shown at the Arizona station. In fact the tannin appears to increase to a maximum at the end of the second season, after which it seems to remain constant; at least we have never found a higher percentage in roots older than two years, than in the two year-old. As the roots do not die or decay, it is optional when to dig them. At this station, when a clump that had grown from a single root was dug up after remaining undisturbed for eight years, not a decayed root was found, and the whole weighed 13 pounds. The older roots are much darker in colour and have a rougher surface than new roots, which are as smooth as sweet potatoes.

The canaigre thus differs from almost every other crop in that its harvest can wait for the convenience of the farmer, within wide limits. It is not certainly known as yet, whether any root increases in weight after the second year; our impression is that the increase is slight if any, and that it will not be

found best to defer harvesting after the second year. But we have found that there is no material difference in the tannin contents of the full grown root whether the plant is resting, blooming or seeding.

Marketing. As has been stated above, the canaigre root, while an excellent keeper when kept very dry, spoils readily when kept in mass. It cannot therefore be shipped green to any great distance, but must for distance shipments be either dried or converted into extract.

Drying is costly and laborious, and after all of somewhat uncertain result on the large scale. Tannin is a very easily decomposable substance; drying at a high temperature will injure it as well as when, at too low a temperature the drying progresses too slowly and permits fermentation to start up. Even small roots cannot be dried whole without serious deterioration; it is absolutely necessary to slice them, very much as beets are sliced for sugar making. But when machinery is once procured for slicing, it seems better to go a step further and end all fear of deterioration by preparing the extract, which will keep indefinitely.

The cost af a factory plant for preparing the extract need not be large, but it must be managed by competent hands.

According to the data obtained by the Arizona station, agreeing well with the averages obtained by us, three tons of green roots will make one of dried, or one-half ton of extract; or six tons of green root will yield one ton of extract, averaging from 60 to 65 per cent. of tannin, and, therefore very well capable of shipment to a distance so far as value is concerned.

* * * * * *

Comparing the canaigre with other tanning materials given in the table, it will be seen that the bark of the black wattle and golden wattle exceed the root in tannin contents. The question then arises whether, supposing the two materials to be of equal quality for tannin purposes, it will be more profitable to grow canaigre than the wattles. An approximate comparative estimate for the crops will therefore be of interest.

Here the time element comes in as an essential factor. It takes eight or ten years to mature a wattle plantation; the yield of bark per acre is for the first eight years (for the black wattle), estimated at about twelve tons, besides possibly 100 cords of wood, available for firewood. This estimate is based upon the planting of 400 trees per acre; close planting being desirable in order to secure long trunks. The bark is worth

about $25 per ton in Australia. At the end of eight years twenty acres will yield 240 tons of such bark (value $6,000) plus 2000 cords of trunk wood, which wood barely brings one dollar per cord in this country. Therefore $8,000 represent the gross returns for the twenty acres as against about $2,050 of cash outlay plus rent of land, interest, wear and tear &c. The clearing of the land for replanting would cost from $40 to $50 per acre, so that $800 to $1,000 must be added to the above estimate of cost; leaving the net returns for the eight years about $5,000.

On the other hand we would have in the case of canaigre, estimating on the cost of the cultivation of sugar beets, and allowing for the differences in the operations required, about $8,000 for the eight years, plus again the rent of land, interest and wear and tear. In return for this, at the rate of ten tons of roots per acre, there would be obtained 1,600 tons of fresh roots worth $8,000 upon the basis of the price of beets only (viz $5, per ton). According to the prices as above estimated the outcome of the eight years culture would be very nearly the same for black wattle and canaigre. But the returns from the latter, unlike the former, would bear interest during the eight years; and the wide climatic range of the canaigre renders it much more widely available.

This presupposes that the tannin of both plants will in commerce bring about the same prices. But it is well known that the acacia tannin is not available for the tanning of fine leathers, for the reason that it tends to render them somewhat brittle. But if, as we are now informed, the tannin of canaigre (rheo-tannin) is well adapted to *all* purposes, including the finest leathers, it will go far towards throwing the balance still farther on the side of the root as against the trees, particularly where the price of labour and capital is high.

Ash composition and nitrogen contents of the canaige root.

In its draft upon the soil ingredients, the canaigre differs from the beet and most other root crops in drawing much less heavily on potash, but more heavily on magnesia, and on phosphoric and sulphuric acids. The following table illustrates these points. The ash analysis of the root grown at this station, was made by Mr. P. W. Tomkins, a student in the agricultural laboratory. That of the sugar beet, placed alongside, is an average from European data:—

Ash composition of Canaigre root.

	Canaigre.	Sugar Beet.
Silica ($S_1 O_2$)	3.89	3.50
Potash ($K_2 O$)	28.04	46.40
Soda ($Na_2 O$)	2.27	9.60
Lime (Ca O)	8.16	6.30
Magnesia(Mg. O)	16.73	8.80
Br. ox. manganese ($Mn_3 O_4$) ...	.98 ...	...
Per-oxide of iron and alumina ...	2.45	1.10
Phosphoric acid ($P_2 O_5$) ...	18.19	14.30
Sulphuric acid ($S.O_3$)	13.16	4.70
Chlorine	6.43	2.60
	101.40	100.40
Excess of oxygen due to chlorine ...	1.40	.57
	100.00	99 83
Percentage of pure ash in dry root...	4.48	4.35
,, ,, crude ,, ,, ,, ...	4.79	5.44
,, ,, carbonic acid in crude ash	5.20	20.00
,, ,, total nitrogen in dry root	1.93	.87

A partial analysis reported from the Arizona station, while confirming the greater demand for phosphoric acid by canaigre as compared with the sugar beet, assigns to the former twice as much potash as to the latter, and does not mention either soda or magnesia. While such differences are not unexampled, these data can hardly be accepted as proving them in this case. Roughly speaking, we are probably justified in assuming that for equal weights of crop the cost of replacing the mineral soil ingredients by the purchase of fertilisers when necessary, will be about the same for both crops; while as regards nitrogen, our determination shows that the canaigre draws nearly twice as heavily as the beet, so that a crop of ten tons of fresh roots will take out of the soil nearly 100lbs of nitrogen per acre. In regular culture, it should, therefore, probably be alternated with leguminous crops, that enrich the soil in nitrogen.

Sericulture.—In August last a letter reached me on this subject from Mr. W. H. Crowley of which the following is a copy:—

J. M. Wood, Esq.

Sir,—Any product that may be new or novel to Durban I think would claim a little of your attention. Sericulture gives unlimited employment to the working classes of Italy and

Southern France, to say nothing of the vast numbers of people in India, and Japan who raise the silkworm. I have been for several years breeding the silkworm, and have got good results from the first importation of eggs by the Natal Government from Italy. Durban produces the mulberry leaves for 9 months in the year. I have produced coccoons equal in size and strength to the best Italian, yet I regret to say that coccoon raising in Durban is a failure. The silkworm eggs came from Italy; its natural condition is its spontaneous hatching during the months of June, July and August, just the very months when the mulberry trees have no leaves on them for feeding the worms. If it were possible for the silkworms to hatch in September or any other summer month, then I feel assured that coccoon raising for export could be undertaken with profit. There are other species of silkworm; I have been informed that the "Iolanthe" breed would suit Durban climate best, as these worms feed on the leaves of the Castor oil plant *Ricinus communis*. I received a few seed that was sent from Kew Gardens to St. Helena, I have one tree which has kept its leaves green all through the past two winters; I have 20 other trees, seedlings from this one, all their leaves were green and plentiful in a very dry and sandy soil all this past winter; this proves that it is possible to raise the Iolanthe silk worm with success; such a success could not be estimated at present.

The Coast lands are doubtless well adapted for the growth of cotton, and for which field labour is constantly required all the year, whilst the labour required for silk culture can be confined to three months per year, the price of cotton being 6d. per lb., and the price of silk 6s.

The difficulty is to obtain this special kind. I have been promised some from St. Helena, to which place the first attempt was a failure, being too long on the voyage. The eggs of the Italian breed may travel safely for a year, but not so with the Iolanthe, the coccoons have to be conveyed quickly as the eggs generate very quickly after hatching.

As you are in communication with gentlemen in India, would you be pleased to make full enquiries, as to the cost of introducing this new variety into Durban, with direct steam service: some 20 or 30 coccoons could be brought as a trial, and if only a couple of pairs could be safely landed the breed would be secured.

I remain, Sir,

Yours respectfully,

(Signed) W. H. CROWLEY.

On receipt of this letter I at once wrote to my correspondent J.Lancaster, Esq., Secretary to the Agricultural and Horticultural Society of India, and on Nov. 6th I received his reply with enclosures as follows :—

Mr. J. Medley Wood, A.L.S.

