Hooker's "Handbook of the New Zealand Flora," *Morchella* should precede *Leotia*. I think that it is very likely that other species of *Morchella* will eventually be found in this colony.

In Germany and France the morel is much used as an esculent when fresh, and in the dried state is used for flavouring gravies, etc. It has also been used for making catsup, for which purpose it is considered superior to the common mushroom. In the forest districts of Germany the morel comes up abundantly after fires, and the collection of these plants was formerly so profitable that the country people are said to have set fire to the forests in order to hasten the production of these esculents. Whether the collection of morels will ever be profitable in New Zealand remains to be seen; but I trust that it will not be necessary to set fire to our beautiful native forests in order to obtain them.

Art. XLV.—*A Synopsis of the New Zealand Species of* Veronica, *Linn., with Notes on new Species.*

By J. B. Armstrong.

[*Read before the Philosophical Institute of Canterbury, 5th August*, 1880.]

Abstract.

Introductory.—The genus *Veronica* is by far the largest New Zealand family of flowering plants, and excepting *Coprosma* (of which I am also drawing up a conspectus) it is also by far the most difficult. Although found in many countries the genus is nowhere else so abundant as in New Zealand, and in no other country does it possess so many large shrubby forms, or enter so largely into the composition of the floral scenery. Indeed I may truly say that if we had only this genus, our flora would be very far from devoid of interest and variety, so different in appearance are many of the various forms which the genus assumes.

Anyone exploring the mountains of these islands cannot fail to be impressed by the remarkable characters assumed by these plants. They abound in all situations; on the lower grassy slopes, in the beds of the numerous mountain torrents, on the steep shingly slopes of the higher peaks, and even on the most barren-looking rocks, these hardy *Veronicas* will be found struggling to maintain an existence and to beautify the scene. Many of them are indeed most beautiful plants; from the tiny *V. canescens*, a little trailing plant forming matted patches less than one inch high, to the stately *V. arborea* with a trunk three feet in diameter, there is not one but is worthy of the most careful cultivation.

Although so many fine hardy shrubs have been introduced into our gardens from Japan and other countries, none of them are equal to very many of our native *Veronicas*, and it is to be hoped that these will in the future receive the attention they so justly merit at our hands as the finest known group of hardy shrubs, and that the foolish prejudice which now prevails among amateur horticulturists against all native plants will soon be given up. I have been induced to draw up the following synopsis of the New Zealand species because, having had such excellent opportunities of studying the species in the living state in the Christchurch Botanic Garden, where my father has succeeded in forming the largest existing living collection of species belonging to this genus, I have probably been able to give more careful attention to the subject than any other New Zealand botanist. It must not, however, be supposed that my synopsis is drawn up from cultivated plants alone. On the contrary, I have examined no fewer than 4,000 or 5,000 dried specimens, from all parts of the colony, and their characters have been noted down and compared with those of the living plants, and with Sir Joseph Hooker's excellent descriptions in the "Handbook of the N.Z. Flora;" and again in my numerous botanical exploring journeys I have had ample opportunities for examining the living plants of very many of the species in the wild state.

By following this course I have been able to detect several errors in the nomenclature usually adopted in gardens and museums.

In such a genus as this, however, where so much depends on habit, etc., dried specimens are often misleading, and consequently I have found our collection of living plants of the very greatest service, and indeed I should not have attempted to form this conspectus without it. It is a matter for regret that so little attention is given to living plants by botanists, as in many cases, more especially in New Zealand plants, descriptions drawn up from dried specimens very often fail to agree with the same plant in the fresh state. It must be admitted that whenever possible living plants should be studied in preference to dried ones by all persons attempting to write on the flora of a country. In a work which I have in preparation, entitled a "Manual of New Zealand Botany," I am attempting to carry out this idea, with what amount of success will I trust be seen in the future.

The cause of the difficulty experienced in studying the New Zealand species of this genus is to be found in their extreme variableness. There is not a single character which does not vary greatly in some one or other of the species, and in many of them the whole of the parts are subject to constant variation. It is not, however, pretended that *Veronica* is the only variable New Zealand genus; on the contrary, there is not in the colony a single genus of any magnitude which does not vary greatly, but in none is

there the extreme variability to be found in these *Veronicas*. In drawing up the synopsis, I have found it in many cases extremely difficult to give diagnoses embracing all the forms of the species, and consequently in these cases the description must be looked upon as representing only the most common form of the species. But the species are not all so variable—many of them are very distinct. It is chiefly in sections 2, 4, 5, 6, and 7 of subgenus II. that these variable forms are to be found. The most difficult forms will be found pointed out in the notes attached to the specific characters which I have made as complete as my materials admitted.*

