Flowers and Insects in Great Britain.

Part II[1].

Observations on the Natural Orders Dipsaceae, Plumbaginaceae, Compositae, Umbelliferae, and Cornaceae, made in the Clova Mountains.

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IN Part I of this series[1] we described the results of work in the more southern and lowland districts of Britain; the present and following papers deal with the flowers and insects of a definite area in the Eastern Grampians of Scotland, and form a contribution to the study of the problem of the composition, distribution, and origin of the flora of that region and its interdependence with those of the insect fauna. Numerous factors have been active in producing the present phenomena of the vegetation of Northern Europe, and among them the floral ecology of the plants concerned has doubtless been one of much importance; its share may best be determined by comparative work upon limited areas in different parts of Europe.

Our observations were made during vacations spent at Clova between 1894 and 1899. We selected Clova for our

[1] Pt. i, see Ann. of Bot., vol. ix, p. 227, 1895.

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work because it is the focus of the distribution of Alpine plants in Britain, and because of special facilities for our work which the owners of the land there gave us. To them we owe our sincere thanks.

The Clova district as here described means the southern face of the Grampians near Clova in Forfarshire, and includes the upper parts of Glens Clova and Prosen, and the moors of the North Esk above Loch Lee. It comprises about 103⅓ square miles, and forms three fairly well defined zones, a zone of straths or valley bottoms (500–1000 feet elevation, 9 sq. miles), a zone of steep hillsides, usually broken by crags above 1,800 feet (1,000–2,500 feet, 74 sq. miles), and a zone of open peaty moors above (2,500–3,000 feet, 20 sq. miles, with ⅓ sq. mile above 3,000 feet). The total phanerogamic flora is 363 species, of which eighty-one are alpines; sixteen other species are maintained by cultivation. Details of these, with discussion of seasonal and altitudinal distribution, are given elsewhere[1].

The insects which we collected have largely been named by the following entomologists, to whom we are very much indebted.

G. C. Bicknell, Esq., F.E.S. (Parasitic Hymenoptera).
H. J. Burkill, Esq., M.A. (Lepidoptera).
P. Cameron, Esq., F.E.S. (Tenthredinidae).
E. Saunders, Esq., F.E.S. (Hymenoptera aculeata).
D. Sharp, Esq., M.B., F.R.S. (Coleoptera and others).
G. H. Verrall, Esq., F.E.S. (Diptera).
C. Warburton, Esq., M.A. (Araneida).

Our observations were distributed as much as possible over the months when flowers occur, August being alone neglected. An account of our visits and a summary of the Flora is given in the Transactions of the Edinburgh Botanical Society, cited below.

Clova stands at about 780 feet above the sea, in a narrow valley between hills which rise rapidly to 2,500 feet, and in

[1] Trans. Edin. Bot. Soc., xxii, 1901, p. 109.

a few instances just exceed 3,000 feet. Crags break the slopes between 2,000 and 2,500 feet. Above the crags stretch peaty moors, which late in the year justify the dreariness attributed to them by Continental writers.

The straths or valley bottoms are as full of flowers and as full of insects as the moors are poor in both. It is part of our purpose to set before the reader a contrast of the two conditions. For the rest we shall compare the conditions of Flower Fertilization at Clova with Flower Fertilization in Germany, the Alps, and elsewhere.

Except on our first two visits we kept a count of individuals visiting, and the record shows more clearly than any lists of visitors the importance of the various species.

The count may be summed as follows, the desirability of the various groups to the flowers being indicated by the type, the larger the type the better suited for fertilizing the flowers[1]:—

Hymenoptera.	APIS (APIDAE)	430
	BOMBUS AND PSITHYRUS (APIDAE)	937
	ANDRENA (66), HALICTUS (1), AND NOMADA (1) (APIDAE)	68
	ODYNERUS (5) AND CHRYSIS (1) (= PETIOLATA TUBULIFERA)	6
	Vespidae (Wasps)	45
	Formicidae and Myrmicidae (*Ants*)	202
	Tenthredinidae (*Sawflies*)	201
	Parasitic Hymenoptera (*Petiolata parasitica*)	461
Lepidoptera.	RHOPALOCERA	192
	NOCTUIDAE AND GEOMETRES	204
	BOMBYCES AND MICROLEPIDOPTERA generally	64
	Eriocephala	101
	Carried forward	2,911

[1] Large capitals denote decidedly desirable insects or groups of insects, small capitals denote desirable; small roman letters denote indifferent, and small italics denote injurious visits. The grouping closely agrees with Loew's classification of Anthophilous insects into Eutropous, Hemitropous, Allotropous and Dystropous.

	Brought forward	2,911
Diptera.	SYRPHIDAE	712
	EMPIS (411), AND PACHYMERIA (16) . . .	427
	Other Empidae	129
	Muscidae (in restricted sense), Tachinidae and Sarcophagidae	1,083
	Other Diptera	10,321
	Coleoptera	1314
	Other Insects	409
		17,306

In this part of our paper, taking the Compositae and their allied orders, and the Umbelliferae and their allied order Cornaceae, we shall show what part of the whole available insect fauna these orders with more or less massed flowers may be considered to attract.

The third part will deal with the most highly specialized plants of the Clova Flora; and the fourth will contain an account of the least specialized Entomophilous plants together with a review of the whole results.

ABBREVIATIONS.

In references.

Brit. = The British Isles.

N.C.E. = North Central Europe (Europe south of the North Sea and Baltic and north of the Alps).

Arct. = Arctic regions. Observations chiefly in Greenland and Arctic Scandinavia.

Pyren. = Pyrenees.

Medit. = Mediterranean countries.

N.Am. = North America.

Scand. = Lowland Scandinavia.

In lists.

sh. = sucking honey.

fp. = feeding on pollen.

cp. = collecting pollen.

And in tables:—

Hl., Lep.l. = long-tongued Hymenoptera and Lepidoptera respectively.

Hm., Lep.m., and Dm. = mid-tongued Hymenoptera, Lepidoptera, and Diptera respectively.

Hs., Lep.s., and Ds. = short-tongued Hymenoptera, Lepidoptera, and Diptera respectively.

We have found it necessary to modify the literature list which was given in the first part of our paper, but in the new one while we have added and omitted titles we have preserved the numbers used before for all entries that are retained.

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B′ § 1. Dipsaceae.

57. Scabiosa Succisa, Linn. [Lit. *Brit.* 23, 39; Darwin 485; *N.C.E.* 1, 3 c, 8, 14, 14 a, 18, 21 b, 33, 34, 40; De Vries 2460, Magnus 1492.] A Bombus-flower at Clova as elsewhere, with abundant visitors among the Syrphidae. We gave figures of the number of insects visiting it on the Scarborough cliffs in the first part of our paper; there the Bombi make 55·3 per cent. of the visitors; at Clova they make 38·2 per cent. Long-tongued flies appeared in greater numbers at Clova than at Scarborough.

Visitors. **Lepidoptera.** Rhopalocera: (1) Polyommatus phloeas L., sh. 13. IX. 95, 700 ft. Heterocera: *Noctuidae*: (2) Celaena Haworthii Cuc., 20. IX. 95, 900 ft. (3) Hydroecia nictitans Bkh., sh. 13. IX. 95, 700 ft. **Hymenoptera.** Aculeata: *Apidae*: (4) Apis mellifica L., sh. 19. IX. 95, 800 ft. (5) Bombus agrorum F., sh. 13–24. IX. 95, 7–1,200 ft. (6) B. lapidarius L., sh. 15. IX. 95, 800 ft. (7) B. pratorum L., sh. 22–23. VI. 95; 13. IX. 95, 7–800 ft. (8) B. cognatus Steph., sh. 14. IX. 95, 800 ft. (9) B. terrestris L., sh. 13–24. IX. 95, 7–1,200 ft. **Diptera.** *Syrphidae*: (10) Melanostoma mellinum L., fp. 16. IX. 95, 800 ft. (11) Platychirus manicatus Mg., fp. 23. VII. 95, 800 ft. (12) P. albimanus F., fp. 17. IX. 95, 700 ft. (13) Sericomyia lapponum L., sh. 13. IX. 95, 700 ft. (14) S. borealis Fln., sh. 13–24. IX. 95, 7–900 ft. (15) Eristalis tenax L., sh. 13. IX. 95, 700 ft. (16) E. pertinax Scop., sh. 13–24. IX. 95, 7–1,000 ft. and once at 2,300 ft. (17) Heliophilus pendulus L., sh. 24. IX. 95, 800 ft. *Empidae*: (18) Empis tessellata F., sh. 13–22. IX. 95; 11. VII. 96, 7–1,000 ft. (19) E. grisea Fln., sh. 15–22. IX. 95, 800 ft. (20) Pachymeria palparis Egg., sh. 15–24. IX. 95, 800 ft. *Tachinidae*: (21) Siphona geniculata Deg., sh. 13–19. IX. 95, 7–800 ft. *Muscidae*: (22) Lucilia cornicina F., sh. 19. IX. 95, 800 ft. (23) Pollenia rudis F., 14. IX. 95, 900 ft. *Anthomyiidae*: (24) Hyetodesia incana W., sh. and fp. 15–18. IX. 95, 8–1,300 ft. (25) Drymia hamata Fln., sh. 14–24. IX. 95, 800 ft. (26 and 27) Anthomyia 2 spp., sh. 14–24. IX. 95, 8–900 ft. (28) Trichophthicus sp., 13. IX. 95, 700 ft. *Cordyluridae*: (29) Scatophaga stercoraria L., 16–23. IX. 95, 9–1,100 ft. **Coleoptera**: (30) Meligethes viridescens F., 15–18. IX. 95, 800 ft. **Araneida**: (31) Xysticus sp., lying in wait, 13. IX. 95, 700 ft.

B′ § 2. PLUMBAGINACEAE, WITH AGGREGATED FLOWERS.

58. Armeria maritima, Willd. [Lit. *Brit.* 23; *N.C.E.* 1, 9, 12, 14, 14 a, 15, 21 a, 25, 31, 34, 35; Knuth 1221; MacLeod 1473. *Pyren.* 17.] Only found at 2,890 feet, the flowers are 8–9 mm. in diameter.

Visitors. **Diptera.** *Cecidomyiidae*: (1) 1 sp. sh. 2. VII. 96. *Mycetophilidae*: (2) Sciara sp.,? sh. 16. VI. 99. *Anthomyiidae*: (3) Trichophthicus sp., sh. fairly abundant 2. VII. 96; 16. VI. 99. **Thysanoptera.** (4) Thrips sp., 2. VII. 96. All at 2,800 ft.

B′ § 3. Blue-flowered Compositae.

59. Centaurea Cyanus, Linn. [Lit. *N.C.E.* 1, 3 c, 9, 11, 14, 16, 18, 32, 34, 40.]

Visitors. **Hymenoptera.** Aculeata: *Apidae*: (1) Andrena analis Panz., seeking h. **Diptera.** *Anthomyiidae*: (2) 1 sp. Both 11. VII. 96, 600 ft.

59 a. Lactuca alpina, Benth. [Lit. *N.C.E.* Loew 1358; *Alps* 2; *Arct.* 36.] At 2,000 ft. The capitula contain 12–20 flowers, and number 16–20. The neighbouring flowers may pollinate each other, but self-pollination by the rolling back of the stigmatic lobes seems not to occur. In this our observations agree with those of Müller. We have had no favourable opportunities for observing visitors.

B′ § 4. Purple-flowered Compositae.

60. Centaurea nigra, Linn. [Lit. *Brit.* 23, 39; Marquand 1513; *N.C.E.* 8; *Pyren.* 17.]

Visitors. **Hymenoptera.** Aculeata: *Apidae*: (1) Bombus terrestris L., sh. 15–21. IX. 95, 8–900 ft. (2) B. agrorum F., sh. 15–21. IX. 95, 8–900 ft. (3) B. lapidarius L., sh. 16–22. IX. 95, 800 ft. (4) B. lapponicus F., 16. IX. 95, 800 ft. **Diptera.** *Empidae*: (5) Empis grisea Fln., sh. 15–21. IX. 95, 800 ft. (6) Pachymeria palparis Egg., sh. 16. IX. 95, 800 ft. *Anthomyiidae*: (7) Hyetodesia incana W., 16. IX. 95, 800 ft. (8) Drymia hamata Fln., sh. and fp. 15–16. IX. 95, 8–900 ft. (9) Anthomyia sp., sh. 21. IX. 95, 800 ft. **Coleoptera**: (10) Meligethes viridescens F., 15–16. IX. 95, 8–900 ft.

61. Carduus palustris, Willd. [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 8, 16, 18, 34, 40; De Vries 2460; Warnstorf 2507; *Alps* 2, 34.] Bombus terrestris and Empis tessellata show some measure of constancy in autumn.

