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A MONOGRAPH
OF THE
BRITISH HIERACIA.
BY
JAMES BACKHOUSE JUN.

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A MONOGRAPH

OF THE

BRITISH HIERACIA

BY

JAMES BACKHOUSE, JUN.

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1856.

Preface.

IN attempting to describe the characters of the various species of *HIERACIUM* which are natives of the British Islands, I am fully conscious of the intricacy of the subject, and of the great difficulty which exists in distinguishing between true *species*, and *varieties* or extreme *forms*. When varying altitude, exposure, geological formations, soil, and moisture, all modify the aspect of the same plant, and not unfrequently to so great a degree, as to leave scarcely a trace of resemblance in the extreme forms, to the eye of a casual observer, it will be seen that a difficulty exists, with regard to this genus, which attaches comparatively to few genera, and which patient investigation, and careful comparison can alone surmount.

It was under the impression that, as far as the plants of Britain are concerned, this genus had received a smaller share of accurate and diligent investigation than almost any other, (owing mainly no doubt to want of opportunity,) that, in conjunction with

my Father, I was induced many years ago, to pay attention to it.* After striving ineffectually for many years, to refer the plants we gathered, to species already described as British, or to make them agree with the characters published in our botanical works, we became fully persuaded that the entire genus required revision, and that the only way to arrive at the truth was by taking nothing for granted, and by examining the specific claim of every specimen. This led to the collection of a considerable series of examples, especially from our mountain districts, which quickly afforded an insight into the great range of form that many species presented. We therefore collected *roots* of all the forms of every species which we met with, that had any appearance of distinctness; believing that if cultivated in the same soil, and having all the surrounding circumstances removed which contributed to make them vary in their wild state, we should find that many would lose their apparent differences, while others would remain permanently distinct, or perhaps exhibit characters still more clearly distinguishing them from their nearest allies. The result was as anticipated; many plants differing widely in appearance originally, approximated so closely under cultivation as to be clearly identical; while others, which when wild bore a strong resemblance to each other, exhibited, under these circumstances, well marked and permanent characters. Others again retained some *few* distinct features, and yet so closely approached the typical form in the *leading* points, as apparently to have only a claim to the name of *varieties*. Many plants hitherto regarded as varieties, belong to the first of these classes; being only extreme

* This commenced during a botanical tour in Teesdale in 1842, in company with our friends Charles C. Babington, and the late James Edward Winterbottom, and when *Hieracium iricum* was first detected as a native of England, in a wild basaltic gorge of Cronkley Scar.

forms, which under similar circumstances of soil, &c. would become typical.

The admirable Monograph of the genus by Professor Fries, of Upsala (“*Symbolæ ad Historiam Hieraciorum*”), has been an invaluable assistant to me in the determination of species, as also the opinion of that distinguished author respecting a series of specimens transmitted to him for examination. To my friend C. C. Babington I am greatly indebted, not only for a critical examination of my manuscripts, and the opportunity kindly afforded from time to time, for examining numerous specimens in his herbarium, but also by his excellent judgment regarding multitudes of intricate cases. I have also to acknowledge the kindness of Professors Balfour, and G. Walker Arnott, also of Thos. Westcombe, Daniel Oliver, Jun. and John G. Baker; who, together with Professors Blytt, of Christiania, and Grenier of Besançon,* have allowed me to inspect their herbariums or given information respecting the result of their researches.

It is not with any idea that the task is *done*, that I now venture to publish this little work; but in the hope that it will form a nucleus round which further knowledge may be collected. In a tribe so varying, and with which a correct acquaintance can only be gained by careful study of the *living* forms, combined with the evidence afforded by cultivation, new light is constantly thrown upon many species, and much longer time must probably elapse before *certain* conclusions can be arrived at regarding them. So that should it ultimately prove that some plants here

* To Professors Blytt and Grenier I am also indebted for a large and valuable series of continental specimens.

described as *species*, have not sufficient claim to that rank ; and that others, perhaps yet but little known, and which are now called *forms* or *varieties*, should be found truly distinct, I must beg for that indulgence, without which, any one, undertaking the investigation of such a genus, might well shrink from publishing the result of his researches. I cannot but hope, however, that this work will assist those who take an interest in the genus, especially any visiting the mountain districts of Clova, Braemar and Teesdale, to identify our various British species with less difficulty. Should this be the case, I shall feel that the labour has not been wholly in vain, and shall gladly receive from any observer the result of further investigation, whether favourable or adverse to my present opinions.

JAS. BACKHOUSE, JUN.

YORK, 1st Mo. 1856.

Explanatory Remarks, &c.

IN the ensuing descriptions of species, terms are not unfrequently used in a sense which deviates in some degree from the ordinary acceptation of them; but which are adopted because of the non-existence of words exactly describing what is required: as for instance, the term "*setæ*" is used to describe *minute hairs tipped with glands*.

The term "*one or few headed*" is used, when the plant spoken of frequently occurs with only a single *developed* head, but where the existence of incipient axillary buds proves the tendency to form more heads if the plant should become luxuriant. *H. cerinthoides* and *H. nigrescens* are plants of this description "*one or few headed*", and such must not be confounded with those which are *invariably single headed*, like *H. alpinum* and *H. holosericeum*, which exhibit no tendency whatever to form a second head even when very luxuriant.

The term "*glandular hairs*" is employed where the hairs are glandular in the lower half or two-thirds, and *not* for *gland-tipped* hairs, here called *setæ*.

"*Black-based hairs*" are usually thickened or rather bulbous at the base.

The term "*ciliated*" is rarely used in describing the hairs near the margins of the leaves, or extremities of the florets, because in most cases these are placed near or close to the margin or tips of the organ, but *not on its edge*.

The term "*porrect*" is used where the young phyllaries (involucral scales) are *erect* and *overtop the unexpanded florets*, as in *H. pallidum*.

“*Floccose*” is used to signify extremely short, soft, white, stellate pubescence.

In describing the *involucre*, the condition of that organ is given when the florets are *in perfection*, except where otherwise stated.

Reliance must not be placed on the fulvous or tawny colour, or whiteness of the hairs; as many species of *Hieracium*, of which the hairs are beautifully white and silky when fresh, become fulvous after the lapse of time, when in a dried state. *H. holosericeum* and others of the “*alpinum* group” frequently exhibit this change.

The colour of the *styles* indicated in the description of each species, refers *exclusively* to that of the *living* plant. The retention or change of the original colour depends so much upon the rapidity or otherwise of the process of drying, that characters drawn from the colour of the style of dried specimens, are but little to be relied upon.

The term “*sub-reticulate*” or “*falsely three veined*,” is employed to designate that form of venation, in which each primary vein (of which there are several springing successively from the midvein) curves upwards before arriving at the margin of the leaf, and then proceeding nearly parallel to it, anastomoses with the succeeding primary vein; frequently forming in the upper part of the leaf two lateral primary veins, uniting at the extremity with the central one.

The term “*reticulate*” is used, when the veins are loosely netted and branch off to the sides of the leaf, showing but little tendency to form anything like a lateral vein running parallel with its margin.

The *names* attached to specimens distributed hitherto, must not necessarily be regarded as correct, according to my present judgment, unless they agree with the characters described in this work; as I consider the present treatise to supersede all articles published respecting this genus to which my name has been annexed, some of which have been printed without my concurrence.

HIERACIUM.

*Hawkweed.**

HIERACTUM. (*Linnaeus.*) Heads compound, with many florets enclosed in an involucre of numerous, contiguous, more or less irregularly or spirally imbricated scales (phyllaries). Receptacle naked, pitted and slightly fringed. Florets ligulate, five-toothed at the apex. Fruit (achenes) terete, angular, ribbed, truncate at the top, with an entire or crenulate margin; not beaked. Pappus whitish or rufescent; in one row; rigid, brittle, minutely denticulate, not dilated at the base.

HERB perennial; more or less milky; with scattered, entire, denticulate, or dentate leaves; hairy, floccose (stellately downy), setose (with minute gland-tipped hairs), or sub-glabrous.

NATURAL GROUPS.

I. PILOSELLOIDEA.—Stoloniferous. Stem scape-like. Fruit minute, slightly striate, crenulate at the top. Hairs of the pappus equal, very slender.

a. Pilosellæ.—Scape leafless, or with one leaf. Inner phyllaries acute.

1. H. Pilosella.

* From *ἱερακίον*, the name of a plant, derived from *ἱεραξ*, a hawk: birds of prey having been imagined to use this plant in order to strengthen their powers of vision.

b. Auriculæ.—Stem corymbose at the top. Inner phyllaries obtuse.

2. *H. aurantiacum*.

II. PULMONAREA.—Root-leaves persistent; forming radical rosettes (rosulate tufts of leaves) in autumn. Involucre interruptedly and irregularly imbricate. Fruit short, truncate, not crenulate at the top, striate. Hairs of the pappus unequal, rigid.

a. Alpinae.—*Involucres* shaggy or *silky*: outer *phyllaries* *lax*; inner ones acuminate or acute. *Florets* *hairy* externally, more or less *pilose* at the tips. Stem with one or few leaves, or leaf-like bracts.

3. *H. alpinum*.

4. *H. holosericeum*.

5. *H. eximium*.

6. *H. calenduliflorum*.

b. Nigrescentes.—*Involucres* *villous* or *hairy*. *Phyllaries* *appressed*, or few outermost *lax*. *Florets* *nearly* or quite *destitute* of hairs externally, minutely *pilose* or sub-glabrous at the tips.

7. *H. gracilentum*.

8. *H. globosum*.

9. *H. nigrescens*.

10. *H. lingulatum*.

11. *H. senescens*.

12. *H. chrysanthum*.

13. *H. cerinthoides*.

14. *H. iricum*.

c. Pallidæ.—*Involucres* *more* or *less* *hairy*. *Phyllaries* *appressed*. *Florets* *without* hairs externally, nearly or quite *glabrous* at the tips.

* Styles yellow, rarely with very minute fuscous hairs.

15. *H. pallidum*.

16. *H. lasiophyllum*.

- 17. *H. Gibsoni*.
- 18. *H. argenteum*.
- 19. *H. nitidum*.
- 20. *H. aggregatum*.

* * Styles more or less livid.

- 21. *H. murorum*.
- 22. *H. cæsium*.
- 23. *H. stelligerum*.
- 24. *H. vulgatum*.

d. Pseudo-accipitrinæ.—Involucres sub-glabrous. Root-leaves frequently forming a winter rosette, but rarely present when the plant is in flower.

- 25. *H. gothicum*.