The question as to what is the cause of the great variations of these plants is perhaps a difficult one to answer, and offers a very wide field for future investigation. It has been suggested that the numerous so-called intermediate forms are the results of natural hybridization, and that many of our so-called "species" are not true species but natural hybrids. But, without going into the vexed question of what constitutes a "species," I feel perfectly satisfied that the hybridism theory is quite untenable. We now know that self-fertile plants are by far the most abundant, and exhibit the greatest amount of endurance and greatest range of temperature; that, in fact, plants capable of self-fertilization are those most fitted to survive in the struggle for existence, as indeed we may see amply illustrated in the naturalization of European plants in this colony, the said introduced plants being nearly all self-fertile. Now when a plant contains within its own flower all the required elements for the reproduction of its kind, it is surely extremely improbable that it will cross with any other plant, no matter how closely allied the latter may be; and such crosses have been found by all investigators to be exceedingly rare, although, of course, they cannot be said to be impossible. Now I have ascertained, by careful experiments, that the great majority of the New Zealand species of *Veronica*, including all the variable ones, are perfectly self-fertile, that is, that the pollen of any one flower is active when applied to the stigma of the same flower, and that when the species are left in a state of nature the pollen is so applied by the natural arrangement of the parts. In most cases, indeed, it is scarcely possible for the corolla to shrivel without bringing the anthers in contact with the stigma. Thus although hybridization is perfectly possible, it must be considered as extremely improbable, and certainly it does not account for many of the phenomena shown in the genus. Moreover the varieties do not show the usual characteristics of hybrids except in their being in so many cases exactly intermediate. Hybrids raised in gardens are usually sterile, and when fertile their seedlings show a remarkable amount of variation, as

* It has only been possible to print the description of the author's new species.—Ed.

may be seen in the numerous varieties of the rose, the pelargonium, the gladiolus, and other florist's flowers which have been produced by the intercrossing of allied species. In all these florist-flowers—the results of artificial hybridization—immense numbers of seedlings are raised every year, and I have been assured by experienced cultivators, and indeed I have myself observed, that very rarely indeed does it happen that any two of these seedlings are exactly alike.

But with our *Veronicas* the case is different. I have been enabled to observe numerous garden-seedlings of many of the forms, and they almost invariably resemble their parents. Sometimes, however, sports appear, and when this happens there seems to be a strong tendency on the part of the sport to reproduce itself, and it appears to me that it is just in this manner that the greater number of our native forms have been produced.

At some very distant date there were probably only two or three, perhaps only one, species existing within the limits of the colony; but, on account of the extreme local variations of climate and varied geological formation of surface, certain variations occurred, and the sport so produced, being self-fertile, and having within itself all the elements required for reproduction, naturally reproduced its like until another such sport occurred, and thus the forms gradually became differentiated from the type, and by a long series of such sports our large family of *Veronicas* has been formed.

I think that this theory, coupled in some cases (as in dicecious plants) with the theory of natural hybridization, will be found to apply to all large variable genera in all countries, but that in those countries which have been long inhabited by man or the larger animals the intermediate forms will be found to have been exterminated through their agency, leaving only in most cases the more widely differentiated forms.

In New Zealand, however, and particularly in the South island, where the natural features of the country had not been very materially altered by the agency of man up to the period of European colonization, very many of the intermediate forms have been preserved. The remarkably rapid destruction of our native forests, and the alteration of the features of the country brought about by European colonists, is but the reflex of what has happened in other lands, and it behoves the colonists of the present time to record carefully all the information obtainable as to the introduction and naturalization of exotic plants, and their variations under the influence of our climate, and also to carefully collect and examine all the existing forms of endemic plants before the ever-recurring changes render them extinct. I am of course aware that this theory will be strongly objected to, and I wish it to be understood that I am not in any way wedded to it, but in my opinion no other theory yet propounded so well accounts

for the phenomena shown in *Veronica* and other variable genera. I have therefore been induced to accept it until some better one is proposed.

It may be mentioned as corroborative of this theory that many cultivated plants exhibit in this colony a remarkable tendency to produce sports, and that these sports in very many cases reproduce themselves. The same tendency also occurs in many naturalized plants, the great majority of which are self-fertile. My space, however, does not admit of any further reference to this interesting subject, but I hope to return to it at some future time.

Since my ideas on this subject were first written out, my attention has been called to a paper on the same subject by Mr. W. T. L. Travers.* The conclusions arrived at by that author are almost precisely similar to my own, but are probably much better expressed.

In this synopsis sixty species are included, being eighteen more than were included in Sir J. D. Hooker's "Handbook." These are, however, not all new discoveries, four or five of them being separations from species with which they had previously been confounded.

On the distribution of the species it is scarcely possible in the present state of our knowledge to give any precise information, as the flora of several of the districts has not yet been properly worked up. It, however, seems certain that the South Island has many more species of *Veronica* than the North Island, and that the Canterbury and Otago districts have more than any other part of the colony. Lists of species have been published of the Auckland, Wellington, Canterbury, and Otago districts only; of these Canterbury is the richest in species, having 46, whilst Otago has 35 or 36, Wellington 17, and Auckland 15. In the Otago district, however, there are many extensive tracts, which have not been thoroughly explored, and no doubt many of the Canterbury species will eventually be found there.

Considering what has been done during the last ten years, I think we may reasonably assume that at least some new species will be discovered, and my own opinion is that these new forms will be very numerous, especially on the western slopes of the Alps, the plants of which have been scarcely at all collected.

In drawing up this synopsis, I have found it impossible to place the species in a natural linear series, and the arrangement is therefore to some extent artificial. I recognize three distinct groups, which I have classed as sub-genera, and divided them into sections and series as seemed most convenient. In arranging species according to this synopsis, I should advise the student to discard all slight variations, and not to attempt to name any of the species of sub-genera II. until the greater majority of

* "Trans. N.Z. Inst.," Vol. I., p. 89.

them have been collected, as it is extremely difficult to furnish descriptions embracing all the numerous variations, and a considerable amount of study of the sub-genus is necessary before the student can even understand the most simple variations assumed by the species. When the first difficulties are conquered, however, it will be found that there is no other New Zealand family of plants so interesting as this.

