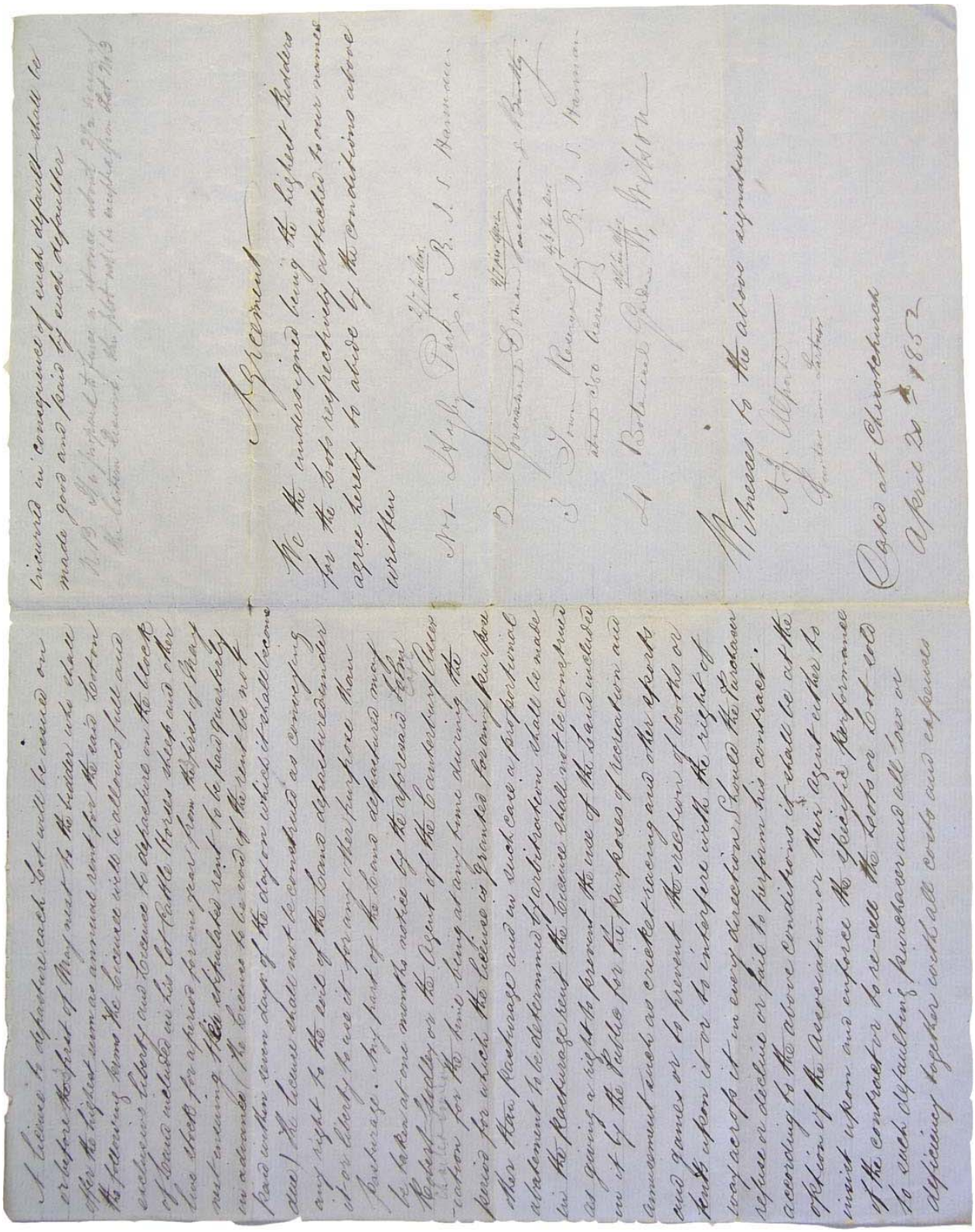
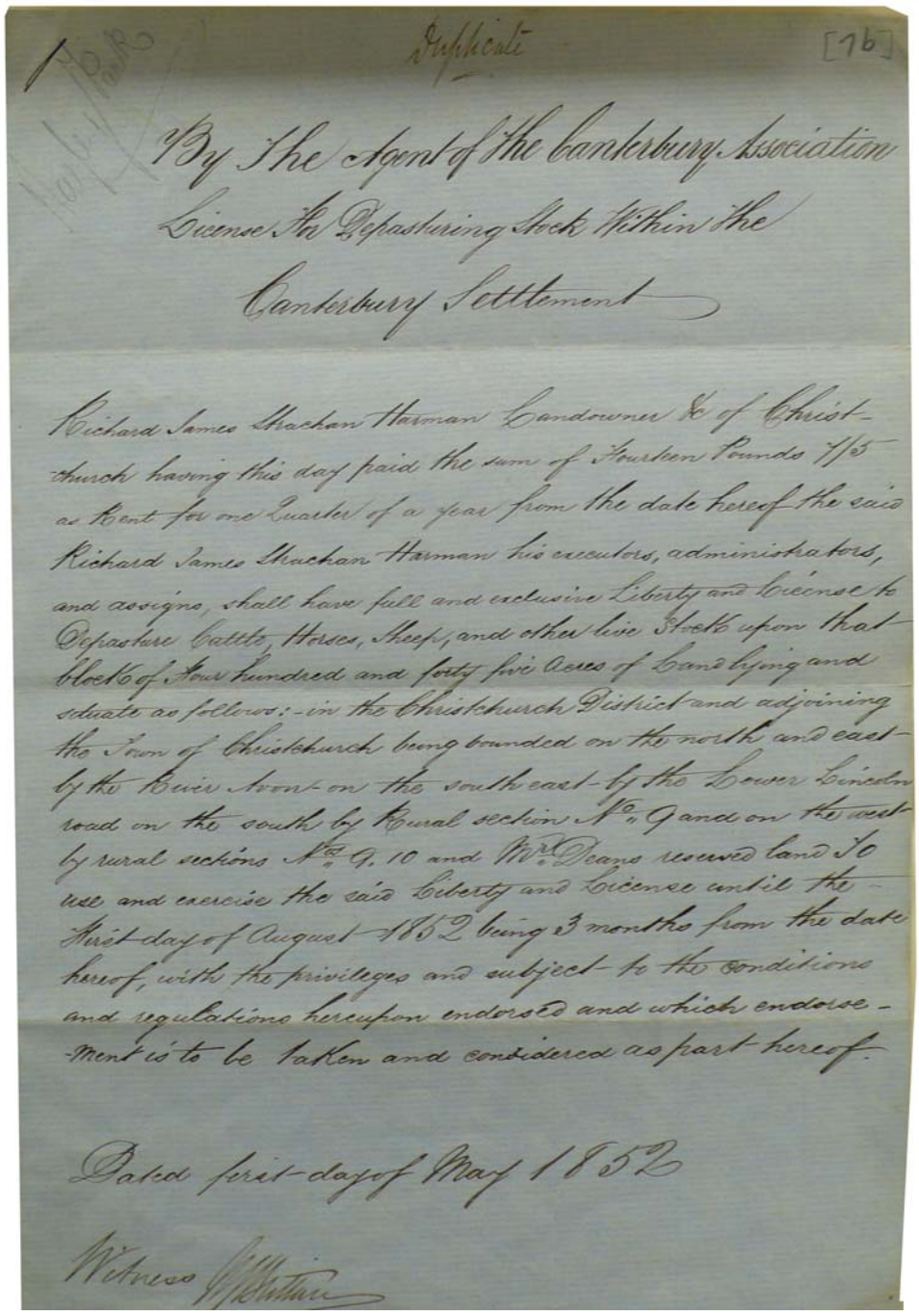
Section 6. Appendices



Appendix 1. Early lease agreement for depasturing on Hagley Park, the Christchurch Domain, Town Reserve and the Botanical Garden dated 20 April 1852.
Source: Canterbury Association archives. Ch290 item 16/1b, ANZ



Duplicate [16]