III. ACCIPITRINA.—Without true root-leaves. Forming in autumn, at the base of the stem, closed buds, which the next season, become leafy stems. Phyllaries in many rows. Hairs of the pappus rigid, unequal.

a. Pseudo-pulmonareæ.—Occasionally forming small rosettes, similar in appearance to those of the *Pulmonareæ*, but not persistent during winter.

- 26. *H. tridentatum*.

b. Aphyllopodæ.—Never forming persistent rosettes.

* Florets minutely pilose or sub-glabrous at the tips.

- 27. *H. prenanthoides*.
- 28. *H. strictum*.

* * Florets glabrous at the tips.

- 29. *H. umbellatum*.
- 30. *H. crocatum*.
- 31. *H. rigidum*.
- 32. *H. corymbosum*.
- 33. *H. boreale*.

The following species have been enumerated as British by several authors; but as no certain native locality is known, there does not seem to be sufficient authority for retaining them in our series. Their names are therefore placed within brackets [] as uncertain, and as plants which it is not desirable to regard as British without further evidence.

H. dubium (stoloniflorum).

H. auricula.

H. villosum.

H. amplexicaule.

H. oreades.

H. saxifragum.

H. plumbeum.

H. dovreense.

H. virescens.

FIRST DIVISION.

PILOSELLOIDEA.

PRODUCING STOLONS. STEM SCAPE-LIKE. INVOLUCRE IRREGULARLY IMBRICATE. FLORETS GLABROUS AT THE TIPS. FRUIT (ACHENES) MINUTE, STRIATE, TRUNCATE AND CRENU-LATE AT THE TOP. HAIRS OF THE PAPPUS EQUAL, VERY SLENDER.

a. PILOSELLÆ.

Stolons more or less *elongated*, rarely absent. Scape leafless in the British species. Leaves floccose beneath. *Inner phyllaries acute*.

1. **H. PILOSELLA.** Dull green. Root-stock creeping; *with slender, leafy, rooting stolons. Primary stem one-headed, leafless.* Leaves oblong or lanceolate, clothed on both sides with long coarse scattered hairs, densely floccose beneath. Involucre with an ovate base, ultimately conical, setose. Outer phyllaries obtuse, inner ones acute. Florets glabrous. Styles yellow.

H. pilosella. Linn. Species Plantarum, ed. 3. vol. ii. p. 1125. English Botany, tab. 1093. Koch, Synopsis Floræ Germanicæ et

Helveticæ, ed. 2. vol. ii. p. 509. Fries, *Symbolæ Hieraciorum*, p. 2. Babington, *Manual of British Botany*, ed. 3, p. 192. Hooker and Arnott, *British Flora*, ed. 7, p. 217. Grenier and Godron, *Flore de France*, p. 345.

β PILOSISSIMUM. *Stolons thick, short. Leaves and stem with very long silky white hairs. Phyllaries all lanceolate.*

H. pilosella var. *pilosissimum*, Koch, *Syn.* p. 509. Fries, *Symb.* p. 3. Grenier & Godron, p. 345.

H. pilosella β *peleterianum*. Bab. *Man. Ed.* 3. p. 192.

Pilosella repens. Ray, *Synopsis*, Ed. 3. p. 170.

Banks and dry pastures: abundant.

β *pilosissimum*, waste places, rare. Channel Islands. Craig Breiddin, Montgomeryshire.

Flowers from 6th to 10th month.

Plant 4 to 12 inches high, with rather small heads. *Root-stock* cæspitose, creeping, with numerous more or less elongated leafy stolons. *Stolons* sometimes ascending near the extremity, and producing a terminal head. Primary *stem* erect, simple, leafless, densely floccose above, hairy, setose. *Leaves* dull green, oblong, or obovate-lanceolate, or spatulate, entire, rather obtuse, narrowed below, covered more or less densely on the upper surface with long sub-erect hairs, whitely floccose and hairy beneath. *Involucre* usually whitish with dense stellate down; setose, or with thick short black-based gland-tipped hairs. Inner *phyllaries* usually with pale margins. *Florets* glabrous, vivid sulphur colour, striped externally with a central reddish purple band, rarely yellow throughout.

The var. *pilosissimum* is shorter, more robust, and sometimes nearly destitute of stolons. Leaves with longer and more silky hairs. Phyllaries broader, and lanceolate.

A form (?) of *H. Pilosella* occurs in Teesdale and other mountain districts with the primary stem and stolons elongated; phyllaries without setæ, but with dense soft black hairs. It seems nearly allied

to the *var. nigrescens* (Fries), but differs in having vittate florets. I have also met with a plant on the cliffs of the Eagle Mountain, Connemara, which is devoid of stolons, and has deep green, erect, very shaggy and silky leaves. Under cultivation it produces thick stolons, (occasionally bearing heads at the extremity,) more spreading leaves, a very tall primary stem sometimes branching near the base, and with dark villous involucre. Possibly this also may be only a form of *H. pilosella*, but both require further examination.

[*H. DUBIUM*, Huds: figured in E. B. t. 2332, and said to have been found in Cumberland, is omitted, there being much doubt respecting it. The description given by Woodward in With. Bot. Arr. and the figure above referred to, both having been taken from garden specimens, belonging to *H. stoloniflorum* of Fries; whilst Smith's description in the Eng. Fl. is taken from *H. auricula*, L.]

b. AURICULÆ.

Sub-stoloniferous. Scape rather leafy below, corymbose at the top. *Inner phyllaries obtuse.*

2. H. AURANTIACUM. Bright green. Root-stock creeping, sub-stoloniferous. *Stem* simple, with one or few leaves, *densely corymbose at the top*, hairy, setose. Leaves obovate or lanceolate, sub-acute, nearly entire, hairy on both sides, not floccose beneath. Involucre rounded at the base, dark with blackish hairs and setæ. Phyllaries obtuse. Florets glabrous. *Styles brown.*

H. aurantiacum. Linn. Sp. Pl. vol. ii. p. 1126. E. B. t. 1469. Koch, Syn. vol. ii. p. 515. Fries, Symb. p. 23. Bab. Man. Ed. 3, p. 192. Gren. & Godr. p. 348. Hook & Arn. p. 209.

Woods and waste places in the north; not frequent. Aberdeenshire. Banffshire. Perthshire. Kinrosshire. Frequently an outcast from gardens. (*A doubtful native.*)

Flowers in 7th and 8th months.

Plant 15 to 20 inches high, with numerous small heads. *Root-stock* usually short, slender and scarcely woody, but occasionally elongated and producing rooting stolons. *Stem* erect, with a single leaf not far from the base, or with 2 or 3 distant leaves; clothed throughout with scattered soft white hairs intermingled near the top with black hairs and stellate down: densely corymbose with 5 to 10 heads or occasionally with few (2 to 3) heads. *Leaves* bright grass green; entire, or very slightly denticulate, frequently apiculate, rarely exhibiting any trace of stellate down beneath; narrowed into short petioles. Upper stem-leaf (when present) nearly or quite sessile. *Peduncles* densely floccose, with numerous setæ and black hairs. *Florets* orange, frequently vittate externally with a deeper central band.

[*H. AURICULA*, L. figured in E. B. t. 2368, and said to have been "found at Dale Head, not far from Grassmere, Westmoreland," is also omitted; the description and figure of that plant given by Smith, being taken from a Swiss specimen of *H. glaciale* of Fries and Lachen.]

SECOND DIVISION.

P U L M O N A R E A.

ROOT-LEAVES PERSISTENT, FORMING ROSETTES (ROSULATE TUFTS OF LEAVES) IN AUTUMN. INVOLUCRE INTERRUPTEDLY AND IRREGULARLY IMBRICATE. FRUIT SHORT, TRUNCATE, NOT CRENUULATE AT THE TOP, STRIATE. HAIRS OF THE PAPPUS UNEQUAL, RIGID.

a. A L P I N Æ.

Involucres shaggy or silky. Outer phyllaries more or less lax ; inner ones acuminate or acute. Florets hairy externally, more or less pilose at the tips. Stem with one or few (usually small) leaves, or foliaceous bracts. Plant green.

3. H. ALPINUM. *Deep green. Stem one headed, hairy, floccose. Root-leaves ovate-spathulate, obtuse or sub-acute, remotely and bluntly dentate, sub-glabrous above, narrowed into petioles. Stem-leaves lanceolate or linear lanceolate. Involucere hemispherical, densely clothed with rather shaggy black-based hairs. Phyllaries few, broad, acuminate, lax ; outer ones sub-obtuse. Florets hairy externally, shortly pilose at the tips. Styles yellow.*

H. alpinum. Linn. Sp. Pl. vol. ii. p. 525, and other authors* (in part).

* None of the descriptions of *H. alpinum* which I have hitherto seen agreeing exclusively with this plant, I omit giving synonyms which may only lead to confusion.

H. melanocephalum. Tausch in Flora oder Bot. Zeit. 1837, vol. i. Biebl. p. 67. (not of Hook. and Arn.)

Granitic mountains of the Cairngorum range at an elevation of 3000 to 4000 feet; not common. Corrie of Ben-na-bourd, Braeriach, Cairntoul, Ravine of the Garachary, and Little Craigindal, Aberdeenshire. Glen Dole, Clova Mountains, Forfarshire, on mica slate.

Flowers in 7th and 8th months.

Plant 4 to 8 inches high, rarely 8 to 12 inches, with a solitary (usually large) head. *Root-stock* woody but slender, frequently rather elongated, with few fibres. *Stem* rather wiry, usually with one leaf, occasionally with two, or with several minute bract-like leaves; more or less clothed throughout with scattered blackish or cinereous black-based hairs, densely floccose, nearly or quite destitute of setæ; invariably single headed. *Leaves* coriaceous, deep glossy green; glabrous, or with scattered white hairs, especially at the margins. *Root-leaves* ovate-spathulate, apiculate, remotely dentate with blunt gland-tipped teeth, or nearly entire; frequently recurved and slightly compressed towards the point; narrowed more or less suddenly into slender or slightly winged, villous petioles. *Stem-leaves* lanceolate, sessile or slightly clasping; lower one sometimes linear-lanceolate and much narrowed downwards so as to resemble a broadly winged petiole. *Bud* usually drooping. *Involucre* broad, rounded at the base, dark green, densely clothed with more or less elongated soft black-based whitish hairs. *Phyllaries* short, broad, narrowed above, acuminate, more or less lax throughout; few outermost sometimes obtuse. *Florets* bright yellow, shortly (but sometimes slightly) pilose at the tips, and always clothed with more or less densely scattered brittle hairs externally.