My Dear Sir,—Your letter of 8th Aug. last is duly to hand. I enclose correspondence *re* the variety of silk producing moth, and also by post a box containing coccoons of the Endi variety, these are said by another person to sometimes take the castor leaves, but I doubt it. From Mr. J. A. Anderson's letter you will see what he says about " Eri " moth to which I think you refer. You will see that the coccoons sell for Rs 45 per maund of about 40—50lbs. which does'nt pay. I will try and get a few coccoons of the Eri moth and send by post. Kindly let me know how the box and contents reach you.

Yours sincerely,

(Signed) J. LANCASTER

Oct. 14th, 1895

The following are the enclosures in Mr. Lancaster's letter.

18/9/95.

Mr. J. A. Anderson to Mr. J. Lancaster.

My Dear Lancaster,—The only worm that will eat castor leaf that I know of is the Eri and it is not worth sending down as the coccoons can only be carded, and are worth about Rs45 per maund, which wont pay the native growers here, so would be useless in Natal. I think I saw it stated on Mookerpies authority that he found ordinary Desi and Cheenee worms did well on castor leaf, but I dont know if it is true. If you write to him he will tell you all about it, and can give you seed, but no use to send it till the cold weather * * *

Yours,

J. A. A.

The following two letters are from the Deputy Collector in charge of Silk Experiments to Mr. Lancaster in reply to his enquiries.

Berhampore, 20th Sept., 1885.

Dear Mr. Lancaster,—My Eri silkworms have just hatched out. I can send you some live coccoons 18 days hence. I think Mr. Anderson meant having seen an article in which I mentioned all kinds of mulberry silkworms feeding on tender leaves of " Peepul " *Ficus religiosa* at their early stages. I have nowhere said the mulberry silkworms eat the castor oil leaf.

Berhampore, 7th Octorber, 1895.

Dear Mr. Lancaster,—I am sending you a box of white Endi coccoons spun yesterday. If you pasted them on to the six sides of a strong wooden box (perforated of course) leaving a space in the middle they might arrive all right in Natal. The moths will come out after a month, and lay eggs inside the box. The hatching of the eggs will take place within 10 days after that.

Yours truly,

* * *

Deputy Collector.

I may say that the tree *Ficus religiosa* or "Peepul" alluded to above as furnishing food for young silkworms is growing in these Gardens, and can be propagated should any demand arise for it. Another tree which is said occasionally to provide food for silkworms is *Maclura aurantiaca*, the "Osage Orange," which is also growing here and could be propagated. Baron F. v. Muller in his valuable work "Extra tropical plants" states: At Sydney Mr. Brady can provide leaves from the Indian variety (of mulberry) all through the year by the removal of cuttings which will strike root almost at any season Mr. Brady also recommends the Cape variety of mulberry, so that it appears that the diffculty experienced by Mr. Crowley may be overcome by the aid of plants already in the Colony. In December the box of coccoons arrived, having come by way of England, the moths had emerged and laid their eggs, but I fear that few if any of them will survive the effects of the voyage. They were at once forwarded to Mr. Crowley.

And now in conclusion I wish to offer my very hearty thanks to all who have in any way contributed to the success of our work during the past year, and also to the members of the Committee for their advice and assitance always so freely rendered.

I have the honour to be,

Gentlemen,

Your obedient servant.

J. MEDLEY WOOD.

DURBAN BOTANIC SOCIETY.

Cr. **RECEIPTS AND EXPENDITURE, 1895.** Dr.

1895.	Expenditure.	£	s.	d.
	Labour	1026	6	6
	Maintenance	199	8	10
	Rations	82	7	0
	Interest	42	0	0
	Col. Herbarium	39	9	2
	Commission	8	7	6
	Printing	15	19	6
		£1413	18	6
	Balance in Natal Bank	709	4	1
		£2123	2	7

1895.	Receipts.	£	s.	d.
	Credit balance Natal Bank 31/12/94	177	18	7
	Produce sold £930 5 6			
	Govt. Grant 700 0 0			
	Col. Herbarium, two years at old amount 80 0 0			
	Subscriptions 234 18 6 —	1945	4	0
		£2123	2	7

MAURICE S. EVANS,
Hon. Treas., Durban Botanic Society.

Durban, 20th January, 1896. Examined, and found correct.

W. MURRAY-SMITH, A.S.A.A. (Eng.), Auditor.

The Botanic Society owes a debt of £700, secured by bond, over the property.

The Government Grant to Gardens is paid to June, 1896, and includes two years' full allowance, thus making a temporary large balance.

The Colonial Herbarium Grant has been paid to June, 1896, but at the old amount of £40 per annum only.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS FOR THE YEAR, 1895,

TAKEN AT THE NATAL OBSERVATORY DURBAN. READINGS 9 A.M. AND 3 P.M.

Reading of Barometer reduced to sea level and 32° Fahrenheit, A light wind has a mean force of 1.00. A fresh wind a mean force of 2.00. 10 corresponds to an overcast sky. Zero to a clear sky.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
Barometer—Highest ..	30·290	30·285	30·356	30 604	30 541	30·555	30·486	30·604	30·603	30·661	30·358	30·273	30 47
Lowest ..	29·611	29·742	29·775	29·770	29·881	29·880	29·825	29·621	29·813	29·734	29·715	29 673	29·75
Mean, 9 a.m.	30·044	30·024	30·096	30·140	30·212	30 305	30·214	30·202	30·186	30·130	30·058	29·998	30·13
Thermometer in shade—	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	
Highest ..	95·7	93 4	88·9	87·6	85·8	80·3	88·7	93·2	90·9	86·2	97·9	94 3	90·2
Lowest ..	59·4	62·7	58·7	56 2	48·8	47·4	48·4	51·3	48·3	48·4	57·8	60·7	54·0
Mean, 9 a.m..	75·5	74·2	73·6	69·7	65·5	60·0	61·8	64·0	67·6	70·1	74·2	76·0	69·4
Mean reading of													
Maximum Thermometer	83·0	82·3	81·3	80 0	77·0	75·1	74·7	76·1	76·9	77·4	82·4	84·0	79·2
Minimum ,,	67·1	67·5	67·3	62·7	58·7	52·7	55·1	55·6	56·9	60·8	65·3	66·7	61·4
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	Total
Rainfall	5·70	10 17	11·10	4·47	1.29	.08	·75	·55	1.63	2·60	1·93	11·23	51·50
	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units	Units	Units.	Units.	Units.
Days on which rain fell	22	18	17	16	11	6	8	7	15	21	19	21	181
Mean force of wind ..	1·12	1·13	1·07	.78	·99	1·07	·92	1·08	1·13	1·22	·99	1·02	1·04
Mean amount of cloud ..	5·90	6·21	5·13	4·47	3·94	2·00	5·42	2.80	4·22	5·74	6·74	5·89	4·87

DURBAN BOTANIC SOCIETY.

REPORT

ON

NATAL

Botanic Gardens

FOR THE YEAR 1896,

BY

J. MEDLEY WOOD, A.L.S.,

Corresponding Member of the Pharmaceutical Society of Great Britain.

CURATOR.

DURBAN:

BENNETT & DAVIS, PRINTERS, 345, WEST STREET.

1897.

DURBAN BOTANIC SOCIETY.

REPORT

ON

NATAL

Botanic Gardens

FOR THE YEAR 1896,

BY

J. MEDLEY WOOD, A.L.S.,

Corresponding Member of the Pharmaceutical Society of Great Britain.

CURATOR.

DURBAN:

BENNETT & DAVIS, PRINTERS, 345, WEST STREET.

1897.

Durban Botanic Society.

COMMITTEE FOR 1896.

President:

B. W. GREENACRE, Esq., M.L.A.

Hon. Secretary:

Mr. J. D. BALLANCE.

Hon. Treasurer:

Mr. M. S. EVANS.

Hon. R. Jameson, M.L.C. Mr. G. Rutherford, C.M.G.

Mr. T. W. Edmonds.

Government Members:

Mr. J. S. Steel. Mr. F. Button.

Curator:

J. MEDLEY WOOD, A.L.S.

REPORT.

Botanic Gardens,
Berea, Durban, January, 1897.

To the President and Committee,
Durban Botanic Society.