Visitors. **Lepidoptera.** Rhopalocera: (1) Argynnis aglaia L., sh. 29. VI.–1. VII. 95; 22. VI.–10. VII. 96, 8–900 ft. (2) Lycaena icarus Rott., sh. 28. VI. 95, 800 ft. Heterocera: *Noctuidae*: (3) Hydroecia nictitans Bkh., sh. 13–21. IX. 95, 7–1,000 ft. **Hymeno-**

ptera. Aculeata: *Apidae*: (4) Bombus terrestris L., 16–21. IX. 95, 7–1,400 ft. (5) B. agrorum F., sh. 1. VII. 95, 800 ft. (6) B. venustus Smith, sh. 26. VI. 96, 800 ft. (7) B. lapponicus F., 16. IX. 95, 1,400 ft. (8) Psithyrus quadricolor Lep., sh. 19. VI. 96, 1,500 ft. *Formicidae*: (9) Formica fusca Latr., 22. VI. 96, 2,300 ft. **Diptera.** *Syrphidae*: (10) Platychirus manicatus Mg., sh. 1–6. VII. 95, 800 ft. (11) Rhingia campestris Mg., sh. 1. VII. 95, 800 ft. (12) Volucella bombylans L., sh. 1. VII. 95, 800 ft. (13) Eristalis arbustorum L., sh. 19. VI. 95, 800 ft. *Empidae*: (14) Empis tessellata F., sh. 2. VII. 95; 16–21. IX. 95; 19. VI. 96, 8–1,500 ft. *Mycetophilidae*: (15) Sciara sp., 21. IX. 95, 1,000 ft. *Anthomyiidae*: (16) Hyetodesia incana W., 1. VII. 95; 6. VII. 96, 800 ft. (17) Trichophthicus sp., 29. VI.–3. VII. 95; 16. IX. 95, 8–1,200 ft. (18 and 19) Anthomyia 2 spp., fp. 26. VI.–1. VII. 95; 21. IX. 95; 19. VI.–1. VII. 96, 8–1,500 ft. **Coleoptera.** (20) Ceuthorrhynchidius contractus Marsh, 23. VI. 96, 2,500 ft.

62. Cnicus arvensis, Hoffm. [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 8, 11, 14, 14 a, 15, 16, 18, 25, 30, 31, 32, 33, 34, 40; De Vries 2460; *Alps* 2, 9, 34; *Pyren.* 17.] At Clova the more specialized visitors deficient.

Visitors. **Lepidoptera.** Rhopalocera: (1) Vanessa urticae L., sh. 21. IX. 95, 1,200 ft. Heterocera: *Noctuidae*: (2) Charaeas graminis L., sh. 14. IX. 95, 900 ft. **Hymenoptera.** Aculeata: *Apidae*: (3) Bombus terrestris L., 21–24. IX. 95, 9–1,200 ft. Petiolata parasitica: *Ichneumonidae*: (4) Hemiteles politus Bridgm., sh. 21. IX. 95, 900 ft. (5) a second sp., 17. IX. 95, 900 ft. **Diptera.** *Syrphidae*: (6) Eristalis pertinax Scop., sh. 21–24. IX. 95, 9–1,200 ft. *Sarcophagidae*: (7) Cynomyia mortuorum L., sh. 14–24. IX. 95, 9–1,200 ft. *Muscidae*: (8) Lucilia cornicina F., sh. 21. IX. 95, 900 ft. (9) Calliphora erythrocephala Mg., 24. IX. 95, 1,200 ft. (10) Pollenia rudis F., sh. and fp. 14–24. IX. 95, 9–1,200 ft. *Anthomyiidae*: (11) Hyetodesia incana W., 21. IX. 95, 900 ft. (12 and 13) Anthomyia spp., fp. 17–21. IX. 95, 8–900 ft. *Cordyluridae*: (14) Scatophaga stercoraria L., sh. 21. IX. 95, 8–900 ft. **Coleoptera:** (15) Meligethes viridescens F., sh. 17–24. IX. 95, 8–900 ft.

63. Cnicus heterophyllus, Willd. [Lit. *Brit.* 23; *N.C.E.* 1; Loew 1359; *Arct.* 34; *Alps* 2.]

Visitors. **Lepidoptera.** Heterocera: *Noctuidae*: (1) Plusia chrysitis L., sh. 2. VII. 96. **Hymenoptera.** Aculeata: *Apidae*: (2) Apis mellifica L., sh. 3–11. VII. 96. (3) Bombus terrestris L., 2. VII. 95. (4) B. hortorum L., sh. 29. VI.–11. VII. 96. (5) B. pratorum L., sh. 11. VII. 96. (6) Psithyrus quadricolor Lep., sh. 22. VII. 95. *Vespidae*: (7) Vespa norvegica F., seeking h. 15. VII. 95. **Diptera.** *Syrphidae*: (8) Platychirus sp., fp. 22. IX. 95. (9) Sericomyia borealis Fln., fp. 8. VI. 95. (10) Volucella bombylans L., sh. 11. VII. 96. (11) Rhingia campestris Mg., 11. VII. 96. *Empidae*: (12) Empis sp., fp. 29. VI. 96. (13) E. aestiva Lw., fp. 29. VI. 96. *Bibionidae*: (14) Scatopse sp., ? seeking h. 3. VII. 96. *Dolichopodidae*: (15) Dolichopus sp., sh. 3. VII. 96. *Anthomyiidae*: (16) Hyetodesia incana W., fp. 22. IX. 95; 24. VII. 96. (17) Hylemyia nigrescens Rnd., 20. VI. 96. (18) Anthomyia sp., 22. IX. 95. *Sciomyzidae*: (19) Dryomyza flaveola Fln., 20. VI. 96. *Sapromyzidae*: (20) Sapromyza sp., 20. VI. 96. **Coleoptera:** (21) Meligethes viridescens F., fp. 15–20. IX. 95; 29. VI. 96. (22) M. aeneus F., fp. 3. VII. 96. (23) Epuraea aestiva L., fp. 29. VI. 96. (24) Anthobium sorbi Gyll., fp. 29. VI. 96. **Hemiptera:** (25) 1 sp., 3. VII. 96. **Thysanoptera:** (26) Thrips sp., 3. VII. 96. All at 7–800 ft.

64. Cnicus lanceolatus, Scop. [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 8, 11, 14, 14 a, 16, 18, 31, 33, 34, 40; De Vries 2460; Warnstorf 2507; *Alps* 2; *Pyren.* 17; *N.Am.* 19 d.]

Visitors. **Hymenoptera.** Aculeata: *Apidae*: (1) Bombus terrestris L., sh. 21–23. IX. 95, 10–1,300 ft. (2) B. lapponicus F., sh. 21. IX. 95, 1,000 ft. (3) Psithyrus quadricolor Lep., sh. 21. IX. 95, 1,000 ft. **Diptera.** *Syrphidae*: (4) Eristalis pertinax Scop., 13. IX. 95, 700 ft. *Empidae*: (5) Empis tessellata F., 21. IX. 95, 1,000 ft. *Phoridae*: (6) Phora sp., 17. IX. 95, 700 ft. *Anthomyiidae*: (7) Hyetodesia semicinerea W., 21. IX. 95, 1,000 ft. **Hemiptera:** (8) Aphis sp., 17. IX. 95, 700 ft.

65. Saussurea alpina, DC. [Lit. *Arct.* 36; *Alps* 2, 9.]

Visitors. **Diptera.** *Anthomyiidae*: (1) Trichophthicus hirsutulus Ztt., fp. 15. VII. 95, 2,400 ft. (2) Anthomyia sp., fp. 18. VII. 95, 2,300 ft.

B′ § 5. Yellow-flowered Rayed Compositae.

66. Solidago Virg-aurea, Linn. [Lit. *Brit.* 23; *N.C.E.* 1, 11, 18, 33, 34, 40; Warnstorf 2507; *Arct.* 36; *Alps* 2, 34; *Pyren.* 17.]

Visitors. **Diptera.** *Tachinidae*: (1) Siphona geniculata Deg., fp. 16. IX. 95, 800 ft. *Muscidae*: (2) Calliphora erythrocephala Mg., 29. VI. 96, 800 ft. *Anthomyiidae*: (3) Hyetodesia incana W., 29. VI. 96, 800 ft. (4) Anthomyia sp., fp. 16. IX. 95, 800 ft. (5) Limnophora solitaria Ztt., sh. 6–10. VII. 96, 21–2,600 ft.

67. Tussilago Farfara, Linn. [Lit. *Brit.* 29; *N.C.E.* 1, 14, 18, 34, 40; *Medit.* 34; *Arct.* 34; *Alps* 2, 9.]

Visitors. **Hymenoptera.** Aculeata: *Apidae*: (1) Apis mellifica L., sh. 12–16. IV. 95, 800 ft. **Diptera.** *Syrphidae*: (2) Melanostoma quadrimaculatum Verrall, sh. 12. IV. 95, 800 ft. *Muscidae*: (3) Lucilia cornicina F., sh. 12–16. IV. 95, 800 ft. abundant. (4) Pollenia rudis F., sh. 12–16. IV. 95, 800 ft. abundant. *Anthomyiidae*: (5) Anthomyia sulciventris Ztt., fp. 20. V. 97, 7–16. V. 98, 8–1,200 ft. (6) A. sp., fp. 18. V. 97, 19–2,000 ft.

68. Senecio vulgaris, Linn. [Lit. *Brit.* 23, 29; A. Bateson 151; *N.C.E.* 1, 3 c, 11, 14, 18, 25, 33, 34.] All observers find it very neglected.

Visitors. **Diptera.** *Anthomyiidae*: (1) Anthomyia sp., fp. 17–19. IX. 95, 800 ft.

69. Senecio aquaticus, Huds. [Lit. *Brit.* 23; *N.C.E.* 8.] Not so abundant as *Senecio Jacobaea*, and very much less visited.

Visitors. **Hymenoptera.** Aculeata: *Apidae*: (1) Bombus terrestris L., sh. 14. IX. 95. **Diptera.** *Syrphidae*: (2) Eristalis pertinax Scop., 14. IX. 95. *Empidae*: (3) Empis tessellata F., sh. 14. IX. 95. *Tachinidae*: (4) Siphona geniculata Deg., sh. 14. IX. 95. *Muscidae*: (5) Lucilia cornicina F., sh. 1. VII. 95. *Anthomyiidae*: (6) Hyetodesia incana W., sh. 2. VII. 95; 14. IX. 95; 6. VII. 96. (7) H. variabilis Fln., sh. 1. VII. 95. (8) Anthomyia sp., 13. IX. 95. All at 7–800 ft.

70. Senecio Jacobaea, Linn. [Lit. *Brit.* 23, 34, 39; *N.C.E.* 1, 3 c, 11, 14, 16, 18, 34, 40; De Vries 2460; *Alps* 34; *Pyren.* 17.] A very conspicuous flower in autumn at low levels, where it attracts the drones of the common Bombi, moths, flies of all sorts and beetles; except the Bombi much in proportion to the then existing prevalence of the various classes; but the Bombi it attracts in less degree.

Visitors. **Lepidoptera.** Rhopalocera: (1) Polyommatus phloeas L., sh. 13–14. IX. 95, 7–800 ft. Heterocera: *Noctuidae*: (2) Hydroecia nictitans Bkh., sh. 13–21. IX. 95, 8–900 ft. (3) Celaena haworthii Cuc., sh. 16–19. IX. 95, 8–900 ft. *Geometres*: (4) Psodos trepidaria Hb., sh. 11. VII. 96, 800 ft. (5) Cidaria immanata Hw., sh. 13–21. IX. 95, 7–900 ft. *Crambidae*: (6) Crambus sp., 14. IX. 95, 700 ft. **Hymenoptera.** Aculeata: *Apidae*: (7) Bombus terrestris L., sh. 13–24. IX. 95, 7–900 ft. (8) B. lapponicus F., sh. 16. IX. 95, 800 ft. (9) B. agrorum F., sh. 13. IX. 95, 700 ft. *Vespidae*: (10) Vespa norvegica F., fp. 19. IX. 95, 800 ft. *Formicidae*: (11) Formica fusca Latr., 16. IX. 95, 800 ft. Petiolata parasitica: *Ichneumonidae*: (12) 1 sp., sh. 21. IX. 95, 800 ft. *Braconidae*: (13, 14, and 15) 3 sp., 16–7. IX. 95, 7–800 ft. *Cynipidae*: (16) Eucoela fortinervis Cameron, 15. IX. 95, 800 ft. **Diptera.** *Syrphidae*: (17) Platychirus albimanus F., 16–24. IX. 95, 8–1,000 ft. (18) P. manicatus Mg., sh. 10. VII. 96, 800 ft. (19) Sericomyia borealis Fln., sh. 21. IX. 95, 800 ft. (20) Eristalis tenax L., sh. 13. IX. 95, 8–900 ft. (21) E. pertinax Scop., sh. and fp. 14–24. IX. 95, 8–900 ft. (22) E. rupium F., sh. 22. VII. 95, 800 ft. (23) E. arbustorum L., sh. and fp. 15. VII. 95; 13–22. IX. 95, 7–800 ft. (24) Helophilus pendulus L., 21. IX. 95, 800 ft. *Empidae*: (25) Empis tessellata F., 13–6. IX. 95, 7–800 ft. (26) E. punctata Mg., sh. 22. VII. 95, 800 ft. (27) E. albipennis Mg., 21. IX. 95, 800 ft. (28) Rhamphomyia spinipes Fln., 14. IX. 95, 800 ft. *Mycetophilidae*: (29) Sciara sp., 16–22. IX. 95, 800 ft. *Bibionidae*: (30) Bibio pomonae F., fp. 13–22. IX. 95, 7–900 ft. *Chironomidae*: (31) Ceratopogon leucopeza Mg., 19–20. IX. 95, 800 ft. *Tachinidae*: (32) Siphona geniculata Deg., sh. 14–22. IX. 95, 800 ft. *Sarcophagidae*: (33) Cynomyia mortuorum L., 16–24. IX. 95, 9–1,000 ft. *Muscidae*: (34) Lucilia cornicina F., 14–24. IX. 95; 10. VII. 96, 8–1,300 ft. (35) Calliphora vomitoria L., ? sh. 22. VII. 95, 800 ft. (36) C. erythrocephala Mg., sh. 4–22. IX. 95, 8–1,000 ft.

