As regards continuity the agreement is as close as in other respects. Under the influence of contracting reagents the protoplasm of the cells leaves the side walls, but it clings most tenaciously to the ends. By the employment of the methods already detailed, however, the tissues may be sufficiently swollen and clarified to allow the connection between contiguous cells to be definitely determined. When this is done, it is found that the cells of the central filaments have their protoplasts united, the union being effected either through open pores at the ends, or, indirectly, through the intervention of one of the sieve-plate arrangements described under *Ascophyllum*. Continuity is also maintained in the layers of cortical cells, as well as in the fibres, which arise from them and curve inwards to interlace with the central filaments. In a word, all that has been said respecting continuity in the previous paragraphs may be applied without error to the two species of *Fucus* now under consideration, and need not therefore be repeated.

Explanation of Plate 255.—*Ascophyllum nodosum*. Fig. 1. Longitudinal section through a portion of the thallus,—emidiagrammatic. 2. Portion of central tissue after treatment with sulphuric acid and ammonia. 3. Filament from central tissue, showing the protoplasm continuous through an open pore. 4. Ditto, showing the annular thickening in section. 5. Ditto, showing continuity by means of a sieve plate. 6. Ditto, by means of a slit. 7. Ditto, by means of a fine pore. 8. Fibres from the central tissue.

FERNS COLLECTED IN NORTH FORMOSA BY MR. WILLIAM HANCOCK.

By J. G. Baker, F.R.S.

The following is a list of the ferns contained in a collection which was made in 1881, by Mr. William Hancock, in the neighbourhood of Tamsui, at the northern extremity of the Island of Formosa. Mr. Oldham and Prof. Steere have previously made collections in the same district; but Mr. Hancock has both discovered several interesting new species and gathered several others not collected in the Island previously. The numbers are Mr. Hancock's collecting numbers, and those within brackets indicate the position of the novelties according to the sequence followed in 'Synopsis Filicum.'

61. *Gleichenia longissima* Blume.

75. *G. dichotoma* Hook.

62. *Alsophila ?*—Probably a new tree-fern, but not in fruit. In cutting and texture it closely resembles *Alsophila lunulata*. The rachis of the pinnæ is muricated throughout with raised points.

55. (48*). **Alsophila denticulata,** n. sp.—Stipe about a foot long, bright brown, clothed towards the base with abundant bright brown lanceolate paleæ. Frond moderately firm in texture, green on both surfaces, densely hairy on the ribs above, glabrous, but

clothed with copious minute ovate bullate scales on all the veins beneath, ovate-deltoid, 1½ ft. long, tripinnatifid, but fertile also in a bipinnate form. Lower pinnæ of the tripinnatifid form the largest, distinctly petioled, lanceolate-deltoid, 4–5 in. long, 1¼–1½ in. broad. Lower pinnules distinct, sessile, lanceolate, pinnatifid, with oblong tertiary segments. Final segments oblong, 1–12th in. broad, conspicuously inciso-crenate; veining pinnate in the final segments; veinlets distinct, simple, erecto-patent. Sori brown, medial, superficial; receptacle but little elevated.

10. *Hymenophyllum Tunbridgense* Sm.

9. *H. polyanthos*, Sw.

7. *Trichomanes parvulum* Poir.

11. *T. radicans* Sw.

8. *T. Filicula* Bory. ? No fruit and the segments more remote and less compound than in ordinary *Filicula*.

12. *T. javanicum* Blume.

79. *Dicksonia scabra* Wall. — Gathered lately by Dickins in Japan, but not known in China.

3. *Davallia pedata* Sm.

16 99. *D. strigosa* Sw.—Two forms.

63. *D. Griffithiana* Hook.

64. May be a new species near *D. fijiensis*, but not in fruit and therefore not safe to describe.

44. *Onychium japonicum* Kunze.

53. *Hypolepis tenuifolia* Bernh.

19. *Cheilanthes mysurensis* Wall.

6. *Lindsaya cultrata* Sw.

70 71. *L. flabellulata* Dryand.

5. *Adiantum Capillus-veneris* L.

36. *A. diaphanum* Blume.

35. *A. flabellulatum* L.

88. *Pteris ensiformis* Burm.

85. *P. semipinnata* L.