Gentlemen,—

I have the pleasure to hand you herewith my fifteenth Annual Report on the work of the Botanic Gardens, It is gratifying to be able to state that during the past year, we have been quite free from damage from flood, frost, or drought, and though the locusts paid us several short visits, no material damage was done. The rainfall for the year as supplied by the kindness of the Government Astronomer has been 39·63 inches, being 8·7 inches less than in 1895; the season has nevertheless been a fairly good one, and the plants in the Gardens have made very satisfactory growth. In consequence of the opening of the railway to Johannesburg, the business of the Gardens has been very much increased, and large numbers of plants have been sent away, entailing a considerable amount of extra work, both to the gardeners and myself, and it has only been by the energy and ability of the staff that we have been able to keep pace with the work; as a matter of course the Garden has been somewhat neglected, and I represented to the committee that more assistance was urgently necessary. I therefore with the consent of the committee advertised in the local papers for a gardener, and though I had numerous applications, I was unable to select one from the number that was likely to be quite suitable for the work. I tried three for a short time each, but none of them were what we required, that is skilled propagators. I therefore wrote to the Director of Kew Gardens asking him to select and send out a suitable man for us, which he has very kindly done, and we expect the new man to arrive here early in January. The time of the gardeners has been so much taken up with attending to the large number of visitors that we have had during the year, that very few plants have been put out into the Gardens, though we have a large number in pots and tins, which ought to have been put out

before now. We hope, however, during the early part of the year to get some of them planted, but we are urgently requiring more space, and it will soon be necessary to clear away some more of the native bush, either at the foot of the Gardens, or at the upper portion near the Observatory, but with the present supply of labour, and the great pressure of other work, we have been quite unable to attend to this, however desirable it may be.

We have long felt the need of a propagating house, and I am pleased to be able to say that during the present year that want will be supplied; the walls are already erected and the superstructure, with boiler and piping, is on board the "Clan Lindsay," now daily expected, so that in a few weeks time, we may hope to have the building in working order.

As stated in my last Annual Report a new Conservatory is very much required, the present building is too small for our stock of plants, and is also sadly out of repair; we had hoped during the past year we should have been able to have had it put in thorough repair, and still look forward to having a larger and more commodious building at no very distant date.

I have been frequently asked by visitors whether a "Guide" of any kind was to be obtained, and as the number of visitors has very much increased, and it is quite impossible for a member of the staff to go round with all, I took advantage of a little comparative leisure in the winter to compile a "Guide to the trees and shrubs." Of course the information given is necessarily in a very condensed form, but it is hoped nevertheless that it may be found useful and interesting. It will be accompanied by a lithographed plan of the ground, on which the position of the trees is indicated by numbers, and also includes indices to both popular and scientific names of the trees. When time can be found for the work it is intended to affix to the plants numbers corresponding with those in the "Guide." This pamphlet will be ready it is hoped during the present month, and can then be obtained at the Gardens at about cost price.

The enamelled plant labels alluded to in my last report give general satisfaction, and it was my intention to have obtained a much larger number, so that one specimen at least of every tree in the Gardens should have a label affixed to it, but in consequence of many of them having been maliciously destroyed, presumably by mischievious boys, I hesitated about sending for more, but as I believe they are the best, neatest, and most conspicuous ones we can obtain, I shall have to send for more in the early part of the year, and we shall be compelled to make an example of the first person who may be detected in damaging them, either with slings, sticks, or otherwise.

My annual collecting trip with wagon was almost a failure. I left in company with E. Ryley, Esq., M.L.A., for Van Reenen, where the wagon was to meet us, and travelled to Nelson's Kop, in the Orange Free State, but the day after leaving I had an attack of dengue fever, which quite incapacitated me for work for several days, and left me too weak to do much in the way of collecting, and I returned earlier than I should have done if I had been in my usual health. I however succeeded in getting a few plants for the Gardens, and for exchange, but by no means as many as I had hoped for.

The locusts which have given so much trouble in other parts of the Colony, have, I am glad to be able to say, spared us altogether ; they visited us more than once, and on one occasion stayed for a few days, but except destroying a few annuals, and eating the leaves of some of the palms, they did but very little damage here ; in other parts of the Colony, and even within a short distance of the Gardens, farmers and planters have not been so fortunate. In addition to killing the young insects, several ways of getting rid of these pests has been proposed, such as spreading disease amongst them by scattering about the swarms the spores of the fungus which kills such numbers of them, shooting them with specially made mortars, and poisoning them with arsenic, and this last method is said to have been very successful when carefully carried out.

On February 20th, a Horticultural Show was held in the Town Hall under the auspices of the Society, assisted by a committee of gentlemen interested in this work ; the Gardens sent a large number of plants, not for competition, and the show was a complete success. It was intended that a similar show should be held annually, but we found that the staff were so overworked that it would have been almost impossible to have given the same time and attention to it at the close of the year, when it was proposed to hold it, as we had done at the commencement of the year. If, however, a separate committee had been formed to carry it out, the Society and the staff at the Gardens would have done what they could to make it a success, and would no doubt be prepared to do so at any future time, if arrangements are made to hold a similar show.

The following publications have been received —

Name.	From.
Kew Bulletin	Director.
Report Royal Botanic Gardens Jamaica ...	,,
,, ,, Trinadad...	,,
,, ,, Ceylon ...	,,
,, ,, Hong-Kong	,,
,, Botanic Gardens, Bangalore ...	,,
,, ,, Saharunpur ...	,,

Name	From.
Report Agricultural Experiment Station of Minnesota	Director.
,, Agricultural Experiment Station of Mississippi	,,
,, Secretary of Agriculture, United States of America	U.S. Government.
,, Secretary of Agriculture, Nova Scotia	Secretary.
,, Museum of Pharmaceutical Society	President.
,, Pomologist, U. States of America ...	U.S. Government.
,, of Chemical Investigations, by E. Merck	Author.
,, Albany Museum, Cape Colony ...	Curator.
,, Botanic Garden and Museum, Berlin	Director.
Bulletins of Botanic Gardens, Jamaica ...	,,
,, ,, Grenada ...	,,
Experiment Station Records U. States of America...	U.S Government.
Chemical Composition of American Food Materials	,,
Canadian Field Peas, by T. Shaw	,,
Forage conditions of the Prairie regions, by J. G. Smith	,,
Oil Producing Seeds, by G. H. Hicks ...	,,
Purity and value of Agricultural Seeds ...	,,
Testing Seeds at Home	,,
List of publications of the Smithsonian Institute	,,
American Blight on Apple Trees	Kew.
Mayflower	Editor.

And the following have been purchased :—Tropical Agriculturist; Farmers' Magazine.

Seeds were received during the year as under :—

	Packets.
Royal Gardens, Kew	35
,, Jamaica	1
,, Trinidad	1
Botanic Gardens, Hong-Kong	18
,, Bangalore	2
,, Saharunpur	42
,, Grenada	3
,, Najpur	3
,, Madras	49
,, New South Wales	1
,, Paris	1
Experiment Station, Kamerunga, Australia ...	2

	Packages.
United States Government	144
L. Cockayne	14
Dr. Schonland, Grahamstown	1
Baron F. v. Mueller, Melbourne	26
W. Buysman, Middleburg	4
Messrs. Reasoner Bros., Florida	16
J. Butt Davy, California	23
Max Leichtlin, Baden Baden	5
Dr. Franceschi, California	15
J. C. Harvey	18
General Lowther, England	3
Messrs. Sander & Co.	1
Messrs. Christy & Co.	1
Mr. A. Buring, Central Africa	1
Major Giles, Richmond	5
Mr. G. H. Wilkinson, Maritzburg	1
Mr. W. Groom, Inanda	1
Mr. R. Jameson, Durban	31
Mr. W. Nicholson, Richmond	1
Mr. M. S. Evans, Durban	1
Mr. W. Bazley, Umzinto	1
Mr. W. J. Dickens, Noodsberg	1
Mr. A. Wagner, Leipsic	7
Mr. F. Button, Durban	1
Mr. Jas. Wilson, East Africa	1
Mr. G. F. Hall, Lidgetton	1
Mrs. Schultz, Durban	1
Dr. Thompson, Gazaland	5
Messrs. Damman & Co., Naples	90
Messrs. Schaff, Shorting & Co.	5
	583

And the following plants were received :—

Messrs. Schaff & Shorting—Bulbs of *Calochortus*, 3 species.

Mr. J. C. Harwey—Bulbs of *Hesperocallis undulatus*.

Messrs. Sander & Co.—

3 *Amaryllis aulica.*	100 *Gloxinias.*
6 *Crinum sp.*	2 *Arum discorides.*
2 *Begonia socotrana.*	2 ,, *aristatum.*
3 *Griffinia hyacinthina.*	2 ,, *palestrinum.*

Hugh Dixon, Esq., New South Wales—

1 *Dendrobium gracicaule.*	1 *Dendrobium bigibbum.*
1 ,, *Kingianum.*	1 ,, *macrophyllum*
1 ,, *caniculatum.*	1 *Cymbidium albuciflorum,*
1 ,, *teretifolium.*	1 *Eria Fitzalleni.*
1 ,, *undulatum*	1 *Phaius grandifolius* (dead)
1 ,, ,, *Johannis.*	

Agri-Horticultural Society of India, Madras—

3	*Dendrobium nobile.*	1	*Denarobium moschatum.*
3	,, *formosum.*	1	,, *suavissimum.*
2	,, *Farmeri.*	6	,, *densiflorum.*
2	,, *fimbriatum.*	1	*Aerides odoratum.*
12	*Vanda Roxburghii.*	12	*Vanda teres* (dead)

Mr. Albert Wagner—

100	*Cocos Weddelliana.*	1	*Sabal Adansonii.*
2	,, *campestris.*	3	*Livistona rotundifolia.*
2	*Geonoma gracillis.*	1	,, *altissima.*
2	*Phœnix canariensis.*	2	,, *Hoogendorffii.*
2	*Rhapis aspera.*	2	*Chamaerops excelsa.*
2	,, *humilis.*	2	*Areca sapida.*
5	*Kentia Forsteriana.*	200	*Cycas revoluta.*
200	*Azaleas* (assorted).	250	*Camellias* (assorted).
5	*Kentia Mooreana.*		

Mr. Jas. Wilson—20 Mangos varieties.