(37) C. sepulchralis Mg., 17. VII. 95, 800 ft. and? 14. IX. 95, 900 ft. (38) Pollenia rudis F., sh. and fp. 15–22. VII. 95; 14–24. IX. 95, 8–1,300 ft. (39) P. vespillo F., 19. IX. 95, 800 ft. (40) Mesembryna meridiana L., 21. IX. 95, 800 ft. (41) Cyrtoneura caesia Mg., sh. and fp. 16–22. IX. 95, 8–900 ft. *Anthomyiidae*: (42) Hyetodesia incana W., sh. and fp. 14–24. IX. 95, 8–1,000 ft. (43) Drymia hamata Fln., fp. 14–19. IX. 95, 8–900 ft. (44) Trichophthicus sp., 16. IX. 95, 800 ft. (45, 46, and 47) Anthomyia 3 spp., sh. and fp. 13–24. IX. 95, 7–1,000 ft. *Cordyluridae*: (48) Scatophaga stercoraria L., fp. 16–21. IX. 95, 7–900 ft. (49) Another sp., fp. 16. IX. 95, 800 ft. *Sepsidae*: (50) Sepsis cynipsea L., 10. VII. 96, 800 ft. *Phoridae*: (51) Phora sp., 21. IX. 95, 800 ft. **Coleoptera**: (52) Meligethes viridescens F., sh. and fp. 27. VII. 95; 14–24. IX. 95, 7–1,000 ft. (53) M. aeneus F., sh. and fp. 14. IX. 95, 800 ft. (54) Brachypterus urticae F., sh. 22. IX. 95, 800 ft. (55) Homalota sp., 16. IX. 95, 800 ft. **Hemiptera**: (56) Anthocoris nemorum L., sh. 16. IX. 95, 800 ft. **Thysanoptera.** (57) Thrips sp., sh. 14–17. IX. 95, 7–800 ft. **Araneida**: (58) Oligolophus morio Fabr., 24. IX. 95, 1,000 ft.

B′ § 6. Yellow-flowered Ligulate Compositae.

71. **Leontodon autumnalis,** Linn. [Lit. *Brit.* 23, 39; *N.C.E.* 1, 3 c, 9, 11, 14, 14 a, 15, 18, 25, 30, 31, 32, 33, 40; De Vries 2460; *Arct.* 34, 36; *Alps* 34; *Pyren.* 17.] This plant ascends (in its var. *pratense*) to considerable elevations, and is one of the most conspicuous of autumn flowers on the moors. Self-fertilization is produced in the way usual in the Compositae by the rolling back of the stigma as the flower ages. Nine-tenths of its individual visitors are short-tongued flies. Visitors of constancy hardly exist, but the circle is wide.

Visitors. **Lepidoptera.** Heterocera: *Pyralidae*: (1) Pyrausta? alpinalis Schiff., 4. VII. 95, 2,500 ft. **Hymenoptera.** Aculeata: *Apidae*: (2) Bombus terrestris L., sh. 24. IX. 95, 1,200 ft. (3) Andrena coitana Kirby, sh. 5. VII. 95, 800 ft. (4) A. analis Panz., sh. 22. VII. 95, 1,000 ft. *Myrmicidae*: (5) Myrmica rubra L., ? fp. 21. IX. 95, 900 ft. Petiolata parasitica: (6) 1 sp., sh. 26. VI. 95, 900 ft. (7) a second sp., 17. IX. 95, 800 ft. Sessiliventres: *Tenthredinidae*:

(8) Allantus arcuatus Forst., 17. VII. 95, 800 ft. **Diptera.** *Syrphidae*: (9) Melanostoma mellinum L., 13. IX. 95, 700 ft. (10) Platychirus manicatus Mg., fp. 30. VI.–20. VII. 95, 800 ft. (11) Syrphus albostriatus Fln., fp. 20. VII. 95, 800 ft. (12) S. balteatus Deg., fp. 13–24. IX. 95, 7–1,000 ft. (13) S. ? luniger Mg., fp. 14. IX. 95, 800 ft. (14) Eristalis pertinax Scop., sh. 13–24. IX. 95, 7–1,000 ft. *Empidae*: (15) Empis punctata Mg., sh. 20. VII. 95, 800 ft. *Mycetophilidae*: (16) Sciara sp., fp. 21. IX. 95, 1,600 ft. *Chironomidae*: (17) 1 sp., sh. 30. VI. 95, 800 ft. *Tachinidae*: (18) Siphona geniculata Deg., sh. 14. IX. 95, 900 ft. *Muscidae*: (19) Lucilia cornicina F., sh. 24. IX. 95, 8–1,200 ft. (20) Pollenia rudis F., sh. 14–24. IX. 95, 8–1,200 ft. *Anthomyiidae*: (21) Hyetodesia incana W., sh. and fp. 4–20. VII. 95; 16–21. IX. 95, 8–1,600 ft. (22) H. sp., fp. 21. VII. 95, 800 ft. (23) H. semicinerea W., fp. 21. IX. 95, 1,100 ft. (24) Drymia hamata Fln., fp. 14–24. IX. 95, 8–1,400 ft. (25) Trichophthicus sp., sh. 30. VI. 95, 800 ft. and 2. VII. 96, 2,800 ft. (26) Hylemyia nigrescens Rnd., 3. VII. 95, 800 ft. (27, 28, and 29) Anthomyia 3 spp., sh. and fp. 13–24. IX. 95, 7–2,000 ft. *Cordyluridae*: (30) Scatophaga stercoraria L., 21. IX. 95, 900 ft. *Phoridae*: (31) Phora sp., 20. IX. 95, 2,400 ft. **Coleoptera.** (32) Meligethes viridescens F., sh. and fp. freq. 26–30. VI. 95; 13–24. IX. 95, 7–1,600 ft. (33) M. aeneus F., sh. 14. IX. 95, 800 ft.

72. Crepis paludosa, Moench. [Lit. *Brit.* 23; *N.C.E.* 3 c, 18; *Alps* 2, 9; *Pyren.* 17.]

Visitors. **Hymenoptera.** Aculeata: *Formicidae*: (1) Formica fusca Latr., 20. VI. 96, 800 ft. **Diptera.** *Syrphidae*: (2) Platychirus manicatus Mg., ? sh. 2. VII. 95, 800 ft. *Anthomyiidae*: (3) Hyetodesia incana W., sh. and fp. 1. VI. 95, 19. VI.–6. VII. 96, 8–1,700 ft. (4) Limnophora sp., sh. 2. VII. 95, 800 ft. (5) Spilogaster nigrivenis Ztt., 19. VI. 96, 1,500 ft. (6) Anthomyia sp., 14. IX. 95, 800 ft. *Agromyzidae*: (7) Agromyza sp., 1. VI. 95, 800 ft. **Coleoptera:** (8) Meligethes viridescens F., sh. 2–6. VII. 95; 29. VI.–6. VII. 96, 8–1,700 ft.

73. Hieracium Pilosella, Linn. [Lit. *Brit.* 34; Marquand, 1513; *N.C.E.* 1, 3 c, 11, 12, 14, 16, 18, 25, 30, 31, 33; De Vries 2460; *Arct.* 36; *Alps* 16, 44; *Pyren.* 17.] At Clova fly-visited; in South Germany, the Netherlands and Flanders visited by mid-tongued bees and by several Syrphidae; in

the Alps with a considerable list of Lepidoptera among its visitors. Lindmann saw a butterfly to be a fairly frequent visitor in Norway.

Visitors. **Lepidoptera.** Rhopalocera: (1) Lycaena icarus Rott., sh. 28. VI. 95, 800 ft. (2) Polyommatus phloeas L., sh. 22. VI. 95, 800 ft. **Hymenoptera.** Petiolata parasitica: (3) 1 sp. 14. VI. 95, 700 ft. **Diptera.** *Syrphidae*: (4) 1 sp., 26. VI. 96, 1,100 ft. *Empidae*: (5) Tachydromia sp., ? fp. 24. VI. 96, 800 ft. (6) Empis chioptera Fln., 26. VI. 95, 800 ft. *Mycetophilidae*: (7) Sciara sp., sh. 18. IX. 95, 800 ft. *Dolichopodidae*: (8) Dolichopus sp., sh. 26. VI. 96, 2,200 ft. *Tachinidae*: (9) Siphona geniculata Deg., 18. VI. 99, 800 ft. *Muscidae*: (10) Lucilia cornicina F., sh. 22. VI. 95, 800 ft. *Anthomyiidae*: (11) Hyetodesia incana W., 18. VI. 99, 800 ft. (12) Limnophora solitaria Ztt., 28. VI. 95, 1,800 ft. (13) Hydrotaea sp., 19. VI. 99, 800 ft. (14) Hylemyia nigrescens Rnd., 16–18. VI. 99, 800 ft. (15) Trichophthicus sp., 28. VI.–4. VII. 95, 1,800 ft. (16) Anthomyia sulciventris Ztt., 25. VI. 96, 2,200 ft. (17 and 18) A. spp., sh. and fp. 14. VI.–5. VII. 95; 18–24. IX. 95; 16. VI.–10. VII. 96, 7–2,300 ft. **Coleoptera:** (19) Meligethes viridescens F., sh. and fp. 26. VI. 96; 19. VI. 99, 8–1,800 ft. (20) Brachypterus sp.?, 26. VI. 95, 800 ft. Thysanoptera: (21) Thrips sp., 26. VI. 96, 1,800 ft.

74. **Hieracium (Archi-Hieracia) spp.** [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 11, 16, 18, 33, 34, 35, 40; De Vries 2460; Loew 1358; *Arct.* 36; *Alps* 2, 34; *Pyren.* 17.] By the kindness of Mr. F. J. Hanbury and the Rev. E. F. Linton, who examined our specimens of Hieracia, we are able to give names to a number of forms. The Clova mountains are very rich in these, and some of them we have studied. The following notes give our observations; we have found it impossible to do otherwise than lump the forms together in enumerating the insect visits. Recognizing in the many forms of Hieracia incipient species, we find our chief interest in noting any characters which would promote segregation of the group by preventing indiscriminate hybridisation or crossing. A tendency to flower early or late, a separation in habitat, or a more complete self-pollination than is usual

ought severally to help to isolate forms in which these characters occur.

SPECIES: **1. H. alpinum,** Linn. Flowers of (*a*) *H. eximium*, Backh., were carefully observed. On the second and third days after the expansion of the head, the pollen was swept out in the outer florets; on the fourth day the stigmas of these outer florets separated. On the sixth day all the florets were open, and the stigmas of the outermost so recurved as to be self-pollinated. Thus apparently this form secures self-fertilization in the absence of insect visitors. (*b*) *H. holosericeum*, Backh., growing with the last, is perhaps not self-pollinated to the same extent. (*c*) *H. alpinum*, the segregate, (*d*) *H. calenduliflorum*, Backh., and (*e*) *H. gracilentum*, Backh., are other Clova forms.

SPECIES: **2. H. nigrescens,** (*f*) *H. Marshallii*, Linton, (*g*) *H. senescens*, Backh., (*h*) *H. chrysanthum*, Backh., and (*i*) *H. lingulatum*, Backh., are all forms which we have found at Clova. *H. chrysanthum* is rather distinct in its orange-yellow heads, but all the species of insects, seen to visit it, were seen on other species, so that so far as we know the colour causes no selection. The stigmas become slightly revolute, and this brings about self-pollination.

