

Avena	Bromus— <i>continued.</i>
sativa, <i>Linn.</i>	sterilis, <i>Linn.</i>
Poa	mollis, <i>Linn.</i>
annua, <i>Linn.</i>	racemosus, <i>Linn.</i>
pratensis, <i>Linn.</i>	Lolium
Briza	perenne, <i>Linn.</i>
minor, <i>Linn.</i>	temulentum, <i>Linn.</i>
Dactylis	Triticum
glomerata, <i>Linn.</i>	sativum, <i>Linn.</i>
Bromus	Hordeum
erectus, <i>Hud.</i>	sativum, <i>Linn.</i>

ART. XLVIII.—*On the Naturalized Plants of the Province of Canterbury.*

By JOHN F. ARMSTRONG.

[Read before the Philosophical Institute of Canterbury, 4th October, 1871.]

THE question of the introduction and naturalization of European and other plants in New Zealand having become a very important one, I have been induced to draw up a list of those to be found in the neighbourhood of Christchurch, and to make a few remarks on the subject, more especially as no list of Middle Island naturalized plants has yet appeared, though an excellent paper on the introduced plants of the Auckland province, by Mr. Kirk, was published in the *Transactions* for 1869.\*

Though my list is by no means to be considered a complete one, it yet contains 171 species, being nearly one-fourth of the total number of flowering plants (naturalized and native) found in the province.

This is certainly very remarkable when we consider that twenty years ago few or none of these plants were to be found in the province. At that time the district consisted of low swampy country, covered with coarse sedges, grasses, large masses of *Phormium tenax*, or such shrubs as *Coriaria*, *Carmichaelia*, *Cordylina*, *Leptospermum*, etc.; here and there grew a small patch of forest, generally composed of *Podocarpus dacrydioides* and *P. spicata*, with a dense undergrowth of *Coprosma*, *Pittosporum*, *Panax*, and similar plants. Now, however, through the colonization of the country by European settlers, the scene has been entirely changed; the sedgy plains have been turned into well cultivated farms; the patches of forest and masses of *Phormium tenax* have almost disappeared, and in their stead we have rich pastures of European and other grasses, and gardens containing almost every plant to be found in those of England.

So completely have these introduced plants established themselves in the neighbourhood of Christchurch, that they nearly equal the native plants in

\* See *Trans. N.Z. Inst.*, Vol. II., p. 131.

the number of species, and by far outnumber them in the abundance of each kind. The rapidity with which foreign plants become naturalized in New Zealand is indeed a most surprising and extraordinary circumstance, and of great interest to every colonist, as it must be quite evident to every observer that the introduction of these European plants will certainly result in the extermination of the indigenous flora, and that at no very distant period of time.

The indigenous Flora seems to have arrived at a period of its existence, when it has no longer strength to maintain its own against the invading races; indeed, every person who has attempted the cultivation of native plants knows how difficult it is to cultivate the most of them, on account of their weakness of constitution. Again the hand of man is busily employed in their extermination—everywhere the forests are being cut down or burnt, the swamps drained, and the grassy plains and valleys broken up and cultivated. Under these combined influences it is evidently utterly impossible that the native plants can survive. Already a few of the rarer species are nearly extinct, and nothing can save our fine forests from destruction but the most rigid preservation by the Government.

It will be seen from the list of species that most of the plants enumerated are natives of Europe; in fact, most of them are common British weeds. Along the roadsides, for miles from the city of Christchurch, are to be seen such plants as *Polygonum aviculare*, *Stellaria media*, *Capsella Bursa-pastoris*, *Sinapis arvensis*, and an abundant growth of grasses, the most common of which are *Hordeum murinum*, *Poa annua*, *Bromus Schraderi*, *B. racemosus*, *B. mollis*, *Lolium* (several species), etc. On the hills and waste ground may be found *Hypochaeris radicata*, *Carduus lanceolatus*, *Erodium cicutarium*, *Anthemis nobilis*, *Marrubium vulgare*, *Trifolium repens*, which is, perhaps, the commonest plant in Canterbury, *Conium maculatum*, *Daucus Carota*, *Pastinaca sativum*, etc. In wet places we find an abundant growth of the large English docks, *Rumex obtusifolius* and *R. crispus*, with the sorrel, *R. Acetosella*, *Ranunculus repens*, *Galium Aparine*, etc.

In the river Avon two plants are found which require more than a passing notice—these are the watercress, *Nasturtium officinale*, Linn., and *Anacharis Alsinastrum*. The former was introduced about twenty years ago, and has proved a great nuisance, blocking up the river and adjacent water-courses, impeding drainage so much that the Provincial Government have had to spend large sums of money to keep it down; it grows to an immense size, far exceeding anything ever seen in England. I may here mention that the water cress is very much infested with the cabbage blight, *Aphis brassica*.