The curious dimorphism shown in sub-genus III. deserves a very careful study. It has occurred to me that the upper lobulate leaves, so often absent, are the true leaves, and that the scale-like productions commonly called leaves are in reality not true leaves, but changed petioles. I have not, however, been able to bring forward any facts to prove this, and it offers a wide and interesting field for future study. Should this idea be substantiated, it will connect the sub-genus with the section represented by *V. haastii*, etc.

Genus *Veronica*, Linnæus.

This genus is a very extensive one, found in most temperate and in some sub-tropical countries. The sixty species found in the colony are not found in any other country, except in the case of *V. elliptica*, which occurs at Cape Horn and the Falkland Islands.

PROPOSED ARRANGEMENT.

Sub-genus I.—*Eu-veronica*. The Speedwells.

Capsules laterally compressed, didymous (rarely non-didymous). Herbs or under-shrubs.

Series A.—Flowers solitary, axillary.

Leaves $\frac{1}{12}$–$\frac{1}{6}$ inch long, hairy, ovate ... 1. *V. canescens*, Kirk.

Series B.—Flowers racemose; leaves entire.

Leaves $\frac{1}{4}$–1 inch, linear, glabrous ... 2. *V. linifolia*, H.f.

Series C.—Leaves deeply toothed; flowers racemose.

Leaves $\frac{1}{2}$–1 inch, ovate-cordate ... ... 3. *V. elongata*, Benth.
Leaves $\frac{1}{6}$–$\frac{1}{3}$ inch, ovate-spathulate ... 4. *V. spathulata*, Benth.
Leaves $\frac{1}{4}$–$\frac{1}{2}$ inch, ovate, glabrous ... ... 5. *V. nivalis*, H.f.
Creeping leaves $\frac{1}{12}$–$\frac{1}{4}$ inch, oblong, glabrous 6. *V. bidwillii*, H.f.
Decumbent leaves $\frac{1}{4}$–$\frac{1}{2}$ inch, oblong-ovate 7. *V. lyallii*, H.f.
Leaves $\frac{1}{2}$–1$\frac{1}{2}$ inch, ovate, obtuse ... ... 8. *V. diffusa*, H.
Leaves 1–1$\frac{1}{2}$ inch, lanceolate ... ... 9. *V. lanceolata*, Benth.
Leaves 3–6 inches, ovate-lanceolate ... 10. *V. cataractæ*, Forst.

Sub-genus II.—*Koromika*. The Koromikos.

Capsules dorsally compressed, ovoid, valves often splitting at the tips.

Section 1.—*Leaves deeply serrate or crenate.*

Series A.—Flowers paniculate.

Leaves 1–1½ inch long, ovate or oblong ... 11. *V. hulkeana*, F.M.
Leaves ⅓–1 inch, obovate-spathulate ... 12. *V. lavaudiana*, Raoul.
Leaves ½–1 inch, oblong-spathulate ... 13. *V. raoulii*, H.f.

Series B.—Flowers racemose.

Leaves ½–1½ inch, obovate or sub-orbicular 14. *V. benthamii*, H.f.
Leaves ½–1 inch, obovate-lanceolate ... 15. *V. macrantha*, H.f.

Section 2.—Leaves entire; flowers spicate or sub-spicate; leaves more or less densely imbricate.

Series A.—Leaves broad, obtuse, glaucous; flowers spicate.

Leaves ⅓–½ inch long, broadly oblong ... 16. **V. amplexicaulis**, n.s.
Leaves ⅓–½ inch, sub-orbicular ... ... 17. *V. carnosula*, H.f.
Leaves ⅓–½ inch, oblong-obovate ... ... 18. *V. pinguifolia* H.f.

Series B.—Leaves not glaucous; flowers sub-spicate.

Leaves ½–¾ inch, ovate-lanceolate... ... 19. **V. decumbens**, n.s.

Series C.—Leaves not glaucous; flowers in sub-capitate spikes.

Leaves ⅛–¼ inch, orbicular, recurved ... 20. *V. buchanani*, H.f.

Series D.—Leaves glaucous, narrow, spikes hairy.

Leaves ¼–⅓ inch, obovate-oblong ... ... 21. **V. glauco-cærulea**, n.s.
Leaves ⅙–¼ inch, linear-obovate ... ... 22. *V. pimeleoides*, H.f.

Section 3.—Leaves densely imbricated; flowers in terminal ovoid heads formed of an aggregation of spikes.

Leaves ¼–⅛ inch, keeled, oblong or broadly obovate ... ... 23. *V. epacridea*, H.f.
Leaves ⅓–½ inch, obovate-oblong or round 24. **V. macrocalyx**, n.s.
Leaves ¼–⅓ inch, oblong-orbicular ... 25. *V. haastii*, H.f.

Section 4.—Leaves closely imbricated; flowers in sub-terminal racemes, often crowded.

Leaves ⅓–½ inch, obovate-oblong ... ... 26. *V. buxifolia*, Benth.
Leaves ⅓–½ inch, obovate, shining ... 27. *V. odora*, H.f.
Leaves ½–¾ inch, broadly obovate-oblong... 28. *V. lævis*, Benth.
Leaves ¾–1 inch, narrowly obovate ... 29. *V. obovata*, Kirk.
Leaves ¾–1 inch, ovate-lanceolate ... 30. **V. monticola**, n.s.
Leaves ⅓ inch, ovate or obovate ... ... 31. **V. grayii**, n.s.
Leaves ¼–⅓ inch, obovate, mucronate ... 32. **V. canterburiensis**, n.s.

Section 5.—Leaves not more than one inch long, decussate, rarely loosely-imbricated; flowers in racemes, which are subterminal, often crowded, usually short.