By The Agent of the Canterbury Association

License for Depasturing Stock Within the

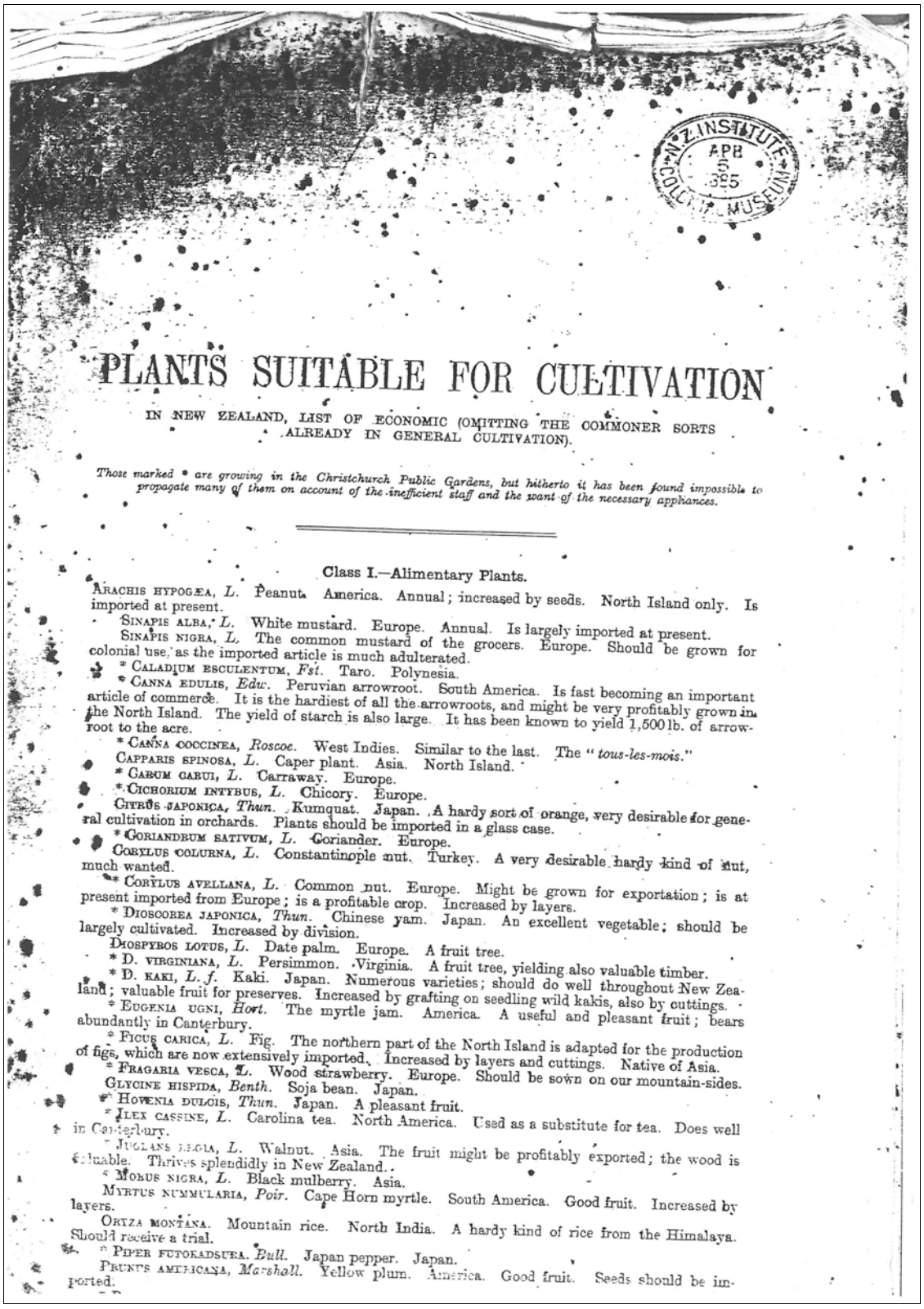
Canterbury Settlement

Richard James Thachan Harman Landowner &c of Christchurch having this day paid the sum of Fourteen Pounds 7/5 as Rent for one Quarter of a year from the date hereof the said Richard James Thachan Harman his executors, administrators, and assigns, shall have full and exclusive Liberty and License to Depasture Cattle, Horses, Sheep, and other live Stock upon that Block of Four hundred and forty five Acres of Land lying and situate as follows:- in the Christchurch District and adjoining the Town of Christchurch being bounded on the north and east by the Bush Road on the south east by the Lower Lincoln road on the south by Rural section No. 9 and on the west by rural sections No. 9, 10 and Mr. Deans reserved land So use and exercise the said Liberty and License until the first day of August 1852 being 3 months from the date hereof, with the privileges and subject to the conditions and regulations hereupon endorsed and which endorsement is to be taken and considered as part hereof.

Dated first day of May 1852

Witness

Appendix 2. License to depasture stock on Hagley Park granted to R J Harman, May 1852
Source: License to depasture stock, CAAR 21366 Ch290 505/Record 29/2, Folder A1, ANZ



PLANTS SUITABLE FOR CULTIVATION

IN NEW ZEALAND, LIST OF ECONOMIC (OMITTING THE COMMONER SORTS ALREADY IN GENERAL CULTIVATION).

*Those marked * are growing in the Christchurch Public Gardens, but hitherto it has been found impossible to propagate many of them on account of the inefficient staff and the want of the necessary appliances.*

Class I.—Alimentary Plants.

ARACHIS HYPOGÆA, *L.* Peanut. America. Annual; increased by seeds. North Island only. Is imported at present.

SINAPIS ALBA, *L.* White mustard. Europe. Annual. Is largely imported at present.

SINAPIS NIGRA, *L.* The common mustard of the grocers. Europe. Should be grown for colonial use, as the imported article is much adulterated.

* CALADIUM ESCULENTUM, *Fst.* Taro. Polynesia.

* CANNA EDULIS, *Edw.* Peruvian arrowroot. South America. Is fast becoming an important article of commerce. It is the hardiest of all the arrowroots, and might be very profitably grown in the North Island. The yield of starch is also large. It has been known to yield 1,500 lb. of arrow-root to the acre.

* CANNA COCCINEA, *Roscoe.* West Indies. Similar to the last. The "*tous-les-mois.*"

CAPPARIS SPINOSA, *L.* Caper plant. Asia. North Island.

* CARUM CARUI, *L.* Carraway. Europe.

* CICHORIUM INTYBUS, *L.* Chicory. Europe.

CITRUS JAPONICA, *Thun.* Kumquat. Japan. A hardy sort of orange, very desirable for general cultivation in orchards. Plants should be imported in a glass case.

* CORIANDRUM SATIVUM, *L.* Coriander. Europe.

CORYLUS COLURNA, *L.* Constantinople nut. Turkey. A very desirable hardy kind of nut, much wanted.

* CORYLUS AVELLANA, *L.* Common nut. Europe. Might be grown for exportation; is at present imported from Europe; is a profitable crop. Increased by layers.

* DIOSCOREA JAPONICA, *Thun.* Chinese yam. Japan. An excellent vegetable; should be largely cultivated. Increased by division.

DIOSPYROS LOTUS, *L.* Date palm. Europe. A fruit tree.

* D. VIRGINIANA, *L.* Persimmon. Virginia. A fruit tree, yielding also valuable timber.

* D. KAKI, *L. f.* Kaki. Japan. Numerous varieties; should do well throughout New Zealand; valuable fruit for preserves. Increased by grafting on seedling wild kakis, also by cuttings.

* EUGENIA UGNI, *Hort.* The myrtle jam. America. A useful and pleasant fruit; bears abundantly in Canterbury.

* FICUS CARICA, *L.* Fig. The northern part of the North Island is adapted for the production of figs, which are now extensively imported. Increased by layers and cuttings. Native of Asia.

* FRAGARIA VESCA, *L.* Wood strawberry. Europe. Should be sown on our mountain-sides.

GLYCINE HISPIDA, *Benth.* Soja bean. Japan.

* HOVENIA DULCIS, *Thun.* Japan. A pleasant fruit.

* ILEX CASSINE, *L.* Carolina tea. North America. Used as a substitute for tea. Does well in Canterbury.

* JUGLANS REGIA, *L.* Walnut. Asia. The fruit might be profitably exported; the wood is valuable. Thrives splendidly in New Zealand.

* MORUS NIGRA, *L.* Black mulberry. Asia.

MYRTUS NUMMULARIA, *Poir.* Cape Horn myrtle. South America. Good fruit. Increased by layers.

ORYZA MONTANA. Mountain rice. North India. A hardy kind of rice from the Himalaya. Should receive a trial.

* PIPER FUTOKADSURA. *Bull.* Japan pepper. Japan.

PRUNUS AMERICANA, *Marshall.* Yellow plum. America. Good fruit. Seeds should be imported.

Appendix 3. Economic plant list prepared by John Armstrong for publication in the AJHRNZ. Those marked with an asterix were under cultivation by the Armstrongs in their economic plant nursery (Continued over)
Source: Unknown acquistion number, Hector Papers, Te Aka Matua Research Library, Hector Library, Te Papa Tongarewa

* PRUNUS VIRGINIANA, *Hook.* Choke-cherry. America. Good fruit.
PYRUS CORONARIA, *L.* American crab. A good fruit.
RUBUS DELICIOSUS, *Torrey.* Rocky Mountain blackberry. A good fruit.
* RUBUS PHŒNICOLASIUS, *Zucc.* Climbing raspberry. Japan. An excellent fruit. Plant useful for covering walls.
SCILLA ESCULENTA, *Ker.* Quamash. America. An edible root.
* THEA CHINENSIS, *Simms.* Chinese tea-plant. China and Japan. The tea-plant is perfectly hardy in Canterbury, and no climatic considerations prevent its successful cultivation in the colony. The greater part of the western side of New Zealand seems fitted for the production of tea of better quality than nine-tenths of the imported article. As so much money is now sent out of the colony for tea it seems desirable to attempt its culture in a commercial sense, and it would be a good thing if good seed could be obtained from Japan, and plants raised for distribution. The preparation can now be done by machinery.
* VACCINIUM MYRTILLUS, *L.* Bilberry. Europe. A good fruit.
* V. MACROCARPON, *Ait.* American cranberry. America.
V. OXYCOCCUS, *L.* British cranberry. England. Both the above are useful plants, but they can be well grown only in bogs.
* V. PENNSYLVANICUM, *Lamck.* Huckleberry. America.
* VITIS CORDIFOLIA, *Mich.* Frost grape. America.
V. HYPOGLAUCA, *Muell.* Gippsland grape. Victoria.
V. LABRUSCA, *L.* Isabella grape. America.
* V. VULPINA, *L.* Fox-grape. America.
* V. ELVIRA, *Hk.* America.
* V. CALIFORNICA, *Hk.* Californian vine. America.
V. VINIFERA, *L.* Early varieties wanted, such as the Esperione, Royal Muscadine, Grisly Frontignac, &c.
V. American hybrids, such as the Elsinboro', the Clinton, and the *Santa Cruz.
* V. CORINTHIACA, *L.* Grocers' currant. Greece. It is proposed to cross the above varieties of vines together in order to obtain a race of hardy vines for the colony, European kinds having proved unsuitable.
* ZEA MAYS, *L.* Varieties white dent and rice corn. Two hardy and early kinds for corn-flour. They do well in Canterbury.

Class II.—Fibre Plants.

