Volume VIII. *Whole No. 69.*

THE

West American Scientist.

AN ILLUSTRATED MONTHLY MAGAZINE
FOR REFERENCE AND STUDY.

January 1894.

C. R. Orcutt, Editor and Publisher.

SAN DIEGO, CALIFORNIA.
No. 365 TWENTY-FIRST STREET.

Price 10 cents. *$1.00 a year.*

Entered at the Post at San Diego, Cal., as second-class mail matter.

CANAIGRE.

THIS plant, which is attracting much attention, but of which little is known as yet, is thus discussed in the Stockton Independent.

The new tannin-producing plant, canaigre, which has received but little attention in California, will be a new source of profit to the farmer who will be the first to cultivate it. One reason why it has not received any attention is that it was not known that there was any market for it, but that objection has now been removed.

The Pacific Tannery, in Stockton, is now using the fluid extract of that plant which is made in Peoria, Ill., but would much prefer to use the plant itself if it could be had in good supply. The plant is now raised in Mexico and Arizona, dried there and shipped to Peoria, where the tannin is extracted and shipped thence to the tanneries that use it. That makes it a very expensive material, and the result is that the Pacific Tannery uses it only as a supplementary material to give additional solidarity to its sole leather. If the plant could be had in plenty it would be used in vast quantities, and those who raised it would find it a valuable crop. Until it is raised in large quantities it will not pay to put up a house to dry it and a mill to grind it.

Canaigre is a plant that when growing much resembles the dahlia, and bears a tuber that also resembles that of the dahlia or the sweet potato. It requires a sandy soil and can endure considerable drouth, but is better for having a generous supply of moisture. It thrives in dry, sandy soils, and hence does well in Arizona. Its annual period of growth, according to a bulletin of the Arizona agricultural experiment station, extends over only a few months. It is planted shortly before the winter rains, and appears above the ground shortly after they fall. Its tubers do not mature the first year, but it lives several years and propagates itself, producing new roots and new plants each season, and from these the planting is done.

Professor Hilgard advises that the culture of canaigre be tried on a small scale first, and says the University has offered the seed for several years but that it has hardly been called for. Now that there is a market for it, its cultivation should be tried by those farmers who have soil adapted to its growth as a new

source of revenue. Those who are disposed to try it even on a small scale can get full directions about it from the Agricultural Department of the University of California, or by addressing Professor E. W. Hilgard, the superintendent, at Berkeley.

The proprietors of the Pacific Tannery are making estimates on its use, and will soon be able to announce what they can afford to pay for the green tubers, and will also ascertain what is the average yield per acre, so that farmers may be able to figure on the possibility of cultivating it as a winter crop.

The Pacific Tannery can use hundreds of tons of canaigre every year, and every tannery on the coast will use it as fast as they can get enough of it.

We take the following additional information about this plant from an article in the Los Angeles Herald by L. M. Holt:

This canaigre very much resembles the rhubarb or pie-plant in leaf, and it has a root very much like a beet. It is a native of Chihuahua, Sonora, New Mexico and Arizona, and is found wild in some parts of Southern California.

It is only during the past four or five years that this plant has attracted public attention as a commercial proposition. In 1882 and again in 1884 attempts were made to utilize the canaigre root by making shipments of the wild root to the eastern states and Europe, but the scarcity of the root was an obstacle to success, and the idea of cultivating the plant was not then thought of.

The value of the root consists in the amount of tannic acid it carries, which ranges from twenty-five to thirty-five per cent, and this acid is used extensively all over the world in the manufacture of leather, the present source of supply being oak and hemlock bark, which are getting very scarce, and hence the price of tannic acid is constantly on the advance.

The first shipment of this root in its green state was made to Glasgow, Scotland, in 1887, and after a trial it was stated that one firm there (Martin & Miller) could use 10,000 tons per year at $40 per ton, in its sliced and dried state. At Eddy, in the Pecos valley, in New Mexico, the farmers are cultivating canaigre, and are getting $10 per ton in its green state for all they can raise. The commercial value of canaigre appears to be established beyond all question. Professor Eitner of the Vienna research station says that "canaigre is suited for tanning uppers,

fine saddlery and fancy leathers. It can be used alone or in connection with other materials." He also recommends it for its quickness and thoroughness in tanning, color, beauty, consistency and pliability. He also says that the price, $65 per ton for the dried root, is very reasonable.

Thus far most of the canaigre root product has been gathered by digging the wild plant; but this is unsatisfactory, for so much territory must be worked over to get a limited supply of the root. It has now been demonstrated beyond question that the plant can be successfully cultivated, and that there is more profit in cultivating the crop than in relying on the wild product, which is necessarily so scattered as to take away all the profit in the extra expense of gathering.

At $10 per ton, which appears to be a minimum price for the root crop, the profits are more than double the profits of beet culture, for the yield per acre is about the same, while the cost of production is less and the price per ton is more than double.

The amount of tannic acid used in the world is enormous, and while the demand is increasing the supply is rapidly decreasing. In addition to the supply of oak and hemlock barks, our country is importing large quantities of gambier from the East Indies. During 1891 15,000 tons were brought into this country, which was valued at $100 per ton or $1,500,000. Six tons of green canaigre root will make one ton of tannic acid worth $100, and this acid can be manufactured at a cost of about $10 per ton, and this would make the green canaigre roots worth $15 per ton — three times the value of the sugar beet. It would require 9,000 carloads of green canaigre to take the place of the imported gambier, to say nothing of supplanting the oak and hemlock bark and exporting to other countries.

While canaigre is a dry climate plant, its growth is assisted materially by irrigation; but it is one of those crops where no irrigation is necessary during the dry summer months of June, July, August and September. The plant begins to grow in October and matures in May, after which the roots or tubers increase in size and value during the summer months, but the top dies down and no water is needed.

The canaigre tubers resemble in shape the sugar beet. They are planted one in a hill like potatoes, the rows being thirty

inches apart and the plants from nine to twelve inches apart in the row. A ton of tubers will plant an acre. The plants grow vigorously, and a dozen tubers, more or less, form in each hill; the seed tuber grows in size, and, unlike the seed potato, at the end of the season it is as good as any taken in the hill, only it is larger. The tubers are planted and harvested as potatoes are planted and harvested.

The man who grows this crop can do so with many advantages in his favor. He takes care of his crop during the fall, winter and spring months, using such irrigation as may be necessary and desirable, and when the hot summer months come he is through his work for the season, and he can retire to the seacoast and take the summer easy with no farm cares to worry him. In the following October he can harvest his crop and plant again, getting ready for another season.

It seems as though the market for this crop was practically unlimited and that the business would never be overdone, but of course regarding this the future will decide more definitely. So far as experience goes, the canaigre tuber improves with cultivation. It would be strange if this were not so. The tubers will probably increase in size, the yield per acre will probably increase also, and the percentage of tannic acid will likely increase with cultivation, and possibly choice varieties may come to light which will be an improvement over the native wild tuber now being grown.

The plant likes a loose sandy soil, but does well in the heavier soils if not too heavy.

The canaigre tubers will keep for many years if kept dry, and after they are fully dried they can be moistened and planted, when they will grow as well as the fresh roots.

The canaigre tuber should be planted the same as potatoes, and a potato planter can be used for that purpose. The ground should be well plowed and pulverized, the same as for planting potatoes. The best results are obtained from planting about the first of October, when the soil should be irrigated before planting. The crop should be irrigated occasionally, unless the winter rains come at such intervals as to render irrigation unnecessary. The plant will commence its growth soon after planting if the soil is moist, and will continue its growth all winter, as the cold is not sufficient to injure the foliage.

The cost of cultivation is given as follows:

Plowing and preparing land, per acre	$3 00
Planting with machine	2 00
Irrigating and cultivating	8 00
Digging with machine	2 00
Water rental	1 50
Total	$16 50

This estimate is made for the Arizona climate, but it is believed that with California rains the expense of irrigation can be reduced. The cost of seed will be about $10 per acre, as a ton of tubers is required, and these sell readily at $10 per ton.

MUSEUM NOTES.

The museum in the Golden Gate Park, San Francisco, is daily increasing in size. Professor Gruber, who had charge of the celebrated Woodward Garden collection since 1859, and who now has charge, is well fitted by experience for this position. Among the new features is a life-like rock cod, prepared by Mr. Winston of Pacific Grove; a black-necked stilt; a golden-eyed duck; a wonga-wonga pigeon with its young, and a beautiful crested pigeon of Australia. A scarf made of many thousands of arrow-shaped feathers, from red-shafted wood peckers, made by the Modoc Indians, is also on exhibition, in the same case where the "Buffalo Chase" is shown. The Union flag made of feathers of California birds also excites general admiration. The "Buffalo Chase," noticed by numerous visitors, is a taxidermic work of art, and represents six gray prairie wolves attacking a buffalo. Among the late additions to the Gruber collections are the feet of an ordinary rooster with spurs three inches long. The white pelican, once the attraction in the swan pond, is also on exhibition.

It has been the practical experience of more than one bee owner of San Diego county that it was not profitable to raise bees and fruit together, the proof of their belief being in the removal of bee hives from their orchards.

VISIT TO A PORCUPINE LOCALITY.

FROM a private letter from Dr. Edward Palmer we take the following as likely to be of interest to our readers:

This afternoon I visited the settlement known as Blue Lakes, twenty-five miles south of Shoshone, Idaho, and five miles below Shoshone Falls. At the time of my visit the peaches were ripe, and the porcupine, an animal which in large numbers infests this locality, is very fond of ripe peaches. From the rocky walls of a canyon which surrounds this place constant watch is kept and a gun is on hand loaded and ready for the appearance of Mr. Porcupine.

The habit of the animal is to ascend the tree, march out on the most exposed limbs, where the fruit is ripest, and eat off the part most accessible to him. He is cautious to walk on the large limbs only, selecting for his feast the fruit attainable without risking a fall below.

The various peach trees in this locality showed that they had received numerous visits. Always the ripest and most exposed portion of the fruit had been eaten where any had been touched, leaving about a two-thirds portion on the tree. In no instance did I see that an attempt had been made to eat the side or under part of a peach. The weight of the animal confined him to firm positions and compelled him to take the upper portion only. Any deviation would precipitate him below.

The numerous dead porcupines testified to the fact that they are being rapidly destroyed by fruit growers. I watched an animal go to a tree, then hunted up the owner of the tree, who soon appeared with a gun and brought the would-be robber to the ground. Sincerely yours, EDWARD PALMER.

Botanical Division, Department of Agriculture.

A CALIFORNIA girl, Miss Dorothea Klumpke, has been made a Doctor of Mathematics by the University of Sarbonne, the first degree ever conferred on a woman in France. Miss Klumpke has contributed something to the knowledge of the world by her study of the heavens.

LITERARY NOTES.

LETTERS TO MARCO.

A book of 260 pages, Letters to Marco, has come to our table fresh from the garden and pond of the author, GEORGE D. LESLIE, where with the eye of an artist he has from day to day and year to year watched the habits of plants and birds and fishes in the south of England, and occasionally descriped them in letters to his friend from 1885 to 1893. The author narrates the occurrences of the day with freshness and vigor; not as a scientist or botanist, but simple with the love of the beauty of the various flowers that he cultivates and admires. He never uses the gun, and hopes the pretty birds are all insectivorous and useful to the horticulturist. The volume contains several pen and ink outlines of flowers, birds, etc., with a cut of the author, sent him by the friend to whom his letters are addressed. New York: Macmillan & Co., publishers; price $1.50.

PUBLICATIONS RECEIVED.

The Modern Climatic Treatment of Invalids with Pulmonary Consumption in Southern California. By P. C. Romondino, M. D. cloth; square 16mo; pp. 120. Price 50 cts. Geo. S. Davis, Detroit.

FIFTY-TWO DIVIDENDS.

As a general thing investors are pleased to receive only two dividends a year, and if they are paid with regularity are fully satisfied. When one, however, can receive fifty-two dividends in a year upon an investment of only three dollars, the matter deserves very serious attention.

The Independent of New York for forty-five years has held the first position among the great religious and literary weeklies of the land. It presents features for the comieg year far in advance of any heretofore offered. It has the leading contributors of the world, it prints the best poetry. It has twenty-one departments, edited by specialists, devoted to fine arts, science, insurance, finance, biblical research, Sunday-school missions, health, etc. The Independent is particularly fitted for intelligent people, whether professional men, business men, farmers, and for their families. It costs little and gives a great deal. A subscriber receives fiftv-two dividends a year.

The subscription price of the Independent is only three dollars a year or at that rate for anv part of a year, and a sample copy will be sent to any person free by a ldressing The Independent, New York City.

The following resolution was adopted by the Michigan state board of health, September 30, 1893: "Resolved, That hereafter, consumption (and other diseases due to the Bacillus tuberculosis) shall be included in the official list of 'Diseases dangerous to the public health,' referred to in sections 1675 and 1676 Howell's statutes, requiring notice by householders and physicians to the local health officer, as soon as such disease is recognized."

ESTABLISHED 1882

The Orcutt Seed and Plant Company

Cable Address ORCUTT

SAN DIEGO, CALIFORNIA, U.S.A.

Thirteenth Year. **WHOLESALE PRICE-CURRENT.** **January 1894.**

IN ENTERING UPON OUR THIRTEENTH YEAR, AFTER THE MOST SUCCESSFUL SEASON in our history, we have greatly increased our office and field staff, and added to our former facilities for growing, propagating and shipping. Our collectors search from the seashore to the mountain tops and deserts of the Pacific Coast for plants of promise, and nearly every foreign land is being drawn upon for supplies for trial in our grounds. Southern California possesses every advantage of soil and climate for the proper development of seeds, bulbs and plants.

MEXICO

CHARLES RUSSELL ORCUTT, the well-known botanical explorer and founder of our company, will travel in Mexico during 1894, visiting remote regions in the interests of science. It is expected that many rare and new plants of horticultural merit will be discovered, whereby we shall sustain our well-earned reputation as introducers of NOVELTIES OF MERIT. Our friends are invited to call upon us freely for any of their wants, horticultural or otherwise. As botanists and collectors we invite exchanges in various scientific departments.

CATALOGUES

ILLUSTRATED ANNUAL TRADE LIST free; California Trees and Flowers, thirty-two pages, illustrated, ten cents; Cacti Illustrated, five cents; Golden Hints for California, fifty-two pages, illustrated, ten cents; West American Scientist, monthly, one dollar a year. We do horticultural printing and engraving of every description, and will print an illustrated descriptive retail catalogue of our specialties, including leading standard varieties of seeds, trees, bulbs and plants, at very low rates.

TERMS

ALL GOODS TRAVEL AT PURCHASER'S RISK AND EXPENSE. Four-pound packages can be sent to New York for eight cents per lb by express. Boxes or bags supplied at cost; no charges for packing. All complaints must be made within a week of receipt of goods. While we endeavor to give entire satisfaction to our customers, and guarantee all seeds and plants true to name, we do not warrant their growth or productiveness. **TERMS CASH** except by special agreement.

Orders for seeds should be received by June 1 to insure supply. The coniferous seed crop the ast season was nearly a total failure, but we anticipate an extra heavy yield for 1894.

CALIFORNIA:

Home Offices and Seaport, SAN DIEGO: O. L. Orcutt, M.D., Mgr.
Central Shipping Branch, LOS ANGELES: Lyon & Cobbe, Mgrs.
Experimental Grounds, ORCUTT: C. R. Orcutt, Mgr.

(Principal address for 1894 will be LOS ANGELES, CALIF.)

ROMNEYA COULTERI.

CALIFORNIA WILD FLOWERS

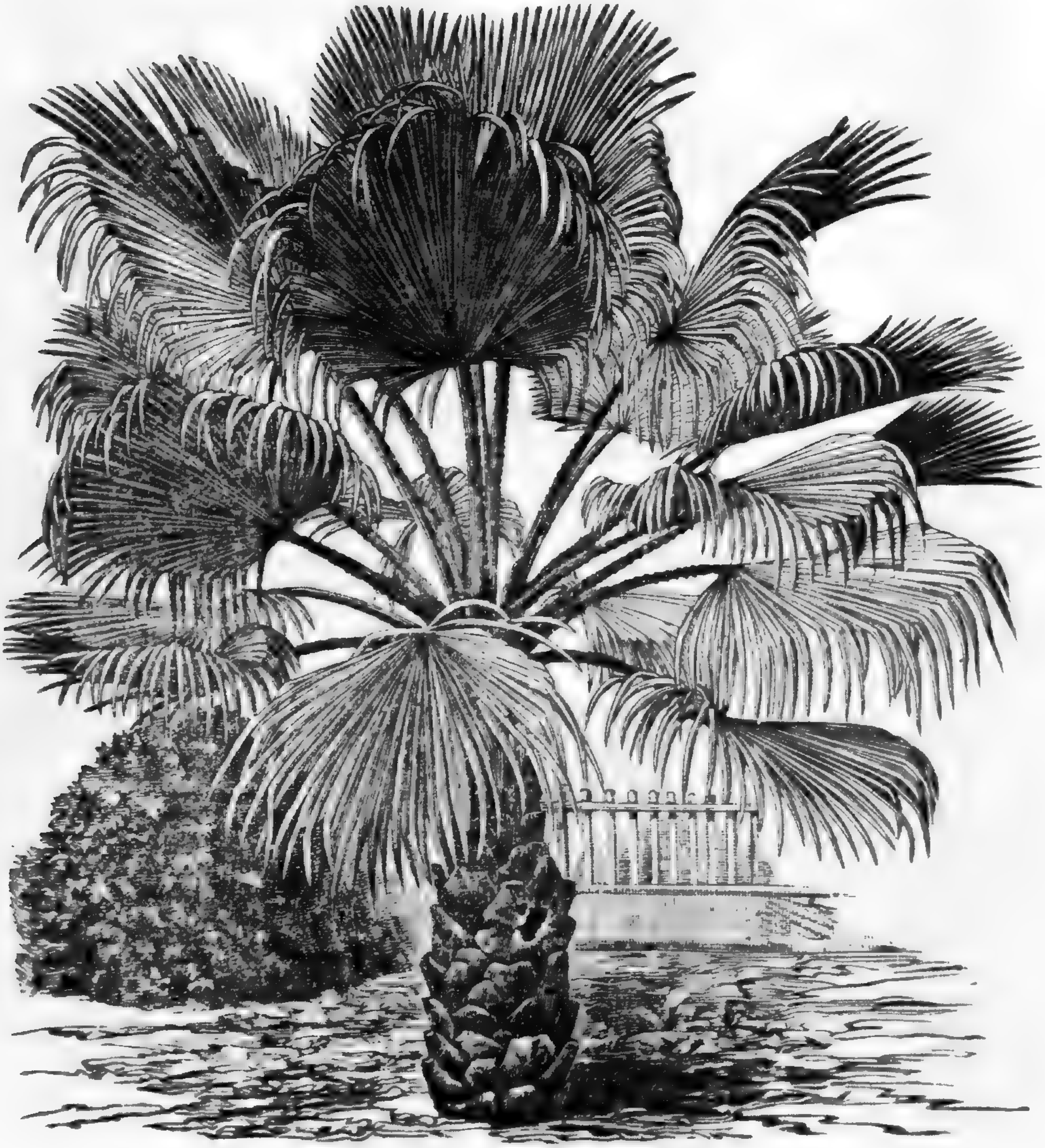
₱ oz.
ABRONIA
$ 0 20 umbellata
60 latifolia
ACTINOLEPIS
40 coronaria
AGAVE
2 — deserti
2 — pringlei
2 — shawii
ANTIRRHINUM
5 — orcuttianum
AQUILEGIA
2 — cærulea
4 — " fl. pl.
2 — chrysantha
4 — truncata
ARGEMONE
20 grandiflora
1 — hispida
20 mexicana
ASTER
9 — orcuttii
CALANDRINIA
10 menziesii
10 " alba
25 " rosea
CASTILLEIA
1 — affinis
2 — foliolosa
CLARKIA
10 elegans
CLAYTONIA
30 perfoliata
COBÆA
35 scandens
—— v. alba
COLLINSIA
30 bartsiæfolia
30 v. alba
20 bicolor
25 v. alba
25 v. atrorubens
20 candidissima
30 carnea
35 v. rosea
COLLOMIA
35 grandiflora
DELPHINIUM
2 50 cardinale
4 — decorum
3 — nudicaule
DICENTRA
2 — chrysantha
DODECATHEON
1 — cleveiandi
EMMENANTHE
3 — penduliflora
ERYTHRÆA
—— venusta pkt $1
ESCHSCHOLTZIA
10 californica
20 v. alba
20 " fl. pl.
20 v. aurantiaca
20 v. compacta
20 v. crocea
20 " fl. pl.
20 v. dentata
20 v. mandarin
5 — v. maritima
20 v. rosea
20 " fl. pl.
20 v. rose cardinal
20 v. sulphurea
20 v. tenuifolia
FOUQUIERA
8 — splendens
FRASERA
4 — parryi
GILIA
20 bicolor
15 capitata
3 — dianthoides
4 — v. alba
30 laciniata
30 liniflora
40 minima
40 nivalis
10 tricolor
LASTHENIA
25 glabrata
LATHYRUS
2 — californicus
2 — splendens
LAYIA
50 elegans
LEPTOSYNE
1 — maritima
LUPINUS
20 affinis
15 densiflorus
15 micranthus
15 nanus
20 v. alba
20 arboreus
20 v. luteus
15 elegans
30 grandiflorus
30 polyphyllus
MIMULUS
2 — cardinalis
2 — moschatus
MINA
1 — lobata lb $10
NEMOPHILA
35 aurita
15 insignis
15 maculata
NICOTIANA
30 glauca
NOLINA
2 — bigelovii
1 50 palmeri
ORTHOCARPUS
6 — purpurascens
PAPAVER
8 — californica
PENTSTEMON
2 — centranthifolius
1 — clevelandi
2 50 palmeri
2 — spectabilis
PHACELIA
60 campanularia
20 congesta
2 — crcuttiana
1 — parryi
20 tanacetifolia
25 whitlavia
PLATYSTEMON
60 californicum
ROMNEYA
1 — coulteri lb $12
SALVIA
1 — carduacea
2 — columbariæ
VIOLA
6 — pedunculata
ZAUSCHNERIA
—— californica pkt $1

CEREUS TUBEROSUS.

CONIFEROUS EVERGREEN TREE SEEDS.

₱ lb
ABIES
$6 — alba
5 — amabilis
1 — balsamea
10 — bracteata
6 — brachyphylla
4 — Canadensis
5 — concolor
3 — *Douglasii
2 — excelsa
5 — firma
4 — grandis
10 — homolepis
6 — *Hookeriana
6 — magnifica
6 — macrocarpa
8 — Mariesii
4 — *Menziesii
6 — *Mertensiana
5 — Nordmanniana
5 — nobilis
5 — pectinata
5 — pinsapo
10 — Sachalinensis
5 — sub-alpina
10 — Veitchii
6 — *Williamsonii
CHAMÆCYPARIS
6 — obtusa
7 50 pisifera
CRYPTOMERIA
5 — elegans
5 — japonica
CUPRESSUS
3 50 funebris
3 — Goveniana
3 — Guadalupensis
3 50 horizontalis
4 — Lawsoniana
2 — MacNabiana
1 — macrocarpa
3 — sempervirens
3 — thyroides (cones)
JUNIPERUS
3 — Californicus
1 50 communis
3 — Virginianus
LIBOCEDRUS
5 — decurrens
PICEA
3 — amabilis
15 — ajanensis
10 — alcoquina
5 — concolor
7 50 Engelmanni
5 — grandis
5 — Menziesii
5 — nigra
5 — *nobilis
10 — polita
5 — pungens
4 — Sitchensis
5 — taxifolia
10 — Yessoensis
PINUS
3 — austriaca
3 — cembra
4 — Coulteri
5 — densiflora
5 — flexilis
2 50 *Fremontiana
3 — insignis
5 — Jeffreyi
2 — Lambertiana
1 — maritima
5 — Massoniana
2 — monophylla
4 — monticola
5 — muricata
3 — Parryana
5 — parviflora
1 — pinea
3 — ponderosa
10 — rubra
2 — Sabiniana
2 50 strobus
1 50 sylvestris
4 — Torreyana
3 — tuberculata
PSEUDOTSUGA
3 — Douglasii
6 — macrocarpa
SEQUOIA
12 — gigantea
10 — sempervirens
TAXUS
5 — baccata
THUYA
3 — aurea
6 — gigantea
3 — occidentalis
2 50 orientalis
TSUGA
6 — Mertensiana
6 — Pattoniana

*Synonyms. (Quoted under true names also.)