Series A.—Racemes crowded, becoming a panicle by the defoliation of the upper leaves.

Leaves ½–1 inch, linear-oblong ... .. 33. **V. anomala**, n.s.
Leaves ½–¾ inch, linear-obovate ... ... 34. *V. vernicosa*, H.f.

Series B.—Flowers corymbose.

Leaves ¾–1 inch, linear-oblong, acute ... 35. *V. diosmæfolia*, Cunn.

Series C.—Flowers sub-corymbose.

Leaves ½–1 inch, elliptic-oblong ... ... 36. *V. elliptica*, Forst.

Series D.—Flowers in sub-terminal, rather crowded, often compound racemes.

Leaves ½–1 inch, linear-oblong ... ... 37. *V. colensoi*, H.f.

Leaves ½–1 inch, linear-lanceolate ... ... 38. **V. rakaiensis**, n.s.

Series E.—Flowers in sub-terminal, dense, stout, obtuse racemes.

Prostrate; leaves ⅓–½ inch, ovate-oblong, glabrous ... ... 39. *V. chathamica*, Buchanan.

Section 6.—Leaves 1–3 inches long, narrow, entire; racemes 2–5 inches long, pubescent.

Leaves 1 inch long, oblong, sessile ... 40. *V. traversii*, H.f.

Leaves 1–2 inches, oblong-lanceolate ... 41. *V. pubescens*, B.&S.

Leaves 1–3 inches, linear-oblong ... ... 42. *V. ligustrifolia*, Linn.

Leaves 1½–3 inches, linear-lanceolate ... 43. *V. parviflora*, Vahl.

Leaves 1–1½ inch long, linear-lanceolate 44. *V. arborea*, Buchanan.

Section 7.—Leaves 1–6 inches long, broad; racemes 2–8 inches long, simple.

Series A.—Racemes very long, slender, sub-pendulous, rather loose-flowered, very many-flowered.

Leaves 1–1½ inch long, lanceolate, acute 45. **V. kirkii**, n.s.

Leaves 2–4 inches, linear-lanceolate, acute 46. *V. myrtifolia*, B.&S.

Leaves 2–6 inches, lanceolate, acuminate 47. *V. lindleyana*, var. hort.

Series B.—Racemes sub-erect, dense-flowered, stout, very many-flowered.

Leaves 1½–2 inches, linear-oblong, sessile 48. *V. carnea*, var. hort.

Leaves 1½–2½ inches, oblong, lanceolate, glabrous ... ... 49. *V. macroura*, H.f.

Leaves 1–1½ inch, oblong-ovate, pubescent 50. **V. lewisii**, n.s.

Leaves 2–4 inches, oblong-obovate, obtuse 51. *V. speciosa*, Cunn.

Leaves 3–4 inches, linear-oblong, acute ... 52. *V. dieffenbachii*, Benth.

Sub-genus III.—*Pseudo-veronica.* The False Veronicas.

Leaves scale-like, appressed, often most densely quadrifariously imbricated, often dimorphic.

Series A.—Leaves in distant opposite pairs.

Leaves $\frac{1}{16}$ inch long, appressed, glabrous 53. *V. cupressoides*, H.f.

Series B.—Leaves densely imbricated, opposite pairs, connate at the base.

Branches square, $\frac{1}{12}$–$\frac{1}{8}$ inch diam., leaves obtuse ... ... 54. *V. tetragona*, H.f.

Branches square, $\frac{1}{12}$ inch diam., leaves sub-acute ... ... 55. *V. tetrasticha*, H.f.

Branches square, $\frac{1}{8}$–$\frac{1}{10}$ inch diam., leaves acuminate	56. *V. lycopodioides*, H.f.
Branches terete, slender, $\frac{1}{16}$ inch diam., leaves $\frac{1}{20}$–$\frac{1}{10}$ inch	57. *V. salicornioides*, H.f.
Branches terete, $\frac{1}{10}$–$\frac{1}{12}$ inch diam., leaves connate to middle	58. *V. armstrongii*, Kirk.
Branches terete, stout, leaves connate to middle	59. *V. hectori*, H.f.

Species the position of which is uncertain until fruit is obtained.

Leaves $\frac{1}{4}$ inch long, ovate-acuminate, imbricated	60. **V. loganioides**, n.s.

Descriptions of New Species.

16. *V. amplexicaulis*, Armstrong, "New Zealand Country Journal," Vol. III., page 56. 1–2 feet high, decumbent or suberect. *Branches* stout, ringed with old leaf-scars. *Leaves* loosely imbricated, amplexicaul or subamplexicaul, oblong, obtuse, $\frac{1}{2}$ inch long, $\frac{1}{3}$ inch broad, glaucous, coriaceous, entire, slightly concave, not keeled. *Flowers* in short conical spikes on hairy peduncles, 1–1$\frac{1}{4}$ inch long. *Spikes* $\frac{3}{4}$–1 inch long, densely hairy between the flowers, crowded together near the ends of the branchlets, dense-flowered. *Bracts* solitary, membranous, longer than the calyx, hairy, and ciliated. *Calyx-lobes* ovate or lanceolate, acute, ciliated, half as long as the corolla tubes. *Corolla* white; *tube* $\frac{1}{4}$ inch long; *limb* $\frac{1}{4}$ inch across; *lobes* lanceolate. *Stamens* longer than the style. *Anthers* blue. *Style* curved upwards, slender. *Capsule* $\frac{1}{8}$ inch long, ovoid-compressed, acute, hairy, one-third longer than the calyx.