SPECIES: **3. H. anglicum,** Fries, (*j*) *H. anglicum*, segregate, (*k*) *H. iricum*, Fries, (*l*) *H. clovense*, Linton, (*m*) *H. cerinthiforme*, Backh., were obtained. Also (*n*) *H. callistophyllum*, F. J. Hanb., has been gathered at Clova. (F. J. Hanbury, Brit. Hierac., pp. 65, 66.) On the crags at Loch Brandy grow together *H. eximium* and *H. clovense*. The former begins to flower before the latter, but their flowering-periods overlap. Heads of *H. clovense* were kept in a room side by side with *H. eximium*, already described. For five days the behaviour of *H. clovense* was just like that of *H. eximium*, but on the sixth day when the last of the florets of *H. eximium* were open, there were still some florets of *H. clovense* to open, and further the stigma of *H. clovense* never recurved as tightly as that of *H. eximium*, and consequently self-pollination would

appear to be less inevitable. Perhaps of these two associates the earlier flowering of the one, and the less period of time when cross-fertilization is possible, may prevent in a measure the crossing which we believe extremely likely to occur. There are then causes which would help incipient species to become isolated. We have seen more insects on *H. clovense* than on *H. eximium*, but they are of the same or similar species.

SPECIES: 4. **H. murorum**, Linn. (*o*) *H. Schmidtii*, Tausch, (*p*) *H. Leyi*, F. J. Hanb., (*q*) *H. lasiophyllum*, Koch, and (*r*) *H. argenteum*, Fries, were obtained. The second seems very common in some spots. It grows at lower levels than *H. eximium*, *H. chrysanthum*, and *H. holosericeum* for the most part, rarely exceeding 2,250 feet, and where mixed with *H. eximium* flowering like *H. clovense*, a little later than it. The stigma becomes tightly recurved when old. We have also gathered (*s*) *H. pictorum*, Linton, (*t*) *H. murorum*, segregate, (*u*) *H. aggregatum*, Backh., and (*v*) *H. rivale*, F. J. Hanb.

SPECIES: **5. H. sylvaticum.** (*w*) *H. vulgatum*, Fries, (*x*) *H. euprepes*, F. J. Hanb., (*y*) *H. angustatum*, Lindeb., and (*z*) *H. diaphanoides*, Lindeb., have been obtained at Clova (Linton, in Journ. Bot. 1890, p. 168; Druce, Ann. Scot. Nat. Hist. 1896, p. 126; F. J. Hanb., Journ. Bot. 1893, p. 133). The stigma of these becomes ultimately tightly recurved. With the exception of *H. pictorum* those we have seen all grow intermixed. Other sub-species or varieties of Hieracia have been found at Clova, bringing up the total to thirty-one forms. For their names see our paper in the Trans. Edinb. Bot. Soc.

There is a sort of stratification about the Hieracia. The sub-species of *H. alpina* grow at the highest levels, next in descending the hills we come to the sub-species *H. Leyi*, *H. clovense*, *H. argenteum*, and similar forms. Lowest come the more richly branched forms, such as *H. anglicum*. One form, *H. vulgatum*, we have found at all heights, from 700–2,900 feet. The others have a much less extensive range. The insects which visit the Hieracia are none of them wide-

flying, and there is every probability that a floret if crossed will be fertilized from a very similar plant. This is another cause helping to allow the segregation of the group.

Visitors. **Lepidoptera.** Heterocera: *Pyralidae*: (1) Pyrausta alpinalis Schiff., sh. (to b, h, j, p) 1–6. VII. 96, 25–2,700 ft. **Hymenoptera.** Aculeata: *Myrmicidae*: (2) Myrmica rubra L., (to w) biting flowers, 18. VI. 96, 1,400 ft. Petiolata parasitica: *Cynipidae*: (3) Cynips sp., (to w) 16. VI. 96, 700 ft. **Diptera.** *Syrphidae*: (4) Melanostoma mellinum L., (to w) fp. 16. IX. 95, 800 ft. (5) Platychirus manicatus Mg., (to j, r, w) 1–6. VI. 96, 17–2,700 ft. *Empidae*: (6) Empis lucida Ztt., (to w) 4. VII. 95, 1,800 ft. (7) E. sp., (to w) 29. VI. 96, 800 ft. (8) E. aestiva Lw., (to w) 29. VI. 96, 800 ft. *Mycetophilidae*: (9) Sciara sp., (to w) sh. 30. VI. 96, 2,100 ft. *Bibionidae*: (10) Dilophus albipennis Mg., (to w) sh. 26. VI. 96, 1,200 ft. *Tachinidae*: (11) Siphona geniculata Deg., (to t, w) 18–25. VI. 96, 7–800 ft. *Muscidae*: (12) Lucilia cornicina F., (to w) sh. 24. IX. 96, 1,000 ft. *Anthomyiidae*: (13) Hyetodesia incana W., (to b, h, j, l, p, r, t, w) sh. and fp. freq. 23. VI.–4. VII. 95, 18. VI.–6. VII. 96, 8–2,600 ft. (14) H. basalis Ztt., (to w) sh. 4. VII. 95, 1,200 ft. (15) Drymia hamata Fln., (to a, b, c, h, j, l, t) sh. and fp. 26. VI.–2. VII. 96, 17–2,700 ft. (16) Spilogaster nigrivenis Ztt., (to w) 19. VI. 96, 1,500 ft. (17) Trichophthicus hirsutulus Ztt., (to h, j, p) 6. VII. 96, 17–2,000 ft. (18) T. sp., (to a, l, p, w) fp. 20. VI.–6. VII. 96, 18–2,500 ft., 16. IX. 95, 8–900 ft. (19) Anthomyia sulciventris Ztt., (to l) 25. VI. 96, 2,000 ft. (20 and 21) A. sp., (to b, w) sh. 13. VII. 95, 19. IX. 95, 27. VI. 96, 22–2,400 ft. [and also Anthomyiidae to a, g, h, j, l, p, r, w, VI. and VII. 96, 8–2,500 ft.]. **Coleoptera.** (22) Meligethes viridescens F., (to p) fp. 26. VI. 96, 2,100 ft. (23) Anthophagus alpinus Payk., (to a) ? fp. 10. VII. 96, 2,500 ft. **Hemiptera.** (24) Aphis sp., (to k) 22. VI. 96, 2,300 ft.

75. Lapsana communis, Linn. [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 11, 14, 18; Warnstorf 2507; *Pyren.* 17.] Nowhere, as far as present records go, well visited.

Visitors. **Coleoptera.** (1) Meligethes viridescens F., sh. 2. VII. 95, 800 ft., nine individuals.

76. Hypochoeris radicata, Linn. [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 12, 14, 14 a, 16, 18, 25, 34, 40; *Alps* 2; *Pyren.* 17.]

The Clova visitors to this species are a little more specialized than those to *Leontodon autumnale*, the cause being in its earlier flowering. Andrena showed some measure of constancy, as also did Eristalis. The young flowers close at night and remain closed by day during rain. Mid-tongued bees are the most numerous in the list of North Central Europe and mid-tongued flies stand second.

Visitors. **Lepidoptera.** Rhopalocera: (1) Vanessa urticae L., sh. 2. VII. 95, 800 ft. (2) Lycaena icarus Rott., sh. 25. VI. 96, 800 ft. Heterocera: *Eriocephalidae*: (3) Eriocephala calthella L., fp. 5–6. VII. 95, 8–1,400 ft. **Hymenoptera.** Aculeata: *Apidae*: (4) Bombus ? terrestris L., sh. 10. VII. 95, 800 ft. once. (5) Andrena coitana Kirby, 5–8. VII. 95, 7–800 ft. (6) A. analis Panz., sh. 18. VI.–11. VII. 96, 8–1,100 ft. *Formicidae*: (7) Formica fusca Latr., 18. VI. 96, 800 ft. Sessiliventres: *Tenthredinidae*: (8) Allantus arcuatus Forst., 26. VI.–5. VII. 95, 7–800 ft. fairly freq. Petiolata parasitica: *Ichneumonidae*: (9) 1 sp., 26. VI.–6. VII. 95, 26–27. VI. 96, 8–1,000 ft. **Diptera.** *Syrphidae*: (10) Chilosia fraterna Mg., 22. VI.–3. VII. 95, 25. VI. 96, 800 ft. (11) C. antiqua Mg., sh. 5. VII. 95, 800 ft. (12) Platychirus manicatus Mg., sh. 25. VI.–6. VII. 95, 18–25. VI. 96, 800 ft. (13) Syrphus ribesii L., fp. 5. VI. 95, 6. VII. 96, 800 ft. (14) S. ? grossulariae Mg., 1. VII. 95, 800 ft. (15) Volucella bombylans L., fp. 2–8. VII. 95, 800 ft. (16) Sericomyia borealis Fln., sh. 26. VI.–1. VII. 96, 800 ft. (17) Eristalis pertinax Scop., 20. VI. 95, 25. VI.–10. VII. 96, 800 ft. (18) E. rupium F., 5. VII. 95, 19. VI. 96, 800 ft. (19) E. arbustorum L., 5. VI. 95, 800 ft. *Empidae*: (20) Empis aestiva Lw., sh. 5. VII. 95, 800 ft. (21) Rhamphomyia nigripes F., 2. VII. 95, 800 ft. (22) Tachydromia sp., sh. 5. VII. 95, 800 ft. *Tabanidae*: (23) Atheryx ibis F., sh. 1. VII. 95, 800 ft. *Tachinidae*: (24) Siphona geniculata Deg., sh. 17. VI.–5. VII. 95, 800 ft. (25) Tachinid sp., sh. 6. VII. 95, 1,400 ft. *Muscidae*: (26) Calliphora vomitoria L., sh. 2. VII. 95, 800 ft. (27) C. erythrocephala Mg., 25–27. VI. 96, 800 ft. *Anthomyiidae*: (28) Hyetodesia incana W., sh. and fp. 17. VI.–6. VII. 95, 18. VI.–6. VII. 96, 16–19. VI. 99, 800 ft. (29) Drymia hamata Fln., 29. VI.–2. VII. 95, 2. VII. 96, 800 ft. (30) Trichophthicus hirsutulus Ztt., 10. VII. 96, 800 ft. (31) T. sp., sh. 28. VI.–2. VII. 95, 16. IX. 95, 9–1,500 ft. (32) Hylemyia nigrescens Rnd., 22. VI.–3. VII. 95, 800 ft. (33) Anthomyia sulciventris Ztt.,

sh. 22. VI. 95, 800 ft. (34) A. pudica Rnd., 22. VI. 95, 800 ft. (35 and 36) A. spp., sh. and fp. 14. VI.–5. VII. 95, 17. IX. 95, 16. VI.–11. VII. 96, 7–1,300 ft. (37) Caricea tigrina F., 16. VI. 95, 800 ft. (38) Coenosia sp., 16. VI.–4. VII. 95, 800 ft. **Coleoptera.** (39) Meligethes aeneus F., 16. VI. 95, 800 ft. (40) M. viridescens F., sh. and fp. 25. VI.–5. VII. 95, 16–17. IX. 95, 16. VI.–8. VII. 96, 8–1,600 ft. (41) Phyllobius pomonae Ol., ? sh. 1. VII. 95, 800 ft. **Thysanoptera.** (42) Thrips sp., 5. VI. 95, 800 ft. **Araneida.** (43) Xysticus sp., lying in wait, 22. VI. 95, 10. VII. 96, 8–900 ft.

77. Taraxacum officinale, Web. [Lit. *Brit.* 23, 29, 34; *N.C.E.* 1, 3 c, 11, 14, 16, 18, 25, 31, 34, 35, 40; De Vries 2460; Warnstorf 2507; *Medit.* 34; *Arct.* 34, 36; *Alps* 2, 9, 16, 34; *Pyren.* 17.] All the season visited by abundant Anthomyids. In early spring Apis shows a measure of constancy but neglects the flower afterwards; a few butterflies visit the flowers in spring not irregularly. Lists of visitors for North Central Europe are in the most marked contrast; in South Germany, on the Frisian coast, in the Netherlands and in Flanders long and mid-tongued bees are many and mid-tongued flies come next to them. In the Alps Lepidoptera are most numerous, but the bees are hardly less in numbers than the flies. Lindmann, however, observed the flower to be visited by many small or moderately small flies in Norway.