The *Anacharis Alsinastrum*, a well known and remarkable American aquatic, is now to be found in abundance in the river Avon, where two years

ago it did not exist. It was introduced in the year 1868, and planted in one of the ponds of the Acclimatization Society as shelter for the young trout; unfortunately the plant was by some means conveyed into the river, where it is spreading with astonishing rapidity. Although pistiliferous plants only have been found in the province, the latter fact is, perhaps, of little importance, as every joint will form roots when separated from the parent plant. As it is sure to prove a far greater nuisance than the water-cress, its introduction is much to be regretted, seeing that the Avon and other small streams must be kept clear for drainage purposes. The spread of this plant over Britain during the last twenty years is one of the most curious and interesting problems that has come under the notice of living botanists. About the year 1850 it was found in a pond in the centre of England, and was then supposed to be indigenous; shortly afterwards it was found in many distant localities, and was proved to be naturalized, the mode of its migration being still a mystery. It is now common all over Britain, and has, in many instances, impeded navigation in rivers and canals, and interfered with the working of water-mills. In most of those places efforts have been made to eradicate it, but with very little success. The *Anacharis* is greedily eaten by swans, ducks, and other water birds, but this circumstance, instead of being advantageous, is quite the contrary, as small portions of the plant are carried away by these birds and transplanted to other rivers. It will, indeed, be an extraordinary circumstance if this remarkable plant should become as common in New Zealand as it is in Britain.

*Conium maculatum*, Linn., the hemlock of England, is to be found in considerable quantities in the neighbourhood of Christchurch, where it was sown in the year 1865 by an herbalist, who, unfortunately, cannot be punished for the injury he has done the province by the introduction of this very poisonous plant.

I see that *Polygonum aviculare* is considered by Mr. Kirk to be indigenous to New Zealand, but, after nine years' study of the native Flora, I feel compelled to differ from him in this matter. The plant is spreading very rapidly in this province, more especially along the roadsides, where the seeds are carried in the mud on cart wheels, etc.

In conclusion, I beg to remind the botanists in the Middle Island that now is the time to determine the date of introduction of foreign plants into the country.

The following abbreviations are used in the list of species:—a. for Agrestal, plants of cultivated land; aq. for Aquatic, plants growing in rivers, etc.; p. for Palustral, plants of swamps, etc.; s. for Sylvestral, plants growing in woods; v. for Viatical, plants of waysides and waste places.

The following numerals are used to indicate the order of abundance in which the species are found :—1, 2, 4, 6.

1—Is used to intimate that of the species so marked only occasional individuals are found.

2—That the species is found in greater abundance than 1, but still not common.

4—That the species is common in some localities, but does not interfere to any great extent with the native Flora.

6—That the species are very abundant, and rapidly taking the place of native plants.

The date of introduction is also given when known.

The derivation of the plants is Europe, unless otherwise stated.

## LIST OF SPECIES.

Ranunculus	Stellaria
acris, <i>L.</i> , v., 4	holostea, <i>L.</i> , v., 4
repens, <i>L.</i> , v., 4	media, v., etc., 6
bulbosus, <i>L.</i> , a., v., 2	Cerastium
Nasturtium	vulgatum, <i>L.</i> , v., a., 6
officinale, <i>L.</i> , aq., 6	Spergula
Barbarea	arvensis, <i>L.</i> , a., 2
præcox, <i>Br.</i> , a., v., 4	Githago
Capsella	segetum, <i>Lam.</i> , v., a., 4
Bursa-pastoris, <i>L.</i> , a., v., 6	Dianthus
Lepidium	barbatus, <i>Asia</i> , s., 1
sativum, <i>L.</i> , a., 2	Malva
Alyssum	rotundifolia, <i>L.</i> , a., 2
maritimum, <i>Willd.</i> , v., 2	Lavatera
Cochlearia	arborea, <i>L.</i> , a., 2
armoracia, <i>L.</i> , a., 1	Erodium
Sinapis	cicutarium, <i>L.</i> , v., 6
arvensis, <i>L.</i> , v., a., 6	moschatum, <i>L.</i> , v., 4
Brassica	Linum
Napus, <i>L.</i> , v., a., 2	usitatissimum, <i>L.</i> , v., a., 2
Rapa, <i>L.</i> , a., 1	Ulex
oleracea, <i>L.</i> , v., a., 2	europæus, <i>L.</i> , v., a., 6
campestris, <i>L.</i> , a., 1	Cytisus
Raphanus	scoparius, <i>Lk.</i> , v., a., 6
sativus, <i>L.</i> , a., v., 1	capensis, <i>Africa</i> , v., a., 4
Viola	Trifolium
tricolor, <i>L.</i> , v., a., 6	repens, <i>L.</i> , v., a., 6
Gypsophila	pratense, <i>L.</i> , v., a., 4
tubulosa, <i>Boiss.</i> , v., 4	minus, <i>Sm.</i> , v., 6
Silene	medium, <i>L.</i> , a., 4
quinquevulnera, <i>L.</i> , <i>Asia</i> , a., v., 6	procumbens, <i>L.</i> , a., 2
noctiflora, <i>L.</i> , a., 4	