Hab.—Provincial District of Canterbury, Rangitata, *Mr. J. F. Armstrong*. Provincial District of Nelson, Upper Waiau, *J. B. A.* A most beautiful and remarkable little shrub, readily distinguished from its nearest relative, *V. carnosula*, by the broadly oblong, very obtuse, amplexicaul leaves, and densely hairy spikes, also by the very long corolla tube, but this character may vary.

19. *V. decimbens*, Armstrong, "New Zealand Country Journal," Vol. III. A small decumbent, very beautiful shrub. *Branches* black and polished. *Branchlets* pubescent. *Leaves* loosely imbricated or decussate, spreading, entire, quite glabrous, very shortly petioled, ovate or lanceolate, $\frac{3}{4}$ by $\frac{1}{2}$ inch, obtuse, flat or slightly concave, not keeled, obscurely three-nerved, dull green in colour, with bright red edges. *Racemes* in pairs near the tips of the branches, shortly peduncled, ovoid, 1 inch long, 12–16-flowered. *Pedicels* $\frac{1}{16}$ inch long, slender, hairy. *Bracts* one-third the length of the calyx-lobes which are $\frac{1}{8}$ inch long, narrow-ovate, acute, hairy, ciliated, with pink edges.

Corolla white; *tube* ¼ inch long, much flattened on the inner side; *limb* ¼ inch across; *lobes* ovate, obtuse. *Stamens* longer than the style. *Anthers* red. *Capsules* ovate, much compressed, surmounted by the remains of the style.

Hab.—Provincial Districts of Canterbury and Nelson, *J.B.A.* A very beautiful little plant with the habit of *V. pinguifolia*, but the leaves are green, glabrous, larger than in that plant, not keeled, and the flowers distinctly pedicellate; a most distinct species.

21. *V. glauco-cærulea*, Armstrong, "New Zealand Country Journal," Vol. III. A small, stout, decumbent, or sub-erect shrub, much-branched, intensely glaucous throughout, with slightly hairy branches. *Leaves* closely imbricated, ⅓ inch long, obovate-oblong, on short broad petioles, acute, rather concave, not keeled, coriaceous (but not rigid). *Veins* obsolete above; *midrib* evident below. *Flowers* in short few-flowered spikes crowded together near the tips of the branchlets. *Peduncles* covered with soft, white hairs. *Bracts* ovate, acuminate, keeled, hairy and ciliated, shorter than the calyx-lobes. *Calyx-lobes* ovate, acute, hairy and ciliated on the margins, $\frac{1}{10}$ inch long. *Corolla* deep blue changing to purple; *tube* $\frac{1}{20}$ inch long; limb ¼–½ inch diameter; *lobes* broadly oblong, obtuse. *Stamens* as long as the style. *Anthers* blue. *Capsules* ovoid-compressed, acute, twice as long as the calyx.

Hab.—Nelson, Canterbury, and North Otago, 2,000–5,000 feet.

The intensely glaucous, closely set leaves, and dark blue or purple flowers, distinguish this from all but *V. pimeleoides*, from which it is best distinguished by the stouter branches, longer petioles, and much darker flowers. It is a most beautiful and ornamental plant, a great favourite in gardens.

24. V. macrocalyx, n.s.

A short-branched, straggling, decumbent or prostrate shrub, 4–8 in. long. *Branches* stout, leafy above, below densely clothed with the broad sheathing bases of old leaves, which are generally hairy and ciliated. *Leaves* bright green when fresh, brown when dry, densely quadrifariously imbricated, often much reflexed, broadly obovate-oblong, ⅓–½ inch long, ¼–⅓ inch broad, obtuse, sessile by a membranous amplexicaul base, concave above, slightly keeled below, slightly revolute, glabrous above, except a few scattered white hairs, puberulous below, coriaceous, rigid when dry, thinned on the margin, minutely lacerated, particularly towards the base, often minutely ciliated; *midrib* sunken above, keeled below; other *veins* very indistinct. *Flowers* very shortly pedicelled in 8–10-flowered racemes, collected into shortly-stalked terminal or sessile sub-terminal heads. *Heads* ovoid or oblong, 1–1½ inch long, ¾–1 inch broad, very dense. *Pedicels* extremely short, stout, rarely absent. *Bracts* ⅓ inch long, linear or linear-lanceolate, acute, sessile or very shortly-

stalked, keeled, minutely pubescent and ciliated, particularly on the keel. *Calyx-lobes* linear, ¼–⅓ inch long, sub-acute, keeled, ciliated or glabrous. *Corolla* white, ¼–⅓ inch across; *tube* short. *Capsules* ovoid, acute, ⅛–⅕ inch long, slightly pubescent, much shorter than the calyx, the valves splitting longitudinally.

Hab.—Waimakariri Valley, 5–6000 feet, *J. B. Armstrong*, March, 1867. Rangitata Valley, 4,500 feet, *Mr. J. F. Armstrong*, March, 1869. Rakaia, *Mr. T. Phillips* (perhaps a different plant), 1878.

This is closely allied to *V. haastii*, but differs much in the sepals and capsules. The leaves are narrower, greener, pubescent, and smaller than in that species, and are without the red edges. This species has longer sepals than any other New Zealand one, except *V. elongata* and *V. macrantha*.