WASHINGTONIA ROBUSTA.

(Seed $2 per lb.)

FRESH AND RELIABLE PALM SEEDS

₱ 100 seeds	
	ACROCOMIA
$2 —	sclerocarpa
	ARECA
2 —	alba
——	Bauері
2 50	Catechu
1 —	lutescens
2 —	monostachya
2 —	rubra
60	sapida
	ATTALEA
2 —	compta
2 50	excelsa
	BRAHEA
1 50	dulcis
2 50	*edulis
30	*filamentosa
2 50	*glauca
	CARYOTA
2 50	sobolifera
1 —	urens
	CHAMÆDOREA
1 —	elatior
1 —	elegans
1 50	Ernesti-Augusti
1 50	gracilis
2 —	Schiedeana
	CHAMÆROPS
1 —	excelsa
2 —	Fortunei
1 —	humilis
	COCOS
2 —	Australis
2 —	plumosa
2 —	Weddeliana
	CORYPHA
40	*Australis
	ERYTHEA
2 50	armata
2 50	edulis
	EUTERPE
2 —	edulis
	GEONOMA
1 50	gracilis
	KENTIA
2 —	Australis
1 —	Belmoreana
3 50	Canterburyana
1 —	Forsteriana
3 50	Moorei
	LATANIA
50	*borbonica
3 —	commersonii
	LIVISTONA
40	Australis
50	chinensis
1 50	macrophylla
	OREODOXA
50	regia
	PANDANUS
——	recurva
1 —	utilis
	PHŒNIX
50	Canariensis
40	dactylifera
2 —	*leonensis
2 —	spinosa
2 —	pumilla
1 —	reclinata
1 50	rupicola
1 50	sylvestris
1 —	tenuis
	PTYCHOSPERMA
60	Alexandræ
2 —	Cunninghamiana
	SABAL
50	Palmetto
50	*serrulata
	SEAFORTHIA
60	elegans
	SERENOA
50	serrulata
	STEVENSONIA
4 —	grandifolia
	THRINAX
1 —	argentea
4 —	radiata
	WASHINGTONIA
50	filifera
50	robusta

ORCHIDS

₱100	
	ACINETA
$30 —	barkerii
	ACROPERA
30 —	citrina
30 —	loddigesii
	ARPOPHYLLUM
——	cardinale
30 —	giganteum
30 —	spicatum
	BARKERIA
25 —	elegans
20 —	skinneri
20 —	spectabilis
	BLETIA
22 —	campanulata
	BRASSAVOLA
45 —	cuspidata
25 —	glauca
44 —	pescatori
	BRASSIA
25 —	flava
——	verrucosa
——	*viridis
	CALYPSO
7 —	borealis
	CATASETUM
19 —	laminatum
18 —	maculosum
28 —	tridentatum
	CATTLEYA
——	albida
18 —	citrina
	CHYSIS
28 —	aurea
28 —	bractescens
——	lemminghei
36 —	maculata
	CŒLIA
28 —	baueriana
29 —	macrostachya
	COMPARETTIA
28 —	rosea
	CORYANTHES
——	macrantha
	CYCNOCHES
——	aurantiaca
——	v. grandiflora
——	eggertoniana
——	ventricosa
	CYRTOCHILUM
——	maculatum
	CYPRIPEDIUM
9 —	californicum
8 —	montanum
——	spectable
30 —	yrapeanum
	EPIDENDRUM
18 —	aurantiacum
19 —	brassavolæ
28 —	ciliare
29 —	cinnabarinum
22 —	cochleatum
36 —	cuspidatum
36 —	eburneum
36 —	falcatum
26 —	fragrans
28 —	gracile
——	macrobulbum
——	myrianthum
——	nemorale
18 —	v. majus
26 —	odoratissimum
38 —	oncidioides
40 —	rhyzophorum
22 —	verrucosum
38 —	vitellinum
22 —	v. majis
	EPIPACTIS
6 —	gigantea
	GONGORA
50 —	maculata
	GOODYEARA
6 —	menziesii
	HABENARIA
6 —	elegans
4 —	gracilis
9 —	leucostachys
9 —	unalaschensis
	HARTWEGEA
33 —	purpurea
	HUNTLEYA
——	sp ?
	ISOCHILUS
66 —	coronatus
38 —	graminifolia
	LÆLIA
24 —	acuminata
26 —	v. violacea
28 —	albida
29 —	v. grandiflora
22 —	anceps
48 —	v. alba
76 —	v. sanderiana
76 —	v. shroderiana
76 —	v. stella
21 —	autumnalis
——	v. alba
28 —	v. atrorubens
38 —	v. rosea
36 —	furfuracea
——	gouldiana
38 —	harpophylla
22 —	majalis
	LYCASTE
36 —	aromatica
26 —	deppei
38 —	inodora
——	skinnerii
	MASDEVALLIA
50 —	barbata
	MAXILLARIA
28 —	tenuifolia
	MORMODES
50 —	aromatica
28 —	citrina
38 —	luxatum
38 —	v. eburneum
28 —	pardinum
50 —	in variety
	ONCIDIUM
38 —	altum
36 —	cavendishianum
35 —	ceboleta
22 —	cornicervii
18 —	cruentum
36 —	incurvum
30 —	ornithorinchum
38 —	reflexum
——	reichenbachiana
35 —	sphacelatum
39 —	stelligerum
38 —	stramineum
32 —	tigrinum
38 —	unguiculatum
	ODONTOGLOSSUM
34 —	affine
28 —	anceps
22 —	cervantesii
22 —	v. majus
36 —	v. roseum
28 —	citrosmum
100 —	v. album
100 —	v. punctatum
100 —	v. roseum
26 —	cordatum
28 —	ehrenbergi
——	hastatum
30 —	v. rœzlii
44 —	insleayi
36 —	v leopardinum
80 —	v. splendens
300 —	karvinskyi
300 —	leucochillum
32 —	maculatum
24 —	nebulosum
——	pulchellum
30 —	v. majus
300 —	reichenheimi
30 —	roseum
——	rossi
32 —	v. majus
32 —	victoniense
	PERISTERIA
——	Barkeri
——	cerea
——	tigrina
	SCHOMBURGKIA
——	tibicinis
	SOBRALIA
38 —	macrantha
40 —	v. splendens
	STANHOPEA
38 —	Devoniensis
36 —	martiana
40 —	oculata
——	tigrina
	STENORRHYNCHUS
40 —	aurantiacus
	TRICHOPILIA
40 —	suavis
38 —	tortilis
	VANILLA
42 —	albida
58 —	aromatica
——	planifolia

CACTI

ANHALONIUM

— Engelmanni
12 — Lewinii
—— prismaticum
15 00 Williamsii

CEREUS

— Berlandieri
8 — cæspitosus
15 — chloranthus
40 — cochal
25 — columbrinus
50 — deficiens
25 — Emoryi
25 — Engelmanni
10 — enneacanthus
20 — flagelliformis
—— gemmatus
100 — giganteus
—— grandiflorus
75 — Greggii
100 — gummosus
75 — maritimus
100 — Pacificus
15 — pectinatus
200 — Pringlei
7 — procumbens
20 — rigidissimus
15 — stramineus
8 — triangularis
10 — tuberosus
20 — variabilis
viridiflorum
25 — oxygona

ECHINOCACTUS

12 — bicolor
30 — brevihamatus
25 — capricornis
25 — coptogonus
25 — cornigerus
20 — cylindraceus
— electracanthus
40 — Emoryi
30 — hæxodrophorus
25 — helophorus
20 — horizontalonius
25 — Lecontei
25 — longihamatus
20 — lophothele
—— McDowellii
20 — multicostatus
30 — Orcuttii
100 — polycephalus
50 — pilosus
— p selgerianus
—— saltillensis
15 — Scheeri
8 — s tispinus
15 — Simpsonii
12 — sinuatus
12 — texensis
12 — viridescens
25 — wislizeni

ECHINOPSIS

25 — Eyriesii
15 — Mulleri

MAMILLARIA

80 — Arizonica
8 — applanata
20 — beguini
20 — candida
10 — Childsii
15 — cornifera
15 — dæmonoceas
8 — deciptens
50 — deserti
10 — echinus
15 — echinata
—— " albispina
15 — Goodrichii
10 — Grahamii
10 — lascia (plumoas)
lasciacantha
15 — macromeris
8 — meiacantha
20 — m longispina
15 — minima
—— leona
—— micromeris
—— V. Greggii
50 — phellosperma
6 — pusil a
8 — pusilla Texana
—— pectinata
—— recurvens
30 — semperviva
15 — tuberculosa
20 — wildiana
8 — Wrightii

OPUNTIA

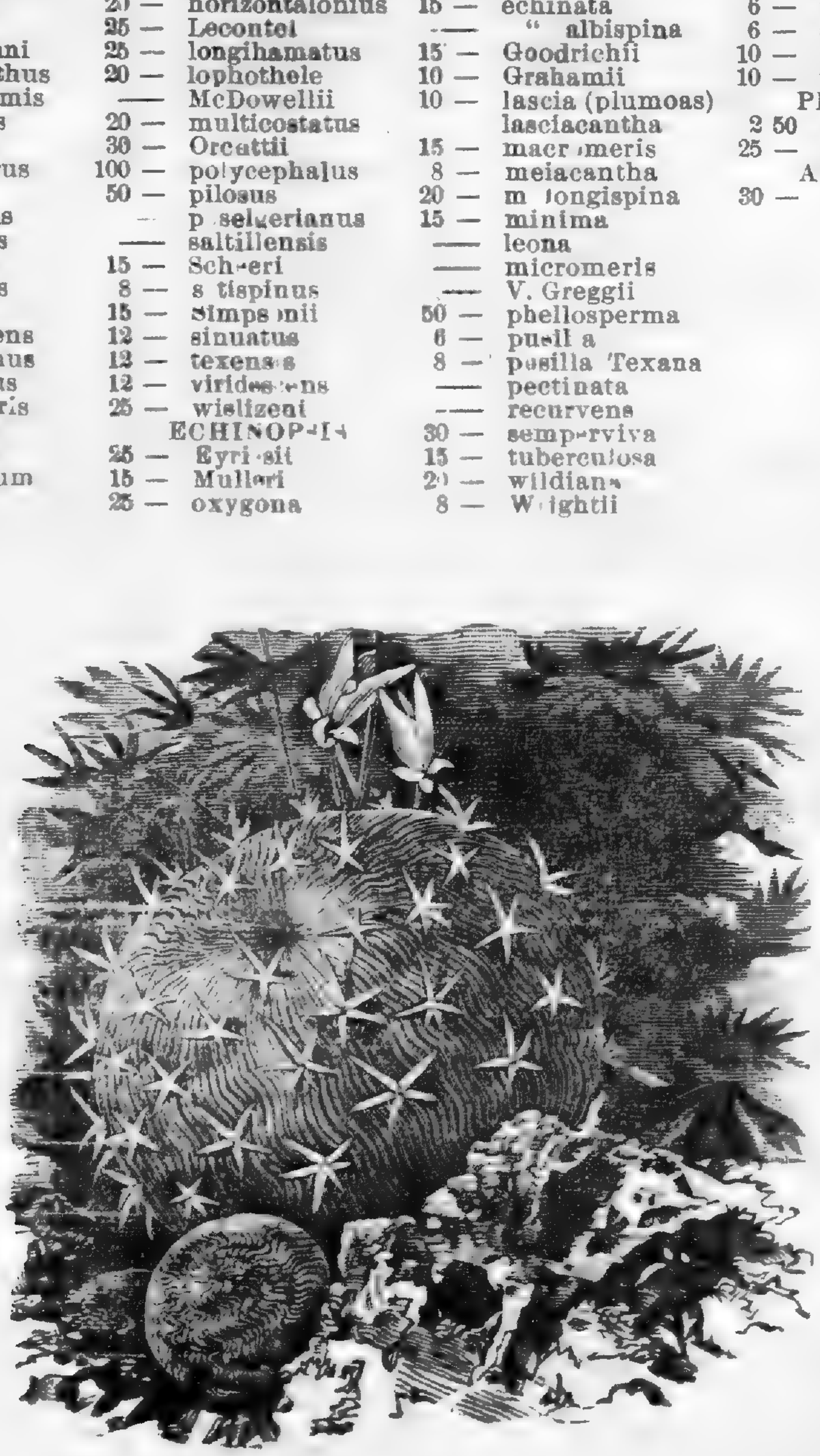
25 — basilaris
10 — Bigelovii
10 — clavata
6 — Engelmanni
10 — Ficus-Indica
6 — frutescens
6 — frutescens major
6 — fulvispina
8 — lurida, cuttings
8 — microdasys "
6 — prolifera
6 — serpentina
10 — tuna-cuttings
10 — tuna-manse

PILOCEREUS

2 50 sargentianus
25 — senilis

ASTROPHYTUM

30 — myriostigma

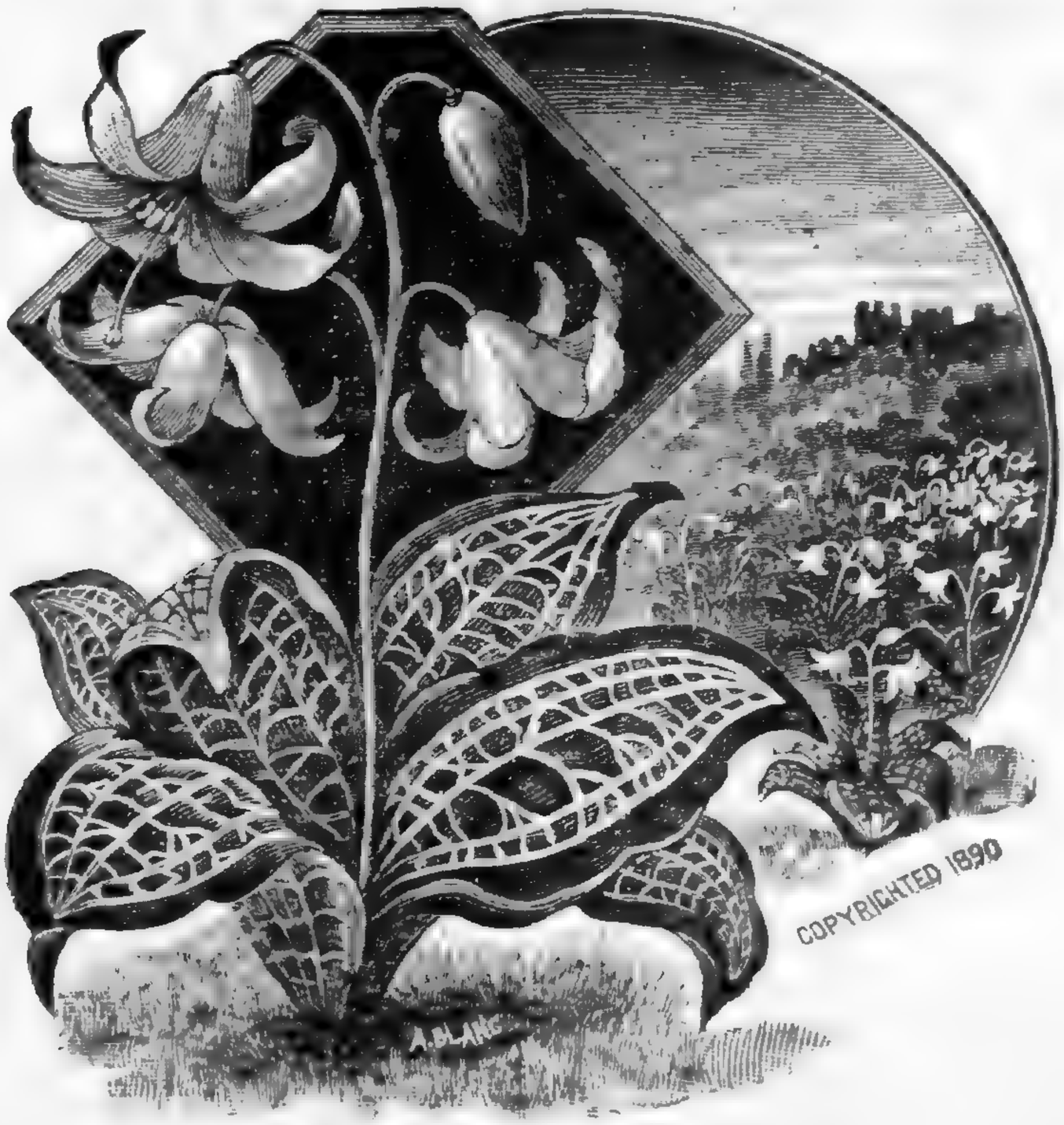


ECHINOCACTUS MULTICOSTATUS.

MISCELLANEOUS TREE AND SHRUB SEEDS

	Per lb
ACACIA dealbata (Leguminoseæ)	5 —
decurrens: black wattle	3 50
floribunda	6 —
latifolia	5 —
melanoxylon	5 —
molissima	—
pycnantha	5 —
ACER (acerineæ)	
macrophyllum	3 50
saccharinum: sugar map'e	2 50
ÆSCULUS flava (sapindaceæ)	2 00
glabra: Ohio Buck-ye,	1 50
AILANTHUS glandulosus (rutaceæ)	1 50
AMELANCHIER canadensis (rosaceæ)	2 00
ARALIA papyrifera (Araliaceæ)	15 00
Sieboldi ℔ 100 seed $1.	——
ARBUTUS Menziesii (ericaceæ)	8 00
unedo: Strawberry-bush	2 50
ARCTOSTAPHYLOS bicolor (ericaceæ)	4 50
glauca: Great-berried Manzanita	1 50
manzanita	3 50
ASIMINA triloba (anonaceæ)	1 50
AUDIBERTIA polystachya (Labiateæ)	15 00
AZALEA (Ericaceæ) oz	
mixed vars.	4 25 ——
arborescens	75 ——
calendula	45 ——
mollis	4 40 ——
Vaseyi	1 — ——
viscosa	50 ——
BUXUS sempervirens (Euphorbiaceæ)	2 50
CALICARPA americana	2 50
CALYCANTHUS floridus (calycanthaceæ)	15
occidentalis: western allspice	50
CARPINUS americanus (cupuliferæ)	2 —
CASTANEA japonica (cupuliferæ)	1 00
vesca americana	35
CATALPA bignonioides (bignoniaceæ)	2 50
speciosa: very hardy tree	5 00
CEANOTHUS integerrimus (rhamnaceæ)	5 00
thyrsiflorus: blue flowering	5 00
CEDRUS atlantica	5 —
deodar	5 —
Libani: Cedar of Lebanon	5 —
CELTIS occidentalis (urticaceæ)	1 50
CERCIS canadensis (leguminosæ)	5 00
CHIONANTHUS virginica (oleaceæ)	4 00
CLADRASTIS tinctoria (leguminosæ)	7 50
CNEORIDIUM dumosum (rutaceæ)	10 —
CORDYLINE australis 100 seeds 40c	——
indivisa " 20c	——
CORNUS florida (cornaceæ)	1 00
Nuttallii	2 50
stolonifera	1 00
CORYLUS americana (cupuliferæ)	1 00
COTONEASTER buxifolia	4 50
CRATÆGUS coccinea (rosaceæ)	4 50
CYCAS revoluta (cycadæ) 100 seeds $2	——
DATURA arborea (solanaceæ)	5 00
meteloides: Jamestown weed	5 00
DIOSPYROS virginiana (ebenaceæ)	1 00
DIRCA palustris (thymeleæ)	3 00
DRACÆNA australis 10 seeds —	——
draco	— ——
indivisa	— ——
nutans	20 —
stricta	20 —
ERYTHRINA crista-galli	5 00
EUCALYPTUS globulus (myrtaceæ)	5 00
rostratus: red gum tree	5 00
FICUS seed per pkt.	
australis	1 —
columnalis	1
macrophylla	1 —

	lb:
FRAXINUS (oleaceæ)	
alba: white ash	2 —
dipetala: flowering ash	6 —
FREMONTIA californica (sterculiaceæ)	10 —
GENISTA juncea: Spanish broom	5 00
scoparia: Scotch broom	5 00
tinctoria: green broom	5 00
GREVILLEA (proteaceæ) pkt.	
Banksii 50	——
Hillii 1 —	——
longifolia 1 —	——
robusta per lb $10 50	1 —
HAMMAMELIS virginiana: witch hazel	5 00
HETEROMELES arbutifolia (rosaceæ)	5 00
ILEX opaca (aquifoliaceæ)	2 50
JUGLANS californica (juglandeæ)	75
cinerea: butternut	50
nigra: black walnut	40
regia: Madeira nut; English walnut	40
KALMIA latifolia	10 —
LARIX Europea: Tryolean larch	3 00
LIRIODENDRON tulipifera (magnoliaceæ)	2 —
MAGNOLIA acuminata (magnoliaceæ)	3 50
grandiflora	3 —
tripetala: umbrella magnolia	2 50
MANDEVILLEA suaveolens	15 00
MELIA azedarach: umbrella tree	2 50
100 seeds:	
MUSA (musaceæ)	
ensete: Abyssinian banana	1 25
lb:	
NEGUNDO	
Californica	5 —
NOLINA Bigelovii (liliaceæ)	20 —
Palmeri	20 —
NYSSA multiflora: sour-gum	2 —
OREODAPHNE: see Umbellularia.	
PHOTINIA	
arbutifolia: see Heteromeles arbutifolia.	
PITTOSPORUM eugenoides	5 00
nigrescens	5 00
undulatum: Australian daphne	5 00
PRUNUS ilicifolia (rosaceæ)	5 00
serotina: black cherry	2 50
PSIDIUM cattleyamun (myrtaceæ), 100 $15	3 00
QUERCUS agrifolia (cupuliferæ)	5 00
chrysolepis: golden live oak	5 —
dumosa: chapparal oak	5 —
Douglasii	5 —
Kelloggii	5 —
Palmeri: holly-leaved oak	5 —
RHAMNUS californicus (rhamnaceæ)	10 00
carolinianus	2 00
RHODODENDRON californic'm (ericaceæ)	10 00
maximum: great laurel	5 00
RHUS integrifolia (anacardiaceæ)	10 00
ovata	10 00
ROSA californica (rosaceæ), pips per oz 50c	——
minutifolia: roots $5 each " 2 50	——
SAMBUCUS glauca: elder	3 00
SASSAFRAS officinalis (laurinæ)	1 50
SCHINUS molle (anacardiaceæ) oz 10c	75
STYRAX californica (styraceæ)	2 50
SWAINSONIA alba	30 00
TACSONIA Buchani: large, pink flowers	15 00
Von Volexmi: large, crimson flowers	30 00
TECOMA radicans: trumpet flower	2 50
stans: flowers golden yellow; shrub	30 00
UMBELLULARIA californica (laurinæ)	4 —
VIBURNUM prunifolium	1 50
WISTARIA frutescens	5 00
sinensis	5 00
ZIZYPHUS Parryi (rhamnaceæ)	3 —



ERYTHRONIUM GRANDIFLORUM.