Visitors. **Lepidoptera.** Rhopalocera: (1) Argynnis selene Schiff., sh. 14. VI. 99, 1,400 ft. (2) Vanessa urticae L., sh. not infreq. 24. V. 96, 19–27. V. 97, 7. V. 98, 6–900 ft. (3) Pieris napi L., sh. 22–23. V. 97, 11–16. VI. 99, 6–800 ft. (4) P. ? rapae L., sh. 20. V. 97, 800 ft. (5) Polyommatus phloeas L., sh. 24. V. 96, 800 ft. Heterocera: *Geometridae*: (6) 1 sp., 11. VI. 99, 800 ft. (7) a second species, 13–14. VI. 99, 900 ft. *Pyralidae*: (8) Pyrausta alpinalis Schiff., sh. 4. VII. 95, 2,700 ft. and 1. VII. 96, 1,800 ft. *Tineidae*: (9) 1 sp., sh. 11. VI. 99, 800 ft. **Hymenoptera.** Aculeata: *Apidae*: (10) Apis mellifica L., sh. and cp. 20–27. V. 97, 7–15. V. 98, 6–800 ft. (11) Bombus lapponicus F., sh. 23. V. 97, 15. V. 98, 800 ft. (12) Andrena analis Panz., sh. 25. V. 96, 800 ft. Petiolata parasitica: *Ichneumonidae*: (13) 1 sp., sh. 25. V. 96, 800 ft. *Proctotrupidae*: (14) 1 sp., 11. VI. 99, 800 ft. **Diptera:** *Syrphidae*: (15) Platychirus albimanus F., 17–

19. IX. 95, 800 ft. (16) P. manicatus Mg., sh. and fp. 19. VI. 95, 21. V. 96, 10–11. VI. 99, 7–800 ft. (17) P. discimanus Loew, ? fp. 15. V. 98, 800 ft. (18) Chilosia fraterna Mg., sh. 11–16. VI. 99, 800 ft. *Empidae*: (19) Empis tessellata F., sh. 21. V. 96, 16. VI. 99, 800 ft. (20) Empis bilineata Lw., sh. 27. V. 97, 14. VI. 99, 8–900 ft. *Mycetophilidae*: (21) Sciara sp., 11. VII. 96, 800 ft. *Bibionidae*: (22) Scatopse sp., 11. VII. 96, 800 ft. *Chironomidae*: (23) Tanytarsus sp., 11. V. 98, 1,000 ft. *Tachinidae*: (24) Siphona geniculata Deg., sh. 21. V. 98, 10. VI. 99, 7–800 ft. *Muscidae*: (25) Lucilia cornicina F., sh. and fp. 27. V. 97, 7–13. V. 98, 10. VI. 99, 6–800 ft. (26) Pollenia vespillo F., sh. 22–27. V. 97, 10. VI. 99, 6–800 ft. *Anthomyiidae*: (27) Hyetodesia incana W., sh. 20. VI.–4. VII. 95, 1. VII. 96, 8–2,700 ft. (28) Trichophthicus sp., sh. 24. VI.–4. VII. 95, 1. VII. 96, 16–2,700 ft. (29) Anthomyia radicum L., 11. VI. 99, 800 ft. (30) A. sulciventris Ztt., sh. and fp. very ab. 28. VI. 95, 18–27. V. 97, 12. V. 98, 7–800 ft. and once at 2,000 ft. (31, 32, and 33) A. 3 spp., fp. 19. VI.–4. VII. 95, 19. IX. 95, 21–22. V. 96, 6. VI. 96, 19–24. V. 97, 16. V. 98, 10–16. VI. 99, 6–2,600 ft. *Cordyluridae*: (34) Scatophaga stercoraria L., sh. and fp. 27. V. 97, 12–13. V. 98, 800 ft. *Phoridae*: (35) Phora rufipes Mg., sh. 22. V. 96, 1,100 ft. **Coleoptera.** (36) Meligethes viridescens F., sh. and fp. 17–21. IX. 95, 10. VI. 99, 7–800 ft.

B′ § 7. Eyed Compositae.

78. Bellis perennis, Linn. [Lit. *Brit.* 23, 29; *N.C.E.* 1, 3 c, 11, 14, 14 a, 16, 18, 25, 30, 31, 34; De Vries 2460; Warnstorf 2507; *Medit.* 34; *Alps* 2, 9; *Pyren.* 17.] Visited in spring and less so in summer by great numbers of short-tongued flies, chiefly Anthomyiids.

Visitors. **Lepidoptera.** Rhopalocera: (1) Pieris rapae L., sh. 24. V. 97, 800 ft. (2) P. napi L., sh. 11–13. VI. 99, 800 ft. (3) Lycaena icarus Rott., sh. 1. VII. 95, 800 ft. (4) Coenonympha pamphilus L., sh. 10. VII. 96, 2,500 ft. Heterocera: (5) 1 Microlepidopteron, 25. VII. 96, 800 ft. **Hymenoptera.** Aculeata: *Apidae*: (6) Apis mellifica L., 15. IV. 95, 13. V. 98, 800 ft. (7) Andrena sp., sh. 20. V. 97, 900 ft. *Myrmicidae*: (8) Myrmica rubra L., 23. VI. 95, 900 ft. Petiolata parasitica: (9) 1 sp., 27. V. 97, 700 ft. **Diptera.** *Syrphidae*: (10) Melanostoma ? quadrimaculatum Verrall,

sh. 16. VI. 95, 800 ft. (11) Platychirus discimanus Loew, 27. V. 97, 16. V. 98, 800 ft. (12) P. manicatus Mg., 10. VI. 99, 700 ft. (13) P. albimanus F., 21. IX. 95, 800 ft. (14) Syrphus vitripennis Mg., 10–11. VI. 99, 7–1,200 ft. (15) S. sp., 10. VI. 95, 2,300 ft. (16) Eristalis arbustorum L., sh. 22. VI. 99, 800 ft. (17) Syritta pipiens L., 19. VI. 99, 900 ft. *Empidae*: (18) Empis tessellata F., 10. VII. 96, 900 ft. (19) E. bilineata Lw., sh. 27. V. 97, 700 ft. (20) E. ? lucida Ztt., 23. V. 97, 900 ft. (21) E. ? vernalis Mg., sh. 11–12. VI. 99, 11–2,200 ft. (22) E. opaca F., sh. 13. VI. 99, 700 ft. (23) Hilara matrona Hal., sh. 17. VII. 97, 800 ft. *Mycetophilidae*: (24) Sciara sp., 14–24. IX. 95, 10–1,600 ft. *Dolichopodidae*: (25) Hercostomus nigripennis Fln., 1. VII. 95, 800 ft. *Tachinidae*: (26) Siphona geniculata Deg., sh. 24. VI. 95, 10. VI. 99, 7–1,400 ft. *Muscidae*: (27) Lucilia cornicina F., sh. 16. IV. 95, 18–20. V. 97, 7–8. V. 98, 10. VI. 99, 7–800 ft. (28) Pollenia vespillo F., 7. V. 98, 1,700 ft. (29) P. rudis F., 15. IV. 95, 30. VI. 95, 800 ft. *Anthomyiidae*: (30) Hyetodesia incana W., fp. 20. VI.–4. VII. 95, 24. IX. 95, 18. VI. 96, 8–1,000 ft. (31) Spilogaster quadrum F., 20. VI. 95, 800 ft. (32) Hylemyia nigrescens Rnd., 11. VI. 99, 1,200 ft. (33) Trichophthicus sp., 14–16. IX. 95, 13–1,600 ft. (34) Anthomyia sulciventris Ztt., fp. 18–27. V. 97, 7–12. V. 98, 5–800 ft. very ab. (35, 36, and 37) A. 3 spp., sh. and fp. 22. VI.–5. VII. 95, 19–24. IX. 95, 21–22. V. 96, 18. VI.–11. VII. 96, 18–24. V. 97, 10–15. VI. 99, 6–2,300 ft. *Cordyluridae*: (38) Scatophaga stercoraria L., 21. IX. 95, 19. VI. 96, 27. V. 97, 12–14. V. 98, 8–1,400 ft. **Coleoptera.** (39) Meligethes viridescens F., fp. 24. IX. 95, 10. VI. 99, 7–1,000 ft. **Hemiptera.** (40) 1 sp., 4. VII. 95, 800 ft. **Thysanoptera.** (41) Thrips sp., sh. 26. VI. 96, 1,800 ft.

79. Chrysanthemum Leucanthemum, Linn. [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 11, 14, 16, 18, 30, 31, 34, 40; Warnstorf 2507; *Alps* 2, 16, 34; *Pyren.* 17.] Large heads at Clova were found to attain 72 mm. in diameter, the disk being 18 mm. across.

Visitors. **Lepidoptera.** Heterocera: *Tortricidae*: (1) Tortrix sp., sh. 2. VII. 95. **Diptera.** *Empidae*: (2) Empis sp., sh. 22. VII. 95. (3) E. bilineata Lw., 2. VII. 95. *Tachinidae*: (4) Siphona geniculata Deg., 21. VI. 95. *Anthomyiidae*: (5) Hyetodesia incana W., 29. VI. 96. (6) Trichophthicus sp., 30. VI. 95, 16. IX. 95.

Coleoptera. (7) Meligethes viridescens F., fp. 2. VII. 95, 16. IX. 95. **Thysanoptera.** (8) Thrips sp., sh. 24. VI. 96. All at 8–900 ft.

80. **Matricaria inodora,** Linn. [Lit. *Brit.* 23, 39; *N.C.E.* 1, 3 c, 11, 14, 18, 31.]

Visitors. **Hymenoptera.** Aculeata: *Apidae*: (1) Apis mellifica L., sh. 22. VII. 95. **Diptera.** *Syrphidae*: (2) Platychirus albimanus F., ? sh. 22. IX. 95. (3) Syrphus vitripennis Mg., 15. VII. 95. (4) Ascia podagrica F., sh. 17. VII. 95. (5) Eristalis arbustorum L., sh. 15. VII. 95. (6) E. rupium F., sh. 22. VII. 95. (7) Syritta pipiens L., sh. and ? fp. 15–19. VII. 95, 22. IX. 95. *Empidae*: (8) Rhamphomyia sp., 5. VII. 96. *Tachinidae*: (9) Siphona geniculata Deg., 24. VI. 96. *Muscidae*: (10) Lucilia sericata Mg., fp. 15. VI. 95. (11) L. cornicina F., sh. 7. VII. 95, 22. IX. 95. (12) Pollenia rudis F., sh. and fp. 15. VII. 95, 22–23. IX. 95. *Anthomyiidae*: (13) Anthomyia sp., 17. IX. 95, 22. VI. 96. *Cordyluridae*: (14) Scatophaga stercoraria L., 22. IX. 95. *Sepsidae*: (15) Sepsis cynipsea L., 17. IX. 95, 22. VI. 96. **Coleoptera.** (16) Meligethes viridescens F., fp. 17–22. IX. 95. (17) Amara bifrons Gyll., ? fp. 3. VII. 95. **Orthoptera.** (18) Forficula sp., devouring the ray-florets, 3. VII. 95. **Thysanoptera.** (19) Thrips sp., 17. IX. 96. All at 800 ft.

B′ § 8. White Compositae.

81. **Antennaria dioica,** R. Br. [Lit. *N.C.E.* 14, 18, 25, 33; *Arct.* 36; *Alps* 2, 9; *Pyren.* 17.] Flowers rarely rose pink.

Visitors. **Lepidoptera.** Heterocera: *Geometridae*: (1) Melanippe sp., sh. 25. VI. 96, 2,200 ft. (2) Cidaria immanata Hw., 22. VI. 96, 2,300 ft. **Hymenoptera.** Aculeata: *Vespidae*: (3) Odynerus trimarginatus Zett., ? sh. 15. VI. 99, 800 ft. **Diptera.** *Empidae*: (4) Empis livida L., sh. 22. VI. 96, 2,400 ft. *Bibionidae*: (5) Dilophus albipennis Mg., 15. VI. 95, 900 ft. *Chironomidae*: (6) 1 sp., 6. VI. 95, 2,300 ft. *Muscidae*: (7) 1 sp., 16. VI. 99, 1,500 ft. *Anthomyiidae*: (8) Drymia hamata Fln., 26. VI. 96, 2,400 ft. (9) Trichophthicus hirsutulus Ztt., fp. 6. VI. 96, 2,100 ft. (10) Coenosia sp., 21. VI. 95, 27. VI. 96, 20–2,200 ft. **Coleoptera.** (11) Meligethes viridescens F., ? fp. 1. VII. 96, 1,700 ft. (12) Sericosomus brunneus F., 16. VI. 99, 1,500 ft.

82. Achillea Ptarmica, Linn. [Lit. *Brit.* 23; *N.C.E.* 1, 3 c, 11, 14, 14 a, 18; Loew 1358.]

Visitors. **Diptera.** *Empidae*: (1) Empis tessellata F., sh. 14. IX. 95, 800 ft. *Anthomyiidae*: (2) Drymia hamata Fln., 16. IX. 95, 800 ft. (3) Anthomyia sp., 15. IX. 95, 800 ft. *Cordyluridae*: (4) Scatophaga sp., sh. 20. VII. 95, 800 ft.