30. *V. monticola*, Armstrong, "New Zealand Country Journal," Vol. III. p. 58 (erroneously printed *montana*). About 2 feet high. *Leaves* imbricated, smooth, thick and leathery, spreading, ovate-lanceolate, about 1 inch long, acute, gradually narrowed into a short stalk, concave, not keeled, *midrib* sunken above. *Racemes* in pairs at the ends of the branches, longer than the leaves, about 20-flowered. *Peduncles* clothed with short glandular hairs. *Bracts* linear, acute, ⅛ inch long, hairy and ciliated. *Calyx-lobes* ovate, acute, ⅒–⅛ inch long, with a white membranous border. *Corolla* white; *tube* ⅙ inch long, compressed; *limb* ¼ inch across; *lobes* ovate, acute. *Anthers* brown. *Capsules* twice as long as the calyx, sub-ovoid, much compressed.

Hab.—Nelson, Canterbury, and Otago, common at 3–4,500 feet. In most New Zealand herbariums this fine little species has been generally confounded with *V. lævis*, from which it differs widely in the leaves being longer, the midrib sunken, not keeled, gradually narrowed into the petioles, in the membranous bordered calyx-lobes, and in the dull, dark colour, smaller size and pubescent peduncles.

31. *V. grayi*, Armstrong, "New Zealand Country Journal," Vol. III. A small upright shrub, 2–3 feet high. *Leaves* closely imbricated, glabrous, entire, flat, ovate or oblong or obovate, sub-erect, ⅓ inch long, acute, rather suddenly narrowed into short foot-stalks, the lowermost leaves cordate at the base; *veins* obsolete. *Racemes* slender, hairy, 4–6 together near the tips of the branchlets, many-flowered. *Bracts* linear, acute, fringed, ⅛ inch long. *Pedicels* ⅛ inch long, stout, hairy. *Calyx-lobes* ⅛ inch long, ovate, acute or obtuse, hirsute, ciliate. *Corolla* white; *tube* very short, ⅙–⅒ inch long; *limb* ½ inch across; *lobes* ovate, acute. *Anthers* blue. *Capsules* compressed-ovoid, acute, more than twice as long as the calyx.

Hab.—Canterbury and Nelson Provincial Districts.

In the original description the name was inadvertently written *greyi*, and the mistake was repeated in my "Sketch of the Flora of Canterbury." This pretty and curious little shrub is named in honour of Mr. W. Gray, of Ohinitahi, an ardent and efficient collector of New Zealand plants. It is a neat little shrub, flowering abundantly and early, and a very desirable garden plant.

32. *V. canterburiensis*, Armstrong, "New Zealand Country Journal," Vol. III. A small prostrate or erect slender shrub, 1–2 feet high. *Leaves* entire, smooth, rather closely imbricated, spreading and recurved, obovate, mucronate, concave, membranous, ¼ inch long, on short slender stalks, which in those leaves on the lower side of the branches are twisted, so as to bring the upper side to the light. *Racemes* in pairs at the ends of the branches, 4–8-flowered, hairy. *Bracts* ⅙–⅛ inch long, linear, acute, hairy, with white membranous ciliated margins. *Calyx-lobes* ⅙–⅛ inch long, linear-oblong, obtuse, with delicate white, membranous, ciliated margins. *Corolla-tube* shorter than the calyx; *limb* ¼ inch diameter, white; *lobes* obovate, obtuse. *Anthers* blue. *Capsules* ovoid-compressed, glabrous, acute, twice as long as the calyx. *V. lucens*, Kirk, in Canterbury Museum.

Hab.—Canterbury and Westland, 3,000–5,000 feet.

A handsome little shrub, very distinct in characters from any other; readily distinguished from all others of its section by the small foliage and twisted footstalks.

33. **V. anomala**, n.s.

A dense-growing shrub, 3–6 feet high, 4–8 feet through. *Branches* long, slender, purplish or reddish towards the tips. *Leaves* decussate, ½–1 inch long, ⅕–¼ inch wide, linear or linear-oblong, patent, often reddish-coloured, coriaceous, quite glabrous on the upper surface, sometimes ciliated on the margin, concave, entire, shortly petiolate; *midrib* obscure above, distinctly keeled below. *Racemes* crowded together, 5–10-flowered, sub-terminal, ultimately becoming a terminal panicle by the defoliation of the upper leaves. *Flowers* white, very shortly pedicellate or sessile. *Bracts* sessile, acute, nerved, keeled, ⅛–⅙ inch long. *Calyx-lobes* 3, linear-oblong, acute or obtuse, distinctly nerved, scabrid, pubescent or glabrous. *Corolla-tube* ¼ inch long; *limb* ¼–½ inch broad; *lobes* nearly equal, 3, or 2 unequal, spreading, narrow. *Stamens* shorter than the style. *Capsules* ovoid-oblong, compressed, obtuse, pubescent, ⅕ inch long, always longer than the calyx.

Hab.—Canterbury Provincial District, Rakaia Valley, Mount Cook, and Mount Peel. A curious plant differing from all other species in the number of the corolla-lobes, but very closely resembling *V. vernicosa* in appearance, and doubtless a very recent offset from that species.

38. **V. rakaiensis**, n.s.