Botanic Gardens. Mauritius, *per* Mr. Bijoux—

40	*Orchids* 5 (dead).	2	*Maranta zebrina.*
4	*Hymenophyllum* (diverse).	2	*Pandanus.*
9	*Manihot* (cuttings).	2	*Hedychium.*
1	*Alpinia.*	12	*Gloxinia.*

During the year 1895 we received 307 plants and 800 packets of seeds, with the following results:—

PLANTS.

Dead on arrival	19
Died afterwards from effects of voyage	50
Planted in Gardens	83
Still in Pots	138
Already in stock	17
	307

SEEDS.

Failed to germinate...	214
Germinated, but died afterwards	70
Distributed	82
Already in stock	200
Still in pots or planted in Gardens	190
Annuals and weeds	37
	800

Packages of plants were sent away for exchange during the year as under :—

Royal Gardens, Kew	...	1 box containing	14	plants
„ Mauritius	...	4 cases „	113	„
E. M. Holmes, London	...	1 box „	5	„
J. Moir, Central Africa	...	1 case „	40	„
J. Wilson, East Africa	...	1 „ „	24	„
Dr. Thompson, Gazaland	...	1 „ „	12	„
A. Wagner, Leipsic ...	...	6 „ „	244	„
Sander & Co., St. Alban's	...	2 „ „	460	„
„ „	...	1 „ „		seeds
Botanic Gardens, Manchester		1 „ „		plants

Packets of seeds were sent away as under :—

	Packets.
Botanic Gardens, Mauritius	14
„ Bangalore	25
„ Maritzburg	22
„ St. Petersburg	25
Scharff & Shorting, California	25
Reasoner Bros., Florida	26
Jackson & Perkins	25
J. C. Harvey, California...	26
C. Gross	25
S. Tomayana, Japan	25
Damman & Co., Naples	2
To 30 correspondents in the Colony	370
	370

And to 27 applicants in the Colony, 81 lots of Sweet Potato cuttings, in 3 varieties.

The following free grants of plants have been made during the year : —

Government Asylum, Maritzburg ...	£10	12	1
Ladies College, Durban	1	5	6
Durban Corporation	3	5	0
Baptist Chapel, Durban	2	1	6
	£17	4	1

The following plants have flowered for the first time in the Gardens during the year :—

	Received From
Acacia spectabilis	Damman & Co.
Agati grandiflora coccinea ...	„
Alchornea ilicifolia	Kew
Aloysia lycioides...	Damman & Co.
„ *urticoides*	„

Amoora Rohituka	Saharunpur
Aristolochia elegans	Mr. Labistour
,, *gigas Sturtevantii*...	Port Elizabeth
,, *ridicula*	Mr. Labistour
Cannas (50 varieties)	Damman & Co.
Cienkowskia Kirkii	Sander & Co.
Clerodendron siphonanthus ...	Madras
Clusia alba	Mauritius
Cobaea macrostemma	Max Leichtlin
Costus igneus	Sander & Co.
Crescentia cujete...	Saharunpur
Cypripedium Chamberlaynii ...	Sander & Co.
Dendrobium Farmeri	H. Strauss
Ehretia serrata	Sahrunpur
Erythrina crista-galli	Damman & Co.
Ixora picturata	Agri-Horticultural Society of India
,, *venusta*	,, ,,
Jacquinia aurantiaca	Reasoner Bros.
Lettsomia sp.	Damman & Co.
Lycium chinense	,,
Melia azederach (continuous flowering)	J. C. Harvey, California.
Passiflora mannicata	
Physalis glabra	Acclimatisation Society of California
Physostegia virginica alba ...	Damman & Co.
Roupelia grata	Agri-Horticultural Society of India
Stevia odorata	Damman & Co.
Thunbergia grandiflora alba ...	Kew
Turnera elegans	Damman & Co.

Amongst the plants enumerated in my last report as having been put out in the Gardens, the following have since died, or been found to be mere weeds, for which we have not sufficient room in the Gardens :—

Delphinium cardinale	*Pueraria Thunbergii*
,, *puniceus*	*Rumex Barlandieri*
Genista tinctoria	*Sisynchrium bellum*
Hypericum assyrion ?	*Trifolium rossidum*
,, *tetrapteron*	*Vicia grandiflora*
Isatis tinctoria	,, *serratifolia*
Poterium sp.	

"Sweet Potatos."—The 3 varieties imported from Florida have done very well indeed with us, and a large number of the bines have been distributed to applicants. The tubers are not so good a colour as those commonly grown here, but have a

different flavour, and are at any rate a change from those that we have been accustomed to for so long. One of the varieties yields a very large amount of bines, and will no doubt be found useful as a forage plant, as well as for its tubers, as cuttings of the bines may be freely taken without apparently diminishing the yield of tubers. Another variety produces but a small quantity of bines, which reach only a very short distance from the root, but the produce of all of them is very similar, and which of them may be most profitably grown may be a matter for experiment.

Atriplex spp.—Seeds of several species of this genus have been repeatedly received from Australia, chiefly from the late Baron F. v. Mueller; they have been tried here, plants have been raised and put out in the Gardens but have invariably dwindled away, and eventually died off; numbers of packets of seed have been given away to applicants, but I have not heard of a single case in which any of the plants have been successfully reared, and think it most likely that they will not succeed in Natal, except it may be in an alkaline soil, of which we do not appear to have much in the Colony. I have, however, received from the United States Government, seeds of another species of this genus, *Atriplex canescens*, of which Mr. F. Lamson Scribner, the States Agrostologist, says:—"I send you by mail to-day a small sample of seed of one of our native forage plants, *Atriplex canescens*, James, locally known as "Shad Scale," "White Sage," or "Sweet Sage," It was formerly one of the chief reliances of the cattle men on the arid plains from Western Texas to Arizona, but has now become almost extinct, occurring only on steep cliffs and in protected situations where cattle and sheep cannot reach it." This plant will have a fair trial here and will be noticed in a future report.

Desmodium tortuosum, "Florida Beggar Weed."—In September I received from the same gentleman a packet of seed of this plant about which he says that it is "A wild forage plant highly esteemed in the subtropical portion of the United States. It produces a fodder of fine quality in large quantities, and grows best on sandy soils containing lime. On cultivated lands it grows often 8 to 10 feet high. The haulms, though woody, are eaten by cattle and working stock of all kinds. Beggar Weed makes an excellent green manure. In Florida it is extensively used as a renewer of worn lands. It promises to be a plant of much agricultural value in the warmer countries." This seed was sown at once on receipt, and the plants are now from 12 to 15 inches high, and growing vigorously, seed will most likely be obtained from it for distribution, and I quite expect to be again told that "cattle will not eat it," but farmers must surely understand that cattle require a little management

before they will take to a plant so different from their ordinary food plants as these are, but a little care and trouble will soon overcome the difficulty, as I know from personal experience.

Rheea or China Grass.—(*Boehmeria nivea*).—So many enquiries have been made during the last few months about this plant that I venture to take over from the "Tropical Agriculturist" for November last, the following article, which contains information for which I have been frequently asked. I would at the same time strongly recommend those who are inclined to cultivate the Rheea, to first make sure that our native species, *Urera tenax*, called by the natives *um-Bogozembe*, will not be a more profitable plant to cultivate than the Rheea:—

SOME PARTICULARS REGARDING RHEEA CULTIVATION.

(Being extracts from a report to the Government of India by James Montgomery, Esq., Kangra).

PROPAGATION.

(1) By seed.—This course must be adopted in some cases, when the germ of the plants has to be carried over great distances; but probably much disappointment will attend the result. To obtain the seed great care is requisite, and a favourable atmospheric season. For this purpose young spring shoots should be carefully reserved in a well sheltered position. These plants should receive special care and be well manured. During the rainy season they must be kept thoroughly drained, and after that has passed, the ground should be carefully loosened round the plants. If the rains come early in October, a fair amount of seed may be obtained; but, as far as I can judge, no amount of care can ensure success, so much depending on the season, a dry one being most favourable for the full development of the seed. The only method of sowing which I found successful, was on a gentle hot-bed under glass, in March and April; the seed scattered over the surface. covered very thinly with sifted earth, and carefully shaded from the sun, until the plants were about three inches high, when sunlight may gradually be admitted. When sufficiently strong they should be planted out a foot apart every way.