83. Achillea Millefolium, Linn. [Lit. *Brit.* 23, 34, 39; *N.C.E.* 1, 3 c, 8, 11, 12, 14, 14 a, 16, 18, 25, 31, 33, 34, 40; *Arct.* 36; *Alps* 2, 9; *Pyren.* 17.] Flowers sometimes rose-pink. Müller in his lists unites this species and A. Ptarmica together.

Visitors. **Lepidoptera.** Heterocera: *Noctuidae*: (1) Hydroecia nictitans Bkh., 14–16. IX. 95, 800 ft. (2) Dianthecia cucubali Fuessl., sh. 2. VII. 95, 800 ft. *Tortricidae*: (3) Tortrix sp., 2. VII. 95, 800 ft. *Tineidae*: (4) Glyphipteryx fuscoviridella Haw., sh. 1–2. VII. 95, 900 ft. **Hymenoptera.** Aculeata: *Apidae*: (5) Bombus terrestris L., sh. 25. VI. 95, 13–14. IX. 95, 7–800 ft. (6) Andrena analis Panz., sh. 6. VII. 95, 800 ft. (7) Halictus subfasciatus Nyl., 14. IX. 95, 800 ft. *Vespidae*: (8) Vespa norvegica F., 13. IX. 95, 700 ft. Sessiliventres: *Tenthredinidae*: (9) Allantus arcuatus Forst., sh. 26. VI.–22. VII. 95, 2. VII. 96, 800 ft. Petiolata parasitica: *Ichneumonidae*: (10) Limneria crassicornis, 16. IX. 95, 800 ft. (11) Hemiteles ? tenebriosus Grav., 2. VII. 95, 800 ft. (12, 13, and 14) three other spp., 1. VII. 95, 800 ft. **Diptera.** *Syrphidae*: (15) Platychirus manicatus Mg., sh. 26. VI.–3. VII. 95, 10. VII. 96, 800 ft. (16) P. albimanus F., fp. 18. VII. 95, 800 ft. (17) Syrphus ? vitripennis Mg., 15. VII. 95, 3. VII. 96, 800 ft. (18) Syrphus sp., 13–14. IX. 95, 7–800 ft. (19) Ascia podagrica F., 17. IX. 95, 800 ft. (20) Eristalis pertinax Scop., 13–18. IX. 95, 7–800 ft. (21) E. arbustorum L., fp. 6. VII. 95, 800 ft. (22) Heliophilus pendulus L., sh. 21–22. IX. 95, 8–900 ft. (23) Syritta pipiens L., 30. VI.–1. VII. 95, 800 ft. *Empidae*: (24) Empis tessellata F., sh. 15–23. VII. 95, 13–16. IX. 95, 2–11. VII. 96, 7–900 ft. (25) E. punctata Mg., sh. 19. VI.–17. VII. 95, 800 ft. (26) E. bilineata Lw., 28. VI.–5. VII. 95, 800 ft. (27) E. grisea Fln., 16. IX. 95, 900 ft. (28) Pachymeria palparis Egg., 16. IX. 95, 900 ft. (29) Rhamphomyia spinipes L., 30. VI. 95, 16. IX. 95, 8–900 ft. (30) Hilara martrona Hal., sh. 17. VII. 95.

800 ft. *Cecidomyiidae*: (31) Lestremia sp., 16. IX. 95, 800 ft. *Bibionidae*: (32) Dilophus albipennis Mg., 28. VI. 95, 800 ft. *Chironomidae*: (33) 1 sp., fp. 6. VII. 95, 800 ft. *Tachinidae*: (34) Siphona geniculata Deg., 16–18. IX. 95, 800 ft. *Sarcophagidae*: (35) Cynomyia mortuorum L., 16. IX. 95, 800 ft. *Muscidae*: (36) Lucilia cornicina F., fp. 2–6. VII. 95, 13–24. IX. 95, 8–1,600 ft. (37) L. sericata Mg., sh. 20. VII. 95, 800 ft. (38) Calliphora erythrocephala Mg., sh. 5. VII. 95, 18–21. IX. 95, 800 ft. (39) C. ? vomitoria L., 22. VI. 95, 800 ft. (40) Pollenia rudis F., sh. 30. VI.–5. VII. 95, 13–24. IX. 95, 8–1,200 ft. (41) Cyrtoneura caesia Mg., 16–21. IX. 95, 800 ft. *Anthomyiidae*: (42) Hyetodesia incana W., sh. and fp. 26. VI.–15. VII. 95, 16–21. IX. 95, 8–1,800 ft. (43) H. basalia Ztt., 17. VII. 95, 800 ft. (44) Hylemyia nigrescens Rnd., 2. VII. 95, 800 ft. (45) Drymia hamata Fln., sh. and fp. 6. VII. 95, 14–16. IX. 95, 800 ft. (46) Anthomyia sulciventris Ztt., fp. 1. VII. 95, 800 ft. (47, 48, and 49) A. 3 spp., sh. and fp. 23. VI.–22. VII. 95, 13–21. IX. 95, 16. VI.–11. VII. 96, 7–900 ft. (50) Trichophthicus sp., 29–30. VI. 95, 16–18. IX. 95, 8–900 ft. (51) Coenosia infantula Rnd., 2. VII. 95, 800 ft. *Cordyluridae*: (52) Scatophaga stercoraria L., fp. 6–20 VII. 95, 14–22. IX. 95, 7–900 ft. (53) S. maculipes Zett., 2. VII. 95, 800 ft. *Opomyzidae*: (54) Opomyza germinationis L., 17. IX. 95, 700 ft. *Chloropidae*: (55) Oscinis sp., fp. 6. VII. 95, 800 ft. *Phoridae*: (56) Phora sp., 17. IX. 95, 800 ft. **Coleoptera.** (57) Meligethes viridescens F., sh. and fp. 14–22. IX. 95, 8–1,000 ft. (58) M. aeneus F., 21. IX. 95, 800 ft. (59) Brachypterus urticae F., 15. IX. 95, 800 ft. (60) Thyanis laevis Duft., ? fp. 27. VI.–1. VII. 95, 800 ft. **Hemiptera.** (61) Anthocoris nemorum L., sh. 21. IX. 95, 800 ft. (62) Lygus campestris Fabr., 16. IX. 95, 800 ft.

A′ § 9. Umbelliferae.

84. **Pimpinella Saxifraga**, Linn. [Lit. *Brit.* 23, 39; *N.C.E.* 1, 3 a, 12, 14, 16, 18, 21 a, 30, 34, 40; *Arct.* 36; *Alps* 21 b, 34; *Pyren.* 17.]

Visitors. **Lepidoptera.** Heterocera: *Noctuidae*: (1) Miana fasciuncula Haw., sh. 20. VI. 95. **Hymenoptera.** Aculeata: *Apidae*: (2) Andrena analis Panz., sh. 23. VI. 95. Petiolata parasitica: *Cynipidae*: (3) Eucoela fortinervis Cameron, 23. IX. 95. *Ichneumonidae*: (4 and 5) Hemiteles spp., 5–20. VII. 95, 22. IX. 95. (6) Xylo-

nomus sp., 21. IX. 95. (7, 8, 9, and 10) four other spp., 13 VII. 95, 18. IX. 95, 25. VI. 96. *Braconidae*: (11) 1 sp., ? sh. 17. VII. 95. *Chalcididae*: (12 and 13) 2 spp., 20–23. VII. 95, 13–23. IX. 95, 24. VI. 96. Sessiliventres: *Tenthredinidae*: (14) Allantus arcuatus Forst., 8–20. VII. 95, 29. VI.–3. VII. 96. (15) another sp., 12. VII. 95. **Diptera.** *Syrphidae*: (16) Chilosia fraterna Mg., sh. 20. VII. 95. (17) C. scutellata Fln., sh. 13. VII. 95. (18) Syrphus ribesii L., sh. 20. VII. 95. (19) S. vitripennis Mg., sh. 20. VII. 95. (20) Eristalis pertinax Scop., 18. IX. 95. *Empidae*: (21) Empis tessellata F., sh. 20. VII. 95. (22) E. punctata Mg., sh. 23. VII. 95. *Mycetophilidae*: (23) Sciara sp., 22. IX. 95. *Bibionidae*: (24) Bibio pomonae F., sh. 23. VII. 95, 22. IX. 95. *Chironomidae*: (25) 1 sp., 5. VII. 95. *Tipulidae*: (26) Pachyrrhina maculosa Mcq., sh. 17. VII. 95. *Tachinidae*: (27) Siphona geniculata Deg., 23. IX. 95. *Muscidae*: (28) Calliphora erythrocephala Mg., sh. 12. VII. 95. (29) Pollenia rudis F., sh. 16–21. IX. 95. *Anthomyiidae*: (30) Hyetodesia incana W., 10–12. VII. 95, 5. VII. 96. (31) Drymia hamata Fln., sh. 12. VII. 95. (32) Trichophthicus sp., 16. IX. 95. (33 and 34) Anthomyia spp., 15–18. IX. 95, 24. VI. 96. (35) Azelia aterrima Mg., sh. 17. VII. 95. *Cordyluridae*: (36) Scatophaga stercoraria L., sh. 1–17. VII. 95, 13. IX. 95. *Sciomyzidae*: (37) Tetanocera elata F., sh. 23. VII. 95. *Sapromyzidae*: (38) Sapromyza apicalis Lw., sh. 23. VII. 95. *Sepsidae*: (39) Sepsis cynipsea L., sh. 5–20. VII. 35. *Borboridae*: (40) Borborus geniculatus Mcq., 5. VII. 95. *Phoridae*: (41) Phora sp., sh. 23. VII. 95. **Coleoptera.** (42) Meligethes viridescens F., 15–23. IX. 95. All at 7–900 ft.

85. Conopodium denudatum, Koch. [Lit. *Brit.* 23; *Pyren.* 17.]

Visitors. **Hymenoptera.** Aculeata: *Acutilingues*: (1) Apis mellifica L., 17. VI. 95. Terebrantia: *Ichneumonidae*: (2) Alomyia debellator Fabr., 11. VI. 99. (3) Hemiteles ? tenebricosus Gravenh., sh. 22. VI. 95. (4) Hemiteles sp., sh. *Chalcididae*: (5) 1 sp., 18. VI. 96. Phytophaga: (6) Allantus arcuatus Forst., lounging and sh. 15–25. VI. 95. (7) Nematus fallax Lep., 21. V. 96. **Diptera.** *Syrphidae*: (8) Platychirus manicatus Mg., 17. VI. 95, 16. VI. 99. (9) Syrphus vitripennis Mg., 11–16. VI. 99. *Empidae*: (10) Empis tessellata F., sh. 15–16. VI. 99. (11) E. bilineata Lw., 15–16. VI. 99. *Tipulidae*: (12) Tipula varipennis Mg., sh. 16. VI. 99. *Muscidae*: (13) 1 sp., 11. VI. 99.

Anthomyiidae: (14) Hyetodesia incana W., 17. VI. 95, ? 23. V. 96. (15) Hylemyia nigrescens Rnd., 17–30. VI. 95. (16) Anthomyia sulciventris Ztt., 18. VI. 96, 10–15. VI. 99. (17) A. radicum L., 11. VI. 99. *Cordyluridae*: (18) Scatophaga stercoraria L., 17. VI. 95. *Sapromyzidae*: (19) Sapromyza sp., 17. VI. 99. **Hemiptera.** (20) Nabis flavimarginatus D. and S., 17. VI. 95. **Thysanoptera.** (21) Thrips sp., 18. VI. 96, 17. VI. 99. All at 7–900 ft.

86. Anthriscus sylvestris, Hoffm. [Lit. *Brit.* 29; *N.C.E.* 1, 3 a, 16, 18, 21 a, 25, 32, 34, 40; *Alps* 16; *Medit.* 34.]

Visitors. **Lepidoptera.** Heterocera: *Bombycidae*: (1) Hepialis humuli L., sh. 23. VI. 95. **Hymenoptera.** Petiolata parasitica: *Chalcididae*: (2) 1 sp., 24. VI. 96. Sessiliventres: *Tenthredinidae*: (3) Dolerus elongatus Htg., 15–21. VI. 95. (4) Allantus arcuatus Forst., 21. VI. 95. **Diptera.** *Syrphidae*: (5) Syrphus sp., 26. VI. 95. (6) Syritta pipiens L., sh. 24. VI. 96. *Empidae*: (7) Empis bilineata Lw., sh. 15. VI. 99. (8) E. punctata Mg., sh. 24. VI. 96. (9) Hilara quadrivittata Mg., 18. VI. 96. *Sarcophagidae*: (10) Sarcophaga sp., sh. 24. VI. 96. *Anthomyiidae*: (11) Hyetodesia incana W., sh. 19. VI.–17. VII. 95, 18. VI.–11. VII. 96. (12) Trichophthicus cunctans Mg., sh. 19. VI. 95. (13) Trichophthicus sp., 16. VI. 95, 24. VI. 96. (14) Anthomyia sulciventris Ztt., 23. V. 97. (15 and 16) Anthomyia spp., 17–19. VI. 95, 24. VI. 96, 19. VI. 99. (17) Azelia aterrima Mg., sh. 19. VI. 95. *Cordyluridae*: (18) Scatophaga stercoraria L., 15–20. VI. 95, 18–24. VI. 96, 19. VI. 99. *Sciomyzidae*: (19) Dryomyza flaveola F., sh. 21. VI. 96. **Coleoptera.** (20) Meligethes aeneus F., 24. VI. 96. (21) Rhagonica limbata Thoms., 19. VI. 95. **Thysanoptera.** (22) Thrips sp., 15. VI. 95. All at 800 ft., except 8 (at 900 ft.) and 15 and 18 also at 700 ft.