CALIFORNIA HERBACEOUS AND SUCCULENT PERENNIALS

AGAVE (Amaryllidaceæ)		per 100
Americana		12 —
deserti; from the Colorado desert		50 —
Pringlei: new		150 —
Shawii: compact growth; dark green		45 —
stricta		25 —
Texana		15 —
ANEMOPSIS—see Houttuynia.		
COTYLEDON (crassulaceæ)		
Desmettiana		12 —
edulis		10 —
lanceolata		12 —
orbiculare		25 —
pulvurulenta		18 —
other sorts $2 to		10 —
DICENTRA (fumariaceæ)	oz.	100:
chrysantha: fine foliage	2 —	25 —
DIPLACUS (scrophulariaceæ)	pkt.	100:
longifolia: fine buff flowers	1 —	40 —
puniceus: deep crimson fls	1 —	35 —
DODECATHEON (primulaceæ)	oz.	100:
Clevelandi: giant cyclamen	1 —	12 —
ECHEVERIA (included under Cotyledon)		
HOUTTUYNIA (piperaceæ)		100:
Californica: fine greenhouse plant		18 —
ROMNEYA (papaveraceæ)	oz.	lb.
Coulteri	1 —	12 — 50 —
STAPELIA (asclepiadaceæ)		
grandiflora: stock exhausted		10 —
variegata: toad cactus		5 —
YUCCA (liliaceæ)	100:	oz.
arborescens	100 —	—
aloefolia	—	1 50
baccata: wild banana	25 —	40
*brevifolia: tree yucca	100 —	—
elata albo-marginata	—	1 50
filamentosa	—	1 50
gloriosa: mound lily; pkt. $1.	—	—
truncata: packet $1.	—	—
whipplei: mountain yucca	20 —	40
" Blooming size	100 —	—
ZAUSCHNERIA (onagraceæ)	100:	pkt.
Californica: California fuchsia	15 —	1 —

CALIFORNIA LILIES AND LILIACEOUS PLANTS

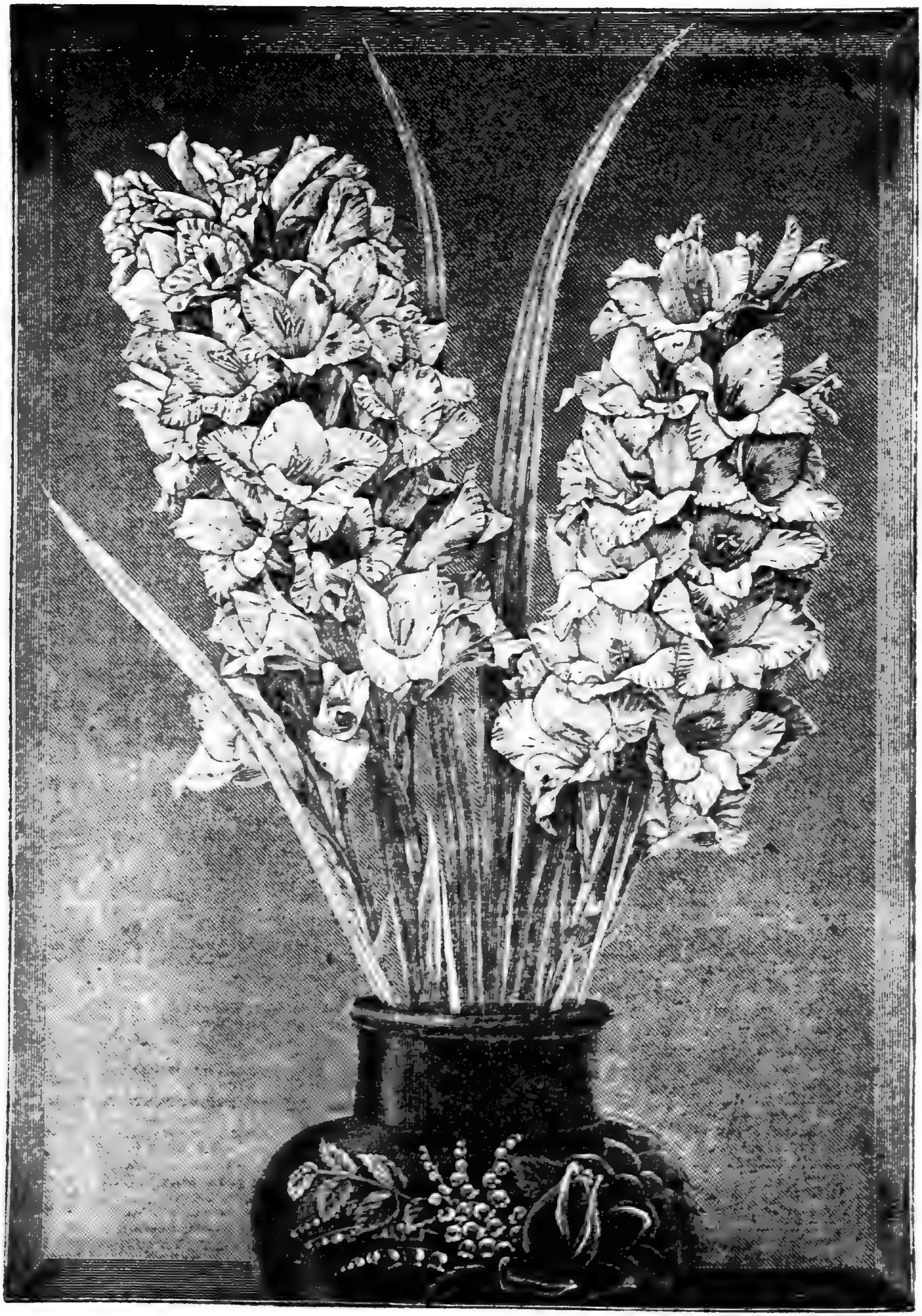
BLOOMERIA (liliaceæ)	per 100	
aurea: golden yellow	1 50	
Clevelandi: smaller, light yellow	3 —	
BREVOORTIA coccinea	100 $15	2 25
BRODIÆA capitata: California hyacinth	1 —	
capitata alba: fine, white variety	2 40	
coccinea: see Brevoortia coccinea.		
congesta: violet-purple, large heads	1 50	
filifolia: lavender color, large flowers	7 —	
grandiflora: dark, waxy purple	1 —	
Hendersoni: yellow, purple stripes	9 —	
Howellii: fine yellow; Oregon	9 —	
ixioides: yellow fls, banded with brown	1 —	
lactea. fls. white, banded with green	1 —	
laxa: blue milla; Ethuriel's spear	1 —	
minor: royal purple flowers	2 25	
multiflora: an early violet colored fl'r	1 50	
Orcuttii	4 —	
peduncularis: waxy, porcelain white	2 25	
stellaris: rich purple, center white	1 50	
terrestris: reddish purple flowers	2 25	
volubilis: per 1000, $30.	4 50	
MIXED, $6 per 1000.	90	

CALOCHORTUS	100:	1000:
albus	1 80	12 —
Benthamii	2 25	15 —
Gunnisoni: true; Colorado	6 —	—
Howellii: white; 2 ft. high	8 —	—
Kennedyi	10 —	—
Leichtlinii	2 25	15 —
lilacinus	1 50	10 —
longibarbatus: a ft high; purple	6 —	—
luteus	1 50	10 —
macrocarpus: large purple fls.	4 50	—
maweanus	1 50	10 —
nitidus: a form of C Benthamii.	6 —	—
nudus	6 00	—
Nuttallii	3 —	20 —
Palmeri: white, tinted yellow	7 50	—
pulchellus	1 50	10 —
splendens	3 —	20 —
" atrovioleaceus	3 —	20 —
Tolmiei: white, tinged purple	6 —	—
venustus (var. roseus considered the type):		
" citrinus	1 50	10 —
venustus oculatus	1 50	10 —
" purpurascens	2 25	15 —
" roseus	2 40	18 —
weedii: one of the finest	4 50	30 —
Mixed varieties: fine strain	1 20	8 —
CAMASSIA cusickii	10 —	—
esculenta: Quamas	90	6 —
CHLOROGALUM angustifolium	4 50	30 —
pomeridianum	4 50	30 —

ERYTHRONIUM	plants, per 100:
grandiflorum	1 50
" very large bulbs	3 —
Hartwegii	2 25
Smithii	3 —
montanum: pure white	4 50
Howellii: white, turning pink	9 —
Hendersoni: purple	7 —
grandiflorum minor	9 —

FRITILLARIA	100:	1000:
atropurpurea	4 50	—
biflora: chocolate lily	3 —	20 —
coccinea: scarlet	6 —	—
lanceolata: mottled colors	3 —	20 —
" gracilis: nearly black,	4 50	—
liliacea: white flowers	3 00	20 —
parviflora	4 50	—
pudica: yellow; 1-flowered	4 50	—
recurva: scarlet, bell-shap'd fls.	3 —	20 —
" very large bulbs	4 50	—

HESPEROCALLIS	100:
undulata: lily of the desert; white	20 —
LEUCOCRINUM	100:
montanum: delicate white flowers	6 —
LILIUM Bolanderi: supply uncertain	60 —
Columbianum: a dwarf species	7 50
Humboldtii: orange, with black spots,	12 50
maritimum: blood red	15
pardalinum: red and orange	4 50
Parryi: delicate lemon yellow	30 —
parvum: canary yellow	7 50
rubescens: fls. turn to a wine color	20 —
Washingtonianum: white; very frag't.	10 —
" large bulbs.	12 50
MUILLA maritima: small, whitish flowers	2 50
TRILLIUM sessile var. californicum	3 —
ZYGADENUS Fremontii: creamy-white fl	4 50
paniculatus: stouter and taller	4 50



GLADIOLUS "CALIFORNIA."

LILIES FROM NEAR AND FAR

(†See also California Lilies, page 9.)

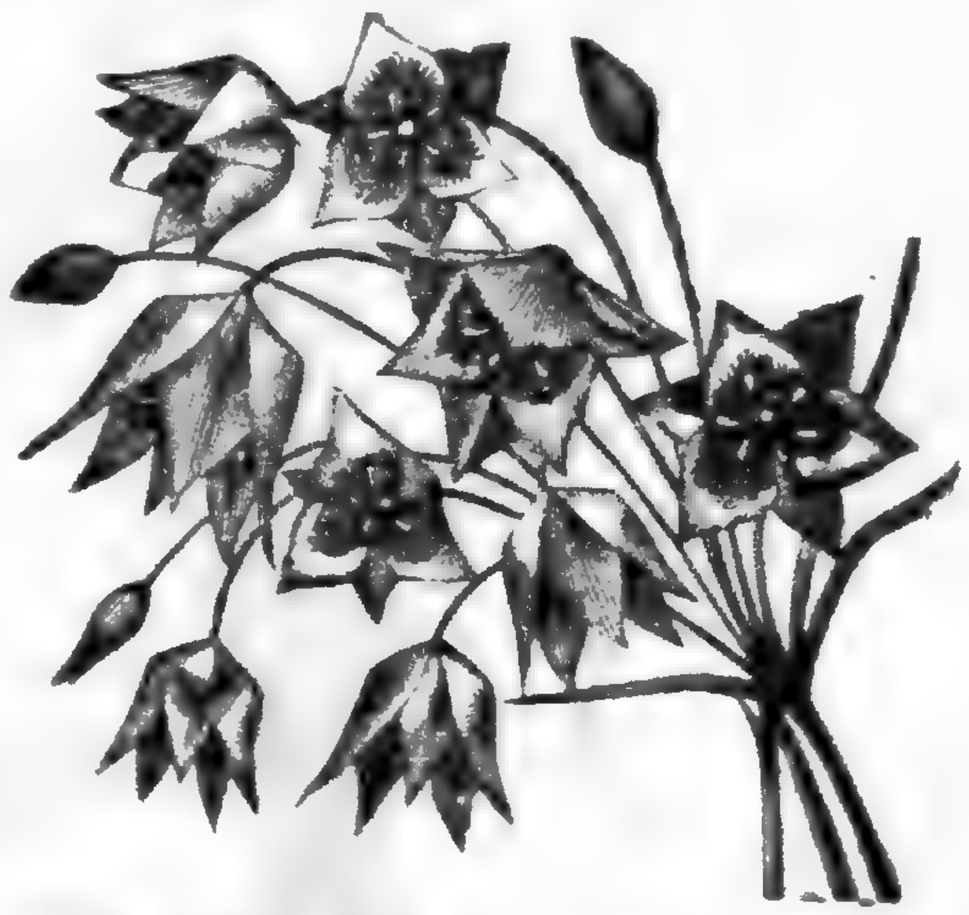
100 AGAPANTHUS
$ 7 — umbellatus
15 — v. albidus
20 — v. variegata
ALOCASIA
8 — illustris
ALBUCA
25 — aurea
15 — fastigiata
20 — major
ALLIUM
2 25 acuminatum
2 25 falcifolium
4 40 fimbriatum
2 25 hæmatochiton
2 — moly
1 75 serratum
1 50 unifolium
ARUM
6 — angustifolium
5 — cornutum
25 — crinitum
—— dracunculus
3 — italicum
5 — maculatum
15 — palestinum
15 — *sanctum
20 — syriacum
ALSTRŒMERIA
4 — aurantiaca
4 — v. aurea
4 — hæmantha
6 — peruviana
5 — psittacina
AMARYLLIS
4 — *atamasco
75 — *aulica
8 — belladonna
9 — v. major
8 — *v. minor (type)
—— v. blanda
10 — v. spectabilis
50 — "Defiance"
9 — *equestre
5 — *formosissima
30 — graveana
—— hybrida americana
—— johnsoni
6 — longifolia alba
—— lutea
50 — reginæ
6 — treatea
30 — vittata
BESSERA
2 50 elegans
†BLOOMERIA
†BRODIŒA
†BREVOORTIA
†CALOCHORTUS
CANNA
4 — alphonse
14 — anacapa
3 — ehermanni
6 — Mad. Crozy
2 — noutoni
5 — Pres. Carnot
4 — robusta
5 — ventura
4 — flaccida

CALADIUM
4 — *esculentum
†CAMASSIA
†CHLOROGALUM
COOPERIA
—— drummondi
2 50 pedunculata
CRINUM
5 — americanum
88 — amabile
10 — fimbriatulum
18 — kirkii
120 — ornatum
*CYCLOBOTHRA
2 — flava
CYCLAMEN
3 — coum
3 — europæum
10 — græcum
6 — hederæfolium
7 — "Mt Blanc"
4 — neapolitanum
4 — repandum
DORYANTHES
75 — excelsa
†ERYTHRONIUM
†FRITILLARIA
9 — messanensis
FREESIA
—— leichtlini
—— v. major
60 refracta alba
FURCRÆA
10 — cubensis
10 — gigantea
GLADIOLUS
3 — illyricus
60 — "California"
40 — "Santa Rosa"
22 — "Mariposa"
12 — "Shasta"
12 — "Cisco"
22 — "Yolo"
gandavensis vars
—— lemoneii vars.
†HESPEROCALLIS
HEMEROCALLIS
12 — dumortieri
8 — flava
4 — fulva
IPOMŒA
12— paniculata
IRIS
6 — alata
—— anglica
30 — atrofusca
5 — germanica
3 25 florentina
7 50 fumosa
18 — hedera
12 — helenæ
1 — hispanica
8 — kæmpferi
18 — tectorum
18 — sibirica orientali
30 — stylosa lilacina
4 — pavonia
25 — robinsoniana
— — tenax oz $4
4 — versicolor

IXIA
75 mixed vars.
†LILIUM
$ 4 — auratum
4 — v. pictum
6 — v. platiphyllum
6 — v. rubrovittatum
6 — batemanni
6 — brownii
24 — callosum
3 — concolor
9 — v. ohime
—— coridion
—— cordifolium
13 — dahuricum
6 — elegans
60 — v. Alice Wilson
6 — v. atrosanguineum
6 — v. incomparabile
7 — v. orange
7 — v. semiplena
7 — v. variegata
60 — hansoni
6 — krameri
30 — leichtlinii
— — longiflorum
18 — modeoloides
—— speciosum
8 — v. album
9 — v. melpomene
7 — rubrum
4 — trigrinum
6 — v. florepleno
7 — virginale
30 — v. album

MILLA
2 — biflora
MONTBRETTIA
2 — crocosmiæflora

MUILLA
3 — maritima
NARCISSUS
25 — corcyrensis
6 — orientalis
NERINE
—— japonica
—— sarniense
OXALIS
1 50 in variety
ORNITHOGALUM
—— arabicum
PANCRATIUM
—— caribbæum
POLYANTHES
—— tuberosa
—— v. "albino"
RICHARDIA
—— africana
—— albo-maculata
SPARAXIS
STERNBERGIA
9 — sicula
SPRECKELIA
5 — formosissima
TIGRIDIA
—— conchiflora
—— pavonia
VALLOTA
—— purpurea
ZEPHYRANTHES
— andersoni
3 — v. texana
4 — atamasco
1 — candida
6 — carinata
—— concolor
3 — rosea
6 — sulphurea
1 — *treatea



CALOCHORTUS (CYCLOBOTHRA) FLAVUS.

THE ALBINO TUBEROSE.

THIS distinct and valuable variety of the single tuberose received a certificate of merit from the Society of American Florists in 1887. The distinctive features are such as have made it one of the most popular of summer cut flowers in the city where it originated for the past eight or ten years. The individual florets are of the purest white inside and out, even in the hottest sun; the petals recurve gently and gracefully; the flower spike is very large and evenly filled and quite frequently branched, and two or more flower stalks often come out of the same individual bulb. It is entirely free from the brown tint on the back of the petal, the tube and expanded sepals being of the purest white, which suggested its name to the committee which awarded it a certificate of merit.

Per dozen, $3; per 100, $18.

THE CANAIGRE PLANT.

RUMEX HYMENOSEPALUS, Torrey, is a plant rapidly becoming of commercial importance in the southwest, as a producer of tannin. Growing wild in many places, and as easily and cheaply grown as potatoes, it should be quite profitable near shipping points. One of our correspondents writes that a thousand tons per annum of the dried roots could be taken, worth $40,000 delivered in Liverpool.

Correspondence invited with intending growers.

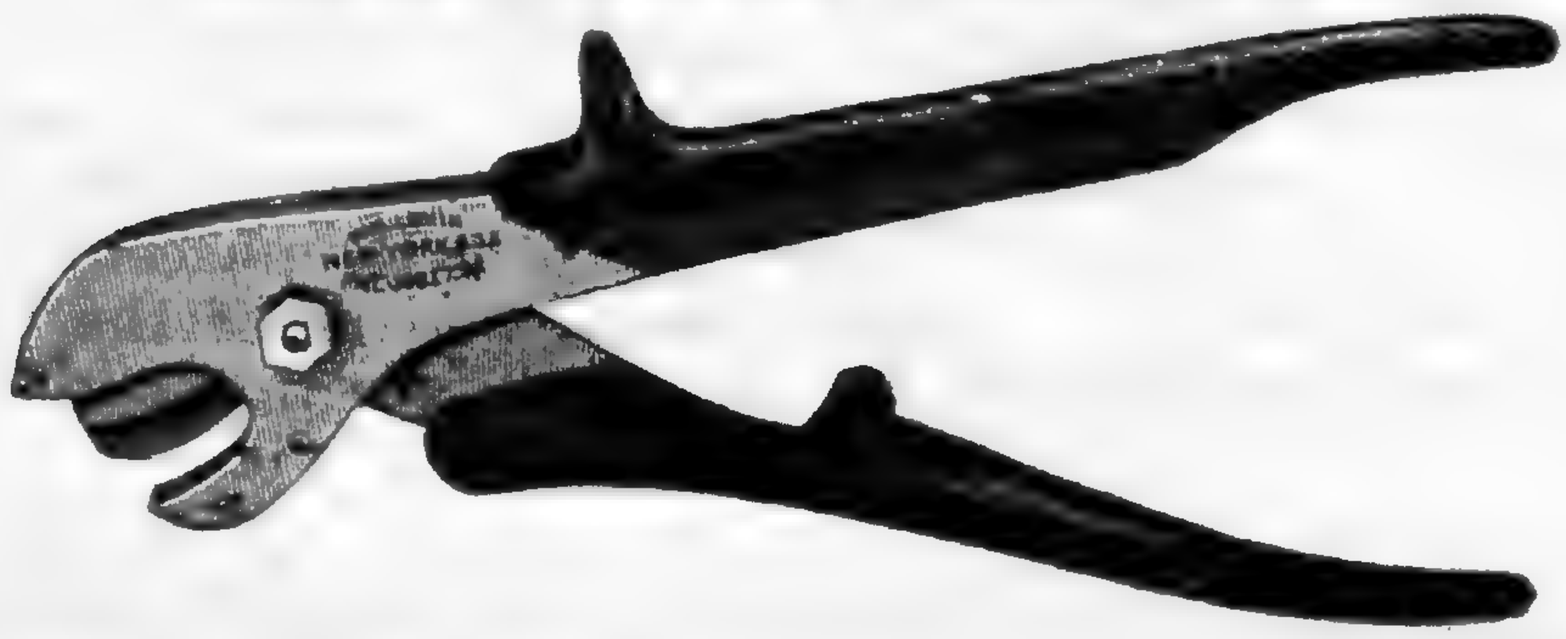
See illustration on page 15 of this price-list.

West American Ferns.

The ferns of Southern California are especially noted for their beauty and grace. We collect the roots of these in the summer, when nearly all are perfectly dry, and they are then sent by mail or express in that condition. They require careful treatment, but are well worth the care. Prices are per 100 roots, carefully packed. It is impossible for us to secure all the following species every year; those marked with an asterisk (*), however, are especially recommended and can generally be supplied with promptness. Collection of ten, our choice, for $1.00, postpaid.

	Per 100
*ADIANTUM EMARGINATUM.—Can be sent either dry or in a growing state	$ 6 00
*ASPIDIUM MUNITUM.—Can be sent only in a growing condition	15 00
*ASPLENIUM TRICHOMANE SVAR. INCISUN.—Feather fern. Choice	10 00
*CHEILANTHES CALIFORNICA.—Lace fern. Exquisite	10 00
CHEILANTHES CLEVELANDI.—Cleveland's Lip fern	9 00
CHEILANTHES GRACILLIMA.—Graceful Lip fern	5 00
CHEILANTHES VISCIDA.—Desert Tea fern	10 00
CHEILANTHES MYRIOPHYLLA.—Fendler's Lip fern	10 00
*GYMNOGRAMME TRIANGULARIS.—California Gold fern	4 00
*GYMNOGRAMME TRIANGULARIS VAR. VISCOSA.—Silver fern	4 00
NOTHOLAENA CRETACEA.—Formerly known as N. candida	10 00
*NOTHOLAENA NEWBERRYI.—Cotton fern. Very pretty	6 00
NOTHOLAENA PARRYI.—Dr Parry's cloak fern. Colorado Desert, rare	20 00
*PELAEA ANDROMEDIAEFOLIA.—Cliff brake Wire fern	6 00
PELAEA DENSA.—A pretty alpine species, three to six inches in height; abundant in Yosemite Valley	6 00
*PELAEA ORNITHOPUS—Tea fern. Easily grown	4 00
PELAEA BREWERI—An alpine species, growing six inches or less in height, in clefts of rocks	6 00
PHEGOPTERIS ALPESTRIS.—A fine alpine species. attaining a height of two feet, from Oregon	10 00
POLYPODIUM CALIFORNICUM.—Californian polypody. Large	5 00
WOODWARDIA RADICANS.—Chain fern. The immense fronds of this luxuriant fern sometimes measure ten feet in height	12 00
SELAGINELLA LEPIDOPHYLLA.—Resurrection plant. Mexico	4 00
SELAGINELLA PILIFERA.—Mexico	4 00

THE LEVIN PRUNER.



No. 1, cuts ½ inch, $12 per dozen. **No. 2, cuts ¾ inch, $15 per dozen**

CALIFORNIA YELLOW BELLS.