(2) By cuttings of the stems.—The stems should be spring grown ones, allowed to ripen well and not cut until duly ripe. Then divide the ripened portion of the stem where the cuticle has turned fully brown into short lengths, each including three eyes or buds, cut a quarter of an inch below the the bottom bud and as much above the top one, and plant with the centre bud level with the surface If the weather be damp and cloudy, they will readily strike root, otherwise they will require shading for a week or ten days, the soil being kept moist. As

with seedlings, I find a foot apart every way the most advantageous distance, as very few shoots are thrown up the first year.

(3) By divisions of the roots.—This is by far the most advantageous and profitable method. The plants for this purpose should be three or four years old. After gathering the spring crop, dig out each plant carefully, and remove the earth from the roots. I generally put the mass of roots into running water for a short time; this cleanses them thoroughly and enables the gardener to see his work clearly. The tuberous portions of the roots will be found to show a large number of eyes similar to those on a potato. From these carefully separate portions, each containing five or six eyes; let the cuts be clean and reject all fibrous and decayed matter. Expose these sets to the sun for a couple of hours to dry the surface of the wounds, and then plant six inches deep, and at the full distance of four feet apart every way. In this way two good crops will be obtained from them the first year.

THE SOIL AND SITUATION FOR PLANTATIONS.

A rich loam suits the plants best, but they will grow in any kind of soil, provided that a full supply of moisture be available, combined with thorough drainage. The latter is emergently (*sic*) required, particularly during the rainy season, as should the land be retentive, and become swampy. the plants will decay in a very short period.

If the land be poor, a liberal supply of manure is requisite, otherwise the stems will be short and weak, yielding scarcely any fibre. In no part of upper India can the plant be successfully cultivated unless water for irrigation be available during the dry season. The facilities for obtaining an ample supply of water, combined with the moderate temperature at all seasons, renders this district particularly favourable to the plant.

CULTIVATION.

Should the land have been stocked with seedlings or cuttings, then in the following spring, after having reaped the first crop of available shoots, every other plant should be transferred to fresh ground, and put down at two feet apart. The following year the same course should be pursued, taking up each alternate root and replanting at four feet apart. After this the plants may well remain undisturbed for four years, hoeing well between after each crop, clearing away weeds, irrigating moderately during the dry season, and supplying manure where neceesary. The only manure I had at command has been vegetable, consisting mainly of the leaves and wood portion of the plant itself, and of tree and vegetable leaves stored up for the

purpose, with which I mix a considerable amount of wood ashes. With the aid of this only, I have kept plants growing in the same spot for upwards of six years; but consequent on the then very crowded state of the ground, the stems were short and very weak. I would therefore recommend a thorough removal after four years, the land to be then well ploughed, cleaned and manured.

GATHERING THE CROP.

The period of reaping will vary slightly according to difference of season. I find that in this district three good crops can be relied on each year—the first during the latter end of April, the second about the commencement of August, and the third about the end of November; the weather here during the remainder of that month is not sufficiently cold to keep back the new growth, und should the young shoots appear above ground early in January, the forests (*sic*) which are usual at that period seriously injure them and lessen the spring crop. My own experience indicates that the stems should be gathered as soon as the cuticle shows a clear brown colour for about one third of the length. At this stage, if the soil be good and the plant healthy, the stems will be clean from butt to point, the leaves of a rich dark green above, and pearly white below, and the branch buds, at the axle of each leaf-stalk just showing. If gathered earlier than this, I find the connection of the fibres very weak, and that a considerable portion separates in the operation of scraping the peel. If allowed a further growth, the axillary branches will have been thrown out, which will cause breakages at every point both in peeling and cleaning.

The average height of stems grown here has been six feet, after cutting off the soft portion at the top. In gathering I supply each coolie with a sharp pruning knife. With this they cut the ripe stems close to the butt; these are removed in bundles by boys to the nearest manure pit. Here the boys cut nine inches off the top and pass one hand with a gentle pressure from top to butt; this removes all the leaves. The stems are then placed in clean water, from whence the peelers remove them and separate the peel, which is again thrown into water, from which it is withdrawn as wanted by the men who clean it. These lay three or four strips of peel on a flat board, scrape it a few times on the inner side from butt to point, then turn it over and repeat the scraping, which removes the cuticle: it is then hung up, or thrown on clean grass to dry.

Taking the distance of four feet apart for fully bearing plants, an acre will contain (allowing for paths and water channels) 3,000 plants; more than this I find to be too crowded and to increase labour, while lessening the actual yield during

a four years period. Thus planted the yield will be a steadily increasing one, and the plants will not show any deterioration.

From repeated experimental washings, I have deduced the following average proceeds from 1,000 freshly cut 6 feet stems

Weight	Lbs.	Per Cent.
As cut	286	
When dried	77·5	= 27
Fresh peel	83	= 29
Dry peel	21·5	= 7·5
Fresh wood	203	= 71
Dry wood	56	= 19·5
Clean dry fibre	18·7	= 6.5
Water	208·5	= 73

If larger stems, from 7 to 8 feet, be taken, the average is less in the weight of peel, but in the outturn of clean fibre it is slightly greater. With small stems, from 3 to 4 feet, the percentage of peel is markedly greater, but the return of fibre is barely 35 per cent. Moreover the extra labour in cutting, peeling, and cleaning these small stems is an important consideration.

The crop cut during the rainy season will always contain a large percentage of water, and that of clean fibre be formed rather less, the fibre being also softer than at other periods of cutting. This I consider due to the fact that at this period the resinous matter in the plant is in a more diluted state, and consequently a greater portion of it is removed during the process of washing and scraping the peel

I have already expressd my opinion against the use of either immature or small stems as likely to give a result inferior both in quality and quantity. Yet I am fully satisfied as to the advisability of not only sorting the crop, as cut, according to length of stem when necessary, but I would further recommend that the peel from all stems of five feet and upwards should be divided into two, and the fibre from the upper and lower portions kept distinct. If cultivated as I suggest, the difference in length of the stems at each cutting will be found very small, the monsoon crop always giving the longest stems.

* * * * * * * * * * *

In earlier estimates, calculating on closely planted crops, and stems four to five feet, I was cautious to restrict my estimate to 750lbs. per acre, but five years additional experience has shown me that with proper open cultivation 1,000lbs. per acre may be fully assured.

Manihot utilissima—"Cassava."—In my Report for 1892, page 13, I alluded to this plant, and gave an extract from the

" Florida Despatch " showing the value placed upon it there as a food for domestic animals and human beings, but no one in Natal cares to give it a trial. When Mr. Bijoux, Curator of the Botanic Gardens, Curepipe, Mauritius, visited Natal, amongst other things that he brought for us were cuttings of nine different varieties of this plant, all of which are growing well, some of these varieties yield a large and coarse root, and are used for feeding cattle and horses, others are used by the labourers on the estates, while the finer varieties give a smaller crop, but the roots are of a superior quality, and are extensively ueed by the planters, and I add here a description of the manner of using them which I obtained from Mr. Bijoux, who tells me that the plant is largely grown on nearly every Sugar Estate in Mauritius.

NOTES ON THE CULTIVATION OF " MANIOC " (" MANIHOT UTILISSIMA.")

This plant is largely grown at Mauritius, first for food, and secondly for starch. It succeeds well in all kinds of soil, but prefers a light sandy one. There is in Mauritius no particular season for planting the cuttings, but they are planted all the year round. When the plant reaches maturity the leaves turn yellow and fall off, and this is the time to dig it. In no case should the roots be dug for use if they have begun to grow, because the starch has lost its properties and the roots become watery. To uproot the plant, the stems are seized and gently shaken, pulling them upwards until all the roots are out. The roots are then cut off and the stems put in a shady place to be replanted in about a month's time. If immediately required to extract the starch, or to eat the roots, they should be peeled, the whole of the skin being removed. In no case should the root be used without the skin being removed. To extract the starch the cleaned roots are reduced on a rasp to a pulp, and then allowed to drop into a large bath or pail, three-quarters filled with water. The pulp is then pressed through a strong linen cloth, with the addition of water, until all the starch has passed through the cloth. The water with the starch is then allowed to settle until all the starch has been deposited, and the water becomes clear, which will be in about 24 hours, the water is then gently poured off, and the starch is found at the bottom of the vessel. It is then collected and laid upon clean linen, or plank, till dry, when the starch is ready for market, and 4 pounds of roots will yield about $1\frac{1}{2}$ pounds of starch. When required to be made into biscuits, the pulp is simply collected and pressed in a bag, and no water is put with it. After 12 hours under the press, the pulp is removed from the bag and placed in a basket in which clean linen has been

laid. A sheet of iron about a foot square and $\frac{1}{4}$ inch thick is heated to a good heat, it is then well cleaned with a brush, and the pulp is spread upon it. After four or five minutes the cake is turned and when sufficiently cooked is finally removed. In Mauritius this is called "Manioc Gallette," and is eaten by children in the morning with milk or coffee. The cake is made as follows:—The pulp is prepared as for the "Galette" and mixed with a little sugar and butter to taste, placed in moulds of three inches square, and one inch thick, and then baked till brown in an oven. There is a factory at Mahebourg, expressly to make Manioc biscuits, and to extract the starch, and I can say that it is in a very prosperous condition; there is a very large demand for its biscuits. Every sugar estate cultivates large quantities of Manioc for its oxen; the variety cultivated for this purpose is a very large one, the roots weighing sometimes as much as 12 to 15lbs. The horses and ponies are also fed with it on many estates.