This plant, though by no means common in Britain, is obviously the same as the one so widely diffused over the continent. My specimens from Ben-na-bourd and other granitic mountains of the Cairngorum range, exactly resemble specimens from Monte Rosa

(found at an elevation of 8000 or 9000 feet), the Bernese Alps, and mountains above Inspruck, in the Tyrol; also from numerous stations in Norway. Out of a large number of specimens from various parts of the Continent, I find little or no wider range of form than occurs on our own mountains.

When *cultivated*, *H. alpinum* never branches, nor produces more than a solitary head. Its stem becomes more elongated than when in its wild state, and bears numerous bract-like leaves. The root-leaves retain their dark shining green colour, but are more shaggy.

4. H. HOLOSERICEUM. Green. *Stem* one headed, shaggy, silky, *Root-leaves* spathulate or linear-lanceolate, obtuse, entire, hairy on both sides, narrowed into winged petioles. *Stem-leaves* small, bract-like. *Involucre* turbinate, very shaggy with long white silky hairs. *Outer phyllaries* broad, obtuse, very lax; *inner ones* linear, acute, appressed. *Florets* hairy externally, densely pilose at the tips. *Styles* yellow.

H. alpinum. E. B. t. 1110.

Hieracium villosum Alpinum flore magno singulari. Ray's Syn. Ed. 3, p. 169.

Alpine cliffs of 2000 to 3500 feet elevation: rare. Glaramara, Langdale Pikes, and head of Pierce Gill, Scawfell, Cumberland, on slate. Lochnagar and Craig Dhuloch, Aberdeenshire, on granite. Cliffs of Caness, Canlochen-Glen, and to the south of Bradoonie, Clova Mountains, Forfarshire. Ben Lawers, Perthshire.

Flowers in 7th and 8th months.

Plant 3 to 9 inches high, with a large solitary head. *Root-stock* rather slender, woody at the neck, frequently cæspitose and matted with numerous fibres. *Stem* usually with one or two small bract-like leaves, sometimes leafless; very shaggy throughout with long white silky hairs, more or less floccose, and with a few minute setæ. *Leaves* green, soft, shaggy. *Root-leaves*

spathulate, rounded at the extremity, minutely apiculate; innermost sometimes linear-lanceolate and sub-acute; entire, or rarely slightly denticulate. *Bud* usually drooping. *Involucre* narrowed towards the base; white with long, silky, black-based hairs. Outer *phyllaries* broad, usually obtuse, or rarely sub-acuminate, frequently sub-foliaceous. *Florets* bright yellow, beautifully clothed externally, and especially at the tips, with brittle white hairs. *Styles* pure yellow.

In its wild state, *H. holosericeum* may be distinguished from *H. alpinum* by its blunt entire leaves, more silky stem and involucre, and by its linear attenuate appressed acute inner phyllaries. Under *cultivation* it becomes more dwarf and shaggy, produces larger heads and still broader external phyllaries, which often resemble a whorl of small linear leaves encircling the true involucre. It never branches, and appears to be invariably single-headed. These characters are permanent when the plant is raised from seed. When dried, the white silky hairs frequently become fulvous, as is probably the case with those of many other species.

5. H. EXIMIUM. Green. *Stem* elongated, one or few headed, hairy, floccose, setose. *Root-leaves* lanceolate, acute, coarsely dentate, or nearly entire; hairy on both sides; narrowed into winged petioles. *Stem-leaves* small, linear or linear-lanceolate. *Involucres* truncate at the base, shaggy with black-based rather silky hairs. *Phyllaries* numerous, linear, attenuate, acute; outer ones small, lax. *Florets* hairy externally, pilose at the tips.

α **EXIMIUM.** Stem elongated. Root-leaves lanceolate. *Styles* livid.

H. alpinum β *melanocephalum*. Bab. Man. Ed. 3, p. 194 (not of Fries).

H. melanocephalum. Hook and Arn. Ed. 7, p. 219. (not of Tausch).

H. villosum. E. B. t. 2379. (not of Linn.).

β *TENELLUM*. Stem shorter, more slender. Root-leaves lanceolate or linear-lanceolate. *Styles yellow*.

Cliffs of 2000 to 3000 feet elevation. Abundant in Glen Fiadh, Glen Dole, Ravine of the White Water, Carlowie, Bassies, Craig Wharral, Cliffs above Loch Brandy, Caness, Canlochen Glen, and many other parts of the Clova district, on mica slate. Head of Glen Callater and cliffs above Loch Ceanndin, Braemar. Rare on the granite of Lochnagar and Ben-na-bourd. Little Craigindal, associated with *H. Globosum*.

β *tenellum*. Granitic mountains of the Cairngorum range. Cliffs of Ben-na-main above Loch Aan, Cairntoul, Ben-na-bourd and Little Craigindal (Braemar). Caness and cliffs above Loch Ceanndin? Forfarshire.

Flowers in 7th and 8th months.

Plant 6 to 15 inches high, with large heads. *Root-stock* thick, woody, usually elongated. *Stem* floccose, clothed more or less densely with black-based shaggy hairs and setæ; single headed, or (rarely) branched and with two to four heads on elongated peduncles. *Leaves* soft, green; with rather coarse, scattered, shaggy, denticulate hairs on both sides. Root-leaves persistent, 3 to 7 inches long, lanceolate, or linear-lanceolate, acute; with sharp irregular teeth (occasionally very large) tipped with glands and always pointing forwards; rarely entire; original ones broader, more spathulate, sub-acute or rounded; all narrowed into long shaggy winged petioles, which are sometimes so broad as to make the leaf appear sessile. Stem-leaves 1 to 3, sessile, small, linear, or linear-lanceolate, acute, frequently resembling bracts. *Involucres* drooping in the bud, ultimately erect, broadly rounded or truncate at the base; densely clothed with shaggy or rather silky, black-based, white hairs. *Phyllaries* more or less

lax, especially the small outer ones. *Florets* bright yellow; hairy externally, and more or less densely pilose at the tips. *Styles* livid, clothed with minute fuliginous hairs.

Var. tenellum resembles the typical form, but has more slender and less elongated stems (4 to 8 in.); entire, or slightly dentate (rarely coarsely dentate) leaves, and yellow styles.

A plant which occurs above Glen Caness and on the cliffs above Loch Ceannidin, which has stems 9 to 12 inches long, large rather ovate obtuse very coarsely toothed root-leaves, lanceolate stem-leaves, and very large heads with broader phyllaries and yellow styles, is probably an extreme form of this variety, but requires further examination.

When growing in the crevices of hard micaceous rock (as in Glen Fiadh, Glen Dole, &c.) its leaves are toothed, but when on crumbling or shaly mica slate (as on the cliffs around Loch Brandy and Loch Wharral) it produces *entire* leaves. In the wild state it rarely (?) branches, though I have met with a few specimens both of the incised and entire-leaved forms, bearing 2 to 4 flowers on the same stem.

Under *cultivation* this plant flowers twice in the same season (in the 6th and 8th months). At the first flowering the heads are usually produced upon simple (unbranched) stems, while at the second flowering (one to two months later) they are borne upon robust branched stems sometimes $1\frac{1}{2}$ feet high, with 4 to 6 heads on elongated peduncles. The *var. tenellum* (which seems to be the "form" that *H. eximium* assumes on the granite) when *cultivated* becomes nearly as robust and branching as the typical form, but always retains its yellow styles.

Among a large range of specimens of the "*Alpinum group*" from Norway, Switzerland and the Tyrol, I do not find a single example of *H. eximium*, and consequently conclude that it is rare, or possibly not existing in those countries.

6. **H. CALENDULIFLORUM.** Green. Stem simple or branched, with one or few heads, hairy, floccose, setose. *Root-leaves* broadly ovate-spathulate, obtuse; original ones nearly circular; sharply dentate, hairy on both sides, narrowed into winged petioles. *Stem-leaves* very small, linear lanceolate. *Involucres* rounded at the base, villous with soft black-based silky hairs. *Phyllaries* attenuate, acute; outer ones lax. *Florets* hairy externally, pilose at the tips. *Styles* livid.

Mountains at an elevation of 3000 to 4000 feet. Abundant on the granite precipices of Dhuloch and Lochnagar, Aberdeenshire (associated with *H. eximium*, &c.) and scattered among the grass over the region lying between the ridge of Lochnagar and the northern part of the Clova district. Corrie of Clova, and damp micaceous ravine above the Spital of Glen Shee, Forfarshire.

Flowers in 7th and 8th months.

Plant 6 to 14 inches high with very large and handsome heads (frequently 2 to 3 inches across). *Root-stock* woody at the neck, sometimes rather elongated, with numerous fibres. *Stem* with one or few much reduced leaves; setose, rather floccose, especially in the upper part, with scattered soft white hairs; simple with one head, or branched with two or three heads on elongated ascending peduncles. *Leaves* clothed on both sides with soft white hairs. *Root-leaves* broadly ovate or ovate-spathulate, rounded at the extremity; inner ones sometimes sub-acute; irregularly and sharply dentate, narrowed into more or less broadly winged shaggy petioles. *Stem-leaves* acute, sessile, frequently bract-like. *Buds* dark, rather drooping. *Involucres* ventricose, rounded and sometimes slightly constricted at the base after flowering, but rarely at all truncate. *Phyllaries* linear, more or less lax; innermost frequently cuspidate. *Florets* bright yellow, beautifully clothed externally and at the tips with scattered or pilose hairs. *Styles* always livid.

One of our handsomest species, easily distinguishable at all times from *H. eximium* (to which it is most nearly allied) by its larger, darker, less shaggy heads, and broadly ovate-spathulate obtuse root-leaves. The stem of *H. calenduliflorum* is also usually shorter and less hairy, but more frequently occurs branched. These characteristics, appearing to be permanent under *cultivation* (plants raised from seed presenting the same appearance), combined with the circumstance that *H. calenduliflorum* occurs in typical form on the mica slate, where it is rare, and *H. eximium* abounds; and also on the granite where the former is abundant, and the typical form of *H. eximium* is very scarce, induces me to regard it as a true species.

b. NIGRESCENTES.

Involucres villous or hairy; in most of the species with dark hairs and setæ. *Phyllaries appressed*, or few outermost lax. *Florets nearly or quite destitute of hairs externally*, shortly pilose or sub-glabrous at the tips.