It seems strange that one of the loveliest of California annuals should have escaped attention among lovers of flowers for so long. And yet the Yellow Bells of California, as it is called, is hardly yet introduced. The plant forms a broad bush, from a span to occasionally two feet high. Each of its numerous branches is fairly loaded with broadly bell-shaped pendulous flowers, a half inch long, and of a delicate cream color. The flowers are almost everlasting, the persistent corolla drying and retaining its shape until the seed has ripened. "The general effect of a branch is suggestive of a long spike of the lily of the valley," says one writer regarding it.

HYMENANTHE PENDULIFLORA.

The pinnatifid foliage has caused the plant occasionally to be taken for a fern, before it blossoms. It occurs in Utah, and from Lake County to San Diego, and southward in Lower California. It belongs to the same family as the phacelia, nemophila and whitlavia of our gardens—all natives of the Golden State. Seed, per packet, 25c; per oz., $3; per lb., $30.

MISCELLANEA

(§Known Hybrids.)

ANTIGONUM leptopus		—
ALOE variegata (liliaceæ)	each	75
fructicosa	℔ 100	8 00
ARISTOLOCHIA	100:	oz.
elegans	$12 00	$4 00
ornithocephala	14 00	00
sipho	00	00
CALLAS—see Richardia and Arum.		
CALLIOPSIS (compositæ)	oz.	℔
lanceolata	35	$3 50
CANNAS (Scitaminæ)	100:	oz.
Indica: mixed hybrids	$ —	50
§Canuloe: splendid seedling	35 00	50
§Mme Crozy	—	1 00
§George Harcourt	—	50
§Hippolyte: dwarf	—	50
§Emile Le Clair	2 00	20
§Admiral Courbet	—	05
COSMOS (compositæ)		05
bipinnatus: mixed		75
" "The Pearl," white		1 25
CYPERUS alternifolius	oz	1 50
DIONÆA		100:
muscipula: Venus fly trap	1	5 00
FRÉSIA refracta alba	oz. 75c, ℔ 10 00	—
GASTERIA		
Unnamed sorts, $10, $15 and		25 00
GERANIUM (Geraniaceæ)		oz.
zonale		75
HEMEROCALLIS (liliaceæ)		100:
fulva fl. pl., each		5 00
kwanso		8 00
" fl. pl		8 00
IPOMŒA (convolvulaceæ)		oz.
Learii: splendid perennial		75
§Heavenly Blue		3 50
lobata: see Mina lobata.		
MACROZAMIA spiralis	each	$ 5 00
NEMASTYLIS (Iridaceæ)		100:
cœlestina		12 00
NERINE (amaryllidaceæ)		
coruscans		20 00
SWEET PEAS: Write for prices.		
SMILAX, seed		℔ 4 00
TRICYRTIS hirta: toad lily	℔ 100	6 00
nigra	"	6 00
TRITELEIA uniflora (liliaceæ)	"	1 50
violacea	"	1 00

CANAIGRE

(See page 12.)

INDIAN QUAMASS —
CAMASSIA ESCULENTA.

RRODIÆA COCCINEA — FLORAL FIRE CRACKER.

G. A. R. NOTICE.

We take this opportunity of informing our subscribers that the new Commissioner of Pensions has been appointed. He is an old soldier, and we believe that soldiers and their heirs will receive justice at his hands. We do not anticipate that there will be any radical changes in the administration of pension affairs under the new regime.

We would advise, however, that U. S. soldiers, sailors, and their heirs, take steps to make application at once, if they have not already done so, in order to secure the benefit of the early filing of their claims in case there should be any future pension legislation. Such legislation is seldom retroactive. Therefore it is of great importance that applications be filed in the Department at the earliest possible date.

If U. S. Soldiers, Sailors, or their Widows, Children, or Parents desire information in regard to pension matters, they should write to the Press Claims Company, at Washington, D. C., and they will prepare and send the necessary application, if they find them entitled under the numerous laws enacted for their benefit.

Address

PRESS CLAIMS COMPANY,

John Wedderburn, Managing Attorney,

WASHINGTON, D. C.

The West American Scientist.

VOL. VIII. SAN DIEGO, CAL. FEBRUARY 1894. WHOLE NO. 70.

LILIES FROM NEAR AND FAR, CACTI, AND SEEDS.

Complete Lists Free.

ORCUTT SEED AND PLANT COMPANY, LOS ANGELES, CALIFORNIA.

CACTI

$1 00 ANHALONIUM
— Engelmanni
12 — Lewinii
— prismaticum
15 00 Williamsii
ASTROPHYTUM
30 — myriostigma
CEREUS
10 — Berlandieri
8 — caespitosus
15 — chloranthus
40 — cochal
25 — columbrinus
100 — dasyacanthus
50 — deficiens
25 — Emoryi
25 — Eoge mauni
10 — enneacanthus
20 — flagelliformis
— gemmatus
100 — giganteus
— grandiflorus
75 — Greggii
100 — gummosus
75 — maritimus
150 — Mojavensis
100 — Pacificus
15 — pectinatus
200 — polyacanthus
200 — Pringlei
7 — procumbens
20 — rigidissimus
15 — stramineus
8 — triangularis
10 — tuberosus
20 — variabilis
25 — viridiflorum
ECHINOCACTUS
12 — bicolor
30 — brevihamatus
25 — capricornis
25 — coptogonus
25 — cornigerus
20 — cylindraceus
— intertextus
— electracanthus
40 — Emoryi
30 — hexedrophorus
25 — helophorus
25 — horizontalonius
40 — dasyacanthus
25 — Lecontei
25 — longehamatus
20 — lophothele
60 — McDowellii
20 — multicostatus
30 — Orcuttii
100 — polycephalus
50 — pilosus
— pseudoselgerianus
— saltillensis
15 — Scheeri
8 — setispinus
15 — Simpsonii
12 — sinuatus
12 — texensis
12 — viridescens
25 — wislizeni
50 — Wrightii
40 — No. 72: new
20 — No. 79: new
ECHINOPSIS
25 — Eyriesii
15 — Mulleri
25 — oxygona
MAMILLARIA
80 — Arizonica
8 — applanata
20 — beguini
20 — candida
10 — Childsii
15 — cornifera
15 — daemonoceas
8 — decipiens
50 — deserti
10 — echinus
15 — echinata
— v. albispina
15 — Goodrichii
10 — Grahamii
10 — lasciа (plumosa)
lasciacantha
15 — v. denudata
50 — No. 81 new
15 — macromeris
8 — meiacantha
20 — v. longispina
15 — minima
15 — leona
15 — micromeris
15 — v. Greggii
50 — phellosperma
6 — pusilla
8 — pusilla Texana
— pectinata
— recurvens
30 — semperviva
15 — tuberculosa
20 — wildiana
8 — Wrightii
OPUNTIA
25 — basilaris
40 — v. ramosa
15 — bernardina
10 — Bigelovii
18 — chlorotica
10 — clavata
6 — Engelmanni
20 — echinocarpa
25 — Emoryi
10 — Ficus-Indica
6 — frutescens
6 — frutescens major
6 — fulvispina
8 — lurida, cuttings
8 — microdasys "
20 — Parryi
6 — prolifera
6 — serpentina
25 — tessellata
10 — tuna, cuttings
10 — tuna-manse
PILOCEREUS
200 — sargentianus
25 — senilis

LILIES FROM NEAR AND FAR.

$1 100 AGAPANTHUS
$ 7 — umbellatus
15 — v. albidus
20 — v. variegata
ALOCASIA
8 — illustris
ALBUCA
25 — aurea
15 — fastigiata
20 — major
ALLIUM
2 25 acuminatum
2 25 falcifolium
4 40 fimbriatum
4 25 hæmatochiton
2 — moly
1 75 serratum
1 50 unifolium
6 — peruviana
5 — psittacina
AMARYLLIS
4 — *atamasco
75 — *aulica
8 — belladonna
9 — v major
8 — *v. minor (type)
— v. blanda
10 — v. spectabilis
50 — "Defiance"
9 — *equestre
5 — *formosissima
30 — graveana
30 — johnsoni
6 — longifolia alba
— *lutea
50 — reginæ
6 — treatea
30 — vittata
BESSERA
2 50 elegans
BLOOMERIA
1 50 aurea
3 — Clevelandi
BREVOORTIA
2 25 coccinea
BRODIÆA
1 — capitata
2 40 capitata alba
2 25 *coccinea
1 50 congesta
7 — filifolia
1 — grandiflora
9 — Hendersoni
9 — Howellii
1 — ixioides
1 — lactea
1 — laxa
2 25 minor
1 50 multiflora
4 — Orcuttii
2 25 pedunculariS
1 50 stellaris
2 25 terrestris
4 50 volubilis
90 MIXED, $6 ₱ 1000
CALOCHORTUS
1 80 albus
2 25 Benthamii
2 — flavus
6 — Gunnisoni
8 — Howellii
10 — Kennedyi
2 25 Leichtlinii
1 50 lilacinus
6 — longibarbatus
1 50 luteus
4 50 macrocarpus
1 50 maweanus
6 — Nuttallus
6 — nudus
8 — Nuttallii
7 50 Palmeri
1 50 pulchellus
3 — splendens
3 — v atrovioiacea
6 — Tolmiei
2 40 venustus
1 50 v. citrinus
1 50 v. oculatus
2 25 v. purpurascens
2 40 v. roseus
4 50 weedii
1 20 Mixed
CALADIUM
4 — *esculentum
CAMASSIA
10 — cusickii
90 esculenta
CANNA
4 — alphonse
14 — anacapa
3 — ehermanni
6 — Mad. Crozy
2 — noutoni
5 — Pres. Carnot
4 — robusta
5 — ventura
4 — flaccida
CHLOROGALUM
4 50 angustifolium
4 00 parvifolium
4 50 pomeridianum
COOPERIA
— drummondi
2 50 pedunculata
CRINUM
5 — americanum
88 — amabile
10 — fimbriatulum
18 — kirkii
120 — ornatum
*CYCLOBOTHRA
2 — flava
CYCLAMEN
3 — coum
3 — europæum
10 — græcum
6 — hederæfolium
7 — "Mt. Blanc"
4 — neapolitanum
4 — repandum
DORYANTHES
75 — excelsa
ERYTHRONIUM
1 50 grandiflorum
9 — v. minor
2 25 Hartwegii
3 — Smithii
4 50 montanum
9 — Howellii
7 — Hendersoni
FRITILLARIA
4 50 atropurpurea
3 — biflora
6 — coccinea
3 — lanceolata
4 50 v. gracilis
3 — liliacea
4 50 parviflora
9 — messanensis
4 50 pudica
3 — recurva
FREESIA
— leichtlini
— v. major
60 refracta alba
FUCRÆA
10 — cubensis
10 — gigantea
GLADIOLUS
3 — illyricus
60 — "California"
40 — "Santa Rosa"
22 — "Mariposa"
12 — "Shasta"
12 — "Cisco"
22 — "Yolo"
gandavensis vars
— lemoneii vars.
HESPEROCALLIS
40 — undulata
HEMEROCALLIS
12 — dumortieri
8 — flava
4 — fulva
5 — fulva fl pl
8 — kwanso
8 — v. fl pl
IPOMŒA
12 — paniculata
IRIS
6 — alata
— anglica
30 — atrofusca
5 — germanica
3 25 florentina
7 50 fimbriata
18 — hedera

MORE ABOUT FUNGI.

Professor W. G. Farlow, in a late number of 'Garden and Forest,' after speaking of Puff-balls, Truffles, Morels, and giving the habits of each, says:

1. Avoid all fungi in the button stage, since in their unexpanded condition, poisonous species may be easily mistaken for edible species.

2. Avoid all fungi which have around the stalk (stipe) a sac-like or scaly envelope (volva).

3. Avoid all fungi having a milky juice, unless the milk is reddest.

4. Avoid all fungi in which the cap (pileus) is thin in proportion to the gills, and in which the gills are nearly all of equal length, especially if the pileus is bright-colored.

5. Avoid all tube-bearing fungi in which the flesh changes color when cut or broken, or where the mouths of the tubes are reddish.

6. In the case of other tube-bearing fungi, experiment with great caution.

7. Avoid those fungi which have a sort of spider-web or flocculent ring round the upper part of the stalk.

8. Never eat fungi of any kind in which the flesh has begun to decay, even slightly.

9. Remember that the popular belief that if a fungus has a surface which can easily be peeled off, or that, if while being cooked it does not blacken a silver spoon, it is not poisonous, is absolutely erroneous.''

It may be added that steeping in milk or vinegar does not destroy the poisonous properties of fungi, except in certain cases, and even then the milk or vinegar must not be eaten. On the other hand, some species become apparently more dangerous by cooking with milk or vinegar.

Every garden has, (or should have), a corner devoted to old fashioned posies, such as daisies, violets, bachelor's buttons, and larkspurs. Try them and see what pleasant reminiscences will be called forth from every visitor.

PRIMULA SINENSIS FIMBRIATA—FRINGED CHINESE PRIMROSE.

Why do not true lovers of flowers cultivate more this charming little plant? There is nothing more easily grown, is never troubled with insect life, and will thrive in a north window with very little sunshine, and where few other plants would bloom. To me it is the most grateful little flower I have in my collection. I would not be without it. Seeds sown in March, April or May will bloom the following winter. I take a small cigar box and fill it two thirds full of nice garden soil mixed with a little sand, water thorough and let soil settle before sowing the seeds which must be lightly covered with the soil. I then place a piece of window glass over the box; keep moist but not wet, and they will begin to grow in two or three weeks. One package of choicest mixed seed will give you quite a variety of colors for pot culture. I like the fern-leaved variety, still they are all beautiful. They make an excellent border on the north side of the house where there is not much sun. M. A. C.

NOTES.

Acacia Farnesiana has been recommended to us by one high in authority among plant lovers, as an unusually sweet scented and quick growing shrub which will resist drouth.

Mammillaria micromeris, the daintiest of little plants, is a cactus, as its delicate lace work of gray spines would indicate to even the casual observer. Our specimen bloomed recently; at least we suppose it did, since it now bears two beautiful red berries on its snowy tip. The blossoms were microscopical, however.

One of the head lines in the March Success, reads: "California—A Mighty Conservatory." Very true. And with departments with temperature suited to the development of almost every known plant.

A New York florist is experimenting with shipping cut flowers to London. A box of "American Beauty" roses picked at the exact moment when they would unfold a little in the dark, were placed in the ice box of a ship, which would be seven days en route, and sent to Ada Rehan, so says the Detroit Free Press.

A well known San Diego rose grower has customers in Arizona to whom he sends cut flowers regularly, and now a Santa Barbara firm announce their intention of making a specialty of supplying eastern florists during the winter season with orange blossoms, acacias, roses etc.

Mrs. Ellen L. Platt, of New York, wife of an ex-senator, is said to be one of the most successful orange growers in Florida; giving her personal supervision to the work during the greater part of the year.

Our season has been so late and cold that there is still plenty of time for planting. Even shrubs and trees may be put out if given particular attention.

At Encinitas, California, during the boom days, the enterprising citizens planted on each side of most of their streets, trees thirty or forty feet apart; principally eucalyptus and acacia. Today the visitor to the little village is filled with delight as he enters the town from any direction, for the sweet scent of the masses of blossoms on the acacias fill the air, while the eucalyptus do their duty in shading the roadside.

At Del Mar also, the one permanent benefit derived from those early days of "the San Diego boom" was the planting of groves of eucalyptus of several hundreds of thousands on the broken mesas and hill tops.

And now let us ask have you planted even one tree of any sort this season? If you have not there is yet time, and every tree planted this spring will help towards the general prosperity we all desire for our beloved county.

OUR TIMES.

The three leaved clover some one told his congregation was emblematic of the three christian graces, faith, hope and charity. Then he walked in the meadow and heard the three leaved clovers boasting of this; but a four leaved clover in silence hung its head, then the listener picked up a four leaved clover and said: "O proud little leaves, do not forget that there is a fourth grace, humility." Ever since, the four leaved clover has brought good fortune, says the legend.

LITERARY NOTES.

INSECTS AND FUNGI INJURIOUS TO DECIDUOUS FRUIT AND FRUIT TREES; with remedies and recommendations. Compiled by W. E. Gumnis, Horticultural Commissioner. Thirty-seven pages published by authority of the Board of Supervisors; San Diego, California, 1894. Apply to Horticultural Commission.

We have received a copy of this valuable little pamphlet. Mr. Gumnis states that all the remedies recommended have been tested under his supervision, and he recommends nothing that has not stood the test. The preface sets forth the objects of the book in these words:

Owing to the large number of inquiries received by this office for information on the subject of insect pests and fungoid diseases, and for the best method of treatment, it has been deemed avisable to issue this little pamphlet, with the hope that it will give, clearly and concisely, the information desired by growers. Should, however, any grower desire information on these subjects, not contained herein, we will gladly answer any inquiries by mail. We should also be pleased to receive specimens of any insects which you are unable to identify, found infesting fruit trees, etc.; and will inform you to what species they belong.

The subjects treated are: Codlin Moth, Wooly Aphis, Peach Borer, Peach Moth or Twig Borer, San Jose Scale, Black Aphis of the Peach, Rose Scale, Red Spider, Round Headed Apple Tree Borer, Flat Headed Apple Tree Borer, Fungoid Diseases, Shot Hole Apricot Fungus, Pear Cracking and Leaf Blight, Apple Scab, Peach Yellows, Root Aphides.

As the edition is limited, application should be made early for copies.

It is the intention to issue at a later date a treatise on insects, etc., injurious to citrus trees.

FIFTY-TWO DIVIDENDS.

As a general thing investors are pleased to receive only two dividends a year, and if they are paid with regularity are fully satisfied. When one, however, can receive fifty-two dividends in a year upon an investment of only three dollars, the matter deserves very serious attention.

The Independent of New York for forty-five years has held the first position among the great religions and literary weeklies of the land. It presents features for the coming year far in advance of any heretofore offered. It has the leading contributors of the world, it prints the best poetry. It has twenty-one departments, edited by specialists, devoted to fine arts, science, insurance, finance, biblical research, sunday-school, missions, health, etc. The Independent is particularly fitted for intelligent people, whether professional men, business men, farmers, and for their families. It costs little and gives a great deal. A subscriber receives fifty-two dividends a year.

The subscription price of the Independent is only three dollars a year or at that rate for any part of a year, and a sample copy will be sent to any person free by addressing The Independent, New York City.

The Independent

NEW YORK.

A Religious and Literary Newspaper and Review.

Undenomenational, unbiased and impartial. A paper for clergymen, scholars, teachers, business men and families. It discusses every topic of the day — religious, theological, political, literary, social, artistic and scientific.

Its contributed articles are by the most eminent writers of the English language.

It employs specialists and distinguished writers as editors of its **Twenty-one Departments**, as follows:

Literature, Science, Music,
Fine Arts, Sanitary, Missions,
Religious Intelligence, Charities,
Biblical Research, Sunday School,
School and College, Personals,
Editorial, News of the Week,
Ministerial Register,
Financial, Insurance.
Old and Young,
Farm and Garden,
Pebbles, Puzzledom.

A paper particularly fitted for lawyers, doctors, clergymen, men and women who read and think for themselves.

A paper especially valuable for those interested in **Fine Arts, Science, Music.**

A paper giving valuable information upon **Finance, Insurance, Commerce.**

A paper for **Sunday-School Workers,** those who have a **Farm, Garden,** or **House Plants.**

A paper for the **Family,** old and young.

Its yearly subscription is $3.00, or at that rate for any part of a year.

Clubs of five, $2.00 each.

Specimen copies free.

THE INDEPENDENT

No. 130 Fulton Street,

P.O. Box 2787. NEW YORK.

OUT OF DOORS FOR WOMEN

"'OUT OF DOORS FOR WOMEN' is the title of a new periodical to be issued monthly by Mrs. Olive L. Orcutt of this city. The initial number contains much interesting matter." -The San Diego Daily Union, Nov. 7, 1890

Price 5 cents, 50 cents a year in advance

MRS. OLIVE L. EDDY ORCUTT,

Agents wanted. San Diego, California.

PATENTS

CAVEATS, TRADE MARKS
COPYRIGHTS.

CAN I OBTAIN A PATENT? For a prompt answer and an honest opinion, write to **MUNN & CO.**, who have had nearly fifty years' experience in the patent business. Communications strictly confidential. A **Handbook** of Information concerning **Patents** and how to obtain them sent free. Also a catalogue of mechanical and scientific books sent free.

Patents taken through Munn & Co. receive special notice in the **Scientific American,** and thus are brought widely before the public without cost to the inventor. This splendid paper, issued weekly, elegantly illustrated, has by far the largest circulation of any scientific work in the world. **$3** a year. Sample copies sent free.

Building Edition, monthly, $2.50 a year. Single copies, 25 cents. Every number contains beautiful plates, in colors, and photographs of new houses, with plans, enabling builders to show the latest designs and secure contracts. Address

MUNN & CO., NEW YORK, 361 BROADWAY.

JOSEPH GILLOTT'S

Steel Pens.

FOR ARTISTIC USE in fine drawings, Nos. 659 (Crow-quill), 290 and 291.
FOR FINE WRITING, No. 303, and Ladies', 170.
FOR BROAD WRITING, Nos. 294, 389 and Stub Point, 849.
FOR GENERAL WRITING, Nos. 404, 332, 390 and 604.

THE MOST PERFECT OF PENS.

Gold Medal Paris Exposition.

Joseph Gillott & Sons, 91 John St., New York.

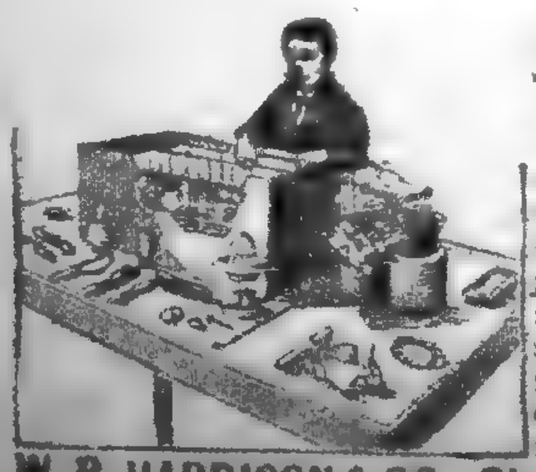
IF YOU WANT INFORMATION ABOUT

PENSIONS

Address a letter or postal card to
THE PRESS CLAIMS COMPANY,
JOHN WEDDERBURN, - - Managing Attorney,
P. O. Box **463.** WASHINGTON, D. C.

PENSIONS PROCURED FOR
SOLDIERS, WIDOWS, CHILDREN, PARENTS.

Also, for Soldiers and Sailors disabled in the line of duty in the **regular** Army or Navy **since** the war. Survivors of the Indian wars of 1832 to 1842, and their widows, **now** entitled. Old and rejected claims a specialty. Thousands entitled to higher rates. Send for new laws. No charge for advice. No fee until successful.



AGENTS $75 A WEEK AT HOME, using or selling **PRACTICAL PLATING DYNAMO.** The most modern method, used in all factories to plate new goods. Plates gold, silver, nickel, etc., on watches, jewelry, table-ware, bicycles and all metal goods; fine outfits for agents; different sizes; always ready; no battery; no toy; no experience; no limit to plating needed; a great money maker.

W. P. HARRISON & CO., Clerk No. 15, Columbus, Ohio.

"A work of supreme importance to students of botany and to horticulturists."

Now ready, Part I, pp. 728, quarto. Price to subscribers who take the whole work, Two Guineas, net.

The work will be completed in four parts, which will be issued to subscribers at Eight Guineas; and the price will be raised on publication

Subscriptions will be received up till the publication of Part IV.

Part I (AA—Dendrobium) now ready, 4to, price to subscribers who take the whole work, £2 2s net, being £8 8s for the four parts.