Zeea Mays.—I received from Mr. Thos. Christy, of London, five seeds of a mealie which is said to reach over 12 feet in height, and to bear cobs 22 inches in length. These seeds were planted on the 22nd of November, and at the close of the year were 6 feet in height, and looking exceedingly well; every care will be taken of them, and if found to be really an acquisition, seeds will be distributed to applicants when ready.

Widdringtonia Whytei.—This is the large "Cedar" from Nyassaland, of which we obtained a few seeds some years ago, and subsequently on Mr. Whyte's visit to Natal he kindly gave us a larger quantity. A number of plants have been reared and sent to different parts of the Colony for trial, and in the midlands at any rate, some of the plants have done very well, but with us, though they grow very well in pots or tins, are taken by white ants soon after being put out, and we have lost in this way every one that has been planted. In this connection I give below a recipe for protecting trees from these pests. We have not tried it yet, as I am at a loss to know what to substitute for the "dekamali" gum, an ingredient about which I have at present no information whatever.

PAINT USED AGAINST WHITE ANTS.

During a brief visit to the Native State of Gondal, the writer gave this subject considerable attention. There seemed to be no doubt that His Higness the Thakore Sahib, by his enlightened action in this matter, had effected a radical improvement. The trees throughout his State were all painted as described, and not a single tree could be found showing the mud encase-

ments so characteristic of the presence of white ants. And very possibly, as a consequence of the care bestowed on these trees, they were healthy and vigorous while those in neighbouring States were sickly and badly attacked by white ants. In consequence of these observations the writer asked for information as to the composition of the paint which had been used. He was informed that the red colour was merely to indicate the fact that the trees had been painted, and that it was for the most part red ochre. The useful ingredients were said to be as follows :—

1 part dekamali gum (the resin of *Gardenia gummifera*).
2 parts asafœtida.
2 parts bazar aloes.
2 parts castor oil cake.

These are well pounded, mixed, and kept in water for about a fortnight. When thoroughly united, and what may be called decomposed into a thickened compound, water is added in order to bring it to the consistency of paint, and the colouring matter is then added. The mixture is now ready for use, and if thoroughly applied for about two feet will check not only the attacks of white ants, but of red ants and other insect pests. Its effect will last for two years or more. The cost of the preparation comes to about 4 to 5 rupees per 100 trees. But according to the information furnished from Gondal, "al" refuse possesses no special properties ; from other parts of India the reputation is very general that it is of great value; the red ochre added to the above preparation may not only be useful as indicating the trees that have been painted but give a useful consistency, if it does not serve to mechanically hold the other ingredients.

The paint was prepared according to the directions given by the "Economic Reporter" to Government, and applied to a number of mango, shisham, and siris trees on the Sirsawa road that were badly attacked by white ants. Before applying the paint the coating of earthy matter deposited upon the trunks of the trees by the ants was removed, and in all instances where the earthy deposit was entirely removed, the paint has, so far, had the effect of preventing further attacks by the ants upon the trees. In a few cases the men employed upon the work of painting, overlooked strips of earthy deposit lying in hollow channels on several of the trunks of trees operated upon. The strips of earthy deposit overlooked were painted over together with the cleaned portion of the trunk, but the ants took no notice of the paint when applied to the outside of their earthy runs, and therefore made use of the strips that were left as passages to communicate with the upper portion of the

trunk, where they continued their attacks as before the application of the paint. The experiment has therefore proved that the paint is an effective against the attacks of white ants if applied directly to the bark of attacked trees, but that it is of little use if applied without first entirely removing all earthy ant deposit from the trees.

The trees experimented on were 29 full grown specimens averaging from $2\frac{1}{2}$ to $3\frac{1}{2}$ feet in diameter. Ingredients for paint to the value of Rs. 13-3-0 were purchased, but as the full quantity was not used, the actual cost of painting the 29 trees operated on was Rs. 7, or at the rate of 3 annas 10 pice per tree nearly. I therefore consider the paint too expensive for extended use on large sized trees, but its cost would not be prohibitive for use on young trees or saplings. In districts where it is found exceedingly difficult to establish the commonest and hardiest of roadside trees, owing to the presence of white ants, the paint, would, I feel sure be most useful.

The following list of weeds of cultivation commonly found in the colony may be of some use, and can be continued in future reports, especially if farmers would be good enough to supply me with recognisable specimens of weeds which may appear on their ground, together with any information they may possess about them, so that at some future time a fuller list with more complete information may be published.

WEEDS OF THE FARM AND FIELD.

Acalypha Ecklonii. (Baill). Natural order, *Euphorbiaceae.*—A small plant abounding in some places in the midlands, but not specially troublesome. Called by the natives *i-Boza.*

Aizoon canariense. (Linn). Natural order, *Ficoideae.*—A prostrate herbaceous plant found all over South Africa, especially in cultivated ground. The ashes are said to abound in soda.

Argemone mexicana. (Linn). Natural order, *Papaveraceae.*—Originally a native of Mexico, but now widely distributed in waste places in most tropical, and sub-tropical countries. The seed possess acrid narcotic, and purgative properties, and have been used medicinally. In Natal this plant seems to be almost confined to the coast districts

Achyranthes aspera. (Linn). Natural order, *Amarantaceae.*—An upright herbaceous plant, found chiefly in the coast districts, but reaching also some distance inland; its barbed seed vessels, which adhere to passing animals, would cause it to be a great nuisance in the sheep-rearing counties.

Amarantus paniculatus. (Linn) Natural order, *Amarantaceae.*
,, *spinosus* ,, ,, ,,
,, *Thunbergii.* (Moq.) ,, ,,
These three plants are all called by the natives *im-Buya*, and are well known to all farmers ; they spread themselves with great rapidity from seed, which they produce at a very early age. *A. spinosus* was probably introduced into Natal with forage, about the time of the Zulu War, and is particularly troublesome, on account of the thorns with which it is furnished. *A. Thunbergii* has been used by both colonists and natives as a sort of spinach, and is probably still so used.

Aneleima Dregeana. (C.B.C.) Natural order, *Commelinaceae.*
,, *equinoctiale.* (Kth.) ,, ,,
Troublesome weeds in the coast districts, the former bearing pink, the latter yellow flowers. Like all plants of the order found in Natal, they are very difficult to eradicate, as they will continue to grow even when pulled up by the roots, and left in heaps on the ground.

Bidens pilosa. (Linn). Natural order, *Compositae.*
,, *bipinnata.* (Linn). ,, ,,
The first named plant is the well known "Black Jack" or "Vegetable Tick," the second one is probably an introduction from N. America, where it is indigenous. So far it has only been found near the Inanda Mission Station. The flower-heads of *B. pilosa* have been used in the colony as a remedy for diarrhœa, and it is said with good effect.

Ceratotheca triloba. (E.M.) Natural order, Pedalineae.—A weed in waste ground, bearing pretty foxglove like flowers, and having a rather unpleasant scent. It is not particularly troublesome.

Chenopodium ambrosiodes. (Linn). Natural Order, *Chenopodiacae.*
,, *Botrys* ,, ,, ,,
,, *murale* ,, ,, ,,
The first and last mentioned are found in the coast districts, up to at least 2,000 feet above sea level, the second named one, appears to be confined to midland and upper districts, and is commonly found in old mealie fields. All three are introduced plants, and the first named is used by the natives as a kind of spinach

Coleotrype natalense. (C.B.C.) Natural order, *Commelinaceae.*
Comelina (several species) ,, ,,
Coleotrype natalense is quite confined to the coast and midland districts, but several species of *Commelina* are found from the coast to the top of the Drakensberg, and in the coast districts at least are very troublesome on account of the great difficulty

experienced in eradicating them, as they will grow vigorously even if pulled up by the roots and turned completely over on the ground. They are often called "Pigweeds," but it is unsafe to feed pigs, especially young ones, on their leaves and stems, as is often done, as they appear to have some deleterious properties, though the underground stems of some of the species yield starch, and are said to be used as food.