A slender, bright-green shrub, 3–6 feet high. *Branches* upright, extremely slender, marked by black leaf-scars. *Leaves* decussate or laxly imbricated, linear-lanceolate, or linear-oblong, shortly petioled, ½–1 inch long, acute, quite entire, glabrous and shining above, pubescent below, concave above, flat not keeled below; *veins* obscure. *Flowers* in many-flowered pubescent racemes in pairs near the tips of the branches. *Racemes* 1–2 inches long, curved. *Pedicels* ⅙ inch longer, very slender. *Bracts* very short, concave and ciliated. *Calyx-lobes* 1/12 inch long, oblong, obtuse, ciliated, and pubescent. *Corolla* pure white; *tube* shorter than the calyx; *limb* ¼ inch diameter; *lobes* nearly equal, obtuse, reflexed. *Stamens* spreading widely. *Anthers* brown. *Style* as long as the stamens, curved upwards. *Capsule* ⅙ inch long, ovate-oblong, acute, pubescent.

Hab.—Canterbury Alps 2,000–4,000 feet, scarce.

This is the *V. colensoi* var. *gracilis* of gardens; it must not be confounded with the Australian *V. gracilis*, Br., which is a very different plant.

This species appears to be self-sterile, and is, I believe, fertilized by a very small hymenopterous insect. The flowers smell strongly of honey. It is best distinguished from *V. colensoi* by the extremely slender branches and smaller narrower leaves.

45. *V. kirkii*, Armstrong, "New Zealand Country Journal," Vol. III., p. 58. A tall handsome shrub 6–12 feet high, with dark brown polished branches, which are ringed by old leaf-scars. *Leaves* 1–1½ inch long by ⅓ inch wide, lanceolate, decussate or loosely imbricate, entire, smooth, acute, sessile by a broad base, slightly concave, recurved; *midrib* rather prominent below, sunken above. *Flowers* shortly pedicelled in long slender racemes in the axils of the uppermost leaves. *Racemes* 4–8 inches long, 50–100-flowered, very slender, curved, very densely flowered, pubescent. *Bracts* lanceolate, acuminate, ciliate, much shorter than the calyx. *Calyx-lobes* 1/10 inch long, lanceolate or ovate, ciliated, acuminate. *Corolla* pure white; *tube* ⅕ inch long; *limb* ¼ inch diameter; *lobes* nearly erect, ovate-oblong, obtuse, concave. *Stamens* as long as the style. *Anthers* blue. *Capsule* rounded, ovate, sub-acute, much compressed, hoary, twice as long as the calyx.

Hab.—Canterbury Provincial District. First collected by *Mr. J. F. Armstrong* in 1868 in the Upper Rangitata valley, which is very rich in species of the genus. This plant seems sufficiently distinct, but is closely related in many characters to *V. macroura* and *V. stricta*; from the former it is best distinguished by the sessile narrower leaves and much longer racemes, and from the latter by the shorter leaves and denser flowers.

47. *V. stricta* var. *lindleyana*, hort., Armstrong. A shrub, 6–10 feet high. *Leaves* 3–4 inches long, 1 inch broad, oblong or oblong-lanceolate, shortly

petioled, entire or obscurely serrate, acuminate, distinctly veined, glabrous or slightly pubescent. *Racemes* long peduncled, in pairs near the tips of the branchlets, curved, rather stout, 4–8 inches long, pubescent, not very dense-flowered; *pedicels* ⅓ inch long, very slender, curved. *Bracts* extremely short, oblong, ciliated. *Calyx-lobes* about $\frac{1}{12}$ inch long, pubescent and ciliated, acute. *Corolla* pale blue or white; *tube* ⅛ inch long, swollen; *limb* ¼ inch across; *lobes* narrow, concave, obtuse. *Stamens* curved upwards, spreading. *Anthers* brown. *Style* shorter than the stamens, curved upwards. *Capsules* broadly ovate, obtuse, more than ⅛ inch long, glabrous or pubescent.

Hab.—Both islands, common in lowland forests. Differs from the type in the larger foliage, always petiolate, and the spreading habit and much larger capsules which are often much recurved.—*V. lindleyana*, hort.

This is often almost indistinguishable from *V. myrtifolia*, and perhaps should be united with that plant. Young plants have sharply serrate leaves.

48. *V. carnea*, hort., Armstrong. A large spreading shrub, with rather slender, pubescent branches. *Leaves* decussate, closely set, 1½–2 inches long, linear-oblong, about ⅛ inch wide, bright green, obtuse or acute, quite entire, with ciliated pink margins, pubescent below, glabrous above, except the midrib which is pubescent, sessile by a narrow base, concave above, scarcely keeled below. *Racemes* in sub-terminal pairs, 2–3 inches long, sub-erect, rather stout, pubescent, not very dense-flowered. *Pedicels* straight, stout, ⅛ inch long. *Bracts* linear-oblong, $\frac{1}{12}$–$\frac{1}{10}$ inch long, acute, pubescent. *Calyx-lobes* $\frac{1}{12}$–$\frac{1}{10}$ inch long, linear-lanceolate, acute, ciliate. *Corolla* rose and white; *tube* about ⅛ inch long, swollen; *limb* ¼–⅓ inch across; *lobes* spreading, unequal. *Stamens* stout, curved upwards, rather longer than the style, which is curved downwards. *Capsules* twice as long as the calyx, pubescent or glabrate, acute, much compressed.

Hab.—Otago? I have had great difficulty in obtaining any authentic information regarding the habitat of this plant, which is commonly cultivated in gardens as a native. Mr. Kirk, I believe, considers it to be from New Caledonia, but I think this extremely improbable as the plant is perfectly hardy in Christchurch, whereas all New Caledonian plants require stove heat. This is one of the handsomest species of the genus, differing from *V. speciosa* chiefly in the much narrower, shorter leaves, narrower, shorter racemes, and much smaller *calyx*. I have been assured by several persons that they have seen this plant growing wild on the coast near the South-west Cape, but I failed to find it on my visit to that neighbourhood in 1873.