* AGAVE AMERICANA, *L.* American aloe. Mexico. Yields a very strong fibre, increased by suckers.
* BŒHMERIA NIVEA, *Gaud.* Ramie or rappa. Japan. A very valuable fibre plant; thrives well in Canterbury. The Chinese grass-cloth is made from it. The fibre is worth about £40 a ton, and it is reported to yield about two tons per acre annually. The plant is perennial, and is increased by division.
* BROUSSONETIA PAPYRIFERA, *Vent.* Paper mulberry. Japan, New Zealand, and Polynesia. This was formerly used by the Maoris for making cloth. It thrives in Canterbury, but the yield is not remarkably great.
* CANNABIS SATIVA, *L.* Hemp. Well known as a fibre plant, and grows well in New Zealand.
* CHAMÆROPS FORTUNEI, *Lind.* Chusan palm. Japan and China. A useful fibre plant. Is the only palm hardy in Christchurch.
* FATSIA PAPYRIFERA, *Benth.* Rice-paper plant. China. Does well in New Zealand.
GOSSYPIUM HERBACEUM, var., *L.* Nankin cotton. Asia. The hardiest species of cotton; might succeed on the low lands of the North Island.
* LEPIDOSPERMA TETRAGONA, *Br.* Sword-rush. New Zealand. Apparently a valuable plant for paper-making; common in many parts of the colony. Increased by seeds.
* CORDYLINE INDIVISA, *Fst.* (C. HOOKERI. *Kirk.*) The great "ti." New Zealand. A strong elastic fibre is yielded by this plant, which might be extensively cultivated on good soils throughout the colony. Plants are easily raised from seeds.
* CORDYLINE FORSTERI, *Muell.* The common cabbage-tree of the colony; is common throughout, and yields a fine white fibre well fitted for paper-making. Is very easily cultivated, and will grow on any soil. A most valuable fibre plant.
* LINUM USITATISSIMUM, *L.* Common flax. Europe. Does well in the colony, and is likely to prove a valuable industrial plant. The seeds yield the common linseed oil, which at present is largely imported.
* PHORMIUM TENAX. *Fst.* Flax-lily or New Zealand flax, in numerous varieties. It seems desirable to preserve from destruction some of the finer kinds of phormium. Such are **atiraukawa*, **rurua*, **tapoto*, **ouc*, **huhiroa*. There is but little difficulty about phormium cultivation when the matter is properly gone about.
* PLAGIANTHUS BETULINUS, *Fst.* Ribbonwood. New Zealand. Paper has been made from the bark of this tree.
* LEPTOCARPUS SIMPLEX. *Br.* Scarlet rush. New Zealand. Yields fibre for paper-making; common in swamps.
* STIPA TENACISSIMA. *L.* Esparto grass. Africa. The well-known paper material. Might be advantageously grown on the coasts.
* YUCCA FILAMENTOSA, *L.* America. A valuable paper-yielding plant.
YUCCA GLORIOSA, *L.* Similar to the last, but larger.

Class III.—Timber Trees.

[Only the rarer kinds are included in this list.]

* ACACIA MELANOXYLON, *Br.* Lightwood. Australia. A small tree, yielding a beautiful wood for furniture.

* ACER DASYCARPON, *Ehr.* White maple. America.

* AILANTUS GLANDULOSA, *L.* Tree of heaven. Japan. Wood, pale yellow; handsome. Leaves for feeding silkworms.

BETULA ACUMINATA, *Wall.* Himalayan birch. India.

* BUXUS SEMPERVIRENS, *L.*, and * B. BALEARICA, *L.* Box-trees. Both of Europe. Are useful on account of the great value of their timber, which is used for engraving. Both grow well in the colony.

* CARYA TOMENTOSA, *Nutt.* The well-known hickory-wood of America, imported here in quantity, is the production of this tree. The climate of New Zealand is in general too warm for it, but it may possibly do on the slopes of the southern mountains. Increased by seeds.

* C. ALBA. Shell-bark hickory.

* C. PORCINA. Pig-nut hickory.

* C. OLIVÆFORMIS. Pecan-nut hickory.

* C. MICROCARPA. Small hickory.

* C. SULCATA. Black hickory.

These are all kinds of hickories. None of them stand the droughts of the Canterbury Plains.

CEDRELA TAONA, *var.* AUSTRALIS. Sydney cedar. Australia. A valuable timber tree, suitable for the North Island only.

EUCALYPTUS AMYGDALINA, *var.* REGNANS. *Muell.* The great gum of Gippsland and the tallest known tree. This grand tree is certain to prove hardy in New Zealand, and should be extensively imported in seed. Trees over 400 feet high are growing in Victoria. It is thus fully 30 feet higher than the tallest Wellingtonia.

Of the numerous gums cultivated in the Christchurch Garden the following have proved the hardiest:—

* E. CORIACEA, * E. COCCIFERA, * E. ALPINA, * E. FISSILIS, * E. RISDONI, * E. URNIGERA, and * E. OBLIQUA. They are all useful timber trees.

* FAGUS CUNNINGHAMII, *Hk. f.* A noble tree. It dislikes drought. Is the Victorian beech, and is increased by seeds.

F. OBLIQUA, *Mir.* Roble beech. Chili.

FRAXINUS OREGANA, *Nutt.* Oregon ash. America.

* JUGLANS CINEREA, *L.* Butternut tree. America.

* J. NIGRA, *L.* Black walnut. America.

* J. CALIFORNICA. Californian walnut. America.

J. SIEBOLDII, *Max.* Japanese walnut. Japan. A very fine kind of walnut. Should be introduced in quantity.

* LIRIODENDRON TULIPIFERA, *L.* Tulip-tree. America.

MYRTUS LUMA, *Mol.* Chilian rosewood. Chili.

LARIX GRIFFITHII, *Hk.* Himalayan larch. India. A fine kind of larch, probably well adapted to the colony.

POPULUS CILIATA, *Wall.* Indian poplar. North India.

P. EUPHRATICA, *Oliv.* Bagdad poplar. Turkey. The weeping willow of the Bible. (*See* Psalm cxxxvii.)

P. HETEROPHYLLA, *L.* Downy poplar. North America.

P. TREMULOIDES, *Mich.* American aspen.

The above kinds of poplar are useful kinds of trees on account of their quick growth.

PINUS TÆDA, *L.* Loblolly pine. Virginia.

P. TSUGA, *Ant.* Tsuga pine. Japan.

P. TEOCOTE, *Cham.* Torch pine. Mexico.

P. SERROTINA, *Mich.* Pond pine. North America.

P. TAMARACE, *Lam.* Tamarack. North America.

P. MASSONIANA, *Lam.* Masson's pine. Japan.

P. MITIS, *Mich.* Yellow pine. United States.

P. GLABRA, *Walt.* Smooth pine. Carolina.

The above pines have not yet been introduced into the colony. All are valuable in some way. They could be imported in seed. [*P. tæda* and *P. mitis* have been introduced since this list was first prepared.]

QUERCUS AGRIFOLIA. Mexican oak. Mexico.

Q. ALBA, *L.* White oak. Canada.

Q. ANNULATA, *Sm.* Nepal oak. Nepal.

Q. AQUATICA, *Walt.* Water-oak. North America.

Q. CHINENSIS, *Bunge.* Chinese oak. China.

Q. GARRYANA, *Doug.* Garry's oak. Oregon.

Q. LYRATA, *Walt.* Overcup-oak. North America.

* Q. MACROCARPA, *Mich.* Bur-oak. North America.

Q. SERRATA, *Thun.* Silkworm oak. Japan.

* Q. SUBER, *L.* Cork oak. Spain. Yields cork.

Q. VIRENS, *L.* Live-oak. North America.

The above oaks are much wanted in New Zealand. The whole of them are valuable, and almost certain to do well. The American ones might be imported in seed; the others would require to be imported as plants, and increased by grafting on the common oak. (*See* also Dye-plants.)

4

* ROBINIA PSEUDOACACIA, *L.* Honey-locust. America.
SALIX ELEGANTISSIMA, *Koch.* Japan. Weeping willow. Japan.
* SOPHORA GRANDIFLORA, *Ait.* Kowhai, N.Z. This appears to be the best known substitute for hickory. It is easy to grow, and grows much faster than the Caryas. It can readily be raised from seeds.
* UMBELLULARIA CALIFORNICA, *Benth.* Californian bay. California.
ULMUS AMERICANA, *L.* American elm. North America.
* U. ACUMINATA, *Hk.* Japan elm. Japan.

Class IV.—Fodder Plants.

* ANDROPOGON SACCHARATUS, *Rox.* Sugar-grass. Asia. A fine grass for green fodder; also used for making sugar: very suitable for the North, but not for the South.
ANTHISTIRIA CILIATA, *L. f.* Kangaroo grass. Australia.
* ANTHYLLIS VULNERARIA, *L.* Europe. Newmarket clover or kidney vetch. A very useful pasture plant.
* BROMUS BREVI-ARISTATUS. Asia. An excellent grass.
* B. LONGIFLORUS. Australia. A very good grass.
BUCHLOA DACTYLOIDES, *Torrey.* Buffalo grass. Kansas.
* CERATONIA SILIQUA, *L.* Carob or St. John's bean; a tree only suited to the warmer parts of the colony.
DACTYLIS CÆSPITOSA, *Fst.* Tussock grass. Falkland Islands. The celebrated tussock grass; suited for cold districts.
* DANTHONIA, species. South Australia. A fine grass.
* FESTUCA DIVES, *F. Muell.* Giant fescue. Victoria. A splendid grass, hardy in Christchurch; very productive.
HEDYSARUM CORONARIUM, *L.* French honeysuckle. Europe.
* HELIANTHUS ANNUUS, *L.* Sunflower. America.
MILIUM EFFUSUM, *L.* English millet. Europe.
PANICUM GERMANICUM, *L.* German millet. Europe.
* PANICUM SPECTABILE, *Nees.* African millet. Africa. A splendid grass, but too tender for the South.
* PHALARIS CANARIENSIS, *L.* Canary grass. Is at present largely imported; might be grown for export.
SECALE CEREALE, *L.* Rye. Europe. For cold districts.
* ZIZANIA AQUATICA, *L.* Water rice. Canada.
Z. MILIACEA, *Mich.* Carolina rice-grass. America.

Class V.—Medicinal Plants.