7. **H. GRACILENTUM.** Green. *Stem leafy, one or few headed, with short hairs, floccose, setose.* Root-leaves lanceolate or oblong-spathulate, sub-obtuse, remotely dentate, hairy or nearly glabrous, narrowed into petioles. Stem-leaves large. *Involucres ventricose, rounded or slightly turbinate at the base, black with soft velvety hairs and setæ.* Phyllaries broad, acuminate, appressed, floccose at the points; outer ones lax. *Florets nearly glabrous externally, slightly pilose at the tips.*

H. alpinum var. *melanocephalum*. Fries, Symb. p. 70 (not of Bab. Man. ed. 3, p. 45, nor of Hook and Arn. ed. 7, p. 219.)

H. alpinum. Flora Danica, t. 27.

Granitic and porphyritic cliffs at an elevation of 2500 to 4000 feet; rare. North-eastern precipices of Lochnagar, associated with *H. holosericeum* and *H. calenduliflorum*. Corrie of Ben-na-bour, and Cairntoul, Aberdeenshire. Canlochen Glen, Forfarshire.

Flowers in 7th and 8th months.

Plant 6 to 10 inches high, usually with a solitary rather large head. *Root* woody but slender, with few fibres. *Stem* with 2 to 4 leaves, numerous setæ, and scattered blackish hairs; hoary, especially in the upper part, with dense floccose down; usually with 1 head, but occasionally with few (2 or 3) heads on simple elongated ascending peduncles. *Leaves* clothed on both sides with scattered soft white hairs, or nearly glabrous. Root-leaves lanceolate, ovate-lanceolate or spatulate, sub-acute or obtuse; outermost broad, rounded; nearly entire or dentate with remote, sometimes acute, glandular teeth; narrowed (usually rather suddenly) into slender or slightly winged petioles. Lower stem-leaves large, linear-lanceolate, acute, nearly or quite entire, narrowed into short or sometimes elongated winged petioles: uppermost small, frequently bract-like. *Peduncles* densely floccose. *Involucres* very dark and velvety with rather short dense blackish hairs, interspersed with scattered black-based hoary hairs and numerous gland-tipped setæ. Inner *phyllaries* appressed; outer ones more or less lax; frequently hoary at the points with dense floccose down. *Florets* bright yellow, nearly or quite destitute of hairs externally, shortly and slightly pilose at the tips. *Styles* yellow or rather livid, frequently clothed more or less densely with very minute dark hairs.

Though closely allied to *H. alpinum*, which it strongly resembles in the wild state, *H. gracilentum* appears to differ permanently from that species, in being of a lighter green and in having a less hairy but more slender setose stem (frequently rather flexuose), larger and more numerous stem-leaves; a blacker, less shaggy involucre; more appressed floccose-tipped phyllaries, florets nearly glabrous externally, and styles usually livid. In many points it also very

closely resembles the "monocephalous" form of *H. nigrescens*; from which however it differs in having a less rigid stem, more lanceolate root-leaves, more linear stem-leaves, broader and less attenuated phyllaries, and livid or yellow (not fuliginous) styles.

Under *cultivation* (unlike *H. alpinum*, which so far as I have observed, never produces more than a solitary head), *H. gracilentum* branches at every axil from the base upwards. This circumstance, combined with the distinctive characters which mark it in a wild state, lead me to regard it as a true species, though having, as before shown, many points in common with both *H. alpinum* and *H. nigrescens*.

On the Cairngorum mountains where both *H. alpinum* and *H. gracilentum* occur, the latter may be distinguished from the former by its more slender and usually rather more elongated stem, smaller heads and nearly glabrous florets.

My specimens from Lochnagar and Canlochen Glen correspond almost exactly with specimens from Norway, kindly furnished me by Professor Blytt of Christiania, as typical forms of the plant figured as *H. alpinum* at tab. 27 of the Flora Danica, and which is the "*H. alpinum* var. *melanocephalum* of Fries; but not (apparently) the *H. melanocephalum* of Tausch, which has florets pilose externally, and must be referred to *H. alpinum*."

8. H. GLOBOSUM. Glaucous or green. *Stem one or few headed, floccose, slightly hairy. Root-leaves ovate or ovate-spathulate, sub-acute or obtuse, entire or dentate, glabrous above, narrowed into petioles. Buds globose. Involucres rounded at the base, ultimately spherical, dark with short black-based hairs. Phyllaries numerous, linear, attenuate, acute, appressed. Florets sub-glabrous externally, glabrous or rather pilose at the tips. Styles yellow.*

Mountains of the Cairngorum range, at an elevation of 2500 to 4200 feet. Eastern slope of Cairntoul in crevices of the granite

cliffs. Precipices of Ben-na-main above Loch Aan. Ben-na-muic-dhui. Among the felspar debris on the north side of Little Craigindal, Braemar.

Flowers in 7th and 8th months.

Plant 6 to 12 inches high, with large heads. *Root-stock* thick, woody, frequently elongated. *Stem* leafless or with few minute bract-like leaves, or (rarely) a rather large obovate-lanceolate leaf supporting a branch; floccose, sometimes slightly setose; with few scattered white brittle short hairs, or destitute of hairs in the lower part; single headed or branched, sometimes from the base, and with 2 to 4 heads on rather elongated spreading or ascending peduncles; uppermost branch extending beyond the primary head, which is frequently double the size of the secondary ones. *Leaves* deep green or silvery glaucous. Root-leaves broadly ovate, ovate-lanceolate, or spathulate; sub-acute, or rounded at the extremity and apiculate; irregularly dentate, especially towards the base, where the teeth are occasionally very large and acute, sometimes entire or very slightly denticulate with minute glandular teeth; sub-glabrous above, with few scattered hairs beneath and at the margins, or beautifully ciliated; few innermost leaves sometimes acute: all narrowed more or less suddenly into rather short, slender, or slightly winged petioles. *Peduncles* thickened and compressed at the top, frequently scaly and setose. *Buds* spherical. *Involucre*s dark green, with numerous small yellow glands, nearly destitute of stellate down and setæ. *Phyllaries* rarely at all lax, usually closely appressed, acute and cuspidate, or rarely sub-acuminate, very attenuate, curving inwards and collapsing at the extremities after flowering, so as to form a spherical or globoso-conical head. *Florets* bright yellow, nearly or quite glabrous externally. Styles always yellow.

A distinct and beautiful species, conspicuous, in the monocephalous form especially, for its large and brilliant heads. It differs

from its nearest ally (*H. gracilentum*) in having broadly ovate, shortly stalked root-leaves, few small stem-leaves, involucre globose before and after flowering, and narrow, linear, attenuate, acute phyllaries. When the root-leaves are entire or denticulate, they are usually narrowed gradually into more or less elongated petioles; but when suddenly narrowed or rounded towards the base, the petioles are generally slender and very short ($\frac{1}{2}$ an inch): the latter must be regarded as the typical form. Under cultivation, *H. globosum* retains its distinctive characters, and branches from the base upwards. The occasionally glabrous florets of this plant seem to indicate an alliance with the continental group which includes *H. glanduliferum*, *H. piliferum*, *H. glabratum*, &c. though the more or less numerous hairs usually present, do not permit of its being attached to that section, which is characterized by having perfectly glabrous florets.

9. H. NIGRESCENS. Green. Stem simple or branched, with one or few heads,* floccose. Root-leaves ovate or lanceolate, coarsely and irregularly dentate, slightly hairy or sub-glabrous above, with slender petioles. Stem-leaves few, lanceolate or oblong, shortly stalked. Involucres ovate at the base, dark green, villous with soft black-based hairs. Phyllaries broad, acuminate; outer ones obtuse; floccose at the points. Florets glabrous externally, shortly pilose at the tips. Styles fuliginous.

H. nigrescens. Willd. Sp. Pl. vol. iii. p. 1574. Fries, Symb. p. 104. Bab. Man. Ed. 3, p. 195.

H. pulmonarum E. B. t. 2307.

Highland mountains at an elevation of 2000 to 3000 feet; not uncommon. Micaceous cliffs of the Corrie of Clova, Craig Wharral,

* See preface, page vii.

Glen Fiadh, Glen Prosen, and other high valleys of the Clova district. Head of Canlochen Glen, on hornblende. Lochnagar and mountains of the Cairngorum range, on granite. Very luxuriant among the granitic sand at the foot of Cairntoul. Ben Nevis.

Flowers in 7th and 8th months.

Plant very variable in size and form, 9 to 18 inches high, or (when reduced to the one headed form) 4 to 8 inches, with medium sized or large heads. *Root-stock* thick, woody, descending with few strong fibres. *Stem* erect or ascending, usually with 1 leaf, sometimes with 2 or 3, or with minute bract-like leaves only; glabrous, or floccose and with scattered soft white or black-based hairs, and setæ; simple and with 1 large head or with ascending more or less elongated branches, each bearing 1 to 3 heads. *Leaves* green or slightly cæsius, with scattered hairs or glabrous above, sub-coriaceous. Root-leaves rosulate, ovate or ovate-lanceolate, acute, apiculate, sometimes broadly ovate and obtuse, irregularly and often coarsely dentate with gland-tipped teeth, rarely denticulate, entire towards the point; original leaves broad, rounded; all narrowed or suddenly contracted into slender, sometimes elongated, hairy petioles. Stem-leaves rather broad, stalked or nearly sessile. *Peduncles* thickened at the top, floccose, frequently with scattered hairs and setæ. *Buds* usually erect. *Involucres* dark with black glandular white-tipped hairs and setæ, sometimes slightly truncate at the base. *Phyllaries* rather broad, floccose at the points (especially when in bud), with whitish pubescence. *Florets* deep brilliant yellow. *Styles* dark with fuliginous hairs.

10. H. LINGULATUM. Green. Stem simple or branched, with few heads. *Root-leaves* lanceolate or oblong, apiculate, denticulate or dentate, coarsely hairy above with short petioles. *Stem-leaves* few, lanceolate or ovate-attenuate, acute, sessile. *Involucres* broad, ultimately truncate at the base, very dark with soft black-based hairs. *Phyllaries* perrect, broad, attenuate, acute. Florets slightly pilose at the tips. *Styles* livid.

H. Saxifragum. Bab. Man. ed. 3, p. 195 (not of Fries).

H. divaricatum. G. Don, in Headrick's Forfar. App. p. 13 ?

Abundant in the high alpine glens of the Clova and Braemar districts, at an elevation of 1500 to 2500 feet, on exposed cliffs and by the rocky margins of streamlets. Head of Glen Dole. Ravine of the White Water. Micaceous cliffs above Loch Wharral. Head of Glen Prosen. Corrie of Clova. Head of Glen Callater. Granite cliffs above Dhuloch. Abundant and very luxuriant among the granitic sand brought down by streamlets descending from Cairntoul on the south-eastern side. Ben Lawers.