INDEX KEWENSIS

PLANTARUM PHANEROGAMARUM NOMINA ET SYNONIMA
OMNIUM GENERUM ET SPECIERUM A LINNAEO USQUE
AD ANNUM MDCCCLXXXV COMPLECTENS NOMINE
RECEPTO AUCTORE PATRIA UNICUIQUE
PLANTAE SUBJECTIS

SUMPTIBUS
BEATI CAROLI ROBERTI DARWIN

DUCTU ET CONSILIO
JOSEPHI D. HOOKER

CONFECIT
B. D. JACKSON

The printing of Part II is well advanced, and the completion of the whole work may be expected during 1894.

The following communication from SIR JOSEPH HOOKER, F.R.S., etc., etc., explains the origin, plan and purpose of this important and comprehensive undertaking:

"SHORTLY before his death Mr. Darwin informed me of his intention to devote a considerable sum in aid or furtherance of some work of utility to biological science; and to provide for its completion, should this not be accomplished during his lifetime. He also informed me that the difficulties he had experienced in accurately designating the many plants which he had studied, and ascertaining their native countries, had suggested to him the compilation of an INDEX TO THE NAMES AND AUTHORITIES OF ALL KNOWN FLOWERING PLANTS AND THEIR COUNTRIES, as a work of supreme importance to students of systematic and geographical botany and to horticulturists, as a fitting object of the fulfilment of his intentions

"I have only to add that, at his request, I undertook to direct and supervise such a work; and that it is being carried out at the herbarium of the royal gardens, Kew, with the aid of the staff of that establishment."

JOS. D. HOOKER.

London: Henry Froude, Clarendon Press Warehouse, Amen Corner, E.C.

The West American Scientist.

VOL. VIII. SAN DIEGO, CAL., MARCH, 1894. WHOLE NO. 71

THE MEXICAN DAGGER PLANT.

YUCCA BACCATA Torrey, Botany Mexican Boundary Survey, page 22, [1858]. Type locality: "High table lands between the Rio Grande and the Gila," New Mexico.

Dr. William Trelease, Director of the Missouri Botanical Garden, in his report for 1893, page 185, says: "With the possible exception of Y. glauca, this is the most widely distributed of our species, ranging in a variety of forms from southern Colorado into Mexico and to California, where it extends from about Monterey into the peninsula." Following this are interesting notes and observations on this species, especially concerning its pollination, together with a plate (pl. 20). In his previous report for 1892, the same author illustrates this species in plates numbered 2 and 48, the first herewith reproduced through the kindness of Dr. Trelease, the other representing the fruit.

Dr. George Engelmann, in Watson's Botany of the Fortieth Parallel, describes the species thus: "Stems none, or short, or several feet high; leaves very thick and rigid, lance-linear, narrowed above the broad base, concave, terminating in a stout spine, with very coarse marginal fibres; flowers panicled; petals rhombic-ovate—1¼–1½ inches long—or linear-lanceolate, sometimes over three inches long; ovary attenuate into a style; stigmas short; fruit ovate or cylindric, long-rostrate." From New Mexico and S. Colorado, through S. Utah, to Arizona, California, and Mexico. Northward a low plant, it becomes a tree farther south; leaves 1½–2 feet long; 1½–2 inches wide. The edible sweet fruit are often called "Dates;" seeds variable in size, usually the largest in the genus, 5–6 lines wide, 1¼–1½ lines thick." For other observations on this species, made by Dr. George Engelmann, see Engelmann Botany, pages 291–292.

F. V. Coville, in contributions from the U. S. National Herbarium, Vol. IV., pages 202–203, seeks to establish two species out of what has heretofore been referred to Yucca baccata, and restricts the name to the acaulescent form. But he has not made it at all plain to the writer that two species exist, or that the form which he takes to be typical was the one collected by Dr. Bigelow. Having a wide field acquaintance with the plant the

writer must consider that Mr. Coville has given the plant another synonym in his Y. macrocarpa. When the whole region over which this (usually) arborescent species is distributed is carefully explored, and the multitudinous forms carefully studied, I have no doubt the synonyms will be found truly burdensome already.

T. S. Brandegee, in Proc. Cal. Acad. Sci., 2nd ser. iii, 208, (pl. xi), has described under the name Y. valida, an arborescent form which occurs south of San Quintin, in Baja California. This was first collected by the writer in the spring of 1886, and Prof. Sereno Watson doubtfully referred the imperfect material then collected to Y. schottii. Mr. Brandegee is doubtless right in his later opinion that it will prove merely a form of Y. baccata.

The fruit is known to Mexicans as *datile*, and among Americans is often called "wild bananas," but it produces a crop too infrequently or with too great uncertainty to ever be of value in that way. The root has been used as a substitute for soap among primitive people, but it is not likely to ever enter into competition with that article. Nor is it likely ever to become in demand as a fiber plant, though its leaves yield a long and tough fiber that has been utilized in Texas and Mexico to some extent. In Mexico the plant is said to be made to yield an alcoholic liquor.

Then, wherefore—if not its beauty—is all the regal magnificence of its luxuriant tropical foliage and flowers—and is not that sufficient?

THE YUCCA PALM.

YUCCA BREBIFOLIA Engelmann, in Watson's Bot. King Surv. 496 [1871]. Type locality: "Sandy and gravelly plains west of the Colorado, California."

Dr. John Torrey, in 1857, first named this Yucca draconis var. arborescens in Pac. R. Rep. iv. 147.

Dr. Engelmann first gave the plant a specific name, as above, and under that name the tree yucca of the Mohave Desert has become widely famous.

F. V. Coville, in Cont. from U. S. Natl. Herb. iv. 201, gives this species the name Y. arborescens, but as a matter of fact, the

name brevifolia has priority as a specific name, and is so well established that it seems needless to create a synonym. The law of priority in nomenclature should not demand such a change—the restoration of a varietal name over a well established specific name, and it is very doubtful if such a change tends toward stability. The writer prefers a conservative course, with only such changes as may be positively justified.

Dr. Wm. Trelease, in the third report of the Missouri Botanical Garden, page 136 [1892], gives the bibliography up to that date, with plates 5 and 49. In the report for 1893, pages 193–194, Dr. Trelease gives extensive notes on the species, especially regarding its pollination, accompanied by plates 6–9, which beautifully illustrate the habit of the species, while plate 21 shows the fruit and figures concerning the pollination.

In North American Fauna, No. 7, pages 353–358 [1893], Dr. C. Hart Merriam gives extended observations, especially on its distribution.

After the above citations little remains to be said concerning this curious tree.

The Fritillarius of Southern California are very attractive, growing wild in lovely clusters with drooping graceful bearing, sometimes the very dark chocolate colored ones are known as the black lily. They are bulbous plants belonging to the lily family. A French author once called the lily the king of flowers, adding "the rose is the queen."

The herbarium of the late Dr. C. C. Parry, containing some 16,000 specimens in excellent condition, has been purchased by the trustees of Iowa Agricultural College, at Ames, Iowa.

Along the coast mesas grow in great profusion shrubs with remarkably handsome sweet scented, violet or blue, clusters of flowers. Solanum umbelliferum is worthy of cultivation.

At Fresno a company has been organized for the propagation of a seedless muscat grape, which can be introduced in the place of the present raisin grape.

Speaking of grapes, the Isabella and the Golden Chasselas are said to make an excellent combination as arbor vines.

SUNN HEMP.

CRATALARIA JUNCEA Linne. The U. S. Department of Agriculture furnishes the following concerning the Sunn hemp: "Throughout India it is sown as a Kharif crop, that is about the commencement of the rains, and cut at the end of September. In Bengal, sown in May and June, and harvested after blossoming, 15th September. In some localities it is harvested in October. A light but not necessarily a rich soil is required; never clay. Sown at the rate of sixty pounds to the acre. Sometimes not harvested till the seeds are almost ripe; then stacked in the field to allow the leaves to fall. The fiber can be extracted by immersing a bundle of stalks in water from three to seven days, according to temperature, when the fiber can be thrashed off by beating the water with handfuls of stalks. It is important to get out a little of the fiber, that the Department may judge of its quality."

Baron Ferd. Von Mueller, in his "Select Extra-Tropical Plants," says of the Sunn hemp: "Indigenous to South Asia, and also widely dispersed through tropical Australia. An annual herb, rising under favorable circumstances to a height of ten feet. In the colony of Victoria, Sunn can only be cultivated in the warmest and moistest localities. It comes to maturity in four or five months. The plant can also be grown as a fodder herb for cattle. It requires rich, friable soil. If a superior soft fiber is desired, the plant is pulled while in flower; if strength is the object, the plant is left standing until it has become almost ripened into seeds. The steeping process occupies about three days. For the purpose of obtaining stanchless stems it is sown closely. Cultivated in the Circars, according to Roxburgh, to feed milch cows."

Seed of this plant is being distributed from the agricultural department of the University of California. Prof. E. W. Hilgard, Berkeley, Calif., desires recipients to report results. The interest in all fiber plants is increasing in this country, and every plant of promise is receiving attention.

A violet farm is mentioned in the New York Herald. The first violets are sent from Madison, N. J., by Mrs. Holmes, who took up her residence in the country for the health of her children. She raises the plants from runners potted off as small plants. She sometimes sends eleven thousand to New York a day, putting fifty violets in a bunch. She raises only the double violet as the single ones droop too quickly. Violets should never be sprinkled nor placed near ice.

The query is made if gophers leave the vicinity of Euphorbia albo-marginata or "snow on the mountain" as it is commonly called. Also the question is asked if moles disappear where the castor oil plant is grown, as both statements have been made.

Another useful occupation out of doors is suggested by the knowledge that Michigan produces one-half of the oil of peppermint used in the world, and that it produces fifteen thousand tons of dried peppermint yearly.

It is said that apples of northern latitudes, Canada and New England, are much more highly and beautifully colored than those of southern climates, Australia, etc.

An upright fuchsia is figured as a novelty in Meehan's monthly for March, but lacks the grace of the pendulous, familiar forms.

It is said that two thousand dollars were recently paid in London for ten yellow calla lilies.

HAVE YOU EVER MADE AN INVENTION?

Of course you have. There are so many things in everyday life that could be made to work better by a little study that you must have thought of ways of improving them. If you have done anything of that kind

WHY DON'T YOU GET A PATENT?

Because it's too expensive? Nonsense, it will cost you only seventy dollars all told, and you may be able to sell it the day after its receipt for fifty thousand. Because your idea is too simple? It's simplicity that sells and pays. The idea of protecting the toes of boys' boots with copper tips was childishly simple, but it paid the inventor half a million dollars. You can't tell what there is in your idea until you have tried it. But there is no other way of investing seventy dollars which offers so good a chance of a fortune with so little risk of a blank. It leaves the Louisiana Lottery out of sight.

If you lend seventy dollars at compound interest it will take ten years to bring you in seventy more. Invested in a patent on a useful invention, no matter how simple, it may return you a hundred thousand the first year.

If you would like to know more on this subject, write to the Press Claims Co., 618 F street, N.W., Washingon, D.C., John Wedderburn, General Manager, and all the questions you care to ask will be answered without charge.

Addresses of Nurserymen and Seedsmen.

We offer 10,000 American and European addresses, ready for pasting on wrappers, at $7.50 per 1,000. Also 30,000 addresses of agents, at $3.00 per 1,000. C. R. Orcutt Publishing House, San Diego, Calif.

$100 Reward. $100.

State of Ohio, City of Toledo, } ss
Lucas County.

Frank J Cheney makes oath that he is the senior partner of the firm of F. J. Cheney & Co., doing business in the City of Toledo, County and State aforesaid, and that said firm will pay the sum of ONE HUNDRED DOLLARS for each and every case of Catarrh that cannot be cured by the use of HALL'S CATARRH CURE

FRANK J. CHENEY.

Sworn to before me and subscribed in my presence, this 6th day of December, A.D. 1886

[Seal.] A. W. GLEASON,
Notary Public.

Hall's Catarrh Cure is taken internally and acts directly on the blood and mucous surfaces of the system. Send for testimonials, free.

F. J. CHENEY & CO., Toledo, O.

☞ Sold by druggists, 75 cts.

"A work of supreme importance to students of botany and to horticulturists."

Now ready, Part I, pp. 728, quarto. Price to subscribers who take the whole work, Two Guineas, net.

The work will be completed in four parts, which will be issued to subscribers at Eight Guineas; and the price will be raised on publication.

Subscriptions will be received up till the publication of Part IV.

Part I (AA—Dendrobium) now ready. 4to, price to subscribers who take the whole work, £2 2s net, being £8 8s for the four parts.

INDEX KEWENSIS

PLANTARUM PHANEROGAMARUM NOMINA ET SYNONIMA
OMNIUM GENERUM ET SPECIERUM A LINNAEO USQUE
AD ANNUM MDCCCLXXXV COMPLECTENS NOMINE
RECEPTO AUCTORE PATRIA UNICUIQUE
PLANTAE SUBJECTIS

SUMPTIBUS
BEATI CAROLI ROBERTI DARWIN

DUCTU ET CONSILIO
JOSEPHI D. HOOKER

CONFECIT
B. D. JACKSON

The printing of Part II is well advanced, and the completion of the whole work may be expected during 1894.

The following communication from Sir Joseph Hooker, F.R.S., etc., etc., explains the origin, plan and purpose of this important and comprehensive undertaking:

"Shortly before his death Mr. Darwin informed me of his intention to devote a considerable sum in aid or furtherance of some work of utility to biological science; and to provide for its completion, should this not be accomplished during his lifetime. He also informed me that the difficulties he had experienced in accurately designating the many plants which he had studied, and ascertaining their native countries, had suggested to him the compilation of an Index to the Names and Authorities of all known Flowering Plants and their Countries, as a work of supreme importance to students of systematic and geographical botany and to horticulturists, as a fitting object of the fulfilment of his intentions

"I have only to add that, at his request, I undertook to direct and supervise such a work; and that it is being carried out at the herbarium of the royal gardens, Kew, with the aid of the staff of that establishment."

JOS. D. HOOKER.

London: Henry Froude, Clarendon Press Warehouse, Amen Corner, E.C.

The West American Scientist.

VOL VIII. SAN DIEGO, CAL., APRIL, 1894. WHOLE NO. 72

LILIES FROM NEAR AND FAR, CACTI, AND SEEDS.

Complete Lists Free.

ORCUTT SEED AND PLANT COMPANY, LOS ANGELES, CALIFORNIA.

CACTI

₱100 ANHALONIUM
$ —— Engelmanni
12 — Lewinii
—— prismaticum
15 00 Williamsii
ASTROPHYTUM
20 — myriostigma
CEREUS
10 — Berlandieri
8 — cæspitosus
15 — chloranthus
40 — cochal
25 — columbrinus
100 — dasyacanthus
50 — deficiens
25 — Emoryi
25 — Eosse manni
10 — enneacanthus
20 — flagelliformis
—— gemmatus
100 — giganteus
—— grandiflorus
75 — Greggii
100 — gummosus
75 — maritimus
150 — Mojavensis
100 — Pacificus
15 — pectinatus
200 — polyacanthus
200 — Pringlei
7 — procumbens
20 — rigidissimus
15 — stramineus
8 — triangularis
10 — tuberosus
20 — variabilis
25 — viridiflorum
ECHINOCACTUS
12 — bicolor
30 — brevihamatus
25 — caput-medusæ
25 — coptogonus
25 — cornigerus
20 — cylindraceus
—— intertextus
— electracanthus
40 — Emoryi
30 — hexædrophorus
25 — helophorus
2 — horizontalonius
40 — dasyacanthus
25 — Leconteï
25 — longehamatus
20 — lophothele
60 — McDowellii
30 — multicostatus
30 — Orcuttii
100 — polycephalus
50 — pilosus
p scheerianus
—— saltillensis
15 — Scheeri
8 — setispinus
15 — simpsonii
12 — sinuatus
12 — texensis
12 — viridescens
25 — wislizeni
50 — Wrightii
40 — No. 78: new
20 — No. 79: new
ECHINOPSIS
25 — Eyriesii
15 — Mulleri
25 — oxygona
MAMILLARIA
80 — Arizonica
8 — applanata
20 — beguini
20 — candida
10 — Childsii
15 — cornifera
15 — dæmonoceas
8 — decipiens
50 — deserti
10 — echinus
15 — echinata
—— v. albispina
15 — G. odrichii
10 — Grahamii
10 — lasciа (plumosa) lasciacantha
15 — v. denudata
50 — No. 81 new
15 — macromeris
8 — meiacantha
20 — v. longispina
15 — minima
15 — leona
15 — micromeris
15 — v. Greggii
50 — phellosperma
6 — pusilla
8 — pusilla Texana
—— pectinata
—— recurvens
30 — semperviva
15 — tuberculosa
20 — wildiana
8 — Wrightii
OPUNTIA
25 — basilaris
40 — v. ramosa
15 — bernardina
10 — Bigelovii
18 — chlorotica
10 — clavata
6 — Engelmanni
20 — echinocarpa
25 — Emoryi
10 — Ficus-indica
6 — fruticosa
6 — fruticosa major
6 — fulvispina
8 — turida, cuttings
8 — microdasys "
20 — Parryi
6 — prolifera
6 — serpentina
25 — tessellata
10 — tuna, cuttings
10 — tuna-manse
PILOCEREUS
200 — sargentianus
25 — senilis

LILIES FROM NEAR AND FAR.

₱100 AGAPANTHUS
$ 7 — umbellatus
15 — v. albidus
20 — v. variegata
ALOCASIA
8 — illustris
ALBUCA
25 — aurea
15 — fastigiata
20 — major
ALLIUM
2 25 acuminatum
2 25 falcifolium
4 40 fimbriatum
ARUM
6 — angustifolium
5 — cornutum
25 — crinitum
—— dracunculus
3 — italicum
5 — maculatum
15 — palestinum
15 — *sanctum
20 — syriacum
ALSTROEMERIA
4 — aurantiaca
4 — v. aurea
4 — hæmantha
2 25 hæmatochiton
2 — moly
1 75 serratum
1 50 unifolium
6 — peruviana
5 — psittacina
AMARYLLIS
4 — *atamasco
75 — *aulica
8 — belladonna
9 — v major
8 — *v. minor (type)
—— v. blanda
10 — v. spectabilis
50 — "Defiance"
9 — *equestre
5 — *formosissima
30 — graveana
30 — johnsoni
6 — longifolia alba
—— *lutea
50 — reginæ
6 — treatea
30 — vittata
BESSERA
2 50 elegans
BLOOMERIA
1 50 aurea
3 — Clevelandi
BRAVOORTIA
2 25 coccinea
BRODIÆA
1 — capitata
2 40 capitata alba
2 25 *coccinea
1 50 congesta
7 — filifolia
1 — grandiflora
9 — Hendersoni
9 — Howellii
1 — ixioides
1 — lactea
1 — laxa
2 25 minor
1 50 multiflora
4 — Orcuttii
2 25 peduncularis
1 50 stellaris
2 25 terrestris
4 50 voluhilis
90 MIXED, $6 ₱ 1000
CALOCHORTUS
1 80 albus
2 25 Benthamii
2 — flavus
— — Gunnisoni
8 — Howellii
10 — Kennedyi
2 25 Leichtlinii
1 50 Hlacinus
6 — longibarbatus
1 50 luteus
4 50 macrocarpus
1 50 maweanus
6 — Eattii as
6 — nudus
3 — Nuttallii
7 50 Pa mert
1 50 pulchellus
3 — splendens
3 — v atroviolacea
6 — Tolmiei
2 40 venustus
1 50 v. citrinus
1 50 v. oculatus
2 25 v. purpurascens
2 40 v. roseus
4 50 weedii
1 20 Mixed
CALADIUM
4 — *esculentum
CANNASSIA
10 — cusickii
90 esculenta
CANNA
4 — alphonse
14 — auncapo
3 — ehermanni
6 — Mad. Crozy
2 — noutoni
5 — Pres. Carnot
4 — robusta
5 — ventura
4 — flaccida
CHLOROGALUM
4 50 augustifolium
4 00 parvifolium
4 50 pomeridianum
COOPERIA
—— drummondi
2 50 pedunculata
CRINUM
5 — americanum
88 — amabile
10 — fimbriatulum
18 — kirkii
120 — ornatum
*CYCLOBOTHRA
2 — flava
CYCLAMEN
3 — coum
3 — europæum
10 — græcum
6 — hederæfolium
7 — "Mt. Blanc"
4 — neapolitanum
4 — repandum
DORYANTHES
75 — excelsa
ERYTHRONIUM
1 50 grandiflorum
9 — v. minor
2 25 Hartwegii
3 — Smithii
4 50 montanum
9 — Howellii
7 — Hendersoni
FRITILLARIA
4 50 atropurpurea
3 — biflora
6 — coccinea
3 — lanceolata
4 50 v. gracilis
3 — liliacea
4 50 parviflora
9 — messanensis
4 50 pudica
3 — recurva
FREESIA
—— leichtlini
—— v. major
60 refracta alba
FUCSCRÆA
10 — cubensis
10 — gigantea
GLADIOLUS
3 — illyricus
60 — "California"
40 — "Santa Rosa"
22 — "Mariposa"
12 — "Shasta"
12 — "Cisco"
22 — "Yolo"
gandavensis vars
—— ramoneii vars.
HESPEROCALLIS
40 — undulata
HEMEROCALLIS
12 — dumortieri
8 — flava
4 — fulva
5 — fulva fl pl
8 — kwanso
8 — v. fl pl
IPOMŒA
12 — paniculata
IRIS
6 — alata
—— anglica
31 — atropurpurea
5 — germanica
3 25 florentina
7 50 fum sa
18 — hedera

NOTES FROM THE TRAVELLER.

Early in the month of April, C. R. Orcutt started on a trip through Old Mexico, and the following notes received from him were by an oversight on the part of the printer omitted from last issue. Fortunately, however, they are as true and interesting as when first written.

Deming, New Mexico, proves the most presentable town I have seen since leaving California. It consists mostly of well-built houses, an indication of a good character of people, who are showing much enterprise. Mr. R. P. Smith, president of the Deming Land and Water Co., showed me their water system, just being put in operation. The well is sixty feet deep, and the pump (which took a premium at the Chicago Exposition) is able to pump a stream twelve by eighteen inches. The reservoir covers an area of ten acres, but has not yet been filled. The company expects to colonize and irrigate some 5,000 acres of land around the town. Fuel used here is mostly mesquite roots, the mesquite here forming only a shrub a few feet high instead of the tree of the Colorado Desert regions in California, but develops enormous roots, which can be obtained for only $2 per cord, and two cords are said to equal a ton of coal.

Mr. Alaire, the principal owner and manager of the canaigre extract works, kindly gave me much information about that industry.

The canaigre root is collected here where it grows wild at a cost of about $6 per ton, dried, leeched out and the product of the leeching is then boiled down to a hard resin which is packed in boxes and barrels. One ton of the extract is equal to three tons of the dried roots or nine tons of the fresh green roots, and is delivered in the London market at 5½ cents per pound. About one hundred tanners in the United States have or are now using the extract, and the product of its use is said to be a very soft, pliable, light-colored leather of unusually tough fibre.

In cultivation it has never yet been tried on a commercial scale, but it is readily propagated from roots, yielding a crop of fifteen to twenty tons per acre in two years from planting. The seed

are here said not to do well, only two or three per cent of the seed germinating.

Silver mines yielding 1,600 ounces to the ton have been discovered cropping out sixty miles south of here, in Mexico. The vein has already been traced for fourteen miles! A new railroad to the Mormon colony in Mexico is one of the probabilities of the near future.

The new colonies are likely to increase largely the acreage that is being planted here to fruit—deciduous trees and vines taking the lead. The horticultural development of the country is in its infancy—just at the turning point it is said, passing from experiment to reasonable certainty.

PUBLICATIONS RECEIVED.

Studies in the Botany of the Southeastern United States. I. By John K. Small. Reprinted from Bull. Torr. Bot. Club, xxi. pp. 15–20; plates 171–172.