ACACIA ARABICA, *Willd.* Gum-arabic tree. Africa. Suitable for the North.
* ACHILLEA MILLEFOLIUM, *L.* Yarrow. Europe.
* ACONITUM NAPELLUS, *L.* Aconite. Europe.
* ALTHÆA OFFICINALIS, *L.* Marsh-mallow. Europe.
* ANTHEMIS NOBILIS, *L.* Camomile. Europe. This does well, and could be grown for export; at present it is imported.
ARISTOLOCHIA SERPENTARIA. Snake-root. Canada.
ASTRAGALUS GUMMIFER, *Lab.* Tragacanth. Syria. Could be grown for export; there is a good demand.
* ATROPA BELLADONNA, *L.* Belladonna. Europe.
BAROSMA SERRATIFOLIA, *Willd.* The buchu. Africa.
* CAMPHORA OFFICINALIS, *L.* Camphor plant. Japan.
* CASSIA TOMENTOSA. Asia.
* CASSIA MARYLANDICA. America. Two kinds of senna; suitable for New Zealand.
* CHELIDONIUM OFFICINALE (C. MAJUS). Celandine. Europe.
CINCHONA OFFICINALIS, *L.* Peruvian bark. South America. It seems that this quinine-yielding plant would be likely to do well in some parts of the colony. The trees are being rapidly destroyed in their native forests.
CISTUS CRETICUS, *L.* Gum-cistus. Europe.
* COLCHICUM AUTUMNALE, *L.* Autumn crocus. Europe.
COPTIS TRIFOLIATA and C. TECTA. America.
* COPROSMA ROBUSTA, *Raoul.* Karamu. New Zealand. The leaves of this plant may be used as a substitute for China tea. It is a good febrifuge.
CUCUMIS COLOCYNTHIS, *L.* Colocynth. Asia.
CUMINUM CYMINUM, *L.* Cumin. North Africa.
* DATURA STRAMONIUM, *L.* Thorn-apple. Europe.
* ECBALLION ELATERIUM, *Rich.* Squirting cucumber. Europe. The source of Elaterium.
EUPHORBIA PILULIFERA, *Hort.* Polynesia. A new remedy for asthma. Highly valuable.
* FŒNICULUM OFFICINALE, *L.* Fennel. Europe.
* FERULA GIGANTEA, *Hk.* Giant fennel. Asia. Europe.
FRAXINUS ORNUS, *L.* Manna-ash. Europe.
GENTIANA LUTEA, *L.* Gentian. Europe.
GLYCYRRHIZA GLABRA, *L.* Liquorice. Europe. Is at present imported in considerable quantities.

GONOLOBUS CUNDURANGO (EQUATORIA GARCIANA). Condurango plant. South America. The condor vine of Chili is now becoming celebrated as a specific for cancer. Seeds could be obtained from Chili.

* HELLEBORUS NIGER, *L.* Black hellebore. Christmas rose. Europe.

* HYOSCYAMUS NIGER, *L.* Henbane. Europe.

* INULA HELENIUM. Elecampane. Europe.

* LACTUCA VIROSA, *L.* Lactucarium plant. Europe.

LAURELIA SERRATA, *Phil.* Chilian sassafras. Chili.

* MENTHA PIPERITA, *L.* Peppermint. Europe. The oil is at present imported.

* M. PULEGIUM, *L.* Pennyroyal. Europe.

* MONARDA DIDYMA, *L.* Bee-balm. Oswego tea. America.

* MYROXYLON PEREIRA, *Lind.* Balsam of Peru. Peru. A valuable plant.

OCIMUM BASILICUM, *L.* Basil. Europe.

OPHELIA CHIRATA, *Grsb.* Chirata. India.

ORIGANUM MARJORANUM, *L.* Marjoram. Europe.

* PAPAVER SOMNIFERUM, *L.* Opium poppy. Asia. New Zealand could certainly produce sufficient opium for home use. The plant is best suited for the North Island. The opium is simply the milky sap of the capsules; it exudes freely through incisions made by the cultivator. Plants grown in gardens here contain abundance of opium. At present it is imported in considerable quantities. The seeds are also valuable.

PEUCEDANUM GRAVEOLENS, *Benth.* Dill. Asia.

PIMPINELLA ANISUM, *L.* Anise. Asia.

PISTACHIA TEREBINTHUS, *L.* Chian turpentine. Scio. Is now being imported. The turpentine is very difficult to procure in the pure state, and the plant might be profitably cultivated in the North Island.

* PODOPHYLLUM EMODI, *Wall.* Podophyllum. India.

P. PELTATUM, *L.* American May-apple. A valuable plant.

PRINGLEA ANTISCORBUTICA, *And.* Kerguelen's cabbage. Kerguelen's Land.

RHEUM EMODI, *Wall.* Turkey rhubarb. Asia. Is largely imported; might easily be grown here.

RHEUM OFFICINALE, *Bail.* Asia. Similar to the last.

* RUTA GRAVEOLENS, *L.* Rue. Europe.

* TANACETUM VULGARE, *L.* Tansy. Europe.

VALERIANA OFFICINALIS, *L.* Valerian. Europe.

VERATRUM ALBUM, *L.* White hellebore. Europe.

* VERONICA STRICTA, *Banks.* Common koromiko. New Zealand. Valuable for dysentery, &c.

Class VI.—Oil Plants.

BRASSICA NAPUS, *var.* COLZA. Rape or colza. The colza-oil plant grows well here, and might become a valuable industrial plant. At present colza oil is imported from Europe.

* LINUM USITATISSIMUM, *L.* Flax. Besides the fibre the linum also produces the well-known linseed oil, which is very extensively imported into the colony. The plant thrives over the greater part of the colony, and there is no doubt but that oil might be produced sufficient to supply our own wants.

* OLEA EUROPÆA and * O. SATIVA. Narrow- and broad-leaved olives. Europe. The olives seem to be well adapted for cultivation in several parts of New Zealand, and every encouragement should be given to intending planters. Government encouragement is more especially required for the olive-growing industry, on account of the rather long time required to bring the trees into bearing. The following early French varieties of olives are much required for trial in the colony, as they are much hardier and earlier than the Spanish and Italian varieties: 1. Raymet; 2. Caillet blanche; 3. Cotignac; 4. Caillet rouge; 5. Rouget; 6. Atrorubens.

Three kinds of Spanish olives, and one Italian one, are now being propagated in the Christchurch Public Gardens. Olives should be planted on well-drained volcanic or calcareous soils in the vicinity of the sea. They should be increased by grafting the improved varieties on wild olives raised from stones, or by cuttings of ripened wood. The North Island is certainly fitted for olive cultivation, and there seems good reason to believe that the volcanic hills of Banks Peninsula are also very suitable, seeing that several trees have been fruiting there for some years past.

* RICINUS COMMUNIS, *L.* Castor-oil plant. This does well in the extreme North, and should prove a profitable crop. In the South it is killed by frosts.

* ROSMARINUS OFFICINALIS, *L.* Rosemary. Yields a valuable oil, and grows luxuriantly in New Zealand.

* THYMUS VULGARIS, *L.* Thyme. Europe. A useful plant.

Class VII.—Plants for binding Sand-drifts.

* CAREX TERNARIA, *Br.* New Zealand.

* CORONILLA VARIA. *Hort.* Europe. A very good sand-plant.

* ELYMUS ARENARIUS, *L.* Sea lyme-grass. Europe. A most useful plant for covering drifting sands.

* E. GIGANTEUS, *L.* America. Similar to the last.

* LAVANDULA STŒCHAS, *L.* French lavender. Europe. A most valuable plant for bees; grows on pure sand, and flowers throughout the summer.

* LUPINUS ALBUS, *L.* Europe. White sand-lupin. Europe.

* L. ARBOREUS, *Sims*. Tree lupin. California.
* L. LUTEUS, *L*. Yellow lupin. Europe.
* L. PILOSUS, *L., var*. Blue lupin. Europe. The above lupins are excellent sand-binders. The seeds of the four varieties should be mixed and sown on the sand-dunes so common on the New Zealand coast. The green stems and seeds are sometimes used for cattle-feeding.
* PINUS PUMILIO, *Hk*. Europe. A good sand-binder.
* P. INOPS. New Jersey scrub-pine. America.
* POPULUS ALBA, *L*. Europe. Is the best of the poplars for sand-binding purposes. Immense numbers of plants could readily be raised from cuttings.
* P. DILATATA, *L*., Lombardy poplar; and
* P. CANADENSIS, Ontario poplar, may also be used.
PSAMMA ARENARIA, *Roem*. Marram. Europe.
SALIX DAPHNOIDES, *Vill*. Amoor willow. Asia.
S. HUMBOLDTIANA, *Wild*. Humboldt willow. America.
* TAMARIX GALLICA, *L*. Tamarisk. Europe. One of the best shrubs for standing the sea-breeze.

Class VIII.—Plants for Basketwork.

* SALIX ALBA, *L*. Huntingdon willow. Europe.
* S. CAPREA, *L*. Palm willow. Europe.
* S. PURPUREA, *L*. Bitter willow. Europe.
S. NIGRA, *Marsh*. Black osier. America.
* S. RUBRA, *Huds*. Red osier. Europe.
* S. VIMINALIS, *L*. Common osier. Europe.
All the above are valuable for basketwork. The whole of them are easily increased by cuttings, and it seems desirable to plant them along the banks of rivers, where they would be useful as sand-binders, and profit might be derived from the sale of the twigs. *S. viminalis*, which was first distributed from the Christchurch Public Gardens, has now become widely spread throughout New Zealand, and its distribution has led to the establishment of basket-making on a considerable scale.

Bamboos.

* ARUNDINARIA KHASYANA. *Munro*. Khasya bamboo. India.
* BAMBUSA NIGRA, *L*. Japanese black bamboo.
* B. VIRIDIS, *Hk*. Green bamboo. Japan.
CHUSQUEA FENDLERI, *Mun*. South America.
* THAMNOCALAMUS SPATHIFLORUS, *Mun*. India.
* TH. FALCONERI, *Mun*. India. Graceful bamboo.
The above are the hardiest of the bamboo tribe, and may all be successfully grown in New Zealand. They are most useful plants for chair-making, basket-making, &c.

Class IX.—Dye Plants.