Flowers in 7th and 8th months.

Plant 15 to 24 inches high, with rather large heads. *Root* slender, scarcely woody, descending with few fibres. *Stem* rigid or flexuose, with few (1 to 3) leaves, scattered black-based hairs, and few (1 to 3) erect heads, on elongated erect or ascending peduncles, or branched (sometimes from the base), each branch bearing 1 to 4 heads. *Leaves* green, rough on the upper surface with coarse hairs, pilose beneath and at the margins. *Root-leaves* usually few in number, 2 to 6 inches long, very variable in form, oblong-lanceolate with small remote teeth tipped with glands, or lanceolate; with sharp and frequently large coarse teeth; entire towards the point and usually acute; sometimes obovate sub-obtuse and nearly entire throughout; original ones blunt or rounded at the extremity; all narrowed more or less

suddenly into short slender or winged petioles. Stem-leaves sessile, lanceolate or narrowed upwards from a rounded base; lower one usually large, denticulate or with a few large remote teeth; upper ones small, nearly or quite entire. *Peduncles* elongated, rigid or (rarely) flexuose, ascending, slightly hairy, thickened at the top. *Involucres* dark green, clothed with short black-based soft hairs and setæ with pale yellow glandular tips. *Phyllaries* erect in bud (not incumbent), not numerous, broad, narrowed upwards or contracted above and rather attenuate, more or less acute. *Florets* bright yellow, minutely (but in dried specimens scarcely visibly) pilose at the tips. *Styles* rather livid.

A strongly marked and handsome species, which may be distinguished in the wild state from *H. nigrescens* and *H. chrysanthum*, by its taller stem, roughly hairy oblong lanceolate root-leaves, broad based sessile stem-leaves, attenuate acute phyllaries, and livid (not fuliginous) styles. Its closest alliance is with *H. senescens*, from which it differs in the root-leaves, and in not having the linear stalked stem-leaf, nor the acuminate incumbent floccose-tipped phyllaries of that species: also in having distinctly livid styles (not yellow as in *H. senescens*.) Under *cultivation*, when raised from seed, all its distinctive characters are retained. Fries refers this plant to his "*H. atratum* var. *ramulosum*," but I cannot regard it as a variety of the plant which he considers as the true *H. atratum*, and feel no hesitation in pronouncing it one of the most distinct of our British Hieracia.

11. *H. SENESCENS*. Green. Stem simple with few leaves and few heads on slender ascending peduncles. Root-leaves elliptic lanceolate, denticulate or remotely and evenly dentate, hairy, stalked. *Stem-leaves linear-lanceolate*, narrowed into slender petioles. Involucres ovate at the base, densely clothed with black-based hairs and setæ. *Phyllaries* incumbent, attenuate, acuminate, floccose at the points. Florets shortly pilose at the tips.

H. atratum v. *ramulosum*. Fries, Symb. p. 105.?

Grassy slopes and rocky margins of streamlets on the south-eastern side of Canlochen Glen, Forfarshire. Head of Glen Callater, Braemar. Ben Voirlich. Mael Ghyrddy, Breadalbane.

Flowers in 7th and 8th months.

Plant 15 to 18 inches high, with rather large heads. *Root* slender, rather woody, with few fibres. *Stem* erect, more or less rigid, with 1 or few leaves, or sometimes leafless but with 1 or more foliaceous bracts; glabrous or slightly hairy below, and with scattered blackish hairs, a little stellate down and numerous setæ above; simple and with few (usually 3) heads on slender ascending elongated peduncles. *Leaves* green, with scattered hairs on both sides. Root-leaves elliptic-lanceolate, or lanceolate, acute, or obtuse and apiculate, denticulate or with remote glandular teeth of equal size, entire towards both extremities; original leaves broader, rounded; all narrowed rather suddenly into slender hairy petioles. *Stem-leaves* linear-lanceolate or linear, more or less elongated, entire or (rarely) denticulate, acute, narrowed gradually into slender petioles or sub-sessile. *Peduncles* very slender, thickened upwards, dark with short blackish hairs and setæ, slightly floccose; lower one straight and usually near the middle of the stem, with a leaf at its base; the other near the top, frequently arcuate, and extending beyond the primary head, supported by a (sometimes foliaceous) bract.

Involucres broadly ovate or sub-turbinate at the base. *Phyllaries* incumbent in bud, linear, attenuate, more or less acuminate; white at the points, with floccose down, especially in the young bud. *Florets* golden yellow, obscurely pilose at the tips. *Styles* yellow, sometimes slightly clothed externally with very minute darkish hairs.

This species differs from its ally *H. nigrescens* in having evenly and remotely dentate root-leaves, a linear elongated stem-leaf, narrower phyllaries, and yellowish (never fuliginous) styles. From *H. lingulatum*, to which it is also closely allied, it differs strongly in its stem-leaves, in its floccose acuminate phyllaries, which are incumbent and not porrect in bud, and in its nearly yellow styles.

The buds of *H. senescens* when in a very young state, are conspicuously marked by the densely floccose tips of the undeveloped phyllaries, giving the effect of a white spot in the centre. *H. nigrescens* and some other species also exhibit this feature, but not to the same degree. All the distinguishing characters of *H. senescens* remain unchanged under *cultivation*, when the plant has been raised from seed for many years successively. Under these circumstances it flowers abundantly a second time, in the 10th month, many weeks after *H. nigrescens* has done flowering.

Although I have no hesitation in regarding this plant as identical with the *H. atratum* v. *ramulosum* of Fries, yet I am equally satisfied that it is specifically distinct from specimens regarded by that author as "*H. atratum*" (which must be referred to *H. chrysanthum* v. *microcephalum*) and to *H. nigrescens*. This leads me to believe that the character of *H. atratum* in Fries' Symb. p. 105, unites that of my *H. senescens* ("*H. atratum* v. *ramulosum*" Fries) with extreme forms of other distinct species. *H. atratum* is described as having "one or few heads:" *H. senescens* is, so far as I have observed, never truly monocephalous.*

* A Plant usually bearing few or many heads, may be so reduced by situation, &c. as only to *develope* one head; but where this is the case, the minute incipient axillary buds prove that it is not a truly "monocephalous" species.

12. H. CHRYSANTHUM. Green. Stem one or few headed, hairy, floccose, setose. *Root-leaves* ovate, acute, sharply, irregularly and coarsely dentate, hairy; with long petioles. *Stem-leaves* linear-lanceolate or subulate, stalked. *Involucres* rounded at the base, green or very dark, with short black velvety hairs and setæ. *Phyllaries* numerous, incumbent, linear, attenuate, acute; outermost small, rather lax. *Florets* nearly glabrous.

H. rupestre. Bab. Man. Ed. 3, p. 194 (not of Fries nor Allion.)

β MICROCEPHALUM. Stem simple, with one or few smaller heads on erect or scarcely drooping peduncles. Leaves dentate or nearly entire. *Involucres* urceolate, dark. *Styles* yellow or faintly livid.

H. atratum. Fries, Symb. p. 105 ?

Mountains at 2000 to 3000 feet elevation. Rocky margins of the Feula Burn, above the falls. Abundant among grass at the heads of many of the Clova valleys. Glen Fiadh, Glen Prosen and Canlochen, Clova Mountains. Cliffs above Loch Ceanndin, Braemar, on mica slate. Ben-na-bourd, Cairntoul, Ravines of the Garachary and Guissachan, Ben-na-muic-dhui, Lochnagar, and other granite mountains of the Cairngorum range,

β microcephalum. Lochnagar. Cliffs above Loch Wharral, Clova. Slate rocks of Stridden Edge and Glara-mara, Cumberland.

Flowers in 7th and 8th months.

Plant 9 to 12 (rarely 18) inches high, with one or few large and handsome heads. *Root* scarcely woody; with strong fibres. *Stem* with one or few small (frequently bract-like) leaves; clothed with scattered white hairs in the lower part, black-based dark hairs, stellate down and numerous setæ above; usually with a single head, but sometimes with two or more heads on rather

drooping peduncles, occasionally with long slender branches from the base, each terminating in a single drooping head. *Leaves* deep green above; with numerous minute white granular spots, paler beneath; with scattered white hairs or nearly glabrous. Root-leaves oval or lanceolate-oval; acute; with very irregular sharp teeth, sometimes $\frac{1}{2}$ an inch long, spreading or pointing forwards, entire towards the point: original leaves broad, very blunt; all narrowed more or less suddenly into long slender or slightly winged hairy, or almost silky, petioles. Stem-leaves minute, bract-like: lower one sometimes lanceolate or linear-subulate, entire or with few large teeth; narrowed into a slender or broadly winged petiole. *Peduncles* more or less elongated, often hairy with stellate down, and densely setose near the top. *Buds* ovate. *Involucres* usually broad, rounded at the base, very dark with black-based short brittle denticulate hairs, and numerous black setæ, intermingled with minute yellowish glands; occasionally pale green and with whitish hairs (on Cairntoul). *Phyllaries* linear-attenuate, acute or cuspidate; sometimes slightly acuminate; innermost usually very attenuate; few outermost short, slender, linear, and rather lax. *Florets* golden yellow, obscurely pilose at the tips. *Styles* golden yellow, or (very rarely) faintly livid.

Var. microcephalum has simple stems, with 2 or 3 shorter and more erect peduncles; or sometimes (in the Cumberland form) many (3 to 9) single headed stems rising from the base. Leaves more evenly and coarsely dentate, or nearly entire. Peduncles thickened upwards. Involucres urceolate, more ovate at the base. Phyllaries more frequently acuminate. Styles more or less livid.

H. chrysanthum may be easily recognised in the wild state by its large (usually drooping) heads and golden yellow florets. I cannot regard it as any form of the *H. atratum* of Fries, that plant being clearly described in his Monograph as having "evenly dentate leaves, acuminate phyllaries, and styles with fuscous hairs;" while the typical form of *H. chrysanthum* is conspicuous for having more

irregularly toothed leaves than any other species of the genus; also for its very attenuate acute phyllaries and golden yellow styles. Fries refers the "*var. microcephalum*" to his *H. atratum*, and the slightly livid styles and less dentate leaves (which occur in the Cumberland and Loch Wharral plant) render its attachment to *H. chrysanthum* somewhat doubtful. Still I do not find characters sufficiently distinct and permanent to induce me to separate it from the above. Under cultivation *H. chrysanthum* branches excessively, but otherwise retains the general appearance which it presents on the Highland mountains.