83. (16*). **Pteris** (Eupteris) **formosana,** n. sp.—Stipe yellow-brown, nearly naked, nearly a foot long. Frond ovate-deltoid, bipinnate, 12–15 in. long, moderately firm in texture, green on both surfaces, glabrous and without paleæ. Upper pinnæ simple, lanceolate; many lower subequal, oblong-lanceolate, 5–6 in. long, 2–2½ in. broad, cut away on the lower side at the base, with a long lanceolate entire tip and cut down nearly or quite to the rachis into 3–4 pairs of non-contiguous erecto-patent lanceolate pinnules 1¼–2 in. long, about ¼ in. broad, with an entire margin. Veining copiously pinnate; veins fine, erecto-patent, simple or forked. Fruit not seen. Allied to *P. semipinnata*, and the Japanese *P. inæqualis* Baker.

68. *P. quadriaurita* Retz.

56. *P. aquilina* L.

57. *P. incisa* Thunb.

98. *Lomaria adnata* Blume.

39 (35*). **Lomaria** (Plagiogyria) **concinna,** n. sp.—Caudex erect. Stipes tufted, greenish, nearly naked, those of the sterile

frond 4–5 in., of the fertile 8–10 in. long. Sterile frond oblong-lanceolate, simply pinnate, 8–9 in. long, 2½–3 in. broad, almost membranous in texture, green and glabrous on both surfaces. Pinnæ about 20 on a side, lanceolate, contiguous, adnate by a dilated base, ¼ in. broad, acute, minutely denticulate. Veins very distinct, rather ascending, simple or forked. Pinnæ of fertile frond fewer, remote, linear. Nearest the American *L. semicordata* Baker.

87. (14*). **Lomaria** (Eulomaria) **apodophylla,** n. sp. — Caudex erect. Basal scales dense, dark brown, large, linear, firm in texture. Fronds tufted, sessile, the sterile ones oblanceolate-oblong, rather thick in texture, 6–9 in. long, 1½–2 in. broad, simply pinnate, narrowed gradually to the base, green and glabrous on both surfaces. Pinnæ about 25 on a side, lanceolate, sub-obtuse, curving upwards, contiguous, adnate by a dilated base, entire, the central ones about an inch long, ⅛ in. broad. Veins quite hidden. Fertile pinnæ remote, linear, ascending, the central ones ¾–1 in. long, 1–12 in. broad. Indusium broad, firm, glabrous. Allied to *L. Spicant* and the Chilian *L. aspera* Klotzsch.

74. *Woodwardia radicans* Sm.

24. *Asplenium Nidus* L.

42. *A. normale* Don.

37. *A. resectum* Smith.

34. (106*). **Asplenium** (Euasplenium) **Hancockii,** n. sp. — Stpes densely tufted, 1½–3 in. long, greenish, clothed with minute linear-subulate ascending dark brown paleæ. Frond oblong-deltoid, subcoriaceous, 3–4 in. long, 1¼–1½ in. broad, tripinnatifid, green and glabrous on both surfaces; rachis slightly paleaceous. Lower pinnæ the largest, rhomboid, cut away cuneately on the lower side at the base ¼–⅓ in. broad, with few cuneate pinnules confluent at the base and strongly toothed on the outer edge. Veins distinct, very ascending. Sori linear, falling a little short of both midrib and margin. Indusium firm, persistent, glabrous. Allied to *A. laciniatum* and the small forms of *affine*.

88. *Asplenium davallioides* Hook.

78. *A. nigripes* Blume. var.

22. *A. lanceum* Thunb.

46. *A. bantamense* Baker.

34. (106*). **Asplenium** (Diplazium) **chlorophyllum,** n. sp. —Stipes tufted, dull grey-green, pubescent, as is also the rachis, ½ ft. long. Frond oblong-lanceolate, simply pinnate, a foot long, 4–5 in. broad, moderately firm in texture, green on both surfaces, minutely paleaceous over the lamina above, and densely clothed with minute linear-subulate scales on the veins beneath. Pinnæ about 20 on a side, close, lanceolate, sessile, acute, crenulate towards the tip, conspicuously auricled on the upper side at the base, the central ones 2–2½ in. long, ½–⅝ in. broad, the lowest strongly deflexed. Veins distinct, erecto-patent, deeply forked. Sori falling but little short of both midrib and margin, ¼–⅓ in. long, rarely diplagioid. Indusium crisped, narrow, moderately firm, pale brown, glabrous, persistent. Allied to *A. pallidum* Blume.

9. *Asplenium japonicum* Thunb.

67. *A. Wichuræ* Mett.—New to Formosa, but gathered by Shearer in Kew-kiang.

86. *A. esculentum* Presl.

84. *Aspidium deltodon* Baker.—Mr. Hancock's specimen quite agrees with the original type collected by Maries in Central China.

65. *A. aculeatum* Sw.

51. *A. amabile* Blume.