OPUNTIA TUNA, *Miller*. For feeding the cochineal insect. The plant can be grown north of Auckland.
CROCUS SATIVUS, *L*. Dye-crocus. Europe.
* ELÆOCARPUS DENTATUS. *Fst*. Hinau. New Zealand. Yields a fine dark-purple dye.
INDIGOFERA JAPONICA. Japan indigo. Japan.
ISATIS TINCTORIA. *L*. Dyers' wood. Europe.
LAWSONIA ALBA, *Lmck*. Henna. Asia.
* MACLURA AURANTIACA, *Nutt*. Yields a yellow dye. Is also a good hedge-plant. We have used the leaves for feeding silkworms with perfect success.
QUERCUS INFECTORIA, *Olivier*. Gall-oak. Europe.
* Q. COCCINEA. *Wang*. Black oak. America.
RESEDA LUTEOLA, *L*. Weld. Europe. Yields a fine yellow dye, much used in Europe.
RUBIA TINCTORIA, *L*. Madder. Europe. Yields a well-known scarlet dye, much used in Europe.
* SOPHORA JAPONICA, *Ait*. Japan laburnum. Japan. Yields a yellow dye. Is a handsome tree.

Class X.—Plants for Tanning Purposes.

* ACACIA DECURRENS, *Willd*. This, with its variety, *mollissima*, yields one of the most valuable known tanning barks. The tree can be very easily grown on low grounds throughout the colony. Baron Mueller says that 1½ lb. of the bark is equal to 5 lb. of oak bark, but the tanning principle differs somewhat. This is the black or soft wattle of Australia, and for some years past the bark has been largely exported to England, where it fetches from £8 to £12 per ton. The cost of production in this colony is believed to be about £2 10s. per ton, and a return may be expected within ten years after sowing. The seed should be sown in drills about eight feet apart in the months of September or October, on thoroughly prepared ground. One-half of the trees may be cut out at five years, and the remainder at from ten to fifteen years. Every encouragement should be offered to planters, seeing that the acacia is valuable for shelter, and also for various timber purposes. The tree also yields a gum similar to gum arabic, and a fine reddish dye has been obtained from the bark. The wood is good fuel.

* ACACIA PYCNANTHA, *Benth.* Australia. Golden wattle. Similar to the last, but not quite so hardy.

* BETULA ALBA, *L.* Birch. Europe. Bark good; is also a valuable shelter-tree in this colony, and should be largely planted.

* FAGUS MENZIESII, *Hk. f.* Red birch.

* F. FUSCA, *Hk. f.* Big-leaved birch.

* F. SOLANDRI, *Hk. f.* White birch.

* F. CLIFFORTIOIDES, *Hk. f.* Black birch.

F. BENSIFOLIA, *Armstrong.* Red birch.

It seems highly probable that the above New Zealand species of beeches (known to the bush men as birches) might prove highly valuable for their tanning properties. If so, much timber that is at present wasted might be turned to profitable use.

QUERCUS ÆGILOPS, *L.* Valonia oak. Asia. The Turkey or Valonia cups of tanners. The fruit is much used for tanning purposes in Europe. Here the tree might be grown as a shelter tree.

* Q. COCCIFERA, *L.* Abraham's oak. Asia.

Q. DENSIFLORA, *Hk.* Chestnut oak. California.

* Q. ILEX, *L.* Holly oak. Europe. These are substitutes for Valonia.

* Q. PEDUNCULATA, *Im.* British oak. Is another tree that might be profitably grown in the colony for tanning purposes. The bark is not so powerful as wattle-bark, but is said to produce much better leather.

* RHUS CORIARIA, *L.* Sumach. Much used by some tanners. America.

Class XI.—Plants for Hedges.

[*Omitting well-known sorts.*]

* ACACIA HORRIDA, *Willd.* Dornboom. South Africa. A very spiny plant, forming a strong fence. This has proved too tender for the South.

* CARPINUS BETULUS, *L.* Hornbeam. Europe. It forms excellent hedges, and does well in New Zealand.

* CEANOTHUS RIGIDUS, *Nutt.* California.

* C. PROSTRATUS, *Benth.* California. Both these plants appear to be well fitted for hedges. They are quite hardy, and appear to be scale-proof.

* CUPRESSUS BENTHAMI, *Gord.* Bentham cypress. Mexico.

* C. LAWSONIANA, *Benth.* Lawson cypress. Forms a splendid hedge, very close and strong, but is expensive.

* BERBERIS DARWINII. Darwin's berberry. Patagonia. Forms a splendid hedge, but grows slowly.

* ELÆAGNUS JAPONICUS, *Thun.* Oleaster. Forms a stiff and durable hedge; evergreen.

* GLEDITSCHIA TRIACANTHOS, *L.* Buffalo-thorn or honey-locust. America. Forms a strong and formidable hedge.

* LIGUSTRUM OVALLIFOLIUM, *Sieb.* Japan privet. Mixed with thorn, this forms a fine ornamental hedge.

* LYCIUM AFRUM, *L.* Box-thorn. South Africa. Is used by some. Excellent for feeding bees.

* MACLURA AURANTIACA, *Nutt.* Osage orange. America. Forms good hedges in sheltered places. Leaves used for feeding silkworms.

* PRUNUS CAROLINIANA, *L.* Carolina cherry. Carolina. A fine evergreen hedge-plant.

* PRUNUS SPINOSA, *L.* Blackthorn. Europe.

* SALIX PURPUREA, *L.* Bitter willow. A very good hedge-plant in wet situations.

* PITTOSPORUM EUGENIOIDES, *Fst.* Tarata.

* P. TENUIFOLIUM, *Banks.* Matipo.

* P. RALPHII, *Kirk.* Great matipo. These New Zealand shrubs form splendid evergreen ornamental hedges, and are much used in the Colony of Victoria, where they have proved unequalled for the purpose. They may all be used as nurses for young forest trees. They must, however, be transplanted whilst very young, as they are liable to fail if of considerable size.

* THUJA GIGANTEA, *Nutt.* California. Forms a splendid hedge.

Class XII.—Miscellaneous Plants.

* ACER SACCHARINUM, *L.* Sugar-maple. America. Yields sugar and the well-known bird's-eye maple wood.

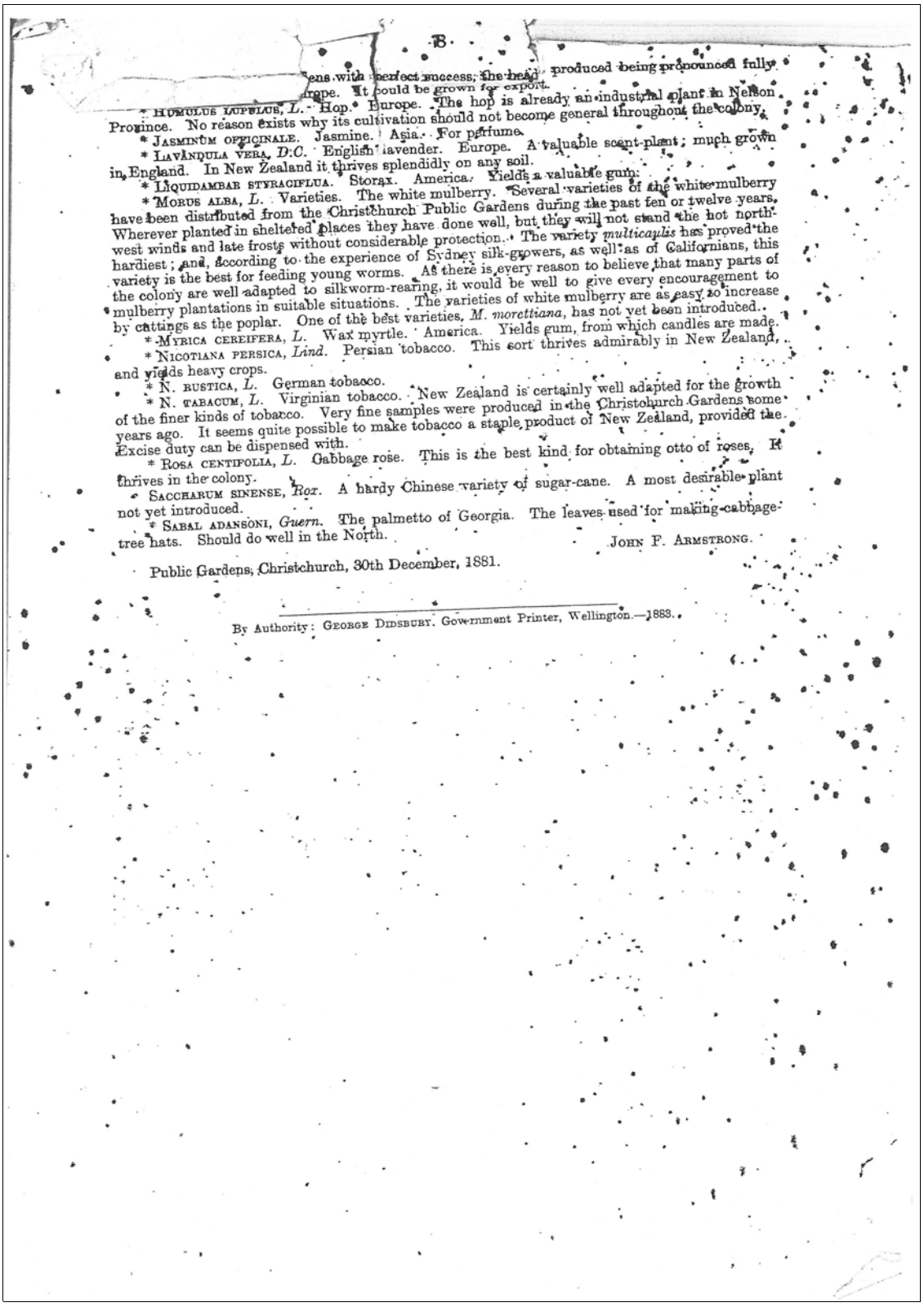
ARUNDO EAREA. Bamboo reed. Japan. Mats, &c.

* BETA VULGARIS, *var.* IMPERIAL. Europe. Sugar-beet. The better soils of the colony are in general suited to the growth of beet for sugar. The best kind is Vilmorin's Imperial.

CITRUS LIMONIUM, *L.* Lemon. Asia. Thrives fairly well in some parts of the colony, and may some day prove a profitable crop.