- Melilotus  
   leucantha, Asia, a., v., 4  
 Medicago  
   lupulina, L., a., 2  
   maculata, L., v., a., 1  
 Onobrychis  
   sativa, Lam., a., 1  
 Lotus  
   corniculatus, L., a., v., 6  
   major, Scop., v., 2  
 Vicia  
   hirsuta, L., v., a., 4  
   sativa, L., v., a., 4  
 Lathyrus  
   latifolius, L., a., 4  
 Rubus  
   fruticosus, L., v., 1  
   rudis, Wehe., v., 1  
   Idæus, L., v., 2  
 Rosa  
   rubiginosa, L., v., 4  
 Prunus  
   avium, L., s., 1  
   cerasus, L., s., 2  
 Pyrus  
   malus, L., s., 1  
 Geum  
   urbanum, L., a., v., 4  
 Potentilla  
   anserina, L., v., a., 6  
   fragariastrum, Ehr., a., 1  
 Fragaria  
   vesca, L., s., 4  
   elatior, Ehr., s., 2  
 Amygdalus  
   persica, L., Asia, s., 2  
 Oenothera  
   stricta, L., v., a., 4  
 Ribes  
   grossularia, L., s., 4  
 Petroselinum  
   sativum, L., a., 4  
 Apium  
   graveolens, L., a., v., 2  
 Daucus  
   Carota, L., a., v., 4  
 Pastinaca  
   sativum, a., v., 4  
 Conium  
   maculatum, L., v., a., 4  
 Sambucus  
   nigra, L., s., 2  
 Galium  
   aparine, L., v., a., 4  
 Helianthus  
   tuberosus, L., America, v., 2  
 Erigeron  
   canadense, L., America, etc., v., 4  
 Bellis  
   perennis, L., a., v., 4  
 Bidens  
   pilosa, L. ? Asia, etc., a., 1  
 Anthemis  
   nobilis, L., v., a., 4  
 Achillea  
   millefolium, L., v., 4  
   rubra, 1866, v., 4  
 Chrysanthemum  
   leucanthemum, L., a., 4  
   segetum, L., v., 1  
 Senecio  
   vulgaris, L., v., 6  
 Carduus  
   lanceolatus, L., a., v., 6  
   benedictus, L., a., 2  
   marianus, 1869, v., 2  
 Matricaria  
   Chamomilla, L., a., 4  
 Artemisia  
   Absinthium, L., a., v., 4  
 Tragopogon  
   porrifolius, L., v., 2  
   minor, Fries., v., 2  
 Centaurea  
   solstitialis, L., v., a., 4  
 Lapsana  
   communis, L., a., 4  
 Hypochæris  
   radicata, L., v., etc., 6  
   glabra, L., 1865, v., etc., 6  
 Sonchus  
   oleraceus, L., v., etc., 6  
 Taraxacum  
   dens-leonis, Desf., v., 6  
 Gnaphalium  
   luteo-album, L., v., 4  
 Erythræa  
   centaurium, Pers., a., 2  
 Ligustrum  
   vulgare, L., v., 4  
 Echium  
   vulgare, L., v., a., 4  
 Myosotis  
   arvensis, Hoff., v., 4  
 Solanum  
   nigrum, L., v., etc., 6  
   tuberosum, L., v., 4