87. Meum athamanticum, Jacq. [Lit. *Alps* 21 b.] Each small umbel is terminated by an ☿ flower, and has a ring of ☿ flowers outside, the intermediate being ♂; and what is seen in these, is seen also in a modified degree in the large compound umbel; for the intermediate umbels of it have more (usually) ♂ flowers than ☿, the innermost generally and the outermost almost always having more ☿ flowers than ♂.

Visitors. **Lepidoptera.** Heterocera: *Geometridae*: (1) 1 sp., 15.

VI. 99. *Tortricidae*: (2) 1 sp., 17. VI. 99. *Tineidae*: (3) 1 sp., 17. VI. 99. (4) a second sp., 13. VI. 99. **Hymenoptera.** Aculeata: *Formicidae*: (5) Formica fusca Latr., 19. VI. 99. Myrmicidae: (6) Myrmica rubra L., 16. VI. 95. Petiolata parasitica: *Ichneumonidae*: (7) Alomyia debellator Fabr., 21. VI. 95. (8) Hemiteles?, 14. VI.–1. VII. 95. (9) Ichneumon sp., 22. VI. 96. Sessiliventres: *Tenthredinidae*: (10) Allantus arcuatus Forst., sh. and devouring flower, 14–26. VI. 95, 18–29. VI. 96, 19. VI. 99. (11) Dolerus elongatus Htg., ? sh. 22. V. 96. **Diptera.** *Syrphidae*: (12) Platychirus manicatus Mg., 10–19. VI. 99. (13) Syrphus vitripennis Mg., sh. 25. VI. 95, 15. VI. 99. (14) Syritta pipiens L., 17. VI. 95. (15) Eristalis arbustorum L., 14–21. VI. 95. *Empidae*: (16) Empis tessellata F., 21–25. VI. 95, 14–16. VI. 99. (17) E. bilineata Lw., sh. and preying on flies, 21–22. V. 96, 17. VI. 99. (18) Rhamphomyia nigripes F., 22. V. 96. *Bibionidae*: (19) Dilophus albipennis Mg., sh. 19. VI. 96. (20) Bibio nigriventris Hal., 21. VI. 95, 17–19. VI. 99. *Tabanidae*: (21) Leptis scolopacea L., 17. VI. 95. *Tipulidae*: (22) Tipula varipennis Mg., ? sh. 22. V. 96. *Tachinidae*: (23) Gymnochaete viridis Fln., sh. 22. VI. 96. *Sarcophagidae*: (24) Sarcophaga sp., sh. 14–19. VI. 99. *Muscidae*: (25) Lucilia sp., 16. VI. 99. (26) Calliphora sepulchralis Mg., sh. and fp. 26. VI. 95. (27) C. erythrocephala Mg., sh. 16. VI. 99. (28) Pollenia Vespillo F., sh. 10–19. VI. 99. (29) Morrellia simplex Lw., sh. 22. V. 96. *Anthomyiidae*: (30) Hyetodesia incana W., sh. 15–21. VI. 95, 22. V. 96, 18–19. VI. 96, 13–19. VI. 99. (31) Mydaea sp., 16. VI. 99. (32) Spilogaster nigrivenis Ztt., sh. 19. VI. 99. (33) Limnophora solitaria Ztt., 15. VI. 95. (34) Anthomyia sulciventris Ztt., sh. and fp. 21. V. 96. (35 and 36) Anthomyia sp., 10–19. VI. 99. (37) Azelia aterrima Mg., sh. 21. VI. 25. (38) Coenosia sp., 13. VI. 99. *Cordyluridae*: (39) Scatophaga stercoraria L., sh. 21–22. V. 96, 16. VI. 96, 17. VI. 99. *Sepsidae*: (40) Sepsis sp., sh. 21–22. V. 96. *Ephydridae*: (41) Hydrellia griseola Fln., 21. VI. 96. *Chloropidae*: (42) Ascinis sp., sh. 21. VI. 95. *Phoridae*: (43) 1 sp., sh. 21. VI. 95. **Coleoptera.** (44) Meligethes viridescens F., 22. V. 96, 17. VI. 99. (45) Epuraea aestiva L., sh. 22. V. 96. (46) Tachyporus obtusus L., 17. VI. 99. (47) Rhagonycha limbata Thoms., 17. VI. 99. (48) Corymbites quercus Gyll., and its var. ochropterus Steph., sh. 21–24. VI. 95, 22. V. 96, 17. VI. 99. **Hemiptera.** (49) 1 sp., 22. V. 96. **Trichoptera.** (50) 1 sp., 17. VI. 99. All at 7–900 ft.

88. **Angelica sylvestris,** Linn. [Lit. *Brit.* 23, 39 ; *N.C.E.* 1, 3 a, 16, 18, 21 a, 34 ; *Arct.* 36 ; *Alps* 2 ; *Pyren.* 17.]

Visitors. **Diptera.** *Anthomyiidae*: (1) Hyetodesia incana W. **Coleoptera.** (2) Meligethes viridescens F. Both 16. IX. 95, 800 ft.

89. **Heracleum Sphondylium,** Linn. [Lit. *Brit.* 23 ; *N.C.E.* 1, 3 a, 8, 10, 16, 18, 21 a, 31, 34, 35, 40 ; *Alps* 2, 16, 34.] The secretion of honey continues in a very marked manner after the fall of the petals.

Visitors. **Hymenoptera.** Aculeata: *Apidae*: (1) Apis mellifica L., sh. 20. VII. 95, 11. VII. 96, 800 ft. *Vespidae*: (2) Vespa norvegica F., sh. 15. VII. 95, 800 ft. Sessiliventres: *Tenthredinidae*: (3) Allantus arcuatus Forst., sh. freq. 5–25. VII. 95, 24. VI.–11. VII. 96, 7–800 ft. Petiolata parasitica: *Ichneumonidae*: (4) Hemiteles ? sh. 6. VII. 95, 25. VI. 96, 7–800 ft., ab. on second date. (5) 1 sp., sh. 22–23. VII. 95, 22. VI.–11. VII. 96, 7–800 ft. and once at 2,300 ft. **Diptera.** *Syrphidae*: (6) Syrphus compositarum Verrall, sh. 22. VII. 95, 800 ft. (7) S. ribesii L., 17. VII. 95, 11. VII. 96, 7–800 ft. (8) Eristalis arbustorum L., sh. 11. VII. 96, 800 ft. *Empidae*: (9) Empis tessellata F., 5–23. VII. 95, 7–800 ft. (10) E. bilineata Lw., 4. VII. 95, 800 ft. (11) E. punctata Mg., sh. 15. VII. 95, 800 ft. (12) Rhamphomyia sp., 20–29. VI. 96, 8–900 ft. (13) Hilara sp., sh. 5–17. VII. 95, 7–800 ft. *Mycetophilidae*: (14) Glaphyroptera fascipennis Mg., 25. VI. 96, 800 ft. *Bibionidae*: (15) Scatopse sp., 3. VII. 96, 800 ft. (16) Dilophus albipennis Mg., 26. VI. 96, 2,300 ft. (17) Bibio pomonae F., sh. 10–11. VII. 96, 8–2,200 ft. *Sarcophagidae*: (18) Sarcophaga sp., 25. VI. 96, 800 ft. *Muscidae*: (19) Lucilia cornicina F., 5. VII. 95, 700 ft. (20) Calliphora erythrocephala Mg., sh. 15. VI.–17. VII. 95, 15–18. IX. 95, 25. VI.–11. VII. 96, 7–800 ft. (21) C. vomitoria L., sh. 20–25. VI. 96, 800 ft. (22) Pollenia rudis F., sh. 12–15. VII. 95, 15–22. IX. 95, 11. VII. 96, 7–800 ft. (23) Pyrellia lasiophthalma Mcq., sh. 24. VI. 96, 800 ft. (24) Mesembryna meridiana L., sh. 17–22. VII. 95, 22. IX. 95, 24. VI–11. VII. 96, 7–800 ft. (25) Morrellia simplex Lw., 10. VII. 95, 800 ft. *Anthomyiidae*: (26) Polietes lardaria F., sh. 11. VII. 96, 800 ft. (27) Hyetodesia incana W., sh. 10–17. VII. 95, 22. VI.–11. VII. 96, 7–900 ft. and four individuals at 2,200 ft. (28) Limnophora solitaria Ztt., sh. and fp. 13. VII. 95, 10. VII. 96, 17–2,300 ft. (29) Trichophthicus sp., sh. 4–17.

VII. 95, 800 ft. (30) Anthomyia sulciventris Ztt., sh. 17. VII. 95, 11. VII. 96, 800 ft. (31 and 32) Anthomyia spp., sh. 12–22. VII. 95, 21. IX. 95, 24. VI.–11. VII. 96, 8–2,300 ft. (33) Azelia Macquarti Staeg., sh. 17. VII. 95, 800 ft. (34) A. aterrima Mg., sh. 2–17. VII. 95, 3. VII. 96, 800 ft. *Cordyluridae*: (35) Scatophaga stercoraria L., 12–20. VII. 95, 25. VI.–3. VII. 96, 7–800 ft. (36) S. maculipes Zett., sh. 10–17. VII. 95, 800 ft. (37) S. suilla Fabr., 10–17. VII. 95, 800 ft. *Helomyzidae*: (38) Tephrochlamys sp., sh. 10. VII. 96, 2,300 ft. *Sapromyzidae*: (39) Sapromyza sp., sh. 10. VII. 96, 2,300 ft. *Sepsidae*: (40) Sepsis cynipsea L., sh. 2–17. VII. 95, 24. VI.–11. VII. 96, 7–800 ft. *Ephydridae*: (41) Hydrellia griseola Fln., sh. 12. VII. 95, 700 ft. *Chloropidae*: (42) Chloropisca ornata Mg., sh. 5. VII. 95, 11. VII. 96, 7–800 ft. *Phoridae*: (43) Phora rufipes Mg., 1–13. VII. 95, 11. VII. 96, 9–1,700 ft. **Coleoptera.** (44) Meligethes viridescens F., sh. 15–21. IX. 95, 22–26. VI. 96, 8–2,300 ft. (45) M. aeneus F., 4. VII. 95, 8–900 ft. (46) Anthobium ophthalmicum Payk., sh. 10. VII. 96, 2,200 ft. (47) Epuraea aestiva L., 4. VII. 95, 800 ft. **Hemiptera.** (48) Heterocordylus tibialis, 16. IX. 95, 800 ft. **Thysanoptera.** (49) Thrips sp., 26. VI.–10. VII. 96, 8–2,200 ft.

A′ § 10. Cornaceae.

90. Cornus suecica, Linn. [Lit. *N.C.E.* 33.] This plant is little visited, but fruits not infrequently. It has a good deal of asexual reproduction by suckers.

Visitors. **Diptera.** *Anthomyiidae*: (1) Limnophora sp., 28. VI. 95, 2,300 ft. (2) Hylemyia nigrescens Rnd., 13. VI. 99, 2,300 ft.

Out of the whole available anthophilous insect fauna of (for the time of our observations) 17,306 individuals, 6,156 went to Class B′, and 1,482 to the massed flowers of Class A, which we may here for brevity call Class A′. The species of plants obtained attention as in Tables IX and X, B′ obtained many more of the desirable insects (see p. 315) than A′, and very much fewer of the injurious, which could find but small encouragement where the honey is hidden (see Table XI). Class B′ is found by our observations to fall very markedly into two divisions: one division contains the plants whose flowers belong to the rose-purple-lilac-blue series, the other

TABLE IX.

The number of individuals observed on the flowers of Class B′.