* C. AURANTIACUM, *L.* Orange. Asia. The orange can be successfully grown in the extreme North, and might perhaps be worthy of Government aid. The growth of the orange tree for the perfume obtained from its blossoms would probably prove remunerative.

* DIPSACUS FULLONUM, *L.* Fullers' teazle. Europe. The spiny heads are used for raising the nap on cloth, and are at present imported for that purpose. Some time ago the plant was tried in



B.

ens with perfect success, the hops produced being pronounced fully
rope. It could be grown for export.

* HUMULUS LUPULUS, *L.* Hop. Europe. The hop is already an industrial plant in Nelson Province. No reason exists why its cultivation should not become general throughout the colony.

* JASMINUM OFFICINALE. Jasmine. Asia. For perfume.

* LAVANDULA VERA, *D.C.* English lavender. Europe. A valuable scent-plant; much grown in England. In New Zealand it thrives splendidly on any soil.

* LIQUIDAMBAR STYRACIFLUA. Storax. America. Yields a valuable gum.

* MORUS ALBA, *L.* Varieties. The white mulberry. Several varieties of the white mulberry have been distributed from the Christchurch Public Gardens during the past ten or twelve years. Wherever planted in sheltered places they have done well, but they will not stand the hot north-west winds and late frosts without considerable protection. The variety *multicaulis* has proved the hardiest; and, according to the experience of Sydney silk-growers, as well as of Californians, this variety is the best for feeding young worms. As there is every reason to believe that many parts of the colony are well adapted to silkworm-rearing, it would be well to give every encouragement to mulberry plantations in suitable situations. The varieties of white mulberry are as easy to increase by cuttings as the poplar. One of the best varieties, *M. morettiana*, has not yet been introduced.

* MYRICA CEREIFERA, *L.* Wax myrtle. America. Yields gum, from which candles are made.

* NICOTIANA PERSICA, *Lind.* Persian tobacco. This sort thrives admirably in New Zealand, and yields heavy crops.

* N. RUSTICA, *L.* German tobacco.

* N. TABACUM, *L.* Virginian tobacco. New Zealand is certainly well adapted for the growth of the finer kinds of tobacco. Very fine samples were produced in the Christchurch Gardens some years ago. It seems quite possible to make tobacco a staple product of New Zealand, provided the Excise duty can be dispensed with.

* ROSA CENTIFOLIA, *L.* Cabbage rose. This is the best kind for obtaining otto of roses. It thrives in the colony.

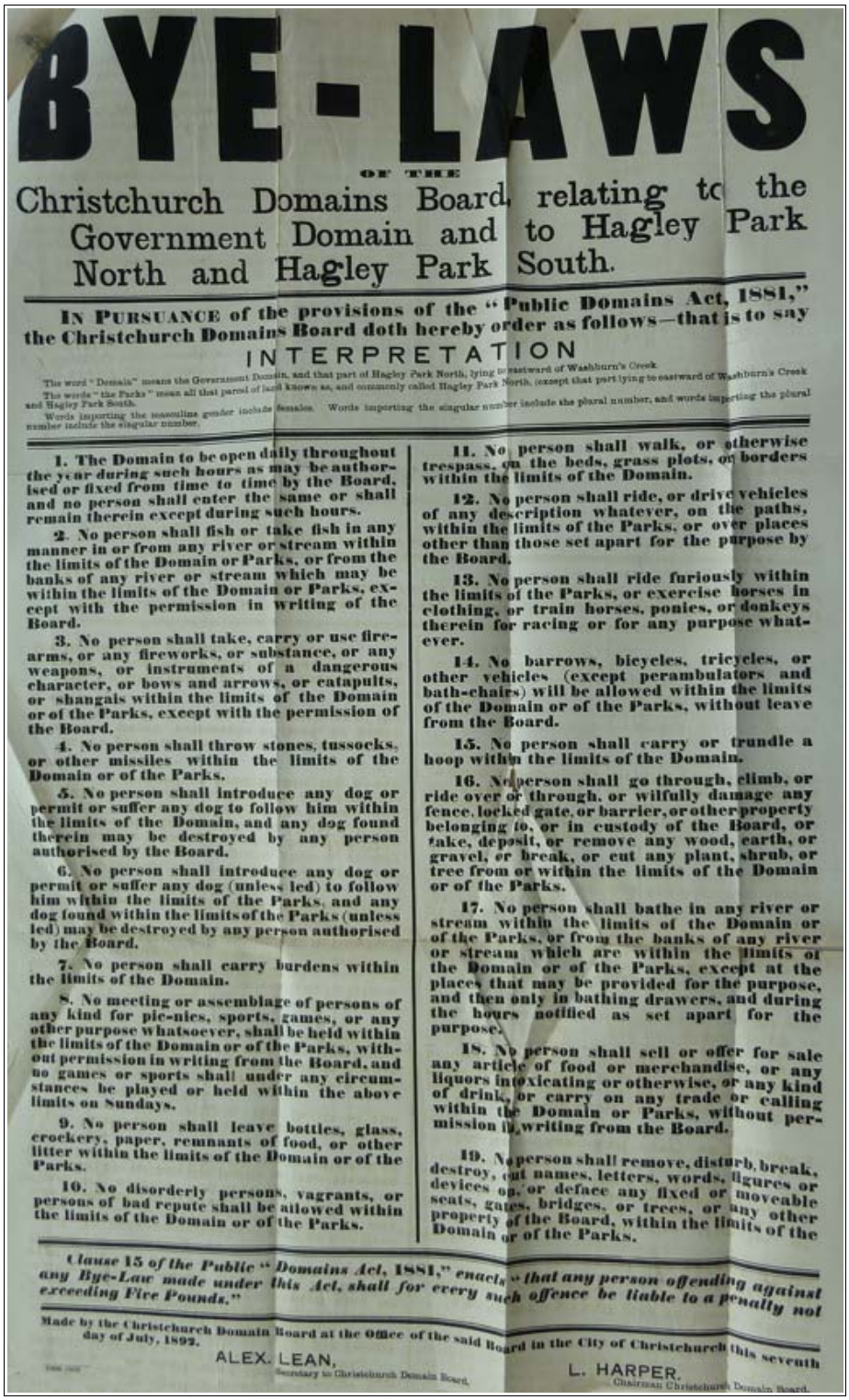
SACCHARUM SINENSE, *Rox.* A hardy Chinese variety of sugar-cane. A most desirable plant not yet introduced.

* SABAL ADANSONI, *Guern.* The palmetto of Georgia. The leaves used for making cabbage-tree hats. Should do well in the North.

JOHN F. ARMSTRONG.

Public Gardens, Christchurch, 30th December, 1881.

By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1883.



BYE-LAWS

OF THE

Christchurch Domains Board, relating to the Government Domain and to Hagley Park North and Hagley Park South.

IN PURSUANCE of the provisions of the "Public Domains Act, 1881," the Christchurch Domains Board doth hereby order as follows—that is to say

INTERPRETATION

The word "Domain" means the Government Domain, and that part of Hagley Park North, lying to eastward of Washburn's Creek.

The words "the Parks" mean all that parcel of land known as, and commonly called Hagley Park North, (except that part lying to eastward of Washburn's Creek) and Hagley Park South.

Words importing the masculine gender include females. Words importing the singular number include the plural number, and words importing the plural number include the singular number.

1. The Domain to be open daily throughout the year during such hours as may be authorised or fixed from time to time by the Board, and no person shall enter the same or shall remain therein except during such hours.

2. No person shall fish or take fish in any manner in or from any river or stream within the limits of the Domain or Parks, or from the banks of any river or stream which may be within the limits of the Domain or Parks, except with the permission in writing of the Board.

3. No person shall take, carry or use firearms, or any fireworks, or substance, or any weapons, or instruments of a dangerous character, or bows and arrows, or catapults, or shangais within the limits of the Domain or of the Parks, except with the permission of the Board.

4. No person shall throw stones, tussocks, or other missiles within the limits of the Domain or of the Parks.

5. No person shall introduce any dog or permit or suffer any dog to follow him within the limits of the Domain, and any dog found therein may be destroyed by any person authorised by the Board.

6. No person shall introduce any dog or permit or suffer any dog (unless led) to follow him within the limits of the Parks, and any dog found within the limits of the Parks (unless led) may be destroyed by any person authorised by the Board.

7. No person shall carry burdens within the limits of the Domain.

8. No meeting or assemblage of persons of any kind for pic-nics, sports, games, or any other purpose whatsoever, shall be held within the limits of the Domain or of the Parks, without permission in writing from the Board, and no games or sports shall under any circumstances be played or held within the above limits on Sundays.

9. No person shall leave bottles, glass, crockery, paper, remnants of food, or other litter within the limits of the Domain or of the Parks.

10. No disorderly persons, vagrants, or persons of bad repute shall be allowed within the limits of the Domain or of the Parks.

11. No person shall walk, or otherwise trespass, on the beds, grass plots, or borders within the limits of the Domain.

12. No person shall ride, or drive vehicles of any description whatever, on the paths, within the limits of the Parks, or over places other than those set apart for the purpose by the Board.

13. No person shall ride furiously within the limits of the Parks, or exercise horses in clothing, or train horses, ponies, or donkeys therein for racing or for any purpose whatever.

14. No barrows, bicycles, tricycles, or other vehicles (except perambulators and bath-chairs) will be allowed within the limits of the Domain or of the Parks, without leave from the Board.

15. No person shall carry or trundle a hoop within the limits of the Domain.

16. No person shall go through, climb, or ride over or through, or wilfully damage any fence, locked gate, or barrier, or other property belonging to, or in custody of the Board, or take, deposit, or remove any wood, earth, or gravel, or break, or cut any plant, shrub, or tree from or within the limits of the Domain or of the Parks.

17. No person shall bathe in any river or stream within the limits of the Domain or of the Parks, or from the banks of any river or stream which are within the limits of the Domain or of the Parks, except at the places that may be provided for the purpose, and then only in bathing drawers, and during the hours notified as set apart for the purpose.