Cuscuta africana. (Willd). Natural order, *Convolvulaceae.*— This is a plant belonging to the same genus as the well known "Dodder," and is probably quite as destructive to the plants upon which it affixes itself; it should therefore be carefully destroyed whenever found in the vicinity of cultivated lands. Another species, *C. cassythioides*, which is parasitical on trees, is known to the natives as "Makumkumka."

Cyathula cylindrica. (Moq.) Natural order, *Amarantaceae.*—
„ *globulifera* „ „ „
„ *lappacea* „ „ „

These plants bear their flowers clustered together in cylindrical spikes, or in globose heads, and are extremely annoying to passing travellers from their habit of clinging persistently to the clothing, by the hooked bristles with which the seed vessels are furnished, and for this reason should not be permitted to grow on sheep farms. The two first named are found from the coast to about 3,000 feet above the sea, the latter one in the upland districts only. The second on the list is known to the natives as "Sinana" and is used by them medicinally.

Cynoglossum enerve. (Turcz). Natural order, *Borragineae.*
„ *micranthum.* (Desf). „ „

Weeds found on hillsides and moist places throughout the colony, and whose seed vessels are more or less thickly covered with hooked bristles, and therefore very undesirable occupants of sheep farms. Specimens of wool have been sent to me in which were found numbers of the seed vessels of one of these plants.

Cyperus retusus. (Nees). Natural order, *Cyperaceae.*— A pestilent weed, found in cultivated ground in most parts of the Colony, but especially I think in the coast districts. This plant belongs to the family which are commonly called "Sedges." The base of the stem is bulbous, and not unpleasantly scented. It propagates itself with great rapidity from long thin roots or stolons which proceed from the main stem, and its rate of growth in the summer season is astonishing. To rid the ground of this pest it is necessary to pull it up by the roots and carry it away, simply hoeing or cutting it off above the ground is of no use, as in a few days' time it will be as

vigorous as ever. It is I believe more properly called *C. esculentus*, and the small tubers have been used as a substitute for coffee, and as food in the south of Europe.

Datura Stramonium. (Linn). Natural order *Solanaceae.*—An introduced weed now found at all altitudes in the colony, but perhaps most plentifully near the coast. Simply considered as a weed it is not very formidable, but it contains an alkaloid called "daturin," and all parts of the plant are more or less poisonous. It has been used medicinally in neuralgia, epilepsy, and asthma.

Echinospermum capense. (D.C.) Natural order, *Borragineae.*—A plant closely related to the *Cynoglossums*, and likely also to prove a pest on sheep farms; the chief difference between the two genera appears to be that while the seed vessels of *Cynoglossums* are covered all over with the hooked bristles, those of *Echinospermum* have them at the margin only, but in either case the purpose of distributing the seeds is equally well accomplished. The seed vessels in both genera consist of four little nuts, which are affixed to a central column, from which at maturity they are easily detached, The flowers of the above named species are either blue or white, and are produced in great abundance.

Eclipta erecta. (Linn). Natural order, *Compositae.*—A common tropical weed, found in waste places, and ill-kept ground all over the coast districts, but not extending far up country. The flowers are yellow, and the plant is not specially troublesome.

Erigeron canadense. (Linn). Natural order, *Compositae.*—A weed belonging to the same order as the last-named one and found in waste and cultivated lands all over the colony. Except for the great profusion in which it occurrs, it is scarcely worth naming here, as it is very easily got rid of. The name signifies "soon becoming old," and is very appropriate, as the plant flowers very early, and has a worn out appearance. It is a common weed in all tropical countries.

Euphorbia sanguinea. (E.M.) Natural order, *Euphorbiaceae.*—A common weed all over the colony, found usually on walks, in damp places, or in slight shade. It is a native of Tropical and South Africa, but the natives do not appear to have any distinctive name for it. The flowers are an interesting object for microscopical examination.

Euphorbia pilulifera. (Linn). Natural order, *Euphorbiaceae.*—A tropical weed found on the coast lands only, and probably introduced. It is not in great abundance, and is only enumerated here, as it is used medicinally both in Natal and at Home, and the dried leaves are an article of commerce.

Gnaphalium luteo-album. (Linn). Natural order *Compositae.*
„ *purpureum* „ „ „
„ *undulatum* „ „ „

Weeds appearing sometimes in great profusion, the foliage being covered with woolly down, the first named is also a native of Great Britain, and prefers moist ground: like the Erigeron, and belonging to the same order, they are only formidable on account of their great numbers, and the rapidity with which they spread themselves.

Gomphocarpus physocarpus. (E.M.) Natural order, *Asclepiadaceae.*
„ *fruticosus* „ „ „

The first named is a coast plant, the second is only found in the up-country districts, especially in the vicinity of Ladysmith. They are easily got rid of, and only alluded to here, as both species may eventually become of economic value, for the fibre contained in their stems, and the cottony substance which is attached to their seeds, which has been used for stuffing cushions, etc., etc.

Gomphrena globosa. (Linn.) Natural order, *Amarantaceae.* —A pestilent weed, common in tropical, and sub-tropical countries, and in Natal almost or quite confined to the coast districts, it flourishes well amongst grass, and is a great nuisance when present in quantity on grass lawns.

Hedyotis Heynei. (R. Br.) Natural order, *Rubiaceae.*—A low growing, much branched plant found chiefly in the midland districts. I should scarcely have thought of alluding to it here, but for the fact that on a recent journey through the Noodsberg district, I found it in great abundance in some Kafir gardens where it occupied almost the whole surface of the ground, and recognised that it might become a most annoying weed, it is a native of Natal only, the flowers are small and white, the leaves linear, and few, and the branches numerous.

Hydrocotyle asiatica. (Linn.) Natural order, *Umbellifereae.* —A prostrate plant with reniform, or cordate leaves, usually found in moist places all over the colony, it is easily eradicated, and though it belongs to an order containing many poisonous plants it is itself quite harmless.

Lactuca capensis. (Thb.) Natural order, *Compositeae.*—A well known plant, common all over the colony. It is closely related to the garden lettuce, but in outward appearance very different, for the lettuce has become so altered by long ages of cultivation that it is not quite certain from which species it originally sprung. *Lactuca capensis* very probably possesses narcotic properties which are most abundant when in flower, or in seed.

Lantana spp. Natural order, *Verbenaceae.*—These plants, which are so common on the coast lands, were probably introduced in the earlier days of the colony, and are now quite acclimatised. In some parts of India, and Ceylon, they grow with great luxuriance, and quite take possession of waste and uncultivated lands. By some they are thought to be a great nuisance, while others think that they are rather of benefit to the land than otherwise, by keeping down other, and more troublesome weeds, and improving land which has become impoverished. In Natal they have been attacked by a parasitic or suctorial insect, which in a very short time destroys them wholesale.

Leucas martinicensis. (R.Br.) Natural order, *Labiatae.*—A common tropical weed, not worth further notice at present.

Milla borbonica. (Baker.) Natural order, *Liliaceae.*—A bulb bearing weed with white flowers, formerly known as *Allium fragrans.* It is a native of Mauritius and Bourbon, from which place it has no doubt been imported into Natal. It is found in great profusion in cultivated lands, spreads with great rapidity, and in Mauritius is said to be very troublesome.

Nicandra physaloides. (Gaertn.) Natural order, *Solanaceae.*—A half shrubby plant bearing large and pretty bell shaped flowers, with its fruit enclosed in the enlarged bladder-like calyx, in the same manner as the Cape Goosebery (*Physalis sp.*) hence the specific name. It is a native of Peru. but has become almost naturalised in Natal, and quickly takes possession of unoccupied ground. The scent of the crushed leaves is somewhat unpleasant.

Oenothera macrantha. (Sellow). Natural order, *Onagrarieae.*—One of the "Evening Primrose" family, a common tropical weed, whose native country appears to be uncertain. Though sometimes growing in great abundance in waste ground, it is quite easily got rid of.

Oxalis corniculata. (Linn.) Natural order, *Geraniaceae.*
,, *semiloba.* (Sond). ,, ,,

These plants are usually known as "Sorrel" and are common all over the colony; the first named is also an English weed; the second is peculiar to South Africa and is occasionally found with double flowers. The natives know it as (um-Swempe) and the tuberous roots are said to be useful as a vermifuge, while the leaves of most of the species of the genus contain a certain amount of acid, and have been used medicinally.

Parthenium hysterophorus. (Linn). Natural order, *Compositae.*—A much branched herbaceous plant, bearing numerous small white flowers, and growing to two or three feet high.

Hitherto I have only seen this plant in the vicinity of Verulam, where for many years past it has luxuriated in waste places and by roadsides. It is a native of Tropical America, and has evidently been accidentally introduced into Natal, probably from Mauritius where it abounds. The leaves have been used medicinally as a febrifuge.