- Verbascum  
   Thapsus, L., v., 4  
 Veronica  
   arvensis, L., v., 4  
   officinalis, L., v., 2  
   saxatilis, L., v., 2  
 Verbena  
   officinalis, L., v., a., 4  
 Lamium  
   album, L., s., 1  
 Mentha  
   viridis, L., p., v., 4  
   piperita, L., v., 4  
 Marrubium  
   vulgare, L., a., 6  
 Anagallis  
   arvensis, L., a., 4  
 Prunella  
   vulgaris, L., a., 4  
 Plantago  
   lanceolata, L., v., 6  
   major, L., v., 6  
   media, L., v., 4  
 Polygonum  
   aviculare, L., v., etc., 6  
   convolvulus, L., a., 1  
   fagopyrum, *Sm.*, 1866, a., 2  
 Rumex  
   obtusifolius, L., p., 6  
   crispus, L., p., 6  
   acetosa, L., a., 6  
   acetosella, L., v., 6  
 Chenopodium  
   urbicum, L., v., 6  
   album, L., v., 6  
   Bonus-Henricus, L., v., 2  
 Euphorbia  
   peplus, L., a., 4  
   helioscopia, L., a., 4  
 Urtica  
   urens, L., v., 4  
   dioica, L., v., 2  
 Humulus  
   Lupulus, L., 1865, a., 4  
 Anacharis  
   alsinastrum, 1870, America, aq., 4  
 Asparagus  
   officinalis, L., a., 2  
 Phleum  
   pratense, L., v., a., 6  
 Alopecurus  
   pratensis, L., v., a., 4  
   agrestis, L., v., a., 4  
 Phalaris  
   canariensis, L., v., 6  
 Holcus  
   lanatus, L., v., 6  
   mollis, L., v., 4  
 Anthoxanthum  
   odoratum, L., v., 6  
 Panicum  
   glaucum, L., Asia, v., 2  
   colonum, L., Asia, v., 2  
   sanguinale, L., v., 4  
 Agrostis  
   vulgaris, *With.*, a., 4  
   alba, L., a., 2  
 Avena  
   sativa, L., Asia, a., 4  
   fatua, L., a., 1  
 Arrhenatherum  
   avenaceum, *Beauv.*, a., 4  
   bulbosum, *Lind.*, a., 4  
 Poa  
   trivialis, L., a., 4  
   annua, L., v., 6  
   nemoralis, L., a., v., 4  
   pratensis, L., v., 6  
     *var. angustifolia*, a., 4  
 Briza  
   minor, L., v., 4  
   maxima, L., v., 2  
 Cynosurus  
   cristatus, L., a., 4  
 Dactylis  
   glomerata, L., v., 6  
 Festuca  
   duriuscula, L., v., etc., 6  
   bromoides, L., a., 6  
   ovina, L., a., 4  
   pratensis, L., a., 2  
   rubra, L., v., 2  
 Bromus  
   sterilis, L., v., 4  
   erectus, *Huds.*, v., 4  
   mollis, L., v., 6  
   racemosus, L., v., 6  
   asper, L., v., 4  
   madritensis, L., 1864, v., 4  
   unioloides, *Kth.*, 1866, America,  
     v., 6  
   Schræderi, *Kth.*, 1866, America,  
     v., 6  
 Lolium  
   perenne, L., v., 6  
   temulentum, L., v., 4

## Lolium—continued.

arvense, L., v., 4  
 multiflorum, Lam., v., 4  
 italicum, L., v., 4

## Triticum

repens, L., v., etc., 4

## Hordeum

murinum, L., v., 6  
 sativum, L., a., 2  
 maritimum, L., v., 4  
 distichum, L., v., 1

ART.—XLIX.—*On some New Species of New Zealand Plants.*

By JOHN F. ARMSTRONG.

[Read before the Philosophical Institute of Canterbury, 4th October, 1871.]

*Aciphylla montana*, Armstrong. n. s.

SMALL, 8–10 inches high, smooth and shining. Radical leaves numerous, spreading, 4–5 inches long, pinnate. Leaflets jointed, 2–3 inches long,  $\frac{1}{5}$ – $\frac{1}{8}$  broad, linear or sword-shaped, pungent, striate, midrib rather obscure; sheath 1–1½ inches long,  $\frac{1}{3}$ – $\frac{1}{2}$  inch broad, with one small subulate leaflet on top of each side. Flowering stem about 8 inches high, as thick as a goose quill, deeply grooved, shining, with one leaf about halfway up; umbels few, fascicled, in a contracted panicle 2 inches long; peduncles very short; bracts numerous, 1–2½ inches long, with one to three spreading leaflets, and two small subulate ones at the top of the sheath. Fruit small, about  $\frac{1}{6}$  of an inch long, closely packed on very short pedicels; carpels with five rather narrow wings. Flowers not seen.

Hab.—On rocky ledges 4,000 feet altitude, Rangitata District, 1869; Collected by *W. Gray* and *John F. Armstrong*.

A curious little species approaching some states of *A. Monroi*, Hook. f., but sufficiently distinct in the fascicled umbels and very large bracts.

*Senecio Pottsii*, Armstrong. n. s.

A small suffruticose, decumbent, very slender species; branches ascending 3–6 inches long, flexuose, grooved, covered with white loose cottony tomentum. Leaves petioled, alternate, ovate or spatulate,  $\frac{1}{2}$ –1 inch long, crenate, glabrous above or nearly so; covered below with appressed cottony tomentum. The veins almost parallel with the midrib; head solitary, on slender bracteate peduncles, turbinate  $\frac{1}{3}$  inch long; involucral scales 15–20, linear spreading, obtuse, cottony.

Hab.—Mount Jollie, Rangitata District, altitude 4,500 feet, *W. Gray* and *John F. Armstrong*.

My specimens are very imperfect, but the species seems very distinct from any other New Zealand one, differing chiefly in the suffruticose habit