Biographical sketch of Charles Christopher Parry, by C. H. Preston, together with a list of papers published by Dr. C. C. Parry, prepared by Mrs. C. C. Parry. Reprinted from Proc. Davenport (Ia.) Acad. Sci., vi. pp. 35–52, with portrait.

List of plants of Los Angeles County, Cal. By Anstruther Davidson, M.D. Price 25 cents. 20 pp. 8vo.

Extinct Monsters. A brief account of some of the most remarkable forms of animal life in the past history of the earth. By Stephen Bowers, Fallbrook, California: 1894. 30 pp. 8vo. with plate of Triceratops prorsus, and portrait of the author.

Notes on recent collections of North American land, fresh water and marine shells received from the U. S. Department of Agriculture. By Robert E. C. Stearns, Ph.D. From the Proceedings of the U. S. Nat'l Museum, xvi. pp. 743-755. 1894.

Description of a new species of blind-snakes (Typhlopidæ) from the Congo Free State. By Leonard Stejneger. From same, pp. 709-810.

Remarks on Japanese Snails. By Leonard Stejneger. From same, pp. 765-769.

MOLLUSK FAUNA OF THE GALAPAGOS ISLANDS.

The molluscan fauna of the Galapagos Islands, according to the summary resulting from the Albatross collection in the U. S. National Museum, and the species previously enumerated in the lists of various authorities and collectors, foots up 288 species and thirty varieties. Of these, fifty-nine collected by the Albatross were not before reported from these islands. Thirty-one species and seventeen varieties of land shells, principally *Bulimi*, form a part of the above total. The mollusca of the Galapagos, both marine and terrestrial, are distinctly West American in their characteristics; a few species suggesting Antillean forms. A small number also appear to be local; of these some dozen or more are new, and have been described by Mr. Dall and the writer. The land shells exhibit exceeding variability, and many species not recognized by me, are apparently based on varietal forms. The general aspect of the land shells, as well as the character of their variation, indicate their relationship to the Bulimoid forms of Chili, and Peru, and point to the South American main land as the region of their origin. Several deep water species have been described by Dall, and more remain to be examined and determined.

The Galapagos Islands seem to be the metropolis of many marine species that have hitherto been found sparingly on the main land. Among these are *Conus Fergusoni*, *Latirus tuberculatus*, *Purpura planaspira*, *Cassis tenuis* and *Cypraea nigropunctata*; while *Conus brunneus*, *Conus purpurascens*, *Murex princeps*, *Oniscidea tuberculosa*, *Cerithium maculosum*, and *Nerita scabricosta*, the latter of large size, are quite common.

While the *Pelecypoda* are represented in the list by sixty-one species, the number of individuals seems to be rather small. The *Onchidiidæ* are represented by two forms both indigenous, and *Tectarius* of the *Littorinidæ*, also occurs. The detection of a species of *Zonites* is worthy of special attention.

ROBERT E. C. STEARNS.

Guano found on islands and in Peru, etc., which was considered the excrements of birds, is now considered to be an accumulation of the bodies of animals and plants, mostly Diatomaceæ, upheaved from the bottom of the ocean by volcanic agency.

CULTURE OF THE GLADIOLUS.

One of the most beautiful flowering bulbs for summer planting is the Gladiolus. It is of most easy culture; any one can grow it successfully with the smallest possible amount of care, and by planting at intervals from ten to fourteen days apart, a continual succession of bloom may be had throughout the summer months. They are gradually growing into popular favor with all florists; for decorative work they are very valuable. By cutting the long spikes of blooms and placing them in water they retain their freshness for a long time, and gradually from day to day unfold the undeveloped buds. Care should be used in placing fresh water in your vases every morning, as the flowers keep much better.

I take great pleasure in growing them from seed. In March, 1892, I sowed some Lemoine's Hybrid Gladiolus seed in a rich sandy loam in a partly shaded garden. It was not long before the tiny blades made an appearance, and in the fall of '93 they well repaid me for all the trouble and care I had given them. They were indeed beautiful, sending up their immense spikes of gorgeous bloom in an endless variety of colors.

The Lemoine's Gladiolus is entirely different from all other varieties in the marking of its flowers, and can not be excelled in their beauty. There should not be a flower garden without them. I do not think that the seed sown from gladiolus will develop as fast in the north or Eastern States as they do here in Southern California, for in the north the bulbs must be taken up in the fall and stored in a cool place free from frost; in fact treated the same as potatoes. Here in California they have nothing to retard their growth but improve the time three hundred and sixty-five days in the year. I planted my bulbs from six to eight inches deep, thinking they do better than planting them too near the surface.

M. A. C.

CALIFORNIA PURE OLIVE OIL.

We are in receipt of the following circular:

The olive growers of California have established a depot at the store of their Treasurer, Justinian Caire, 521-523 Market street, San Francisco, where all the brands of pure California olive oil, approved by the association, will be on sale. The names and addresses of other dealers where these oils can be had will be freely given, and all particulars regarding the probable quantity of the different brands. All information concerning the importance of the daily use of pure olive oil, its medicinal value, etc., will be in pamphlet for gratuitous distribution. Samples of oils, of which tests are desired to determine their purity, may be left at the depot and an analysis will be made and reported in due time.

The public will be informed of bogus brands purporting to be California olive oil, which are put up under false labels and offered to the trade. The Association will from time to time purchase such bogus samples and keep them on exhibition at their depot where they can be seen; also the names of all parties who conform to the law by filing their affidavits of their different brands of olive oils will be on record and open to public inspection. The pamphlet referred to contains the names of all persons growing olives and actually making olive oil.

HAVE YOU EVER MADE AN INVENTION?

Of course you have. There are so many things in everyday life that could be made to work better by a little study that you must have thought of ways of improving them. If you have done anything of that kind

WHY DON'T YOU GET A PATENT?

Because it's too expensive? Nonsense, it will cost you only seventy dollars all told, and you may be able to sell it the day after its receipt for fifty thousand. Because your idea is too simple? It's simplicity that sells and pays. The idea of protecting the toes of boys' boots with copper tips was childishly simple, but it paid the inventor half a million dollars. You can't tell what there is in your idea until you have tried it. But there is no other way of investing seventy dollars which offers so good a chance of a fortune with so little risk of a blank. It leaves the Louisiana Lottery out of sight.

If you lend seventy dollars at compound interest it will take ten years to bring you in seventy more. Invested in a patent on a useful invention, no matter how simple, it may return you a hundred thousand the first year.

If you would like to know more on this subject, write to the Press Claims Co., 618 F street, N.W., Washingon, D.C., John Wedderburn, General Manager, and all the questions you care to ask will be answered without charge.

Addresses of Nurserymen and Seedsmen.

We offer 10,000 American and European addresses, ready for pasting on wrappers, at $7.50 per 1,000. Also 30,000 addresses of agents, at $3.00 per 1,000. C. R. Orcutt Publishing House, San Diego, Calif.

"A work of supreme importance to students of botany and to horticulturists."

Now ready, Part I, pp. 728, quarto. Price to subscribers who take the whole work, Two Guineas, net.

The work will be completed in four parts, which will be issued to subscribers at Eight Guineas; and the price will be raised on publication.

Subscriptions will be received up till the publication of Part IV.

Part I (AA—Dendrobium) now ready, 4to, price to subscribers who take the whole work, £2 2s net, being £8 8s for the four parts.

INDEX KEWENSIS

PLANTARUM PHANEROGAMARUM NOMINA ET SYNONIMA
OMNIUM GENERUM ET SPECIERUM A LINNAEO USQUE
AD ANNUM MDCCCLXXXV COMPLECTENS NOMINE
RECEPTO AUCTORE PATRIA UNICUIQUE
PLANTAE SUBJECTIS

SUMPTIBUS

BEATI CAROLI ROBERTI DARWIN

DUCTU ET CONSILIO

JOSEPHI D. HOOKER

CONFECIT

B. D. JACKSON

The printing of Part II is well advanced, and the completion of the whole work may be expected during 1894.

The following communication from SIR JOSEPH HOOKER, F.R.S., etc., etc., explains the origin, plan and purpose of this important and comprehensive undertaking:

"SHORTLY before his death Mr. Darwin informed me of his intention to devote a considerable sum in aid or furtherance of some work of utility to biological science; and to provide for its completion, should this not be accomplished during his lifetime. He also informed me that the difficulties he had experienced in accurately designating the many plants which he had studied, and ascertaining their native countries, had suggested to him the compilation of an INDEX TO THE NAMES AND AUTHORITIES OF ALL KNOWN FLOWERING PLANTS AND THEIR COUNTRIES, as a work of supreme importance to students of systematic and geographical botany and to horticulturists, as a fitting object of the fulfilment of his intentions

"I have only to add that, at his request, I undertook to direct and supervise such a work; and that it is being carried out at the herbarium of the royal gardens, Kew, with the aid of the staff of that establishment."

JOS. D. HOOKER.

London: Henry Froude, Clarendon Press Warehouse, Amen Corner, E.C.

The West American Scientist.

VOL. VIII. SAN DIEGO, CAL., MAY, 1894. WHOLE NO. 73

LILIES FROM NEAR AND FAR, CACTI, AND SEEDS.

Complete Lists Free.

ORCUTT SEED AND PLANT COMPANY, LOS ANGELES, CALIFORNIA.

CACTI

$100 ANHALONIUM
3 — Engelmanni
12 — Lewinii
— prismaticum
15 00 Williamsii
ASTROPHYTUM
30 — myriostigma
CEREUS
10 — Berlandieri
8 — cæspitosus
15 — chloranthus
40 — cochal
25 — columbrinus
100 — dasyacanthus
50 — deficiens
25 — Emoryi
25 — Engelmanni
30 — eoneacanthus
20 — flagelliformis
— gemmatus
100 — giganteus
— grandiflorus
75 — Greggii
100 — gummosus
75 — maritimus
150 — Mojavensis
100 — Pacificus
15 — pectinatus
200 — polyacanthus
[illegible] — Pringlei
7 — procumbens
20 — rigidissimus
15 — stramineus
8 — triangularis
10 — tuberosus
20 — variabilis
25 — viridiflorum
ECHINOCACTUS
12 — bicolor
30 — brevihamatus
25 — caprico nis
25 — coptogonus
25 — cornigerus
20 — cylindraceus
— intertextus
— electracanthus
40 — Emoryi
30 — hexedrophorus
25 — helophorus
2[illegible] — horizontalonius
40 — dasyacanthus
25 — Lecontei
25 — longehamatus
20 — lophothele
60 — McDowellii
20 — multicostatus
30 — Orcuttii
100 — polycephalus
50 — pilosus
p. sclerianus
— saltillensis
15 — Scheeri
8 — s-tispinus
15 — simpsonii
12 — sinuatus
12 — texensis
12 — viridescens
25 — wislizeni

60 — Wrightii
40 — No. 72: new
20 — No. 79: new
ECHINOPSIS
25 — Eyri-sii
15 — Mulleri
25 — oxygona
MAMILLARIA
80 — Arizonica
8 — applanata
20 — beguini
20 — candida
10 — Childsii
15 — cornifera
15 — dæmonoceas
8 — decipiens
50 — deserti
10 — echinus
15 — echinata
— v. albispina
15 — Goodrichii
10 — Grahamii
10 — lascia (plumosa)
lasciacantha
15 — v. denudata
50 — No. 81 new
15 — macromeris
8 — meiacantha
20 — v. longispina
15 — minima
15 — leona
15 — micromeris
15 — v. Greggii
80 — phellosperma
6 — pusilla
8 — pusilla Texana
— pectinata
— recurvens
30 — sempervira
15 — tuberculosa
20 — wildiana
8 — Wrightii
OPUNTIA
25 — basilaris
40 — v. ramosa
15 — bernardina
10 — Bigelovii
18 — chlorotica
10 — clavata
6 — Engelmanni
20 — echinocarpa
25 — Emoryi
10 — Ficus-Indica
6 — frutescens
6 — frutescens major
6 — fulvispina
8 — aurida, cuttings
8 — microdasys "
2[illegible] — Parryi
6 — prolifera
6 — serpentina
25 — tessellata
10 — tuna, cuttings
10 — tuna-manse
PILOCEREUS
2[illegible]0 — sargentianus
25 — senilis

LILIES FROM NEAR AND FAR.

$3 100 AGAPANTHUS
[illegible] — umbellatus
15 — v. albidus
20 — v. variegata
ALOCASIA
8 — illustris
ALSTŒMERIA
25 — aurea
15 — fastigiata
20 — major
ALLIUM
2 25 acuminatum
2 25 falcifolium
4 40 fimbriatum

ARUM
6 — angustifolium
5 — cornutum
25 — crinitum
— dracunculus
3 — italicum
5 — maculatum
15 — palestinum
15 — *sanctum
20 — syriacum
ALSTROEMERIA
4 — aurantiaca
4 — v. aurea
4 — haemantha

2 25 hæmatochiton
2 — moly
1 75 serratum
1 50 unifolium
6 — peruviana
5 — psittacina
AMARYLLIS
4 — *atamasco
75 — *aulica
8 — belladonna
9 — v major
8 — *v. minor (type)
— v. blanda
10 — v. spectabilis
50 — "Defiance"
9 — *equestre
5 — *formosissima
30 — graveana
30 — johnsoni
6 — longifolia alba
— *lutea
50 — reginæ
6 — treatea
30 — vittata
BESSERA
2 50 elegans
BLOOMERIA
1 50 aurea
3 — Clevelandi
BRAVOORTIA
2 25 coccinea
BRODIÆA
1 — capitata
2 40 capitata alba
2 25 *coccinea
1 50 congesta
7 — filifolia
1 — grandiflora
9 — Hendersoni
9 — Howellii
1 — ixioides
1 — lactea
1 — laxa
2 25 minor
1 50 multiflora
4 — Orcuttii
2 25 peduncularis
1 50 stellaris
2 25 terrestris
4 50 volubilis
90 MIXED, $6 ₱ 1000
CALOCHORTUS
1 80 albus
2 25 Benthamii
2 — flavus
6 — Gunnisoni
8 — Howellii
10 — Kennedyi
2 25 Leichtlinii
1 50 lilacinus
6 — longibarbatus
1 50 luteus
4 50 macrocarpus
1 50 maweanus
6 — Eattianus
6 — nudus
3 — Nuttallii
7 50 Palmeri
1 50 pulchellus
3 — splendens
3 — v atroviolacea
6 — Tolmiei
2 40 venustus
1 50 v. citrinus
1 50 v. oculatus
2 25 v. purpurascens
2 40 v. roseus
4 50 weedii
1 20 Mixed
CALADIUM
4 — *esculentum
CAMASSIA
10 — cusickii
90 esculenta
CANNA
4 — alphonse
14 — ausecapa

3 — ehermanni
6 — Mad. Crozy
2 — noutoni
5 — Pres. Carnot
4 — robusta
5 — ventura
4 — flaccida
CHLOROGALUM
4 50 augustifolium
4 00 parvifolium
4 50 pomeridianum
COOPERIA
— drummondi
2 50 pedunculata
CRINUM
5 — americanum
88 — amabile
10 — fimbriatulum
18 — kirkii
120 — ornatum
*CYCLOBOTHRA
2 — flava
CYCLAMEN
3 — coum
3 — europæum
10 — græcum
6 — hederæfolium
7 — "Mt. Blanc"
4 — neapolitanum
4 — repandum
DORYANTHES
75 — excelsa
ERYTHRONIUM
1 50 grandiflorum
9 — v. minor
2 25 Hartwegii
3 — Smithii
4 50 montanum
9 — Howellii
7 — Hendersoni
FRITILLARIA
4 50 atropurpurea
3 — biflora
6 — coccinea
3 — lanceolata
4 50 v. gracilis
3 — liliacea
4 50 parviflora
9 — messanensis
4 50 pudica
3 — recurva
FREESIA
— leichtlini
— v. major
60 refracta alba
FURCRÆA
10 — cubensis
10 — gigantea
GLADIOLUS
3 — illyricus
60 — "California"
40 — "Santa Rosa"
22 — "Mariposa"
12 — "Shasta"
13 — "Cisco"
22 — "Yolo"
gandavensis vars
— lemoneii vars.
HESPEROCALLIS
40 — undulata
HEMEROCALLIS
12 — dumortieri
8 — flava
4 — fulva
5 — fulva fl pl
8 — kwanso
8 — v. fl pl
IPOMŒA
12 — paniculata
IRIS
6 — alata
— anglica
30 — atrofusca
5 — germanica
3 25 florentina
7 50 fum sa
18 — hedera

THE PRODUCTION OF ARTIFICIAL RAIN.

By B. S. Pague, Forecast Official.

In arid or semi-arid regions the subject of rainfall in connection with crop production is a most important one. The question of what is the least amount of rain that is necessary to produce crops has been frequently argued, but this one fact can be relied upon: good crops on other than adobe soil can be raised with ten inches of rainfall, if the rainfall is properly distributed and the temperature conditions favorable. With unfavorable temperature conditions at the time the stem of the product is full of sap, forty inches of annual rainfall will not assure good crops. In California the autumn rains begin in October and by December 1st the soil in all parts of the State is in condition to plow and seed. The rains of December, January and February are usually sufficient, even in the phenomenal dry years, to cause the seed to sprout and the grain to grow. Statistics bear out the assertion that it is upon the rainfall of March, April and May that the crops of California depend. The largest crop ever produced in the State was in 1880 when in April the rainfall was the heaviest on record. The years of great drouth in California and consequent short crops were in 1851, 1864 and 1877. The present season to the south of Stockton and especially south of the Tehachapi mountains, is similar to the year 1877. As the State is developed the necessity for irrigation is more apparent and more irrigation is practiced year by year, so that the same percentage of deficiency in the total product will not prevail that did prevail in former years of deficient rainfall. The following statement shows how the rainfall this season compares with the average:

Places.	Total for season to date.	Average seasonal to date	Average seasonal July 1 to June 30.	Percentage of deficiency for season to date.
San Francisco	16.10	20.88	23.93	23
Red Bluff	19.15	22.23	26.55	13
Sacramento	13.85	16.91	19.53	18
Fresno	6.17	8.33	9.27	26
Los Angeles	6.40	16.15	18.22	60
San Diego	4.76	9.88	11.16	52

In the season of 1876–77 the total rainfall at Los Angeles amounted to 5.28 inches, at San Francisco to 10.00 inches, and at Sacramento 8.96 inches. In 1863–64 the total at San Francisco amounted to 10.08 inches, at Sacramento 7.87 inches, while for the least seasonal rainfall on record in 1850–51, at San Francisco 7.40 inches, and at Sacramento 4.71 inches fell. In a period of 45 years there have been three seasons of drouth in California, and in addition several years of markedly deficient rainfall when vegetation suffered and crops were short for lack of rainfall. These facts are mentioned to show that artificial means are necessary to always insure sufficient moisture for good crops, though in favorable years—favorable in as-

much that the rain has been well distributed—artificial means need not be resorted to to produce good crops.

A popular fallacy exists that after all great battles heavy rain fell and that the rainfall was due to cannonading. This fallacy took such a strong hold of some, that Congress was induced to make an appropriation to determine whether rain could be produced by the use of explosives. The experiments were conducted in 1891 in Texas, under the charge of the Forestry Division of the Agricultural Department. The official report on the subject made by the meteorologist who accompanied the expedition contained the following: "These experiments have not afforded any scientific standing to the theory that rain storms can be produced by concussion."

When the expedition reached Midland, Texas, some experiments were made to test the material composing the rackarock. No results were expected from the tests, but the following afternoon considerable rain fell. An employee of the expedition took upon himself the sending of the following message: "Fired some explosives yesterday afternoon. Raining hard today." This first telegraphic report was followed by others. As the natural operation and result have become known the attitude of the newspapers became changed from unsuspecting and ready acceptance to satire and ridicule. Where millions saw the dispatches only hundreds have read a detailed account of the facts, and a vast number of people still believe that the experiments were in some degree successful, and concussion, when made for the purpose, will produce rain. So errors, which will require years of teaching to eradicate, have been sown broadcast in a single summer, and the rainmaking myth is added to the numerous errors about the weather which already prevail.

Charlatans, sharpers and fakers have not been slow to seize the opportunity thus afforded. Artificial rain companies have sprung up and are yet engaged in defrauding the farmers of this and other States by contracting to produce rain and by selling "rights" to use their various methods.

Rainmakers are now at work in this State, especially in those sections where the deficient rainfall is most noticeable in its effects on crops. Mr. Edgar B. Davison, of Ballard, Santa Barbara county, writes this office under date of April 5, 1894: "Would you kindly inform me as to the possibilities of causing rain by artificial means. We all know that during the Harrison administration experiments were made on the production of rain, but the newspaper reports were so conflicting as to be entirely unsatisfactory. Were these experiments as complete failures as some authorities would have us think? We have the prospects of a dry season staring us in the face, and there is some talk of 'rain experiments.' Will you kindly give me your opinion on the matter."

This is in answer to Mr. Davison's letter: For example, suppose you take a cubic mile of air upon which operations were made in Texas, on the night of Friday, November 25, 1892. The record shows the temperature of the air as 72 degrees, the dew-point 31 degrees. To cool down a cubic mile

of that air to the dew-point would require the abstraction of as much heat as would raise 88,000 tons of water from the freezing to the boiling point. To cool it down another eleven degrees would require as much more heat to be abstracted. The amount of water set free would be 20,000 tons which, spread over a square mile would give about 1.4 pounds per square foot, or 0.7 of an inch of rainfall. The amount of latent heat set free by the condensation of that amount of water would raise 100,000 tons of water from the freezing to the boiling point, and it would be necessary to abstract this heat in order that the rainmaking might go on. The foregoing on the presumption that the cubic mile of air be kept constant; if the air operated on is constantly changing the task becomes one of infinitely greater difficulty.

Two causes of artificial rain have been suggested, explosion and fire. The belief that battles occasion rain is older than the invention of gunpowder, for Plutarch in a sentence often quoted, says: "It is a matter of current observation that extraordinary rains pretty generally fall after great battles." And he explains this by supposing that some divine power in this way cleanses the earth or that the vapor from the blood steams forth and makes moisture fall. If from a great heat a large body of air is made to ascend in a column a large cloud will be generated and that cloud will contain in itself a self-sustaining power, which may move from the place over which it has formed and cause the air over which it passes to rise up into it and thus form cloud and rain, until the rain may become more general. This is in theory, but the records of great fires do not show that rain has been caused by them. Relative to explosions or concussions, it appears probable that on the southeast quadrant of a storm (the region of greatest moisture), if no rain should fall, though it threatened, great concussions to cause a disturbance of the water particles held in suspension would produce rainfall. The Texas experiments were made without attempting to produce rain when the conditions were favorable for rain, but under any and all conditions the attempt was made, with the result a practical failure, though in a few instances a few drops of rain fell.

It may be stated in conclusion that, admitting that explosives and fires have in some few cases determined rainfall, they can only do so when moisture is present in sufficient quantity in the air, and when the other conditions, such as temperature and wind, are favorable. In other words, when the conditions are favorable for rain, explosives and fires may precipitate rain, but when the air is too dry, no artificial means can cause rain to fall. Legitimate scientific investigation for the production of rain should be encouraged, but the experiments should first be carried on in the physical laboratory before attempting them upon natures great physical laboratory. Those people who do not desire to be duped will do well not to contract or subscribe for any rainmaking agents for the production of rain. Money invested in developing irrigating canals will prove to be of far greater value and yield ten thousand fold more returns.

Weather Bureau Office, San Francisco, Cal., April 11, 1894.

THE IRRIGATION MOVEMENT.

Active preparations are now being made for the next National Irrigation Congress to be held about September 15, at some point in the West not yet determined on. The last Congress, which was in session an entire week in Los Angeles, October 1893, appointed Commissioners in every Western State and Territory, whose duty it is to prepare a report to be submitted to the coming Congress covering all the features of special interest in each State and Territory of the Arid West. These reports will show the amount of arid and semi-arid land; the amount of land now irrigated, and the acreage believed to be irrigable; the sources of water supply, developed and possible of development; the cost of procuring, storing, and delivering water on lands; State legislation, in force and needed; National legislation as to the disposition of arid lands and government control of water sources; and such other points as may suggest themselves to each Commission as being pertinent to their own State.