50. V. lewisii, n.s.

A very handsome close-growing shrub, 3–6 feet high or more. *Branches* stout, scarred, covered with minute dense greyish pubescence, which is

thinner towards the tips. *Leaves* pale green, spreading, decussate in rather distant pairs, ovate or oblong-ovate or oblong, 1–1½ inch long or more, ¾–1 inch wide, on very short extremely stout petioles, quite entire, acute, almost glabrous above, pubescent below and on the midrib, coriaceous, ciliated; *midrib* excurrent, concave above, prominent below, the other *veins* faintly reticulated. *Racemes* in sub-terminal pairs, very stout and dense, erect, 2 inches long, 1 inch through. *Peduncles* stout, pubescent. *Bracts* linear-oblong, acute, $\frac{1}{12}$ inch long, ciliated, sometimes ¼ inch long, leafy, lanceolate. *Calyx* pubescent and ciliate; *lobes* ⅛ inch long, ovate-oblong, keeled, ciliated, acute. *Corolla* pale purple, white or blue; *tube* $\frac{1}{10}$–⅛ inch long, very broad, angled; *limb* ⅓–½ inch diameter; *lobes* concave, spreading, nearly equal, obtuse. *Stamens* very stout, spreading widely, curved upwards, longer than the straight stout style. *Anthers* brown, very large. *Capsules* ¼ inch long, ovate-oblong, glabrous or hoary, obtuse or surmounted by the base of the style, much compressed.

Hab.—Downs near the sea in the south of Canterbury.

I have been much puzzled with this plant which is exactly intermediate in character between *V. elliptica* and *V. speciosa*. It resembles *V. elliptica* in the colour and size of the flowers and the colour of the leaves, and *V. speciosa* in the stamens and shape of the foliage. In size it is exactly intermediate between these two, and those authors who favour the hybridism theory as accounting for the variations of species would probably class this as a hybrid, but such an idea is exceedingly improbable in this case, as no plants of *V. speciosa* have been found within 200 miles of the district where this plant was found, although the whole district has been very carefully botanized. Besides hybrids usually show very great variations in the characters of their flowers, but this plant is one of the most constant species in the colony. It is a very beautiful shrub, with larger flowers than any other New Zealand one except *V. macrantha*.

Besides the above species, I have two other species belonging to this section, without flowers or fruit.

No. 1. A small, decumbent, or sub-erect shrub, about 1 foot high. *Leaves* imbricated, dimorphic, the young state spreading, obovate, acute, deeply lobed or pinnatifid, the old state sub-erect, not closely appressed, not connate at the bases, ovate-lanceolate, acute, keeled, gradually narrowed to the point, sessile, ciliated, ⅛–¼ inch long. *Branches* obscurely tetragonous, tomentose or pubescent between the leaves.

Hab.—Rangitata, Ashburton, and Rakaia valleys; differs from *V. lycopodioides*, in the larger size, and the leaves not connate, and gradually narrowed into the acute points.

No. 2. A very small shrub a few inches high, like *V. tetragona*, but the

leaves are longer, narrower, and spreading, not appressed to the twig, but connate at the base.

Hab.—Near Dunedin.

60. *V. loganioides*, Armstrong, "New Zealand Country Journal," Vol. III. A small shrub, six inches high, decumbent and rooting at the joints. *Branches* hairy towards the tips. *Leaves* densely imbricated, appressed to the branch with spreading tips, ovate, acuminate, glabrous except the ciliated margins, usually entire, sometimes with 1–3 small teeth on each side, ¼ inch long, sessile, very sharply keeled below. *Flowers* in short few-flowered racemes in pairs near the points of the branches. *Peduncles* hairy, short. *Bracts* ⅛ inch long, ovate, acuminate. *Pedicels* hairy. *Calyx-lobes* lanceolate, acute, keeled, ciliated. *Corolla* white with pink stripes, very fugaceous; *tube* 1/12 inch long; *lobes* broadly ovate, obtuse; *limb* ⅓ inch across. *Stamens* as long as the style. *Anthers* brown. *Capsule* not seen.

Hab.—Rangitata valley, *Mr. J. F. Armstrong.* Clyde valley, *Mr. W. Gray*, 5,000–6,000 feet.

A most singular plant, quite different in appearance from any other known *Veronica*. Until the fruit is obtained the position and relationship cannot be determined. The corolla seems to approach that of *V. linifolia*, but the aspect of the plant is more that of *V. tetragona*, though the leaves are not connate at their bases.

ART. XLVI.—*A natural Arrangement of the New Zealand Ferns founded on the System of Smith's "Historia Filicum," with critical Notes on certain Species.* By J. B. ARMSTRONG.

[*Read before the Philosophical Institute of Canterbury, 2nd September*, 1880.]

[Extract.]

CRITICAL NOTES.

Gymnogramma rutæfolia, Br. *G. alpina*, Potts, is certainly referable to this species. Specimens collected on the Upper Rangitata and kindly given to me by Mr. Potts, do not present any characters differing from those of *G. rutæfolia* sent from other parts of the colony. I have it from several localities in Canterbury and Otago, but have seen no North Island specimens. The New Zealand plant is, however, quite distinct from *G. pozoi* with which it was united in the "Syn. Filicum."

Lastrea invisa. The *Nephrodium thelypteris* var. *squamulosum* of the "Handbook" is undoubtedly the *Aspidium invisum* of Forster, and the specific