41. (29*). **Aspidium** (Polystichum) **reductum,** n. sp.—Stipes densely tufted, 3–5 in. long, greenish, slightly scaly. Frond lanceolate, simply pinnate from a deltoid bipinnate base, 5–6 in. long, moderately firm in texture, green and glabrous on both surfaces. Lower pinnæ one on each side, as in *A. tripteron*, ½–1 in. long. Central pinnæ ¾–⅞ in. broad; segments subquadrate, attached by the lower corner, ⅛ in. long, entire on the inner side and inner half of the lower, sharply dentate for the rest of the margin. Veins ascending, the central ones forked, the lowest on the upper side pinnate. Sori medial, in a single complete low and a very incomplete second one. Indusium peltate, membranous, glabrous. Very near *A. tripteron*, but on a much reduced scale.

14. *A. falcatum* Sw.

13. *Nephrodium gracilescens* Hook.

93. *N. decursivo-pinnatum* Baker.

54. *N. setigerum* Baker.

52. *N. Filix-mas* Rich., var.

17. (134*). **Nephrodium** (Lastrea) **leucostipes,** n. sp.—Stipes 9–12 in. long, slender, whitish, densely clothed throughout, as is the rachis, with spreading subulate dark brown paleæ. Frond deltoid, tripinnatifid, 12–15 in. long, moderately firm in texture, green and finely pubescent on the veins on both sides. Lower pinnæ much the largest, deltoid, more produced on the lower side. Pinules lanceolate, the lowest fully pinnate. Tertiary segments linear-oblong, entire, the largest ⅙–¼ in. long, 1-12th in. broad. Veining pinnate in the tertiary segments; veinlets distinct, simple, erecto-patent. Sori costal. Indusium membranous, minute, fugacious. Allied to *N. intermedium* Baker.

58, 59, 60. *N. molle* Desv.

90. *N. sophoroides* Desv.

94. *N. decurrens* Baker.

95. *N. variolosum* Baker.

43. *Nephrolepis ramosa* Moore.

73. *N. cordifolia* Presl.

80. *N. acuta* Presl.

4. *Polypodium* (*Phegopteris*) *distans* Don.—New to China.

50. (230*). **Polypodium** (Goniophlebium) **formosanum,** n. sp.—Rhizome wide-creeping, naked, glaucous, ⅛ in. diam. Stipes distant, brownish, naked, about ½ ft. long. Frond oblong-lanceolate, membranous, simply pinnate, 10–12 in. long, 3–4 in. broad, green on both sides, hairy on the main veins. Pinnæ 20–30 on a side, crowded, dilated and slightly confluent at the base, those of the barren frond obtuse or subacute, ¼ in. broad, the

lowest rather reduced and a little deflexed. Areolæ in two rows, only the inner row with an included free veinlet. Pinnæ of fertile frond narrower and more acute. Sori medial, uniserial, moderately large, superficial, 12–15 jugate. Allied to *P. amœnum* Wall. and *P. niponicum* Mett. The latter has been gathered in China both by Shearer and Maries.

32. *P.* (*Niphobolus*) *Lingua* Sw.

33. *P. polydactylon* Hance, Journ. Bot. 1884, 269.—A most distinct and interesting novelty.

69. *P.* (*Drynaria*) *conjugatum* Lam.

96. *P.* (*Phymatodes*) *linearifolium* Hook.

30. *P. lineare* Thunb.

25. *P. normale* var. *P. chinense*, Mett.

28. *P. normale* var. *sumatranum* Baker, in Journ. Bot. 1880, p. 215.—Only gathered before in Sumatra.

45. *P. hastatum* Thunb.

49. *P. Dipteris* Blume.

23. *P. pteropus* Blume.

31. (298*). **Polypodium** (Phymatodes) **macrosorum**, n. sp. —Rhizome wide-creeping, hypogæous, $\frac{1}{6}$–$\frac{1}{8}$ in. diam.; paleæ small, dense, spreading, lanceolate, brown-black. Sterile frond lanceolate, simple, coriaceous, glabrous, 4–8 in. long, nearly an inch broad at the middle, narrowed gradually to both ends, its naked stipe 3–4 in. long. Veins fine, immersed, indistinct. Fertile frond usually much smaller. Sori very large ($\frac{1}{8}$ in. diam.), globose, superficial, uniserial, 4–10 on each side of the midrib, confined to the upper half or two-thirds of the frond. Allied to *P. accedens* Blume.