The Commission for California is composed of Eli H. Murray, San Diego, Chairman; C. C. Wright, Modesto; Will S. Green, Colusa; John A. Pirtle, Los Angeles; L. M. Holt, Los Angeles; Frank Robbins, San Diego, Secretary.

The citizens of this State are cordially invited to correspond with any of these gentlemen, and give them such information as they may possess on the points to be covered by their report, as it is designed to cover every point of interest which can be suggested. Information covering the work of the National Committee can be obtained from Fred L. Alles, Secretary, Los Angeles, California, and information as to the work in this State from any of the Commissioners named above.

"As the season of Spring approaches, the irrepressible small boy appears on the scene with sling-shot and target rifle and begins the cruel work of murdering our familiar birds. Most of these birds are, in the long run, beneficial to the horticulturist and farmer. Moreover, for every bird slain a large number are only wounded and escape, to drag out a wretched existence until death relieves them. The thought of the unnecessary suffering inflicted upon helpless animals by the thoughtless or cruel, prompts me to take this opportunity to appeal to citizens of our towns and cities, urging them to see that the laws which forbid the using of sling-shot or gun within the corporate limits, and the laws which protect our birds, be strictly enforced."—F. L. Washburn, in Bulletin No. 31 Oregon Experiment Station.

A specimen of mistletoe from Nevada is figured in Meehan's Monthly, though it has hitherto been found only in California. The mistletoe of the Old World is viscum, and those of the New World are phoradendron. The white berries are compared to pearls.

HAVE YOU EVER MADE AN INVENTION?

Of course you have. There are so many things in everyday life that could be made to work better by a little study that you must have thought of ways of improving them. If you have done anything of that kind

WHY DON'T YOU GET A PATENT?

Because it's too expensive? Nonsense, it will cost you only seventy dollars all told, and you may be able to sell it the day after its receipt for fifty thousand. Because your idea is too simple? It's simplicity that sells and pays. The idea of protecting the toes of boys' boots with copper tips was childishly simple, but it paid the inventor half a million dollars. You can't tell what there is in your idea until you have tried it. But there is no other way of investing seventy dollars which offers so good a chance of a fortune with so little risk of a blank. It leaves the Louisiana Lottery out of sight.

If you lend seventy dollars at compound interest it will take ten years to bring you in seventy more. Invested in a patent on a useful invention, no matter how simple, it may return you a hundred thousand the first year.

If you would like to know more on this subject, write to the Press Claims Co., 618 F street, N.W., Washingon, D.C., John Wedderburn, General Manager, and all the questions you care to ask will be answered without charge.

"A work of supreme importance to students of botany and to horticulturists."

Now ready, Part I, pp. 728, quarto. Price to subscribers who take the whole work, Two Guineas, net.

The work will be completed in four parts, which will be issued to subscribers at Eight Guineas; and the price will be raised on publication.

Subscriptions will be received up till the publication of Part IV.

Part I (AA—Dendrobium) now ready, 4to, price to subscribers who take the whole work, £2 2s net, being £8 8s for the four parts.

INDEX KEWENSIS

PLANTARUM PHANEROGAMARUM NOMINA ET SYNONIMA
OMNIUM GENERUM ET SPECIERUM A LINNAEO USQUE
AD ANNUM MDCCCLXXXV COMPLECTENS NOMINE
RECEPTO AUCTORE PATRIA UNICUIQUE
PLANTAE SUBJECTIS

SUMPTIBUS
BEATI CAROLI ROBERTI DARWIN

DUCTU ET CONSILIO
JOSEPHI D. HOOKER

CONFECIT
B. D. JACKSON

The printing of Part II is well advanced, and the completion of the whole work may be expected during 1894.

The following communication from Sir Joseph Hooker, F.R.S., etc., etc., explains the origin, plan and purpose of this important and comprehensive undertaking:

"Shortly before his death Mr. Darwin informed me of his intention to devote a considerable sum in aid or furtherance of some work of utility to biological science; and to provide for its completion, should this not be accomplished during his lifetime. He also informed me that the difficulties he had experienced in accurately designating the many plants which he had studied, and ascertaining their native countries, had suggested to him the compilation of an Index to the Names and Authorities of all known Flowering Plants and their Countries, as a work of supreme importance to students of systematic and geographical botany and to horticulturists, as a fitting object of the fulfilment of his intentions

"I have only to add that, at his request, I undertook to direct and supervise such a work; and that it is being carried out at the herbarium of the royal gardens, Kew, with the aid of the staff of that establishment."

JOS. D. HOOKER.

London: Henry Froude, Clarendon Press Warehouse, Amen Corner, E.C.

The West American Scientist.

VOL. VIII. SAN DIEGO, CAL., JUNE, 1894. WHOLE NO. 74

LILIES FROM NEAR AND FAR, CACTI, AND SEEDS.

Complete Lists Free.

ORCUTT SEED AND PLANT COMPANY, LOS ANGELES, CALIFORNIA.

CACTI

$1 00 ANHALONIUM
5 — Engelmanni
12 — Lewinii
— prismaticum
15 00 Williamsii

ASTROPHYTUM
30 — myriostigma

CEREUS
10 — Berlandieri
8 — cæspitosus
15 — chloranthus
40 — cochal
25 — columbrinus
100 — dasyacanthus
50 — deficiens
25 — Emoryi
25 — Engelmanni
10 — enneacanthus
20 — flagelliformis
— gemmatus
100 — giganteus
— grandiflorus
75 — Greggii
100 — gummosus
75 — maritimus
150 — Mojavensis
100 — Pacificus
15 — pectinatus
200 — polyacanthus
250 — Pringlei
7 — procumbens
30 — rigidissimus
15 — stramineus
8 — triangularis
10 — tuberosus
20 — variabilis
25 — viridiflorum

ECHINOCACTUS
12 — bicolor
30 — brevihamatus
25 — capricornis
25 — coptogonus
25 — cornigerus
20 — cylindraceus
— intertextus
— electracanthus
40 — Emoryi
30 — hexedrophorus
25 — helophorus
20 — horizontalonius
40 — dasyacanthus
25 — Leconteï
25 — longehamatus
20 — lophothele
60 — McDowellii
20 — multicostatus
30 — Orcuttii
100 — pentacephalus
50 — pilosus
— p. selleriannus
— saltillensis
15 — Scheeri
8 — setispinus
15 — simpsonii
12 — simulans
12 — texensis
12 — viridescens
25 — wislizeni

50 — Wrightii
40 — No. 72: new
20 — No. 79: new

ECHINOPSIS
25 — Eyriesii
15 — Mulleri
25 — oxygona

MAMILLARIA
80 — Arizonica
8 — applanata
20 — beguini
20 — candida
10 — Childsii
15 — cornifera
15 — dæmonoceas
8 — deciplens
50 — deserti
10 — echinus
15 — echinata
— v. albispina
15 — Goodrichii
10 — Grahamii
10 — lasciа (plumosa)
— lasciacantha
15 — v. denudata
50 — No. 81 new
15 — macromeris
8 — meiacantha
20 — v. longispina
15 — minima
15 — leona
15 — micromeris
15 — v. Greggii
50 — phellosperma
6 — pusilla
8 — pusilla Texana
— pectinata
— recurvene
30 — sempervіva
15 — tuberculosa
20 — wildiana
8 — Wrightii

OPUNTIA
25 — basilaris
40 — v. ramosa
15 — bernardina
10 — Bigelovii
18 — chlorotica
10 — clavata
6 — Engelmanni
20 — echinocarpa
25 — Emoryi
10 — Ficus-Indica
6 — frutescens
6 — frutescens major
6 — fulvispina
8 — lurida, cuttings
8 — microdasys "
20 — Parryi
6 — prolifera
6 — serpentina
25 — tessellata
10 — tuna, cuttings
10 — tuna-manse

PILOCEREUS
2 50 — sargentianus
25 — senilis

LILIES FROM NEAR AND FAR.

$ 100 AGAPANTHUS
7 — umbellatus
15 — v. nibidus
20 — v. variegata

ALOCASIA
8 — illustris

ALBUCA
25 — aurea
15 — fastigiata
20 — major

ALLIUM
2 25 acuminatum
2 25 falcifolium
4 40 fimbriatum

ARUM
6 — angustifolium
5 — cornutum
25 — crinitum
— dracunculus
3 — italicum
5 — maculatum
15 — palestinum
15 — *sanctum
20 — syriacum

ALSTROEMERIA
4 — aurantiaca
4 — v. aurea
4 — haemantha

2 25 hæmatochiton
2 — moly
1 75 serratum
1 50 unifolium
6 — peruviana
5 — psittacina

AMARYLLIS
4 — *atamasco
75 — *aulica
8 — belladonna
9 — v major
8 — *v. minor (type)
— v. blanda
10 — v. spectabilis
50 — "Defiance"
9 — *equestre
5 — *formosissima
30 — graveana
30 — johnsoni
6 — longifolia alba
— *lutea
50 — reginæ
6 — treatea
30 — vittata

BESSERA
2 50 elegans

BLOOMERIA
1 50 aurea
3 — Clevelandi

BREVOORTIA
2 25 coccinea

BRODIÆA
1 — capitata
2 40 capitata alba
2 25 *coccinea
1 50 congesta
7 — filifolia
1 — grandiflora
9 — Hendersoni
9 — Howellii
1 — ixioides
1 — lactea
1 — laxa
2 25 minor
1 50 multiflora
4 — Orcuttii
2 25 pedunculariS
1 50 stellaris
2 25 terrestris
4 50 volubilis
90 MIXED, $6 ℔ 1000

CALOCHORTUS
1 80 albus
2 25 Benthamii
2 — flavus
6 — Gunnisoni
8 — Howellii
10 — Kennedyi
2 25 Leichtlinii
1 50 lilacinus
6 — longibarbatus
1 50 luteus
4 50 macrocarpus
1 50 maweanus
6 — Eastwoodiae
6 — nudus
3 — Nuttallii
7 50 Palmeri
1 50 pulchellus
3 — splendens
3 — v atroviolacea
6 — Tolmiei
2 40 venustus
1 50 v. citrinus
1 50 v. oculatus
2 25 v. purpurascens
2 40 v. roseus
4 50 weedii
1 20 Mixed

CALADIUM
4 — *esculentum

CAMASSIA
10 — cusickii
90 esculenta

CANNA
4 — alphonse
14 — annaeana

3 — ehermanni
6 — Mad. Crozy
2 — noutoni
5 — Pres. Carnot
4 — robusta
5 — ventura
4 — flaccida

CHLOROGALUM
4 50 augustifolium
4 00 parvifolium
4 50 pomeridianum

COOPERIA
— drummondi
2 50 pedunculata

CRINUM
5 — americanum
88 — amabile
10 — fimbriatulum
18 — kirkii
120 — ornatum

*CYCLOBOTHRA
2 — flava

CYCLAMEN
3 — coum
3 — europæum
10 — græcum
6 — hederæfolium
7 — "Mt. Blanc"
4 — neapolitanum
4 — repandum

DORYANTHES
75 — excelsa

ERYTHRONIUM
1 50 grandiflorum
9 — v. minor
2 25 Hartwegii
3 — Smithii
4 50 montanum
9 — Howellii
7 — Hendersoni

FRITILLARIA
4 50 atropurpurea
3 — biflora
6 — coccinea
3 — lanceolata
4 50 v. gracilis
3 — liliacea
4 50 parviflora
9 — messanensis
4 50 pudica
3 — recurva

FREESIA
— leichtlini
— v. major
60 refracta alba

FUNCKIA
10 — cubensis
10 — gigantea

GLADIOLUS
3 — illyricus
60 — "California"
40 — "Santa Rosa"
22 — "Mariposa"
12 — "Shasta"
12 — "Cisco"
22 — "Yolo"
gandavensis vars
— lemoinei vars.

HESPEROCALLIS
40 — undulata

HEMEROCALLIS
12 — dumortieri
8 — flava
4 — fulva
5 — fulva fl pl
8 — kwanso
8 — v. fl pl

IPOMŒA
12 — paniculata

IRIS
6 — alata
— anglica
30 — atrofusca
5 — germanica
3 25 florentina
7 50 fumosa
18 — hedera

MEXICAN NOTES.

The morning of the 26th of April, 1894, found the writer entering the City of Mexico in search of many things horticultural. Just around the corner of the National Palace a familiar face was met in the person of Mr. Fred Higgins — when last seen a resident of Baja California.

Later in the day a visit was paid to the Museo Nacional, where by the merest chance I had the pleasure of meeting the national botanist, Dr. Manuel Urbina, through whom I had the pleasure of visiting the natural history rooms and herbarium, not yet open to the public, and was also given an introduction to Dr. A. L. Herrera, one of the best known naturalists of Mexico, to whom I was subsequently indebted for many favors.

On the 7th of May, having hunted well over the old Aztec city, so full of historic reminders, I paid a visit to the beautiful town of Cuautla, which lies within the tierra templada, where Jack Frost is never known to visit. Near this town I found beautiful trees of the wild fig, and many wild flowers and shrubbery whose acquaintance I had not previously made. It is not the object of this article to give an account of the many beautiful plants that were seen, nor to dilate upon other tropical beauties. It will perhaps be more practical to speak of some general existing conditions observed in this sister republic of ours.

One great surprise was to observe the arid condition of so large a portion of the country; my visit was at the warmest and dryest season of the year it is true, but the northern portion of the republic is fully as arid as the southwest portion of the United States, and in fact the same conditions exist throughout the larger part of the tierra templada and tierra frio of Mexico. The tierra caliente is abundantly supplied with water, I judged from what I saw and was told by others who had traversed larger areas than I.

Another surprise was the inferior quality of most of the fruits sampled. The oranges first sampled were very sweet but insipid; others eaten later were of fine flavor but inferior in other respects — in fact in no wise equal to those of California. The

is doubtless due to the non-introduction as yet of the finer varieties, for certainly Mexico should be capable of producing as fine an orange as any country, and those of Guadalajara are said to be fine in every respect.

The small apricots were hardly to be recognized—scarcely as large as plums but of fair flavor. A good drummer should be able to sell every tree in the nurseries of California, if he were to travel one season through Mexico with truthful representations of our fruit.

At Irapuato the natives offer the passengers of the Mexican Central railway fine strawberries the year round. The tourist is often disappointed to find only one layer of the large luscious berries on the top of his basket, but he will find the small berries that fill the bulk of the basket just as sweet; and if philosophical in mind will congratulate himself on having thrice as many berries for his money as if they were all large!

The native fruits were mostly pleasant, though some are not at first palatable, until a taste has been acquired for them. The Mango, Mammee, Sapotas, Anonas, Pineapples and Bananas were all duly tested, but in general pronounced inferior to our temperate fruits.

Another surprise was to find potatoes, raised in California, upon the table in Mexico City—where I was told they retail at twenty-five cents per pound! (at wholesale bringing eight cents per pound).

Many Americans are now turning their attention to Mexico, where many opportunities for making money await men of enterprise *and capital*. The poor man has no showing, unless he goes with a capitalist or strong corporation as his patron.

Coffee receives the greatest attention and is very remunerative at the present time. But many turn from coffee after careful investigation of the prospects and enter some other line of production or trade.

Day labor is cheap; one strong young fellow offered to work for me for four dollars per month and board himself! Twenty-five cents to a dollar a day are the usual wages paid—probably 36 cents a day being a fair average. Lands in large tracts can be

bought as low as $1.25 per acre, and from that up to several hundred dollars per acre.

Near Mexico City the cultivation of the Maguey plant is doubtless of primary importance. Corn and beans are also important crops in Mexico, and, with red peppers, form the bulk of the food of the lower classes — to which three-fourths of the population of the republic belong.

Mexico is a land of strong contrasts: the rich and the poor are farther apart even than in the United States; the several zones living one above the other offer all the vegetable growths of tropic and temperate regions within a few miles of each other; and last, but not least noticeable we are brought to contrast the ancient Aztec, the Spanish, and the more modern styles of art and customs — all side by side.

Gross ignorance and superstition still hold the lower classes in subjection. Vice and filth equally abound, and disease of every description make strong inroads on the population annually. Strangers almost invariably become victims of some disease the first year of their residence, and often, as in the writer's experience, within the first month of their arrival in the country. On the 20th of May the writer was taken with a fever, and on the 8th of June he was glad to return to California to recuperate.

C. R. ORCUTT.

EDITORIAL.

After several months of field work the editor again takes his pen in hand. With his botanical work in Mexico so inceriminously cut short he cannot hope to offer much that is new to the literature of Mexico, but in the few weeks of active work in the City of Mexico much information was gleaned that may be as new to our readers as to us.

Withal, the most valuable lesson learned, and the most valuable information gained, is that California is the most beautiful and healthful land known to mankind, and has nothing to fear for many years from Mexican competition in the growing of fruits or flowers, but on the other hand Mexico may be made one of the best customers of the Golden State.

COTYLEDON ORBICULATA L.

Dr. William Trelease contributes a description of this succulent decorative plant to the fifth annual report of the Missouri Botanical Garden, accompanied by a plate (No. 29). It is an African species, rarely mentioned in the catalogues of nurserymen, though said to have been introduced into Europe in 1690.

It makes a fine shrub when well grown, and produces clusters of large pendant flowers of a delicate flesh color, shaded at times with darker red or light green, which add greatly to its beauty Dr. Trelease's description and figures were drawn from specimens from the nursery of Messrs. Lyon & Cobbe, Los Angeles. Calif., whose collection of succulents and cacti is one of the most complete in America.

MEXICAN FLOWER MARKETS.

The City of Mexico possesses many interesting markets, and the market places are perhaps the most typical of the Aztec regime. The raising and selling of cut flowers is almost exclusively in the hands of Indian women, if not entirely — there being only one foreign florist, whose business in cut flowers was apparently small. The Indians raise the flowers outside of the city and bring in every morning to the market, an iron pavillion near the cathedral built on the site of the Aztec temple.

On the first of May roses and pansies and camelias were in the greatest abundance, while some old fashioned flowers, carnations, poppies, bachelor buttons, sweet peas (homely varieties), larkspurs and lupins were displayed in smaller quantities.

The large formal bouquets gave little scope for the display of artistic talent, but the beautifully marked varieties of pansies made everything containing them attractive.

Various street vendors of artificial plants and flowers, and vendors of orchids or other native plants was another noticeable feature of the city's floricultural trade. In May Indians daily paraded the streets with blooming plants of La Flor de Mayo (Laelia majalis), the bright magenta colored flowers lending beauty to the picturesque street scenes.

C. R. Orcutt.

HAVE YOU EVER MADE AN INVENTION?

Of course you have. There are so many things in everyday life that could be made to work better by a little study that you must have thought of ways of improving them. If you have done anything of that kind

WHY DON'T YOU GET A PATENT?

Because it's too expensive? Nonsense, it will cost you only seventy dollars all told, and you may be able to sell it the day after its receipt for fifty thousand. Because your idea is too simple? It's simplicity that sells and pays. The idea of protecting the toes of boys' boots with copper tips was childishly simple, but it paid the inventor half a million dollars. You can't tell what there is in your idea until you have tried it. But there is no other way of investing seventy dollars which offers so good a chance of a fortune with so little risk of a blank. It leaves the Louisiana Lottery out of sight.

If you lend seventy dollars at compound interest it will take ten years to bring you in seventy more. Invested in a patent on a useful invention, no matter how simple, it may return you a hundred thousand the first year.

If you would like to know more on this subject, write to the Press Claims Co., 618 F street, N.W., Washingon, D.C., John Wedderburn, General Manager, and all the questions you care to ask will be answered without charge.

"A work of supreme importance to students of botany and to horticulturists."

Now ready, Part I, pp. 728, quarto. Price to subscribers who take the whole work, Two Guineas, net.

The work will be completed in four parts, which will be issued to subscribers at Eight Guineas; and the price will be raised on publication

Subscriptions will be received up till the publication of Part IV.

Part I (AA—Dendrobium) now ready, 4to; price to subscribers who take the whole work, £2 2s net, being £8 8s for the four parts.

INDEX KEWENSIS

PLANTARUM PHANEROGAMARUM NOMINA ET SYNONIMA
OMNIUM GENERUM ET SPECIERUM A LINNAEO USQUE
AD ANNUM MDCCCLXXXV COMPLECTENS NOMINE
RECEPTO AUCTORE PATRIA UNICUIQUE
PLANTAE SUBJECTIS

SUMPTIBUS
BEATI CAROLI ROBERTI DARWIN

DUCTU ET CONSILIO
JOSEPHI D. HOOKER

CONFECIT
B. D. JACKSON

The printing of Part II is well advanced, and the completion of the whole work may be expected during 1894.

The following communication from Sir Joseph Hooker, F.R.S., etc., etc., explains the origin, plan and purpose of this important and comprehensive undertaking:

"Shortly before his death Mr. Darwin informed me of his intention to devote a considerable sum in aid or furtherance of some work of utility to biological science; and to provide for its completion, should this not be accomplished during his lifetime. He also informed me that the difficulties he had experienced in accurately designating the many plants which he had studied, and ascertaining their native countries, had suggested to him the compilation of an Index to the Names and Authorities of all known Flowering Plants and their Countries, as a work of supreme importance to students of systematic and geographical botany and to horticulturists, as a fitting object of the fulfilment of his intentions

"I have only to add that, at his request, I undertook to direct and supervise such a work; and that it is being carried out at the herbarium of the royal gardens, Kew, with the aid of the staff of that establishment." JOS. D. HOOKER.

London: Henry Froude, Clarendon Press Warehouse, Amen Corner, E.C.

The West American Scientist.

VOL. VIII. SAN DIEGO, CAL., JULY, 1894. WHOLE NO. 75

PATENTS

NOTICE TO INVENTORS—There was never a time in the history of our country when the demand for inventions and improvements in the arts and sciences generally was so great as now. The conveniences of mankind in the factory and work shop, the household, on the farm, and in official life, require continual accessions to the appurtenances and implements of each in order to save labor, time and expense. The political change in the administration of government does not affect the progress of the American inventor, who, being on the alert and ready to perceive the existing deficiencies, does not permit the affairs of government to deter him from quickly conceiving the remedy to overcome existing discrepancies. Too great care can not be exercised in choosing a competent and skillful attorney to prepare and prosecute an application for patent. Valuable interests have been lost and destroyed in innumerable instances by the employment of incompetent counsel, and especially is this advice applicable to those who adopt the "No patent, no pay" system. Inventors who entrust their business to this class of attorneys do so at imminent risk, as the breadth and strenght of the patent is never considered in view of a quick endeavor to get an allowance and obtain the fee then due. THE PRESS CLAIMS COMPANY John Wedderburn, General Manager, 618 F street, N. W., Washington, D. C., representing a large number of important daily and weekly papers, as well as general periodicals of the country, was instituted to protect its patrons from the unsafe methods heretofore employed in this line of business. The said company is prepared to take charge of all patent business entrusted to it for reasonable fees, and prepares and prosecutes applications generally, including mechanical inventions, design patents, trademarks, labels, copyrights, interferences, infringements, validity reports, and gives especial attention to rejected cases. It is also prepared to enter into competition with any firm in securing foreign patents.

Write for instruction and advice.

JOHN WEDDERBURN,
618 F Street
Postoffice Box 384. Washington, D. C.

THE PHYSICAL CONDITIONS OF LIFE IN THE DEPTHS OF THE SEA.

By Frank C. Baker, Curator of Zoology, Field Columbian Museum of Chicago.

Recent observations on the deep sea have so enlarged our knowledge on that once obscure subject, that we are now enabled to more clearly undestand many of the perplexing phenomena, and to classify the varied and curious inhabitants of that region. The results of the Challenger expedition, and more recently of the various trips of the United States Fish Commission steamers Fish Hawk and Albatross, have added greatly to, in fact I may say have given us our only knowledge of the deep sea.