13. H. CERINTHOIDES. Glauous green. Stem with few leaves and few heads near the top. Root-leaves ovate-lanceolate, apiculate or acuminate, denticulate, hairy beneath, narrowed into long shaggy winged petioles. Stem-leaves clasping, ovate, acuminate. Involucres ventricose, rounded at the base, hairy, setose. Phyllaries acuminate, or attenuate and acute. Florets pilose at the tips. Styles livid.

α **CERINTHOIDES.** Stem simple, with few heads near the top, and few obovate constricted broadly clasping stem-leaves. Outermost phyllaries lax, acute.

H. cerinthoides. Linn. Sp. Pl. vol. ii. p. 1129. Fries, Symb. p. 57. Bab. Man. Ed. 3, p. 193. Gren. & Godr. p. 360?

H. Lawsoni. E. B. t. 2083.*

β **ANGLICUM.** Stem with elongated arcuate ascending lateral peduncles, and usually a solitary leaf narrowed to a scarcely clasping base. Phyllaries appressed, outer ones rather lax.

H. anglicum. Fries, Symb. p. 93. Bab. Man. Ed. 3, p. 194.

* The figure of *H. Lawsoni* given by Sowerby more closely resembles the typical form than the var. β

✓ **ACUTIFOLIUM.** *Extremely glaucous.* Stem usually branched from the base upwards, and with sharply and coarsely toothed, *very acute* or *acuminate*, more or less clasping *glabrous leaves*. Phyllaries appressed.

Micaceous cliffs of 1500 to 2000 feet elevation: not uncommon. Eagle Crag near Lochlee. Head of Glen Fiadh and Glen Dole. Rocky margin of the streamlet descending from Kilbo Corrie, and in other high parts of the Clova district. Canlochen Glen, Forfarshire. Damp ravine above the Spital of Glen Shee. Head of Glen Tilt. Stuich-an-Lochen, and other mountains of the Bredalbane district, Perthshire.

Var. anglicum. Mountain districts of England and Scotland. Teesdale, on basalt. Craven district, on mountain limestone. Cumberland and Westmoreland. Highlands of Scotland, usually on mica slate.

Var. acutifolium. Margins of streamlets descending from Cairntoul, Aberdeenshire, and among granitic sand at the foot of the mountain. Confluence of the Clunie and the Dee, near the Castle-town of Braemar. Aberdeen Links.

Flowers in 7th and 8th months.

Plant 15 to 24 inches high, with large heads. *Root-stock* woody, with few fibres, rarely elongated. *Stem* erect, rigid, wiry, frequently purplish below, slightly hairy, with few (usually 2) leaves, and 1 to 3 heads near the top. *Leaves* soft, dull green or glaucous. Root-leaves ovate-lanceolate and acute, or acuminate, or taper pointed; nearly smooth above, paler and hairy beneath; denticulate chiefly towards the middle, sometimes dentate, rarely entire; original leaves broad, rounded, apiculate. Petioles, more or less shaggy, sometimes scarcely winged. Stem-leaves sessile; lower ones oblong-lanceolate or narrowed below the middle and again enlarged into a rounded clasping base; uppermost scarcely clasping, small and usually entire. *Peduncles* rigid, frequently rather arcuate, floccose, and with several setæ. *Involucres*

rounded below, frequently constricted at the base after flowering. Outermost phyllaries small, slender, rather lax; inner acuminate or sometimes tapering and acute; all clothed more or less densely with scattered brittle hairs. *Florets* shortly but distinctly pilose at the tips. *Styles* livid.

The *var. anglicum* may be known by its shorter, less rigid, simple or *branched* stem, and elongated arcuate ascending lateral peduncles. Root-leaves frequently dentate below, with teeth spreading or pointing forwards. Stem-leaf usually solitary and rather large.

Var. acutifolium is strongly marked by its glabrous, very acute, usually coarsely and sharply toothed root-leaves, which are however occasionally obovate, slightly hairy, sub-entire, and so broadly winged as to appear sessile; also by its attenuate, acute inner phyllaries.

Though conspicuously distinct in appearance in their wild state, the above-mentioned varieties so approximate and resemble each other under *cultivation*, as to leave no doubt on my mind of their specific identity. The typical form and both the varieties, under these circumstances, become branched from every axil; the strongly clasping stem-leaves of the former, as well as the sessile ones of the varieties, become *slightly* clasping, showing every gradation. The truncate or constricted involucre and lax outer scales are by no means constant, while all the forms resemble each other in having ventricose involucre, slightly pilose florets, and livid styles. Our typical form seems to agree well with the description of *H. cerinthoides* in Fries' Monograph, and is identical with that species in the opinion of Fries. I am therefore compelled to reject the name of "*anglicum*" as denoting a *species*; for although that *form* is far more abundant in this country than the typical one, I believe that full investigation and careful cultivation will prove that they are not specifically distinct from each other.

A plant occurs on basaltic and limestone rocks of the north coast of Antrim, Ireland, which in many respects closely resembles the variety

anglicum, but differs in having a more elongated stem, corymbose at the top with 3 or 4 heads, few small root-leaves, and 1 or 2 very large remote ovate-lanceolate acuminate sessile stem-leaves, not at all clasping. It closely resembles the continental *H. vogesiacum* in some respects, and may ultimately prove to be distinct from *H. cerinthoides*. The specimens I have seen were from near Cushendall, sent to my friend C. C. Babington, by David Moore, of Glasnevin Botanical Gardens, Dublin.

Prof. Grenier regards our "*H. cerinthoides* var. *acutifolium*" as identical with the typical *H. vogesiacum* of Fries, &c. and refers our "typical *H. cerinthoides*" to the var. *procerum* of *H. vogesiacum*. After carefully examining the characters of the latter species given in Fries, Symb. and in the Flore de France; and comparing our plant with dried specimens of *H. vogesiacum* from Jura, &c. (sent to me by Prof. Grenier) I am unable to satisfy myself that the British plant has more alliance with that species than with *H. cerinthoides*, though undoubtedly very near to both; nor can I indeed convince myself that the continental "*H. vogesiacum*" is clearly distinguishable as a species from *H. cerinthoides*; the dissimilarity between the two, being decidedly less than between extreme forms of the British plant.

The figure of *H. cerinthoides* in Sowerby's English Botany differs so conspicuously from all the native forms of this plant with which I am acquainted, and so exactly resembles the Pyrenæan plant, (which has a more leafy stem, more entire and glaucous ciliated leaves nearly glabrous above, and yellow (?) styles, that I believe it to have been taken from a garden specimen not of British origin. Should this Pyrenæan plant ultimately prove distinct from our British one (as I suspect it will), the name of *H. cerinthoides* as denoting the British species must probably give way. But not being well acquainted with the range of form which the Pyrenæan plant exhibits, and as Fries regards our British plant as identical with his *H. cerinthoides*, I am unwilling without further evidence to deviate from the course now adopted.

14. *H. IRICUM*. Glauous green. *Stem leafy, simple, corymbose at the extremity*. Root-leaves ovate or oblong-lanceolate, acute, denticulate or dentate, hairy beneath, narrowed into winged petioles. *Stem-leaves broadly ovate, clasping, taper-pointed*. *Involucres truncate at the base, ultimately constricted, floccose, hairy*. Phyllaries broad, narrowed upwards, sub-obtuse or acuminate. Florets glabrous. Styles livid.

H. Iricum. Fries, Symb. p. 60. Bab. Man. Ed. 3, p. 193. Hook. and Arn. Ed. 7, p. 218.

H. Lapeyroussii. Froel. in De Cand. Prod. v. 7, p. 232? Bab. Man. Ed. 2, p. 196. E. B. Suppl. t. 2915.

Mountain districts of England, Ireland and Scotland. Banks of the Tees, near Winch Bridge. Grassy slope to the south of Langdon foot-bridge. Falcon Clints, and Cronkley Scars, Teesdale, on basalt. Rocky margins of streams descending from the Twelve Pins of Bennabola and on the Eagle Mountain, Connemara. Garron Head, Antrim. In rich soil and among micaceous gravel on the banks of the Clunie near Castle-town of Braemar. Rocks west of the Linn. of Dee. Near the "Grey Mare's Tail" Waterfall, Dumfriesshire.

Flowers in 7th and 8th months.

Plant robust, 18 to 24 inches high with large handsome heads. *Root* as in *H. cerinthoides*. *Stem* erect, rigid, frequently reddish purple, with numerous (3 to 6) leaves and scattered white denticulate hairs. *Leaves* firm, deep glaucous green, frequently tinged with purple. Root-leaves denticulate or remotely dentate, with teeth pointing forwards, entire towards the extremity, glabrous above or with scattered white hairs, original ones broad, rounded. Petioles (in my Irish specimens) short and very shaggy: in the English ones less shaggy and more elongated. Stem-leaves decreasing in size upwards; all clasping; the lowest narrowed downwards. *Corymb* with 3 to 8 heads, on rigid diverging

peduncles, frequently leafy below. *Peduncles* confined to the upper portion of the stem, setose, with black-based hairs and stellate down. *Involucres* constricted at the base after flowering, clothed with scattered brittle white hairs. *Phyllaries* attenuate above, sub-obtuse; innermost ones (in the Teesdale and Scotch plant) not unfrequently acuminate. *Florets* pale brilliant yellow, glabrous, or (rarely?) "obscurely pilose at the tips."

A fine species, nearly allied to the preceding, but distinguished from it by its robust habit, more leafy stem, broadly ovate stem-leaves, (not constricted below and again dilated as in *H. cerinthoides*) truncate involucres, and sub-glabrous florets. When *cultivated* and raised from seed for successive years, all its distinctive characters are maintained, and it becomes very robust and leafy. Unlike *H. cerinthoides*, it shows no disposition to branch or exhibit flower-buds, till its stem is from 12 to 18 inches high. *H. Iricum* ultimately becomes double the height of all the varieties of *H. cerinthoides* and forms a large branching corymb. On exposed cliffs it sometimes occurs much reduced in size (9 to 12 inches) with 1 or 2 strongly clasping stem-leaves, and a solitary large terminal head.