100. (360*). **P.** (Phymatodes) **Hancockii**, n. sp. — Rhizome short-creeping. Paleæ small, black, membranous, lanceolate, clathrate. Stipes none, a narrow wing reaching down to the very base of the rachis. Frond oblanceolate, simple or slightly compound in the upper third, $\frac{1}{2}$–1 ft. long, with 2–3-jugate lanceolate pinnæ an inch broad; wing to the rachis $\frac{1}{2}$ in. broad halfway up the frond either in the simple or compound form, narrowed to the base very gradually; texture thin, but moderately firm; both surfaces green and glabrous. Main veins indistinct. Areolæ copious, hexagonal, with abundant included free veinlets. Sori small, copious, superficial, scattered irregularly. Cutting of the less-divided forms of *P. Phymatodes*. Sori more like those of *P. affine* Blume.

21. *Gymnogramme Wrightii* Hook.

82. *G. elliptica* Baker.

20. *G. lanceolata* Hook.

47. *G. Maingayi* Baker.—New to the Chinese area. Known before only at Malacca and Penang.

2. *Antrophyum plantagineum* Kaulf.

26, 27. *Vittaria elongata* Sw.

77. *Meniscium triphyllum* Sw.

20. *Drymoglossum carnosum* var. *obovatum* Harringt.—Gathered previously only at the same place by Steere.

40. *Hemionitis Griffithii* Hk. fil. & Thoms.
1. *Acrostichum sorbifolium* L.
15. *A. repandum* Blume.
48. *A. aureum* L.
76. *A. bicuspe* Hook, var. *integrifolium* Eaton.
89. *Osmunda javanica* Blume.
72. *Lygodium japonicum* Sw.
81. *Angiopteris evecta* Hoffm.

A CONTRIBUTION TOWARDS A FLORA OF BRECONSHIRE.

By W. Bowles Barrett, F.L.S.

(Continued from p. 89).

Lapsana communis L. Very common.

Hypochæris radicata L. C.

Leontodon hirtus L., *L. hispidus* L., and *L. autumnalis* L. C. No *Picris hieracioides* or *Helminthia echioides* seen.

**Tragopogon pratensis* L. Canal bank, Talybont. Seemingly uncommon in South-east and Mid-Wales.

Taraxacum officinale Wigg. Near Newbridge; *A. Ley.* — Var. c. *lævigatum*. Dry limestone rocks, Craig-y-Rhiwarth, Pen-y-wyllt; *A. Ley.*

Lactuca muralis Fresen. Remarkably common and generally distributed. — *L. virosa* L. Not seen.

Sonchus oleraceus L. F. Gilwern, Three Cocks Junction, &c. — *S. asper* Hoffm. Near Newbridge; *A. Ley.* — *S. arvensis* L. F. *A. Ley.*

Crepis virens L. Nantgwyllt; *A. Ley.* Crug Lane, near Brecon; *Mrs. Fryer.* — Var.* *agrestis* W. & K. Gilwern.

Hieracium Pilosella L. C. — *H. pallidum* Fr. ? Limestone rocks, Craig-y-Rhiwarth, Pen-y-wyllt; *A. Ley;* (doubtful whether *pallidum* or *cæsium;* most likely a *cæsium* form; *J. G. B.*) — *H. murorum* L., pt. F. on the Tarens in the Honddu Valley, a large form; *A. Ley.* F. Gilwern. Brecon. Ravine Ffrwdgrech Waterfall. — *H.* (*cæsium* Fr., I think; *J. G. B.*). Craig-y-gledsiau, Brecon Beacons; *A. Ley.* — *H. vulgatum* Fr. F. On the Tarens in the Honddu Valley; by the Usk, above Brecon; *A. Ley.* Rhymney Bridge Vale. Gilwern. — *H.* '*gothicum* Fr.' ? Stream side, Cwm Tarell; Brecon Beacons; *A. Ley;* (most likely a var. of *vulgatum*, receding from type towards *tridentatum; J. G. B.*). — **H. tridentatum* Fr. *teste* J. G. Baker. Rocks in vale above Rhymney Bridge Station. — *H. prenanthoides* Vill. Mountain cliff at Taren r' Esgob near Llanthony, in plenty, though on a very restricted spot, about a rill of strongly petrifying water, alt. 1000 feet: affirmative answer to query in Top. Bot.; *A. Ley.* — *H. umbellatum* L. Pen-y-wyllt. Near Dolygaer reservoir. — *H.*

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

Edited by

JAMES BRITTEN, F.L.S.,

British Museum (Natural History), South Kensington.

VOL. XXIII.

ILLUSTRATED WITH PLATES AND WOODCUTS.

LONDON:

WEST, NEWMAN & CO., 54, HATTON GARDEN.

1885.