18. No person shall sell or offer for sale any article of food or merchandise, or any liquors intoxicating or otherwise, or any kind of drink, or carry on any trade or calling within the Domain or Parks, without permission in writing from the Board.

19. No person shall remove, disturb, break, destroy, cut names, letters, words, figures or devices on, or deface any fixed or moveable seats, gates, bridges, or trees, or any other property of the Board, within the limits of the Domain or of the Parks.

Clause 15 of the Public "Domains Act, 1881," enacts "that any person offending against any Bye-Law made under this Act, shall for every such offence be liable to a penalty not exceeding Five Pounds."

Made by the Christchurch Domain Board at the Office of the said Board in the City of Christchurch this seventh day of July, 1892.

ALEX. LEAN,
Secretary to Christchurch Domain Board.

L. HARPER,
Chairman Christchurch Domain Board.

Appendix 5. By-laws for the Government Domain and Hagley Park 1892
Source: Bye-Laws (sic) of the Christchurch Domains Board relating to the Government Domain and to Hagley Park North and Hagley Park South, dated 7 July 1892, AADS W3562 Box 257/1/562 Pt 1, ANZ

attack next year, and this being so they have paid a good rent for their boxes."

So far Mr. Holten and his story need no comment, or the starling any recommendation. I use the opportunity for drawing your attention to the weevil (Curculio) genus, several species of which have been very destructive and annoying here this year, one on Strawberries in pots, one on Roses, another on Peas, and lastly, one on my Pinks. Their natural history, especially if there is any preventive, would be of much interest to me, and very likely more readers. *M. P. Andersen, Head Gardener, Wrams, Gunnerstorp, Sweden, July* 24.

NOTES FROM NEW ZEALAND.

(*Concluded from p.* 173).

IN regard to public gardens, a certain amount of latitude must be allowed for the want of support and encouragement from the Government; but apart from this, the gentlemen who have been placed in charge of these gardens, which may be called Government gardens, occasionally display an incredible amount of apathy, and want of knowledge as to the true purposes for which botanical gardens are, or ought to be, established. In horticultural matters this country suffers in the same respect, and from the same causes as political affairs. Whilst I am penning these words we as a nation, colony or people, are undergoing a remarkable political crisis, and one upon which hangs the whole future of this colony. The politics of this country are easily understood, for if you can imagine two large islands nearly equal in size, and these two islands separated by natural barriers into well-defined districts, each with their harbours, railways, and other works, and each endeavouring through their representatives in Parliament to obtain the best, and even all of everything, you have a correct conception of the great difficulty experienced by a Ministry determined to please all parties. In consequence of the political and geographical nature of the colony, we have no leading town in New Zealand as in other colonies, for Auckland and Wellington in the North Island vie with each other, and with Christchurch and Dunedin in the Middle Island. From the same cause we have no public garden worthy of a name. Each town claims its share of the money voted for such purposes, whereas the sum combined would form an establishment suitable for all the country; but divided amongst the jealous provincialists it is worse than useless, and disgraces the very name of gardening. As an example of what is called a botanical garden out here, I will briefly allude to the one in Christchurch, reckoned to be the best in the colony.

Canterbury Province, of which Christchurch is the capital, or chief town, occupies the central part of the eastern side of the Middle Island, and contains a large tract of flat country termed the Canterbury Plains. These plains are, as a rule, very fertile, and constitute the "great grain growing district of New Zealand." At the head of these plains the city of Christchurch is situated, and occupies a pleasant position on the banks of the river Avon, only a few miles from the sea. The land in and around Christchurch is very rich and fertile, well watered by numerous small rivulets, as well as having a great boon in the flow of artesian wells. These wells are tapped at depths varying from 50 to 200 feet simply by driving a succession of 2-inch pipes through the loam, sand, and gravel. These wells, from a gardener's point of view, are a great advantage, and give to the gardening fraternity of Christchurch facilities by which perfect paradises might be brought into existence. Besides being well watered this city has a climate highly conducive to vegetable growth in the great variety of weather found throughout the whole year, namely, a few days' bright weather, then more rain, often making the summer almost as wet as the winter. Occasionally we have a few weeks of drought, and now and then a good blow from the north-west, which makes a little havoc amongst the plantations and gardens such as they are, so that it will be seen that Christchurch could have enjoyable gardens and a botanic garden. The present garden is situated in a large bend of the river Avon on the western side of the city, and with the park on the opposite side of the river contains several hundreds of acres. The entrance is from a very interesting and picturesque street; in fact, the approach to the garden is misleading, because the splendid Holly hedge and long avenue of Sycamore, Birch, Alder, and Ash, with the imposing structures, as seen in the colleges and museums in close proximity to the garden gates, would certainly lead a stranger to expect something grand in the way of gardening on entering those locally made gates, which are in themselves a great ornament and a credit to Christchurch artizans. The first sight is disappointing in the extreme—no shape, design, plan, or purpose discernible in the whole place. The ground is in its primitive unevenness; the lawns (such as they are) possess no shape, and are up and down like a camel's back; the paths are either unnecessarily wide or too narrow, lead nowhere, and take no part in the dividing of the grounds; the borders are arranged anyhow, and contain a jumbled-up, overgrown, ill-grown collection of shrubs, trees, herbaceous plants and annuals. In what is called the pinetum and plantations matters are even worse than in the garden proper, no care in thinning or pruning having ever been exercised, and what would now be representing great value in timber trees is one vast series of ill-shaped, gnarled branched, and smothered trees, with no prospect of ever forming marketable timber although originally planted for that purpose.

Still this garden is not without some redeeming features, for being pleasantly situated in the bend of a beautiful river, upon whose banks Weeping Willows have been planted, it is impossible to prevent some beautiful spots forming. These Willows are full grown and extend their graceful weeping plumes in a perfect canopy of vegetation over the deep and placid waters of the Avon, giving vistas hard to be beaten. One part of this river is spanned by a rather pretty foot-bridge, and to stand on the centre of this bridge, where a full view of the water and Willows can be obtained, is a treat which many would walk miles to behold. The scene is soothing, charming, and what I should call sweetly grand, if such an expression may be used.

The collection of plants contained in the garden, if it received better treatment, would do credit to any first-class establishment. Amongst the trees there are Araucaria imbricata—a fine specimen and now bearing cones, A. Bidwilli and A. brasiliensis; Abies grandis, A. Nordmanniana, A. Fraseri, A. balsamea, A. cephalonica, and A. nobilis; Picea Menziesii, P. Douglasii, P. excelsa, P. alba, and P. canadensis; Sequoia gigantea—several fine trees, a fine specimen of Cryptomeria japonica in full bearing, C. elegans, noble examples of the graceful Cupressus Lawsoniana. This very useful timber tree grows to perfection in this colony, and will no doubt be most extensively planted. It does well in almost any position, I have myself seen it doing well in an almost impenetrable clay on highlands and on low-lying land with gravelly bottom. Last winter, when in the southern part of this district, I had the pleasure of seeing some grand forms of this tree which had been planted over twenty years; each was a perfect picture in itself, being about 30 feet in height, well furnished at the bottom, and forming broad-based pyramids. This habit, enhanced in beauty by the masses of bright red and black male catkins covering the drooping plumes of the branches, was sufficient to make even the dullest of mortals brighten up with delight. These trees, with numerous other good specimens of Coniferæ, were on the estate of the Hon. Lanceolet Walker, in the Geraldine district—a gentleman greatly interested in trees. But to return to the public gardens. Thuia gigantea, Libocedrus decurrens, and Sequoia sempervirens are represented by good-sized trees. Cedrus Deodara, C. rigida, C. atlantica, and C. Libani, Juniperus virginiana, and several other species, also give promise of coming to perfection. In deciduous trees there are all the generally grown species of English, European, and American origin, most of which grow well here. In shrubs the garden is fairly well supplied, containing many which in England must have greenhouse protection—Colletia bictonensis forming quite a feature with its phylloid branches; Hydrangea japonica cœrulea, in very large clumps, also H. hortensis. I may here mention that the Hydrangeas grow to perfection in Christchurch, and remain in bloom for a very long period. The Photinias also make handsome flowering shrubs in this garden. Drimys aromatica, a Tasmanian shrub of very compact habit, with racemes of white, globular, Erica-like flowers, is here quite at home; and with several species of Hakea, Callistemon, Melaleuca, and Grevillea, show the wide range of shrubs open for cultivation in these neglected gardens. Acacia decurrens forms large trees, and in the early spring is quite a feature in and around Christchurch, by its rich golden flowers, standing out from amongst the silvery and feather-like leaves. A part of these grounds is alloted to native plants; but any person unacquainted with the beautiful trees and shrubs of the New Zealand forests would conceive a poor idea of our indigenous flora, from what is here presented to view. A few Panax crassifolium, Drimys colorata, several Pittosporums and Leptospermum, Corynocarpus lævigatus, Olearias and Coprosmas, also a few New Zealand Birch trees, with here and there a clump of Phormium tenax, and other species of the same family; also the New Zealand rival to the Pampas-grass—I mean Poa conspicua—and Dracæna australis and D. indivisa, plants that form a great feature in the scenery of this country.

There is a very good collection of herbaceous plants, containing, but in a very bad condition, some representatives of the British flora, which I need hardly say are much prized by the colonists. But the department in which this garden excels is in the number of variegated plants and sports which have, to a certain extent, been grouped into a rather effective border or bed—Cupressus Lawsoniana lutea, Cupressus macrocarpa aurea, Cupressus torulosa aurea, in very large specimens. These three forms originated here, and have been largely propagated. Besides these there are a whole host of every conceivable variegation, and I may here mention that the Christchurch climate is very favourable and prolific in the production of sports or varieties; a sowing of almost everything is bound to have some new form in the batch, especially conifers. A short time ago, in visiting a place up country, I was astonished to come across a golden form of Pinus insignis, not arising from sickness, but one in perfect growth. The above will show to my readers the material advantages, &c., which even this part of New Zealand possesses in the way of gardening; but in the present condition of affairs the so-called Government gardens at Christchurch are utterly useless. No taste is displayed, few efforts are made to assist Nature; there is a great want of proper nomenclature, so that visitors can gain but small benefit or instruction, and very little in recreation, because the paths are covered with shifting and loose gravel, or sticky clay; the grass is forbidden ground, and what few broken down, make-believe garden-seats there are, cannot be comfortably utilised. This lamentable state of garden affairs, I ought to mention, in justice to the gentleman in charge of the above garden, is due to the niggardly support of the municipal and Government authorities. *Christopher Mudd.*

Florists' Flowers.