[*H. VILLOSUM*. This species is omitted under the firm belief that it is not British. The evidence resting on the specimen in the Herbarium of the York Museum, supposed to be collected by the late G. Don, is weak and unsatisfactory. I believe it to be a foreign specimen, and that the plant found by Don was either *H. calenduliflorum*, or *H. eximium* (figured as *H. villosum* in Eng. Bot. 2379.) The specimen above referred to is *not* marked "Lochnagar" *exclusively* (as though this identical specimen had been found on that mountain), but "Lochnagar and other mountains;" making it highly probable that this specimen was one received from the continent, and erroneously supposed by Don to be British and identical with the

plant which he had collected on Lochnagar and other mountains, which had received the (incorrect) name of "*H. villosum*."*]

[*H. AMPLEXICAULE*, which has strongly toothed oblong root-leaves narrowed into short winged petioles, 1 to 3 clasping or half-clasping ovate stem-leaves with a broad cordate base, acuminate lax phyllaries and pilose florets, does not seem to have sufficient claim to be regarded as a species indigenous to Britain to warrant its being retained as such.

Its recorded localities are "Walls of Cleish Castle," Kinrosshire, (where it cannot be regarded as a native), and "Rocks called Garriebarns," where it was said to be found by the late G. Don. The "Garrie-burn rocks" are a range of precipices on the south side of Glen Fiadh, Clova Mountains. It is a district abounding in forms of *H. cerinthoides*, some alpine form of which has probably been mistaken for the true *H. amplexicaule*; or perhaps *foreign* or garden specimens were accidentally circulated by Don under the apprehension that they were similar to what he had seen or gathered upon the mountains.]

* During the last few years, Lochnagar and the surrounding mountains of the Clova and Braemar districts, have been carefully examined, and many thousand specimens of Hieracia collected; but nothing at all resembling the true *H. villosum* has been met with.

c. PALLIDÆ.

Involucres more or less hairy. Phyllaries appressed. Florets without hairs externally, nearly or quite glabrous at the tips.

15. **H. PALLIDUM.** *Extremely glaucous. Stem slender with few heads and usually one leaf; glabrous. Root-leaves lanceolate or ovate, acute, remotely denticulate, or dentate below; glabrous or coarsely ciliated with long hairs; original ones obtuse; stalked. Stem-leaves lanceolate, shortly stalked or sessile. Involucres ovate at the base, ventricose, constricted above, floccose, with setæ and few hairs. Phyllaries appressed, acute. Florets sub-glabrous. Styles yellow.*

H. pallidum. Fries, Symb. p. 94. Bab. Man. Ed. 3, p. 195.

H. macrocaulon hirsutum folio rotundiore. Ray's Syn. Ed. 3, p. 169.

Cliffs of 1000 to 2000 feet elevation. Falcon Clints and Cronkley Scars, Teesdale, on basalt. Crossfell, Cumberland. Glara-mara and other mountains of the Lake district. Micaceous cliffs of Craig Maid and Ravine of the White Water, Clova mountains (?). Duniquoich, Inverary. Near the Grey Mare's Tail Waterfall, Dumfriesshire. Craig Breiddin, Montgomeryshire. Killarney.

Flowers in 6th and 7th months, and again in 9th month.

Plant 6 to 18 inches high (usually 12 to 15 inches) with heads of medium size. Root-stock thick, elongated, decumbent, woody, with few strong fibres. Stem usually with 1 leaf, sometimes 2, or leafless; with few (2 to 6) heads, nearly or quite glabrous. Leaves silvery-glaucous or pale cæsius green. Root-leaves rosulate, denticulate or remotely dentate, usually rounded at the base and with few (sometimes large and broad)

teeth pointing backwards or spreading; innermost leaves lanceolate acute, narrowed downwards; original ones broadly elliptical, rounded at both extremities; all conspicuously fringed with long rather rigid whitish deciduous hairs, which are sometimes scattered over the whole upper surface; coriaceous and frequently glabrous throughout in autumn. Lower stem-leaf stalked when there are two; otherwise nearly or quite sessile. *Peduncles* erect or ascending, slender, usually floccose and with scattered setæ. *Involucres* sometimes without hairs. *Phyllaries* acute; (outer ones rarely sub-acute) porrect in bud. *Florets* bright yellow; glabrous, or rather pilose at the tips especially in the unexpanded state. *Styles* always pure yellow.

A form of *H. pallidum* (?) occurs not unfrequently among the Clova and probably other Scottish mountains, differing from the typical one in having glaucous root-leaves more or less *incised at the base*, which are glabrous or coarsely hairy above, but *with none of the long rigid erect cilia* which mark the typical *H. pallidum*. It is frequently without a stem-leaf, has *peduncles and involucres densely setose* with minute black gland-tipped hairs, acute phyllaries and yellow styles. Specimens transmitted to Fries were regarded by him as "*H. murorum incisum*," but my specimens do not agree satisfactorily with his description of that plant at page 110 of the Symb. Hier., their peduncles and involucres being densely clothed with black gland-tipped setæ. It appears to agree well with the *H. Schmidtii* of Tausch and Koch, and I feel very doubtful as to its identity with *H. pallidum*. At present, however, there does not seem to be sufficient proof of its specific distinctness to warrant separation from that species.*

* The plant described by Dillenius in Ray's Synopsis. Ed. 3, at page 169, (which is referred by Fries to *H. Oreades*) evidently belongs to this species. For the identification of the original specimens preserved in Sherard's Herbarium at Oxford, I am indebted to M. Masters, (the Curator,) who has kindly transmitted tracings of them for examination. Some of the specimens with which the label in the handwriting of Dillenius is placed bearing

16. H. LASIOPHYLLUM. *Ash-coloured.* Stem leafless or with one leaf and few heads, *pilose*. Root-leaves broadly oval or ovate-lanceolate, obtuse, entire or remotely denticulate, innermost acute; *coarsely pilose* on both sides and at the margins, or destitute of hairs above; *floccose*; with shaggy petioles. Peduncles *densely setose*. Involucres *ventricose*, slightly hairy, *densely floccose* and *setose*. *Phyllaries acuminate* or *cuspidate*. Florets glabrous. Styles yellow.

H. lasiophyllum. Koch, Syn. p. 522. Fries, Symb. p. 97.?

H. cinerascens. Gren. and Godron, Flore de France, p. 370.

Heathy alpine glens at an elevation of 1000 to 2500 feet; rare. Glen Dole and Ravine of the White Water, Clova mountains. Near Castletown of Braemar. Ravine descending from Ben-na-bour. Little Craigindal, Aberdeenshire. Near Llyn Ogwen, Caernarvonshire. Craig Breidden, Montgomeryshire. Ben Bulbin, Sligo?

Flowers in 7th and 8th months.

Plant 8 to 20 inches high, with heads of medium size. *Root* rather woody, with few fibres, frequently elongated and clothed with the remains of leaf stalks. *Stem* brittle, striated, rough with long scattered white hairs, more or less *floccose* and *setose* in the upper part; simple and leafless, or with one small leaf near the base, and few (2 to 3) heads, or unequally bifid rather

the name of "*Hieracium glaucum pilosum foliis parum dentatis*," are evidently forms of *H. pallidum*; but on the same sheet is another plant (apparently a piece of *H. cerinthoides* β *anglicum*) which appears to have been taken for the same species. Both of these plants may now be found in the district referred to. "In loco declivi Gordil prope Malham Cravoniæ vicum." Other specimens in the same Herbarium, bearing the same number ("4896"), and to which the name "*Hieraciū alpinū* * * *rotundifoliū flore specioso from Malhā*" is annexed, apparently in the handwriting of Dr. Richardson, are unquestionably forms of *Hieracium vulgatum*.

below the middle and with 1 or 2 ascending or slightly diverging elongated branches each bearing 2 or 3 heads: lower branch supported by a leaf, upper one (near the top of the stem) surpassing the original flower. *Leaves* extremely glaucous or ash-coloured. Root-leaves broad, rounded at both extremities, apiculate and nearly entire, or occasionally acute; narrowed downwards, and more or less dentate in the lower half; rough on both sides, with long coarse scattered bulbous-based white hairs, which become more numerous as they approach the densely pilose margin; or destitute of hairs above; more or less floccose (especially beneath) with stellate down. Original leaves subrotund. Petioles usually rather short but sometimes elongated; dilated at the base, shaggy with villous hairs. Stem-leaves lanceolate, very acute, narrowed into a short petiole. *Peduncles* elongated, frequently rather arcuate, floccose and densely clothed towards the top with black gland-tipped setæ. *Involucres* subglobose. *Phyllaries* attenuated upwards, rather acuminate; innermost ones very acute or cuspidate; outermost frequently more or less obtuse. *Florets* bright yellow, perfectly glabrous. *Styles* yellow, sometimes clothed with faintly livid hairs.

Possibly this plant may be identical with that described by Fries in his Monograph as "*H. murorum pilosissimum*," from Ben Bulbin in Sligo. Not having specimens from that locality, I am not able to decide with certainty, but cannot regard the above as any variety or form of *H. murorum*. The brittle stem, extremely glaucous leaves, and slender elongated branches of *H. lasiophyllum* indicate an alliance with *H. argenteum*. From that species however it differs in being extremely hairy and in having broad and usually obtuse root-leaves and more acute phyllaries. These characters are permanent under cultivation.

Fries describes *H. lasiophyllum* as having "obtuse phyllaries," but recognises the *H. lasiophyllum* of Koch's Synopsis, (which is described as having "rather obtuse outer and acute inner phyllaries,") as identical with his *H. lasiophyllum*. With the

description of Koch, our plant seems to agree exactly, as also with the description of *H. cinerascens* of Grenier and Godron. Specimens of the latter kindly furnished me by Professor Grenier appear to be identical,* as also others collected by myself near Gudvangen in Norway.

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17. **H. GIBSONI.** Glauous green. *Stem wiry, simple or forked, leafless, with few heads, sub-glabrous. Root-leaves broadly ovate, obtuse, apiculate, rather truncate at the base, denticulate, glabrous above, pilose at or near the margins, with slender petioles. Peduncles bifid, straight. Involucres truncate at the base, floccose, with few hairs. Phyllaries broad, obtuse. Florets glabrous. Styles yellow.*

H. hypochæroides. Samuel Gibson, in Phytol. v. I. p. 907.

H. hypochæridis. Hook and Arn. Ed. 7, p. 222.

H. cæsium var. *hypochæridis.* Fries, Sym. p. 113.

H. cæsium β *hypochæridoides.* Bab. Man. Ed. 3, p. 196.

Mountain limestone districts of the north-west of Yorkshire. Abundant among debris at the foot of Giggleswick and Gordale Scars, near Settle.

Flowers in 7th and 8th months.