	Apis.	Bomb.	Hm.	Tenthr.	Parasit.	Ants.	Wasps.	Lep.l.	Lep.m.	Lep.s.	Dm.	Ds.	Col.	Etc.	Total.
57. Scabiosa succisa	1	128	—	—	—	—	—	5	—	—	107	74	19	1	335
58. Armeria maritima	—	—	—	—	—	—	—	—	—	—	—	10	—	2	12
59. Centaurea cyanus	—	—	3	—	—	—	—	—	—	—	—	1	—	—	4
60. Centaurea nigra	—	24	—	—	—	—	—	—	—	—	8	35	24	—	91
61. Cnicus palustris	—	31	—	—	—	1	—	7	—	—	17	14	1	—	71
62. Cnicus arvensis	—	2	—	—	2	—	—	2	—	—	4	40	3	—	53
63. Cnicus heterophyllus	6	8	—	—	—	—	1	1	—	—	7	16	6	8	53
64. Carduus lanceolatus	—	11	—	—	—	—	—	—	—	—	2	3	—	1	17
65. Saussurea alpina	—	—	—	—	—	—	—	—	—	—	—	3	—	—	3
66. Solidago Virg-aurea	—	—	—	—	—	—	—	—	—	—	—	9	—	—	9
67. Tussilago Farfara	—	*	—	—	—	—	—	—	—	—	*	15	—	—	15
68. Senecio vulgaris	—	—	—	—	—	—	—	—	—	—	—	2	—	—	2
69. Senecio aquaticus	—	1	—	—	—	—	—	—	—	—	2	17	—	—	20
70. Senecio Jacobaea	—	34	—	—	7	1	1	57	1	—	60	474	83	9	727
71. Leontodon autumnalis	—	1	2	1	2	1	—	—	2	—	12	411	26	—	458
72. Crepis paludosa	—	—	—	—	—	1	—	—	—	—	1	15	19	—	36
73. Hieracium Pilosella	—	—	—	—	1	—	—	2	—	—	3	82	4	2	94
74. Hieracium spp.	—	—	—	—	1	1	—	—	4	—	7	144	2	3	162
75. Lapsana communis	—	—	—	—	—	—	—	—	—	—	—	—	9	—	9
76. Hypochoeris radicata	—	1	21	54	6	1	—	2	—	3	47	688	30	15	868
77. Taraxacum officinale	15	3	2	—	2	—	—	17	5	—	18	1,358	57	—	1,477
78. Bellis perennis	1	—	1	—	1	1	—	6	1	—	36	1,101	1	5	1,154
79. Chrysanthemum Leucanthemum	—	—	—	—	—	—	—	—	1	—	3	9	2	8	23
80. Matricaria inodora	1	—	—	—	—	—	—	—	—	—	11	45	7	9	73
81. Antennaria dioica	—	—	1	—	—	—	—	2	—	—	1	10	2	—	16
82. Achillea Ptarmica	—	—	—	—	—	—	—	—	—	—	1	5	—	—	6
83. Achillea Millefolium	—	4	2	11	8	—	1	3	7	—	47	266	16	2	367
Total	24	248	32	66	30	7	3	104	21	3	394	4,847	311	65	6,155
Percentage	·39	4·03	·52	1·09	·49	·11	·05	1·69	·34	·05	6·40	78·74	5·05	1·06	

* April visitors in 1895 when no count was made.

contains those whose flowers belong to the yellow-white series. The latter is visited by less desirable insects than the former, and therefore, as shown in Tables XII and XIII, approaches A′.

TABLE X.

The number of individuals observed on the flowers of Class A′.

	Apis.	Bomb.	Hm.	Tenthr.	Parasit.	Ants.	Wasps.	Lep.l.	Lep.m.	Lep.s.	Dm.	Ds.	Col.	Etc.	Total.
84. Pimpinella Saxifraga .	—	—	2	21	45	—	—	1	—	—	7	98	4	—	178
85. Conopodium denudatum	1	—	—	9	11	—	—	—	—	—	15	33	—	2	71
86. Anthriscus sylvestris . .	—	—	—	4	1	—	—	—	1	—	4	111	3	1	125
87. Meum athamanticum .	—	—	—	34	11	2	—	—	4	—	45	375	16	2	489
88. Angelica sylvestris . .	—	—	—	—	—	—	—	—	—	—	—	2	19	—	21
89. Heracleum Sphondylium	2	—	—	18	77	—	3	—	—	—	8	381	70	37	596
90. Cornus suecica	—	—	—	—	—	—	—	—	—	—	—	2	—	—	2
Total	3	—	2	86	145	2	3	1	5	—	79	1,002	112	42	1,482
Percentage	·20	—	·13	5·80	9·78	·13	·20	·07	·33	—	5·33	67·61	7·56	2·85	

TABLE XI.

	Available.		B′.		A′.	
	No.	%	No.	%	No.	%
Distinctly desirable	1,763	10·19	376	6·11	4	0·27
Desirable	1,277	7·37	447	7·26	86	5·80
Indifferent . . .	12,993	75·08	5,164	83·89	1,117	75·37
Injurious	1,273	7·36	169	2·73	275	18·56

Both halves of Class B′ as well as Class A′ obtain more desirable visitors in North Central Europe than they do at Clova. Whether, as in Tables XIV, XV, and XVI, we contrast Müller's or MacLeod's or Knuth's and Verhoeff's observations with ours, we see in each case that long- and mid-tongued Hymenoptera make far more species visits in Germany or Flanders than they do in Scotland, and that in Scotland

short-tongued flies make far more species visits than they do in Flanders and Germany.

TABLE XII.

	B′.				A′.
	Blue and lilac.	Rose and purple.	Yellow.	Eyed and white.	White, or greenish.
Decidedly desirable	39·53	30·66	3·43	1·03	·27
Desirable	32·45	12·67	4·82	6·84	5·80
Indifferent . . .	27·73	51·99	88·94	89·37	75·37
Injurious	·29	2·67	2·81	2·75	18·56

TABLE XIII.

Percentages of the individual visitors to Class B′ arranged by families.

	Apis.	Bomb.	Hm.	Wasps.	Tenthr. Parasit. Ants.	Lep.l.	Lep.m.	Lep.s	Dm.	Ds.	Col.	Etc.
Blue and lilac §§ 1 and 3 .	·29	37·76	·89	—	—	1·48	—	—	31·56	22·13	5·60	·29
Rose and purple §§ 2 and 4	2·00	25·33	—	·33	1·00	3·33	—	—	12·67	40·33	11·33	1·67
Yellow flowers §§ 5 and 6 .	·12	·24	·24	·06	1·28	·67	·55	—	6·05	87·60	1·71	1·47
Eyed and white §§ 7 and 8	·39	1·03	·64	·03	2·06	2·01	·31	·08	3·87	82·90	5·93	·75

TABLE XIV.

Species visits in different parts of Europe to the flowers of the Rose-Purple-Lilac-Blue series of B′.

		Apis.	Hl.	Hm.	Hs.	Lep.	Dm.	Ds.	Col.	Etc.	Total.
Clova	(9 species)	2	22	1	3	9	25	43	8	5	118
Germany—Müller . .	(6 ,,)	6	38	66	10	43	51	15	13	—	242
Flanders—MacLeod .	(5 ,,)	5	31	24	2	21	45	13	2	—	143
Frisian Coast—Knuth and Verhoeff . . .	(6 ,,)	5	48	21	3	27	37	33	4	1	179
Alps—Müller	(4 ,,)	1	15	5	—	27	7	—	4	—	59
Pyrenees—MacLeod .	(2 ,,)	—	21	8	—	30	8	1	1	—	69

By season it can be shown that on flowers of both B′ and A′ the short-tongued flies decrease in percentage of individual visits towards autumn, while Coleoptera increase on B′;

Bombi increase and so do mid-tongued flies on B′; but on A′ mid-tongued flies decrease towards autumn. A′ owes its large number of long-tongued flies in spring to the genus

TABLE XV.

Species visits in different parts of Europe to the flowers of the Yellow-White series of B′.

	Apis.	Hl.	Hm.	Hs.	Lep.	Dm.	Ds.	Col.	Etc.	Total.
Clova . . . . . (18 species)	3	8	9	29	34	83	184	26	14	390
Germany—Müller . (16 „)	7	63	203	26+	49	110	49	56	4	567+
Flanders—MacLeod . (13 „)	3	18	64	15	41	74	66	18	—	299
Frisian Coast—Knuth and Verhoeff . . (16 „)	8	87	155	5	29	86	80	11	2	463
Alps—Müller . . . (11 „)	1	25	26	8	161	52	61	22	—	356
Pyrenees—MacLeod (6 „)	—	5	2	1	4	8	13	6	—	39

TABLE XVI.

Species visits in different parts of Europe to flowers of A′.

	Apis.	Hl.	Hm.	Hs.	Lep.	Dm.	Ds.	Col.	Etc.	Total.
Clova . . . . . (7 species)	2	—	1	31	6	27	102	13	7	189
Germany—Müller . . (4 „)	2	5	59	72	7	53	71	67	10	346
Flanders—MacLeod . (4 „)	1	—	9	18	1	28	40	7	1	105
Frisian Coast—Knuth and Verhoeff . . . (5 „)	—	1	21	49	—	32	49	12	—	164
Alps—Müller. . . . (2 „)	—	—	2	8	—	1	5	14	—	30
Pyrenees—MacLeod . (2 „)	—	—	2	11	2	7	19	7	—	48

Platychirus, one of the least specialized of Syrphidae; B′ owes its larger number in autumn to highly specialized Empids and Eristalis. Injurious insects are chiefly summer insects. The actual figures recorded are given in Table XVII, the percentages from them in Table XVIII, and the net result in Table XIX.

In conclusion, B′ obtained the visits of Apis mellifica, of eight species of Bombus, one of Psithyrus, of one species of Halictus, two of Andrena, one of Odynerus, one of Vespa,

of two Ants, and of ten other injurious Hymenoptera; of eighteen of the higher Lepidoptera, of six Microlepidoptera

TABLE XVII.

Individuals visiting by season: Spring = April and May; Summer = June and July; Autumn = August and September.

	Apis.	Bomb.	Hm.	Wasps.	Tenthr. Parasit. Ants.	Lep.l.	Lep.m.	Lep.s.	Dm.	Ds.	Col.	Etc.	Total.
Class B'.													
Spring	16	3	1	0	2	14	0	0	12	2,072	0	0	2,120
Summer	7	20	30	1	89	25	20	3	167	1,560	126	48	2,096
Autumn	1	225	1	2	13	65	1	0	215	1,215	185	17	1,940
Class A'.													
Spring	0	0	0	0	4	0	0	0	28	135	8	1	176
Summer	3	0	2	3	218	1	5	0	50	815	46	39	1,182
Autumn	0	0	0	0	11	0	0	0	1	52	58	2	124

TABLE XVIII.

Percentages derived from preceding Table.

	Apis.	Bomb.	Hm.	Wasps.	Tenthr. Parasit. Ants.	Lep.l.	Lep.m.	Lep.s.	Dm.	Ds.	Col.	Etc.
Class B'.												
Spring	·75	·14	·05	—	·09	·66	—	—	·57	97·74	—	—
Summer	·33	·96	1·43	·05	4·25	1·19	·96	·14	7·97	74·42	6·01	2·29
Autumn	·05	11·60	·05	·10	·67	3·35	·05	—	11·08	62·63	9·54	·87
Class A'.												
Spring	—	—	—	—	2·27	—	—	—	15·91	76·70	4·55	·57
Summer	·25	—	·17	·25	18·45	·08	·43	—	4·23	68·95	3·89	3·30
Autumn	—	—	—	—	8·87	—	—	—	·81	41·94	46·77	1·61

TABLE XIX.

Insects visiting in different seasons, classed by desirability.

	B'.			A'.		
	Spring.	Summer.	Autumn.	Spring.	Summer.	Autumn.
Decidedly desirable	1·55	2·50	14·92	0·00	0·33	0·00
Desirable	·62	8·63	11·64	15·91	4·83	0·81
Indifferent . . .	97·74	81·01	71·90	81·25	73·09	88·71
Injurious	·09	6·56	1·54	2·84	21·75	10·48

including Eriocephala; of twenty-two Syrphids, of thirteen species of Empis, of Pachymeria palparis, of five short-tongued Empids, of nine Muscids, one Sarcophagid, two Tachinids, three Cordylurids, of twenty-one Anthomyiids and twenty of other flies; of twelve Coleoptera, two Hemiptera, and five other insects. A′ obtained the visits of Apis mellifica, of one Andrena, of one species of Vespa, of two Ants, and of twelve injurious Hymenoptera; of one of the higher Lepidoptera (Miana fasciuncula), four short-tongued Lepidoptera, including Hepialis but not Eriocephala; of eight Syrphids, four species of Empis, four short-tongued Empids, nine Muscids, one Sarcophagid, two Tachinids, three Scatophagids, sixteen of Anthomyiids, and of twenty-three other flies; of seven Coleoptera, two Hemiptera, and two other insects. 167 species of insects made 6,156 visits to Class B′, 104 made 1,482 visits to Class A′; the average number of visits per insect to Class B′ is therefore 36·86, and the average to Class A′ is 14·25.