Formerly, when dredging with the usual appliances from small boats, 150 fathoms (900 feet) was considered the extent to which successful dredging could be carried on. Yet within the past ten years successful dredging has been carried on at a depth of about two and a-half miles. If one stands on the roof of a high building—say 200 feet high—and looks down, the idea of collecting a good representation of the insects and plants on the ground at its base by dragging a dredge or trawl by a line let down from the top of the building strikes one as preposterous. Yet this is only about thirty-four fathoms high. Multiply this by fifty or sixty and the idea seems even more unreasonable. Yet living animals have been secured from a depth of not less than one hundred times the height of the house first spoken of.

The waters of the earth have been divided by naturalists into three regions. The first is known as the Litoral Region, which is regarded as extending from the actual shore out to the limit of 100 fathoms, and is that to which light can penetrate, and where, therefore, marine vegetation can exist. Beyond this point it is pretty certain that light does not penetrate sufficient for the growth of sea-weeds. Outside this 100 fathom limit the borders of the continents gradually slope to the bottom of the ocean, which is found at a depth of about 2,000 or 3,000 fathoms.

On these continental slopes, which have been given the name of the Archibenthal Region, the conditions are often very favorable for life. There are numerous currents of warm, fresh water sweeping along, bringing supplies of food to the animals along their track. These currents, however, are rarely found below 700 or 800 fathoms, and this depth corresponds to a temperature of about 40° Fahr. Beyond the Archibenthal Region the cold, dark area of the ocean bottom is reached, to which has been applied the name of the Benthal or Abyssal Region. The division between the Benthal and Archibenthal regions is more a matter of temperature than of depth. Below the depth of 800 fathoms, where a temperature of 40° is found, the temperament diminishes at the rate of one-tenth of a degree to 100 fathoms, to the freezing point. There is no reason to suppose, however, that the water in the Benthal Region ever becomes congealed.

Among the chief characteristics of the last two regions, which, since the differences between them are more of degrees than of kind, need not be considered separately, is the composition of the sea water. Chemists have determined that the water of the deep sea varies in the proportions of mineral salts, carbonic acid and air contained in it very much as does the surface water. The warm water of the tropics at the surface contain more salts and less nitrogen. As the water flows northward to the Arctic regions, the salts sink to the bottom as the water is cooled. Therefore, the Polar waters are less saline and contain more nitrogen than do the warm waters of the tropics. The proportion of air in the water is closely related to the temperature, and the amount of oxygen diminishes gradually from the surface until about 400 fathoms are reached, when it ceases to change.

Carbonic acid is said by some chemists not to exist in a free state in sea water. This, however, may well be questioned since the shells obtained from the deep sea are all eroded and the devices of the animal for protection against erosion so apparent. Erosive agencies, like those due to carbonic acid found in the species inhabiting the Litoral Region, are very recognizable in various species found in the abyss. This fact leads us to conclude that the composition of the water of the deep sea does not differ materially from that of any other sea water.

The physical conditions, however, are vastly different. It is difficult to imagine what the pressure must be at a depth of 2,000 fathoms. Without doubt the pressure at some points on the oceanic floor may amount to several tons to the square inch. Rope made impervious by tarring has been reduced one-third in its diameter by a descent into these depths. We must conclude from these facts that all the animals living in these depths and subject to these conditions must have their tissues so constituted as to permit the free permeation of the water through every part of their bodies to equalize the pressure. How such a condition is possible without putting an end to all organic functions is one of the greatest problems of modern biology.

This looseness of tissue is very conspicuous in the animals obtained from the deep sea, their flabby and gelatinous appearance upon reaching the surface is notorious, and many rare and valuable specimens have been destroyed by too rough handling by some careless assistant. In fishes this condition is most noticeable, although some of the most flabby specimens are armed with very formidable teeth. We can conceive, however, that under the great pressure of the depths of the sea, this loose and flabby tissue may be reduced to a condition resembling iron or steel, and the animals may be as lithe and active as their shallow water relatives. The influence of darkness in the Abyssal Region of the sea is often spoken of. It is a curious fact that the inhabitants of the deep sea are either destitute of visual organs, or have excessively developed eyes, far beyond the normal of the group to which they belong. This fact is evidence that the depths are very much darker than the shallows. This is not evidence enough, however, as some physicists have maintained that the depths are shrouded in complete

darkness. The presence of large and remarkably developed eyes in many abyssal animals shows conclusively that light of some kind does exist on the floor of the ocean. It seems absurd to suppose, as many scientists have, that the phosphorence of certain animals is a sufficient factor to produce the development of such enormous and complicated eyes in a multitude of deep sea species.

We find in a general way that the physical conditions are much simpler but more energetic in the depths of the sea than in the shallow waters of the Litoral Region. The effect of temperature is marked in the distribution of life over the warm and cold areas of the oceanic floor. The influence of pressure, partial darkness, and the quietness of the abyssal waters, is yet too imperfectly known to draw conclusions from. The sea bottom is very irregular, in some places being formed of bare rocks destitute of animal or vegetable life. Such a tract, however, is usually in the path of some powerful current like the Gulf Stream. In other parts of the oceanic floor the fauna is found on the walls of submarine cliffs, and is here difficult to obtain with the appliances now in use. The greater portion of the bottom is covered with a layer of solid matter, in condition varying from coarse gravel to the finest kind of mud. The gravels are chiefly confined to the Archinenthal regions, while the true depths of the sea are carpeted with a viscid layer of the finest kind of calcareous mud or clay.

Many animals flourish in a soft bottom, especially the molluscan family Nuculidæ; others require some solid substance upon which to rest as a stone, piece of wood or the spine or test of some dead echinoderm. In muddy regions where such objects are wanting, such animals are also absent. Many are the ingenious devices resorted to by the unfortunate animals that are compelled by circumstances to exist on a muddy bottom; under these conditions we find small hermit crabs encased in the dead shell of Dentalium, Amalthea roosting on an Echinus spine, or Choristes in the empty egg capsules of rays or sharks.

The conditions governing the food supply in the ocean depths are somewhat peculiar. It has been stated that marine vegetation ceases to exist at a depth of 600 feet below the surface. Whatever light does exist in the depths is probably not sufficient for the growth of vegetation. The animals which belong to phytophagous groups seem to live chiefly on foraminifera which they swallow in great quantities. The result of such a diet is seen in the greatly enlarged intestines, the diminution of the masticatory organs, teeth, jaws, and in the mollusks, in the prolongation of the termination of the intestine as a free tube to carry the faeces away from the branchial organs. The quantity of protoplasm of the foraminifera is so small that a much larger mass must be swallowed than if the food consisted of the tissues of algæ. The great mass of abyssal animals, however, are members of those groups which in shallow waters are carnivorous and prey upon each other to a great extent. In the depths of the sea this carnivorous destruction is unnecessary.

The surface of the sea is constantly teeming with millions of organisms which are constantly dying and sinking from the region to which they belong to that of the Abyssal. Hence in many regions of the deep sea the food supply is readily furnished to the animals inhabiting the depths, and

is obtained with but very little effort on their part. But few mollusks are found which have been drilled by other predatory mollusks, such as are found on every ocean beach. From these facts we conclude that the animals inhabiting the deep sea do not live in perpetual conflict with one another. A small proportion of warfare doubtless goes on, but on the whole the struggle for existence is not between the individuals inhabiting the area; it is rather an industrial community, feeding, breeding and dying. Depredations are committed, however, by deep sea fishes and echini, but their inroads are not of such a character as to seriously modify the specific characteristics. It will be seen at once that the course of evolution is here very much simplified, and modifications of specific types not so pronounced as in the species inhabiting the shallow waters.

The deep sea animals did not originate in the depths, but are the descendants of those unfortunate creatures who, by circumstances carried beyond their usual depth, managed to adopt themselves to their surroundings. In this change of environment many species, and hosts of individuals, must have perished. Others more plastic survived the change and gradually spread over the oceanic floor. With the lesser need of protection from enemies a less vigorous elimination of character would follow, and we find as a result that the deep sea mollusks are more variable in their ornamentation and other superficial characters than those from shallow water. In some species the balance of characters is well maintained, while in others variation has had full play.

The shells of deep sea mollusks are generally pale or delicately tinted in color patterns. This is probably due to the absence of sunlight, which has a stimulating effect in developing colors, as is shown by the bright colors of the shallow water species of the tropics. In the Litoral Region the sunlight operates by promoting the development of color in algæ which are fed upon by phytophagous mollusks and affect the coloration of the latter directly through the assimilation of the coloring matter of the food. In the deep sea these influences are wanting, and the development of color is necessarily dependent upon hereditary tendency, or some physical feature of environment not yet understood. The colors chiefly assumed by deep sea mollusks are pink or reddish, straw color, and various shades of brown. The epidermis is usually pale yellowish, but is frequently found of a beautiful and delicate green, such as is found in many of our fresh water Paludinas. A color pattern which is found most abundantly is that formed by square dark spots, which occasionally become fused into bands. The nacre, so common in shallow water shells, is found of additional brilliancy in abyssal shells, though more thin and delicate.

The sculpture of deep water shells is of a kind which serves to strengthen the structure. Spirals and longitudinal hollow riblets and transverse lattice work of elevated laminæ are the principal styles of sculpture. The shells are thin, but wonderfully strong, and more or less permeable. The deep sea shells are also ornamented with large knobs and long, thin, delicate hollow spurs which are probably the remains of the heavily armed spines and knobs of their shallow water congeners. The nucleus of the deep water forms is much larger than that of the same group inhabiting shallower waters. This would seem to indicate that a small number of large larvæ was more liable to survive than a large number of small ones.

The foregoing facts lead us to recognize the importance of a thorough study of the phenomena attached to deep sea life. Experiments upon shallow water forms, artificially subjected to pressure, and also upon the deep sea forms which are obtained in a living state, would undoubtedly enable us to penetrate more deeply into the mysteries of life in the extreme depths of the sea.

THE WEST AMERICAN SCIENTIST.

News reaches the editor that Mr. Walter Bryant is authority for the statement that "The West American Scientist" is no longer published. Probably Mr. Bryant has not seen it since the great and wealthy California Academy of Science discontinued its subscription, and refused to pay for some numbers which had been ordered—but that has not prevented "The West American Scientist" from appearing every month this year just the same. The Academy is unique in being the only scientific institution in America or Europe that has refused to exchange publications with "The West American Scientist," and it is only natural that its members should not be posted on the scientific progress of the day. "The West American Scientist" is the oldest scientific journal west of the Mississippi, and one of the oldest periodicals in Southern California, and the first magazine published in San Diego.

COLLECTING FOR AN AQUARIUM.

Collecting for an aqnarium is great sport. Equipped with baskets containing tin pails or preserve-jars, a company sets out treasure-seeking. Old clothes must be worn, since sea-water will spoil new ones; and old shoes, for salt water ruins leather, and it is necessary to protect your feet from sharp shells and stones. A slip or two, or even a tumble, amid the slippery, weed-covered rocks, will not matter, but only be provocative of fun and laughter. In addition to your jars and pails, you must be armed with an old table knike, a hammer, perhaps a chisel, and, necessarily, with a dip-net made of mosquito netting or some closely woven material. Children are the best collectors. They have not the same instinctive dread of wetting their feet or hands that older people have. Extreme low tide is by all odds the best time to go hunting. "As soon as you reach the beach, wade right in to your work; look under the stones, scoop up with your net the sand or mud from the bottom of the pools left by the tide, examine every promising-looking bunch of sea-weed, and before the tide comes in you will have material enough to stock forty aquariums. When your hunt is over, sort out your specimens, discard all weak and sickly animals, and put the healthy ones in flat, earthenware dishes filled with sea-water, where they can be examined at leisure, and the proper ones taken out and put into tin pails with perforated lids, along with salt water and sea-weeds, to be carried home for the aquarium."—From "Ocean Life in Inland Seas;" Demorest's Magazine for July.

All lupines are easy plants to cultivate, says "The Garden," a valuable weekly illustrated journal of horticulture and arboriculture from England. "The Garden" recommends growing lupines, aquilegias and verbascums in large masses for a fine effect.

HAVE YOU EVER MADE AN INVENTION?

Of course you have. There are so many things in everyday life that could be made to work better by a little study that you must have thought of ways of improving them. If you have done anything of that kind

WHY DON'T YOU GET A PATENT?

Because it's too expensive? Nonsense, it will cost you only seventy dollars all told, and you may be able to sell it the day after its receipt for fifty thousand. Because your idea is too simple? It's simplicity that sells and pays. The idea of protecting the toes of boys' boots with copper tips was childishly simple, but it paid the inventor half a million dollars. You can't tell what there is in your idea until you have tried it. But there is no other way of investing seventy dollars which offers so good a chance of a fortune with so little risk of a blank. It leaves the Louisiana Lottery out of sight.

If you lend seventy dollars at compound interest it will take ten years to bring you in seventy more. Invested in a patent on a useful invention, no matter how simple, it may return you a hundred thousand the first year.

If you would like to know more on this subject, write to the Press Claims Co., 618 F street, N.W., Washington, D.C., John Wedderburn, General Manager, and all the questions you care to ask will be answered without charge.

MRS. O. L. ORCUTT,

San Diego, California.

I am interested in flowers and will help OUT OF DOORS FOR WOMEN all I can.

.....

.....

.....

.....

Cut this out and return with ten cents (after signing with address) and OUT OF DOORS FOR WOMEN will be sent you for one year with no further expense to you.

NICE FLOWERS.

You need no introduction to the CALLA—but our price, 10c. and 15c. for large bulbs may surprise you.

The daintiest and sweetest of flowers, FREESIA refracta alba, may be had for 25c. a dozen.

COTYLEDON ORBICULATA is old fashioned, but good. Plants at 50c. and $1 will please you. Many other sorts also.

AGAVES—five fine varieties for $1.50—and many others

YUCCA BREVIFOLIA, the tree yucca, is a fine decorative species. Fresh seed 25c. per packet—liberal size

THE DAY LILY OF THE DESERT (Hesperocallis undulata) bloomed with us this season, and we wish all our friends might have the pleasure of seeing it—for it de-erves all the praise it has received. Bulbs 50c and $1 each, according to size.

ALA DE PERICO (Mina lobata) is a charming Mexican vine. Seed, per packet, 25c. Grow it in your window next winter if you wish to enjoy it.

CACTI? Why yes, we have lots of kinds—you ought to see them. Our catalogue isn't ready because we expect more sorts soon from Mexico and Arizona—so write us all about your wishes.

THE PEACH VIOLET (Viola pedunculata) is worth trying. We have only a little seed, so order early. Per packet 5c.

THE RESURRECTION PLANT is a curiosity of plant life. We offer one kind, Selaginella pilifera, at 15c. each.

The Mignonette or MADEIRA VINE is nice for indoors, 10c.

Do you know the AFRICAN LOVE FLOWER—Agapanthus umbellatus? You can for 50c.

The Spanish YERBA MANSA (Anemopsis Californica) is valued abroad, and we would like to introduce it in American homes. Roots 50c. each.

California lilies, and wild flowers seeds a specialty.

LYON & COBBE CO.,

Los Angeles, Calif.

Wholesale price-current free on application.

TRY the TRIO!

Out of Doors for Women, monthly, per year	$ 50
Science and Horticulture, " "	1 00
The West American Scientist " "	1 00
Advertising rate: for either magazine,	
separate, per line, nonpareil	$ 20
per inch, each insertion	2 00
Combination rate: for all three, per	
line	50
per inch	5 00
One inch, one year, in all three	50 00
One page, " " " "	700 00

THE C. R. ORCUTT PUBLISHING HOUSE,

San Diego, California.

Vol. VIII. Whole No. 76. Price, 10c; per year, $1.00

THE

West American Scientist.

A MONTHLY JOURNAL OF HORTICULTURE

OCTOBER 1894

C. R. ORCUTT, PUBLISHER,

NO. 365 TWENTY-FIRST STREET

SAN DIEGO, - - CALIFORNIA.

Entered at the postoffice at San Diego, Cal., as second-class mail matter.

SOME LEPIDOPTEROUS LARVÆ ON MESQUITE.

By C. H. Tyler Townsend.

The following are brief descriptions of some lepidopterous larvæ collected near Las Cruces, N. M., on mesquite (Prosopis juliflora,) which are published at this time so as to enable the identification of the species in the future. There are five distinct species. The figures in parentheses refer to the numbers which the specimens bear in collection of the New Mexico Station.

a. Length, 5 mm. Blackish or brownish, with some yellowish, sparsely rather long hairy, with a wart on each side near the head from which proceeds a tuft of long fine hairs. Somewhat Hemileuca-like larva, but hairs longer, and tubercles not branched. Five pairs of prolegs, on segments 7 to 10 and 13. Head not as wide as thoracic segments, subcircular in outline from above, yellowish with brown markings and anterior margin. Two median longitudinal blackish stripes on dorsum extending from prothoracic to anal segments, inclosing twelve pairs of small unbranched blackish tubercles, a pair to each segment, the metathoracic pair being much larger than those on abdominal and prothoracic segments and slightly larger than those on mesothoracic segment. Each tubercle bears a tuft of blackish hairs. Between this median pair of black stripes is a yellowish stripe. On each side of the black stripes there are brownish stripes separated by narrow interrupted yellowish ones. The thoracic segments each bear on sides a brownish tubercle, more or less whitish or yellowish apically, bearing a tuft of brownish hairs, the tubercles on prothoracic segment being much the largest and bearing the longest hairs. The fifth and sixth abdominal segments show smaller similar tubercles, but hardly noticeable except from below. Hairs springing from sides of body mostly yellowish or grayish. Feet yellowish or pale.

Several specimens beaten, May 10, 1891. Color noted in life. Mesa. (No. 41.)

b. Length, nearly 7 mm. Black, marked anteriorly with white. Very sparsely hairy. Five usual pairs of prolegs. Head as wide as rest of body, quite quadrangular in outline from above, brown or blackish. Prothoracic segment blackish, with a median white longitudinal line. Mesothoracic and metathoracic segments blackish, with anterior border narrowly white. Head and prothoracic segments chitinous, the latter posteriorly narrowed, both with hairs on dorsal portions. Mesothoracic and abdominal segments fleshy, the mesothoracic blacker than the following segments. Abdominal segments each with six very small smooth white tubercles or papillæ, each bearing a pale hair; the papillæ on each segment being arranged with four median ones nearly forming a square, the two posterior ones being a little more removed than the anterior, and with a single lateral one on each side. A whitish small tubercle on lateral edge of each segment, from each of

which spring two hairs; anal extremity of larva pale. Two papillæ on ventral surface of segments 5 and 6, and some ventral hairs on other segments. Legs blackish, prolegs paler.

One specimen beaten, May 12, 1891. Mesa. Color noted in life. (No. 82.)

c. Fifth or full grown stage. Length, about 23 mm. Light brownish, a large larva, with quite elongate segments, which imitates a span-worm in the curves of its body, but has five quite equally developed pairs of prolegs, on segments 7 to 10 and 13. The prolegs are set well back on the pos terior edge of the segments, especially those on segments 8 to 10. Body widest on posterior three-fourths. Head about as wide as anterior segments, pale colored, mottled with brown, hairy on dorsum, rather rounded in outline. Thoracic segments not as long as broad; segments 5 to 7 and 13 longer than broad, with a transverse wrinkle on dorsum which gives each the appearance of being two segments; segments 8 to 12 about as long as broad. Segments 8 to 10 widest, 11 to 13 successively narrower. A whitish or yellowish median line runs the length of dorsum. Segments 5 to 6 with some blackish on posterior edge of dorsum and overlapping on anterior edge of next segment. Interrupted brownish and paler lines more or less indistinct on outside of median yellowish stripe. Dorsum of segments each with about eight small tubercles or papillæ, each bearing a hair which springs from a central black dot. Lateral inferior edges of segments with a sort of fringe of fleshy simple or branched prolongations of the integument, rather slender and resembling small rootlets just sprouting. Venter of segments dark red centrally, especially on segments 5 to 8, uniting on following segments in a broad median longitudinal line. One specimen beaten, three miles south of Mesilla, May 16, 1891. (No. 104.)

Fourth stage. Length, 12 to 15 mm. Differs in more brownish color with a grayish shade. Tubercles or papillæ from which the hairs spring darker. Irregularly and narrowly striped with brownish and pale colored, the brownish more or less interrupted on posterior portions of segments with blackish. Rootlet-like lateral prolongations much smaller and less noticeable. Venter pale, except the dark red centers of segments which show deepest on 5 to 8. The two anterior pairs of prolegs, on segments 7 and 8, are extremely short and rudimentary compared with those on 9 and 10, not being developed. This fact may indicate this and the following stages to be distinct from the preceding one, but I have considered them to be all the same, inferring the probability of a development of the two anterior pairs of prolegs during the larval growth. This however, may prove to be a wrong supposition. Two specimens beaten, May 12 and 16, 1891. Three miles south of Mesilla, and Mesa back of Las Cruces.

Third stage. Length, 10 to 11 mm. Smaller, more uniformly brownish, prothoracic segment apparently more elongate, papillæ more uniformly black; less distinctly lined or striped longitudinally, except for the pale median line, more whitish on head. No trace of the root-like elongations. Segments 7, 8 and 13 particularly elongate, the two anterior pairs of prolegs

small and bud-like. Three specimens beaten, May 12 and 16, 1891. Same localities as preceding.

Second stage. Length, 8 mm. Head broadly whitish on dorsum, the color appearing as an anterior widening of the whitish median longitudinal line. Very span-worm like in appearance, with exactly same curve of body, the two rudimentary anterior pairs of prolegs looking like small tubercles. One specimen beaten, May 16, 1891. Three miles south of Mesilla

First stage. Length, 4 mm. Very small, longitudinally whitish dorsally and ventrally, the central red areas of venter showing indistinctly on segments 5 to 8. Two anterior pairs of prolegs hardly discernible, the other pairs elongate and well developed. One specimen beaten, May 16. Three miles south of Mesilla. (No. 81.)

Colors of the above were mostly noted in life. Alcohol changes them to pink and pale reddish, especially the older stages. The above stages are not meant to be understood as consecutive, but are the ones represented in the alcoholic material.

d. Length, 14 mm. A brown geometrid larva or span-worm, rather cylindrical, with black markings. True legs black. Two pairs of prolegs on segments 10 and 13. Head as wide as body, mottled, with black on sides and posterior dorsum. Almost bare, very few small hairs, about four to the dorsum of each segment, each arising from a small black papilla. Fourth and two posterior segments with more black on dorsum, the twelfth segment with a pair of elongate conical posteriorly directed tubercles. Sides of body somewhat lighter colored back to segment 11. No longitudinal stripes or lines, except a median narrow stripe of blackish which shows on two posterior thoracic segments, 12 and 13. Segments all transversely wrinkled dorsally, except head and prothoracic segments, less so ventrally.

One specimen beater, three miles south of Mesilla, May 16, 1891. Color noted in life. (No. 103.)

e. Length, 15 mm. Stout, green span-worm. Color noted in life. Two pairs of prolegs, on segments 10 and 13. Head a little narrower than body, rounded in outline from above; thoracic segments short, as are also segments 10 to 13. Segments 5 to 9 as long and wide. Color is wholly green above and below; a narrow whitish stripe runs the length of body on each side along the lateral edges of segments, and above this on dorsum there is a very faint whitish longitudinal line on each side also running the length of body perhaps most plain on abdominal segments. Head with a very few short hairs, each arising from a microscopic papilla, about six to eight hairs to the dorsum of a segment. Ventral surface also with hairs. Segments more or less transversely wrinkled above and below.

One specimen beaten, May 10, 1891. Mesa. (No. 40.)

All the above larvæ are from "Prosopis juliflora." The measurements and general coloration were taken in life.