THE AMARYLLIS.—The present hot weather is very well adapted for the requirements of the plants at this stage of their growth. They are now ripening off, and although they have been shaded from the sun for a few hours at mid-day, when it was excessively fierce, they are well exposed to the sun, and the ventilators are open night and day. We do not now give them much water at the roots, and the atmosphere of the house is also kept comparatively dry. The black thrips have been a greater trouble to us this year than usual. They were killed night after night with tobacco smoke, but they have swarmed outside, and seem to get in, and are at work on the leaves before the day is over. The seedling plants of this year must be kept growing freely in a house where they can obtain a moist, warm atmosphere. Our plants have just been pricked out, a dozen of them in 6-inch pots. They do best with the pots plunged in a gentle bottom-heat. Syringe the young plants daily while the weather continues hot.

CALCEOLARIAS AND CINERARIAS.—These plants are grown together, and require very much the same treatment. At present they show signs of distress from excessive heat. Our earliest flowering plants have been potted into 6-inch pots, and are making good growth in a well ventilated span-roofed pit; from such strong plants as these we had last year a plentiful bloom of both from Christmas onwards. The latest flowering plants have been potted off into large and small 60's. A good compost of turfy loam four parts, one part

Appendix 4. Description of the Domain written in 1884 by Christopher Mudd, gardener and plant collector
Source: *The Gardeners' Chronicle: a weekly illustrated journal of horticulture and allied subjects. [Gardeners Chronicle],* 1884, Volume 22, p. 204

ever, that much poisoning is probably due to bacterial fermentation in stored fodders rather than to any definite toxic principle in special plants.

REFERENCES.

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Rangiora.—"Transactions N.Z. Institute," Skey, Vol. 14.
"Ergot and its Effects: Charlton, N.Z. Department of Agriculture. Leaflets for Farmers, No. 11."
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Ragwort and its effects are elaborately investigated by Gilruth in Report Department of Agriculture N.Z., 1913.

Measurements taken of some Specimen Trees in Christchurch Botanic Gardens.

By J. Young and T. W. Adams.

We think it may be safely claimed that in no other garden in New Zealand such a variety of fine specimens trees can be seen as in the Christchurch Botanic Gardens, and believe such a record as we are now about to give will be of much value at the present time, and that as the years go by the interest in these fine trees will increase. We feel sure there will be those who will be glad to know the height and girth of these beautiful trees in the year 1918. The land is generally of a light sandy nature, not altogether unfavourable for tree growth, especially as water is not far from the surface in any part of the garden.

Some of the trees have an especial interest to Canterbury people since they mark interesting events connected with the history of the Province of Canterbury. Other trees are very rare in cultivation, and there are others, strange to say, that already exceed in height trees of the same species in their native habitats; *Pinus Torreyana* is one of those which, although only about fifty years old, is much larger than trees recorded in South California, the home of this tree. Although there are not yet any oaks so large as the oaks of Europe yet we are assured by the best authorities in England that oaks of fifty years' growth here far surpass oaks of the same age in Great Britain.

The Albert Edward oak planted on the 9th July, 1863, is now 67ft. high, 8ft. 6in. in girth. Another oak of the common species growing near the Museum, measures 8ft. 4in. in girth, and is 70ft. high.

Appendix 6. Measurements taken of some Specimen Trees in the Botanic Gardens in 1918 (continued over)
Source: *The Journal of the Canterbury Agricultural and Pastoral Association*, Vol. VI, 3rd Series, 1918

A Turkey oak inside the grounds is 71ft. high and 7ft. 7in. in girth, besides these, there are scores of fine oaks in the park, which, until this year, had shown no disease of any kind, but during the past summer some pest has attacked them, and many of them have looked quite miserable. A rather poor specimen of *Cryptomerea Japonica*, near the cottage, is 41ft. high, and 5ft. in girth. This species is a fine timber tree in Japan, and E. H. Wilson in a recent work on Japanese trees remarks of this tree "the most generally useful and popular tree in Japan." Young trees in the gardens are growing vigorously, but it is to be feared that they will never make good trees in Canterbury. Near the *Cryptomeria* is an olive tree 24ft. high loaded with olives. Residents in New Zealand from the South of Europe should note this, remembering the proverb "One olive tree the life of a man." Near the main entrance to the gardens is a fine specimen of *Araucaria imbricata*, 48ft. high, and 6ft. in girth; according to a memorial stone near by this was planted by Sir George Grey, April, 1870. There is also in the neighbourhood a *Cedrus Deodara* planted by the Marchioness of Normanby, date not given, which is 37ft. high, and 7ft. 6in. in girth. A *Paulcwnia imperialis* near by, which has seen its best days, and is now in decline, is about 30ft. high, and 8ft. in circumference. A sycamore tree is 68ft. high, and 6ft. 7in. in girth. There are several fine elms in the Avenue in front of Christ's College; two that we measured were respectively 70 and 72ft. high, and 8ft. and 8ft. 10in. in girth. A black *Acacia* measured 44ft. by 4ft. 8in. A good specimen of *Libocedrus Chilensis* was 29ft. high, and so dense that the base could not be measured. A bright golden specimen of *Retinospora oblusa aurea* was found to be 21ft. high, and 2ft. 6in. in girth. A *cupressus torulosa*, 46ft. high, and 5ft. 9in. in girth was measured; finer trees of this species may be seen at the Cashmere Home, introduced to Canterbury by the late Sir Cracroft Wilson. A tree marked *Cedrus Libani* is 8ft. 6in. in girth, and 41ft. high. Behind the Museum is a large specimen of *Pinus Canariensis*, 76ft. high, with a girth of 9ft. 9in. Opposite, on a natural mound, there is a circle of pines of the species *pinaster*, ranging from 70 to 80ft. high, and up to 8ft. in girth; there are two other groups of this pine in the gardens containing even larger trees. A Japanese larch (*Larix leptolepis*), not looking healthy, again reminds one that Japanese trees are not the best trees to plant under Canterbury conditions, the tree in question is 27ft. high, and 2ft. 7in. in girth. Two *Abies Douglasii* were measured, and were respectively 69ft. and 49ft. high, and 8ft. 8in. and 5ft. 8in. in girth. This tree generally succeeds in Canterbury, and larger trees than those measured are to be found. A lovely specimen of the glaucous variety of *Cedrus atlantica* measured 8ft. 2in. in girth, and 38ft. high. Trees of this species do so well everywhere in Canterbury that they should be planted in thousands. The Engish maple (*acer campestre*) is a good specimen 40ft. high, and

6ft. 3in. in girth, this maple seems quite at home in Canterbury. The *Oreodaphne Californica*, with strongly scented leaves, is not often seen, was found to be 38ft. high, and 4ft. 8in. in girth, young plants from seed were noticed coming up under the parent tree. *Libocedrus decurrens*, planted 1873, is favoured with a good place, and is a perfect specimen 55ft. high, and 9ft. 6in. in girth. This species can hardly be considered a success generally in Canterbury, but some fine specimens were noticed at Glenmark a few years ago. A *Wellingtonia gigantea* proved to be the tallest of all the trees measured; two were measured, and their respective heights were 104ft. and 93ft. by 11ft. 8in. and 15ft. 4in.; the taller tree was of the smaller girth. A sugar maple, 31ft. high, and 2ft. 8in. in girth does not look as though the situation agreed with it. A New Zealand black birch, 58ft. high, and 5ft. 10in. looks quite happy. The writer believes the birch forests to be the only native forests that can be successively regenerated by natural seedlings. A tulip tree has reached the height of 59ft., and is 6ft. 2in. in girth, near it there is a common alder 47ft. high, and 7ft. 6in. in girth. The next tree, *Arbutus Menziesii*, the Californian strawberry tree, has made wonderful growth; about a foot from the ground it divides into six large trunks of beautiful appearance with their smooth poles. The main stem before it divides is 12ft. 3in. in circumference, and the tree rises over 60ft. in height. At the bridge leading to the Acclimatization Society ground is a willow tree which was distributed by the firm of the late Andrew Duncan under the name of *Salix mas*, and is related to the weeping willow. This fine tree is now 73ft. high, and 9ft. 6in. in girth. A red oak, 41ft. high, and 4ft. in circumference, on the first of April, was just beginning to show its beautiful autumn tints. An *Abies firma*, which was much damaged by fire a few years ago, but has now almost recovered, is fruiting well this year. This was the only silver fir measured that bore any cones worth notice. It was 61ft. high by 8ft. 5in. Good specimens were measured of *Abies Cephalonica* 61ft. high, girth 9ft. 3in. *A. concolor*, 8ft. 3in. in girth, and 56ft. high; *A. pinsapo*, 52ft. high, with a girth of 10ft. These are all beautiful trees, but the gem of the silver firs is a lovely specimen of a *Nobilis*; this is 49ft. high, and 5ft. 2in. in girth. It bore one of its grand cones last year. Several species of pines were measured, the largest being an *insignis*, now called *radiata*, to the confusion of every one; this tree was 100ft. high, and 13ft. 6in. in girth. A tree of *Pinus luricio*, 56ft. high by 6ft. 5in., one of *P. Austriaca*, 58ft. 6in. by 8ft. 3in., the Austrian is much the older tree. *P. Sabiniana*, 71ft. high, and 12ft 9in. in girth, here, as in its native home, was noticeable for its open growth and light airy appearance. A good healthy-looking specimen of *Pinus Lambertiana* is growing in the park, this was 46ft. high, and 6ft. 8in. in girth; some of its fine cones were hanging from the boughs. Earlier we mentioned the large specimens of *Pinus Torreyana*