Portulaca oleracea. (Linn). Natural order, *Portulacceae.*—The common "Purslane," which has become naturalised here, it is somewhat difficult to eradicate. as the succulent stems and branches retain life for a considerable time, and should be carried from the ground after being hoed up. It has antiscorbutic properties, and is frequently used as a salad.

Richardsonia scabra. (St. Hil.) Natural order, *Rubiaceae.*—A most troublesome weed, which in the vicinity of Durban appears to be greatly on the increase. It bears small white flowers, in few flowered heads, which are enclosed in in an involucre, and its leaves and stems are covered with fine white hairs, the roots run for a considerable distance, and take almost complete possession of the ground where it is found; it is perhaps most destructive to lawns, from which it is very difficult to eradicate. The roots are emetic, and have been used at Home under the name of "White Ipecacuana," but have been completely superseded by the true drug, which is said to be more active and certain in its effects. Baron Mueller quotes it as "an herb for pastures and hay-crop, appreciated in localities with sandy soil." In Natal, however, it is not much appreciated for that or any other purpose.

Rumex luxurians. (Linn.) Natural order, *Polygoneæ.*—A climber of the "Dock" family, found chiefly at edges of bush, and in newly-cleared land, but soon disappears as cultivation advances.

Senecio pterophorus. (DC.) Natural order, *Compositae.*—A tall weed bearing large numbers of yellow flower heads, and appearing in quantity in neglected ground in the summer and autumn, except for the great profusion in which it occurs, and for the rapidity of its growth, it is not a very great pest.

Siegesbeckia orientalis. (Linn.) Natural order, *Compositae.*—A well known tropical weed reaching from 1 to 3 feet high, with branching stems and yellow flowers. It is quite confined to the coast and midland districts, not very formidable, and has no useful properties.

Solanum nigrum. (Linn.) Natural order, *Solanaceae.*—A very variable, low growing weed, bearing white flowers with conspicuous yellow stamens, berries which are black, when ripe. It has been said to have poisonous properties, but the berries are eaten by children with impunity, and the leaves have

been used in salads in Mauritius. So variable is this plant that it has received upwards of 60 different names, all of which have been reduced to this one species.

Sonchus oleraceus. (Linn.) Natural order, *Compositae.*—One of the "Sow-thistles" cosmopolitan weeds in cultivated grounds, they have all a milky juice, and are sometimes used in salads.

Spilanthes Africana. (D.C.) Natural order, *Compositae.*—Another tropical weed belonging to the same order as the last-named one. It is a low growing plant with conical heads of yellow flowers. It has been called in Natal the "Electric" plant on account of the peculiar pungent taste of the leaves, and is used by the natives medicinally.

Striga coccinea. (Bth.) Natural order, *Scrophularineae.*
„ *Forbesii.* „ „ „

These two plants are called by the natives "i-Sona," and are usually found in cultivated ground. The first-named one bears scarlet flowers, and is the smallest of the two; the other has lighter coloured flowers, and much more conspicuous leaves. Both of these plants are said to be destructive to mealie and other crops, and it is, I think, certain that where they appear in large numbers in cultivated ground heavy crops need not be expected. There are different theories to account for this —one being that they are parasitical on roots of other plants, especially on those of plants belonging to the Order Gramineae, to which the mealie belongs. The other theory is that these plants only appear on land that has become to some extent exhausted by frequent cropping.

The matter has often been debated in Natal, but so far without satisfactory result. The genus Striga includes about 18 species, all natives of tropical countries, and taken as a whole the genus is thought to be a parasitical one, but though I have often examined the plants, I have never been able to discover any organs on the roots, which would lead me to say certainly, that the plants were parasitical, even when they have been gathered in close proximity to a mealie plant I was once gravely assured by a farmer that the "Isona" and the "Horse-tail" (Equisetum) were the same plant in different stages of growth, that is, that the "Horsetail" of this season would be the "Isona" of next season, and when I ventured to assert that the thing was quite impossible, I was told that botanists "did not know everything." Of course the idea is absurd. Of the genus *Striga*, we have in the Colony five species, the two above named being the only ones which are commonly found in cultivated ground in any quantity, though probably in the upper districts *S. Thunbergii*, or *S. elegans*, may be occasionally

seen, but I have never yet seen or heard of their being found in such profusion as *S. coccinea* and *S. Forbesii*, though they are plentiful amongst grass, on the hillsides all over the upper districts. Information on this point would, however, be very welcome.

Xanthium spinosum. (Linn). Natural order, *Compositae.*
„ *strumarium.* „ „ „

The first of these plants is too well known to need any mention here; spasmodic attempts are made to keep it under or destroy it, but it seems still to increase and to extend its area of growth. It may not be generally known, however, that *X. strumarium* has the reputation of being poisonous to cattle, and some years ago I supplied the Government with information which had come into my possession on this matter: an attempt was then made to exterminate the plant, but I note that it is still occasionally met with. It is quite probable that it is only in the early spring, when grass is scarce, that cattle would care to eat it, and then only in its early stages of growth.

In conclusion, I wish to offer my very hearty thanks to the members of the Committee, for much kindness and valuable support in the prosecution of my work, also to all donors of seeds and plants, both within the Colony and abroad, and I have much pleasure in again acknowledging the very valuable services rendered by Mr. Wylie, who has given his time and ability without stint to the work of the Gardens during the busiest year that we have had since I took charge of the work, and probably since the Gardens were first established; also to Mr. Harman and Mr. Rutter, who still remain with us.

I have the honour to be,

Gentlemen,

Your obedient servant,

J. MEDLEY WOOD.

DURBAN BOTANIC SOCIETY.

RECEIPTS AND EXPENDITURE, 1896.

Cr. Dr.

1896.	Expenditure.	£	s.	d.
To	Labour	1072	8	0
	Maintenance	454	7	3
	Rations	88	17	0
	Interest	42	0	0
	Colonial Herbarium	100	19	11
	Commission	10	5	4
	New Propagating House ...	45	0	0
	Passage, Gardener	16	16	0
		£1830	13	6
	Balance in the Natal Bank ...	894	10	2
		£2725	3	8

1896.	Receipts.	£	s.	d
By	Balance in the Natal Bank at 31st December, 1895 ...	709	4	1
	Produce sold	1717	1	7
	Colonial Herbarium	60	0	0
	Subscriptions	238	18	0
	Government grant paid last year in advance			
		£2725	3	8

MAURICE S. EVANS,
Hon. Treasurer.

Examined and found correct, Durban, 22nd February, 1887.
(Signed) W. MURRAY SMITH, A.S.A.A. (Eng.), Auditor.

ABSTRACT OF METEOROLOGICAL OBSERVATIONS FOR THE YEAR 1896,

TAKEN AT THE NATAL OBSERVATORY, DURBAN. READINGS, 9 A.M. AND 3 P.M.

Reading of Barometer reduced to sea level and 32° Fahrenheit. A light wind has a mean force of 1·00. A fresh wind a mean force of 2·00. 10 corresponds to an overcast sky. Zero to a clear sky.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	
Barometer—Highest ..	30·269	30·270	30·271	30·334	30·431	30·481	30·503	30·491	30·453	33·455	30·534	30·417	
Lowest ..	29·652	29·663	29·839	29·800	29·860	29·889	29·882	29·865	29·695	29·715	29·662	29·697	
Mean, 9 a.m...	30·022	30·055	30·069	30·127	30·245	30·233	30·296	30·255	30·153	30·142	30·112	30·051	30·147
Thermometer in shade—	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Year.
Highest ..	95·2	93·2	91·4	87·1	87·6	88·9	88·9	89·4	109·6	107·8	90·2	94·1	109·6
Lowest ..	59·1	64·6	64·5	56·7	52·9	46·8	48·3	52·0	46·5	58·2	54·6	60·5	46·5
													Mean.
Mean, 9 a.m...	76·2	76·5	76·2	70·9	65·5	63.7	62·4	68·0	70·9	74·0	73·1	77·6	71·3
Mean reading of													
Maximum Thermometer	85·4	85·9	85·8	80·6	77·6	76·8	76·8	78·0	80·2	80·9	80·4	84·4	81·1
Minimum ,,	68·6	70·0	68·6	65·0	58·3	56·2	53·3	59·4	59·6	63·6	63·6	68·6	62·9
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	Year.
Rainfall	2·95	3·80	4·28	5·34	1·00	0·11	0·71	1·34	3·89	5·31	4·34	6·56	39·63
	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units.
Days on which rain fell ..	16	14	13	15	11	7	6	12	15	8	19	22	158
Mean force of wind ..	1·16	0·95	0·94	0·94	0·91	0·95	0·94	1·06	1·14	1·11	1·18	0·86	1·01
Mean amount of cloud ..	5·31	5·59	3·86	6·09	2·62	3·15	2·00	3·74	4·47	5·28	6·35	6·95	4·62