Plant 6 to 18 inches high (usually about 12 inches), with few heads of medium size. *Root* woody at the neck, with numerous strong fibres. *Stem* erect, rigid, wiry, slightly hairy when young, ultimately glabrous; frequently purplish red especially in the lower part; leafless and (usually) simple with 2 heads; or once forked, each branch bearing 2 heads. *Leaves* ovate or oblong, obtuse and apiculate; denticulate, with glandular

* The British and French plants are also regarded as identical by Grenier.

teeth, rarely dentate ; purplish and rather hairy beneath, spotted or blotched with deeper purple above ; more or less truncate at the base. Petioles rather short (rarely elongated), more or less villous. *Peduncles* rigid, supported at the base by a small (rarely) sub-foliaceous bract ; densely floccose, and setose. *Involucres* with scattered hairs and few setæ. *Phyllaries* short, very broad, obtuse, white at the margins with dense floccose down. *Florets* bright yellow.

I cannot regard this plant as any form of *H. cæsium*, nor indeed as being very closely allied to that species. Its nearly glabrous, ciliated leaves and yellow styles indicate a nearer alliance with *H. pallidum*, from which, however, it differs strongly in having always obtuse phyllaries, and involucres truncate at the base. Its few heads borne in pairs and wiry rigid stem also present, even in *cultivation*, a constant feature which induces me to regard it as a true species.

From the *H. ovalifolium* of Jordan it differs in having a more wiry stem, rigid (not flexuose) peduncles, firmer and less hairy leaves, broad truncate-based involucres, and very blunt but much less attenuate phyllaries.

Although this plant was originally described under the name of "*H. hypochæroides*," and subsequently, as a supposed variety of *H. cæsium*, as "*var. hypochæridis*" and "*var. hypochæridoides*," yet (not without due deference to the *rule* of priority), there is nevertheless so much that is unsatisfactory in the above-mentioned names that I believe no one will object to its bearing the simpler name of "*Gibsoni*," after its original discoverer, the late Samuel Gibson of Hebden Bridge.

18. **H. ARGENTEUM.** *Extremely glaucous.* Stem simple or branched, with one or few leaves, and few heads on elongated rigid peduncles, *fistulose*, glabrous. Root-leaves lanceolate, acute, *denticulate towards the middle* or entire, glabrous above; narrowed into short petioles. Stem-leaves sub-sessile. Involucres broadly ventricose, ultimately truncate below, with scattered hairs, *floccose*. *Phyllaries sub-obtuse, appressed.* *Florets glabrous.* *Styles yellow.*

H. argenteum. Fries, Symb. p. 99.

H. pallidum β *persicifolium.* Bab. Man. Ed. 3, p. 195.

Mountain districts of England, Scotland and Wales: rather local. Melbreak near Crummock Water, and Great End, Cumberland. Kilbo Corrie, Glen Fiadh, Corrie of Clova, Ravine of the White Water, and heathy hillocks near the Kirktown of Clova. Damp micaceous ravine above the Spital of Glen Shee. Rocky margins of the Clunie in Castle-town of Braemar. Craig Dhuloch, on granite. Harris, Hebrides. Foot of Snowdon, North Wales.

Flowers in 7th and 8th months.

Plant 1 to 2 feet high, with heads of medium size. *Root* slender, descending with few brittle fibres. *Stem* erect, *fistulose*, milky, brittle, rather rigid, striated, nearly or quite glabrous, with few (1 to 3) leaves; simple with 2 to 4 heads, or branched from the base, each branch bearing 1 to 3 heads. *Leaves* silvery-glaucous; glabrous, or with short scattered hairs beneath and at the margins. Root-leaves not numerous, 3 to 4 inches long, remotely denticulate, or dentate towards the middle; frequently entire or narrowed into slightly hairy (usually short) petioles. Original leaves rather obtuse. Stem-leaves sessile or lowest ones (rarely) stalked, lanceolate or linear-lanceolate; uppermost small. *Peduncles* elongated, rigid. *Buds* cylindrical. *Involucres* small, constricted above. Outer *phyllaries* incumbent in bud, usually

obtuse, with scattered brittle whitish hairs, stellate down at the margins, and a few setæ; inner ones sub-acute, sometimes obtuse, with pale margins. *Florets* bright yellow. *Styles* always pure yellow.

A strongly marked species, differing from its allies *H. pallidum* and *H. lasiophyllum*, in its brittle fistulose stem, elongated rigid peduncles, and in its nearly glabrous entire or denticulate leaves.

On elevated cliffs *H. argenteum* has simple stems and 1 to 3 heads, but in lower and less exposed situations it branches freely and has several heads. Under *cultivation* it branches from the base upwards.

19. H. NITIDUM. *Dark green.* Stem with one leaf or leafless, and with few heads, glabrous. *Root-leaves* lanceolate, acute, *sharply dentate or almost runcinate*, glabrous above, slightly hairy beneath and at the margins, narrowed into petioles. Peduncles, scaly, rigid. Involucres ventricose, with black-based hairs and setæ. Phyllaries acuminate or sub-obtuse. Florets sub-pilose at the tips. Styles yellow.

Rocky margins of alpine streamlets at an elevation of 1500. to 2500 feet: rare. On granite. Sides of the stream issuing from the Corrie of Ben-na-bour, and eastern side of Cairntoul, Aberdeen-shire.

Flowers in 7th and 8th months.

Plant 15 to 24 inches high, with medium sized or rather large heads. *Root* slender, woody at the neck, with few fibres. *Stem* rigid, wiry, glabrous or with a few scattered hairs in the lower part; with 1 leaf, usually near the base; simple and sub-corymbose at the top with few (2 to 5) heads, or (rarely?)

branched, and with 5 to 10 heads. *Leaves* firm, deep shining green, with pale midribs. Root-leaves ovate-lanceolate, or (innermost) lanceolate; acute, or sub-obtuse and apiculate; original ones rounded; irregularly and usually very coarsely dentate with large sharp teeth spreading or pointing forwards; narrowed into rather short or slightly winged and villous channelled petioles. Stem-leaf large if near the base of the stem; otherwise rather small, or when very distant, bract-like. *Peduncles* spreading, much thickened and with numerous scales on the upper part; setose; supported by minute linear bracts. *Involucres* rounded at the base, contracted above. *Phyllaries* acuminate or sub-obtuse, with pale margins: outermost short. *Florets* bright yellow, conspicuously (though shortly) pilose at the tips when in bud, ultimately nearly glabrous. *Styles* pure yellow.

Closely allied to *H. argenteum*, from which however it differs conspicuously in its wild state, in having dark green (not at all glaucous) strongly toothed leaves, a rarely branched firmer stem, and shorter peduncles. Under rich *cultivation*, besides retaining the characteristics which distinguished it when wild, it becomes densely rosulate with numerous leaves (sometimes 6 to 8 inches long, bearing enormous irregular teeth, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch in length) and forms a large repeatedly branched spreading corymb.

It may be distinguished from *H. pallidum* by its rigid stem and peduncles, deep green coarsely toothed leaves, and acuminate phyllaries.

20. H. AGGREGATUM. *Deep green. Stem with one leaf, umbellato-corymbose at the extremity, floccose, without hairs. Root-leaves broadly ovate, obtuse, coarsely dentate at the base, stalked, glabrous on both sides or slightly hairy beneath and at the margins. Stem-leaf sub-sessile. Peduncles erect, closely aggregated, densely floccose. Involucres narrow, rather turbinate at the base, ultimately conical, floccose, nearly destitute of hairs. Phyllaries obtuse. Florets glabrous.*

Margins of Alpine streamlets at an elevation of 1500 to 2500 feet : rare. Usually on granite. Glen Dee, and eastern slope of Cairntoul. Cliffs above Dhuloch, and on Little Craigindal, Aberdeenshire.

Flowers in 7th and 8th months.

Plant 15 to 20 inches high, with numerous small heads. *Root* slender, woody at the neck, with few fibres. *Stem* erect, rigid, frequently purplish below, glabrous throughout or floccose ; simple and with 1 (usually small) leaf near the base, or branched rather below the middle and having at the axil a (sometimes strong) leaf ; densely corymbose at the extremity, with numerous (3 to 17) heads on elongated slender erect peduncles, springing nearly from the same point ; when branched, each branch terminating (if sufficiently robust) in a similar sub-umbellate corymb. *Leaves* coriaceous, dark and rather dull green above, paler and slightly glaucous beneath. Root-leaves densely rosulate, apiculate ; nearly entire, or with distant glandular teeth in the upper part ; usually with very irregular blunt teeth below the middle and sharply dentate at the (sometimes slightly decurrent) base ; glabrous, or with few scattered deciduous hairs and stellate down beneath, minutely villous at the margins when young. *Petioles* reddish, nearly glabrous. *Stem-leaf* lanceolate, acute, sharply toothed (when large), narrowed downwards to a nearly or quite sessile base. *Peduncles* slender, elongated, simple or bifid, white with dense stellate down, more or less thickened upwards, destitute

of hairs. *Involucres* green, cylindrical in bud, ultimately conical; truncate or constricted at the base after flowering, with very few hairs, but hoary with coarse stellate down. *Phyllaries* rather porrect in the bud, obtuse or sub-acuminate, few innermost occasionally cuspidate. *Florets* bright yellow, perfectly glabrous. *Styles* yellow or faint orange, sometimes clothed with a few minute darker hairs.

Though in some respects strongly resembling *H. cæsum*, yet *H. aggregatum* widely differs in appearance from that species in its umbellate corymb of narrow sub-cylindrical heads on long slender petioles, and in having more coriaceous leaves and yellowish (not livid) styles. Even when the plant is so feeble as to produce only 3 heads, the peculiar arrangement of the peduncles is frequently exhibited, though sometimes it occurs with fewer and more branched heads. As it retains its distinctive features under *cultivation* I am induced to name it as above.

On Little Craighindal it occurs with very dark heads (less aggregated, but still showing the *tendency* to form an umbellate corymb), and is conspicuous for the whiteness of its densely floccose peduncles. This form in some respects closely resembles the continental *H. bifidum*, to which it is referred by Grenier; but from the *description* of that species in Fries' *Symbolæ*, *H. aggregatum* differs in having dark green (not glaucous) leaves, a stem but little branched and usually corymbose at the top only, and in having obtuse (rarely cuspidate) phyllaries.

[*H. OREADES*, (Fries), which has a leafy branched stem, oblong obtuse, glaucous leaves denticulate in the middle, sessile stem-leaves; floccose tumid or truncate involucres with scattered white hairs, obtuse phyllaries, florets pilose at the tips, and yellow styles, is regarded by Fries as British on the authority of Dillenius. I am not, however, satisfied to retain it as a

British species, believing that the Gordale plant was *H. pallidum*† and not identical with the continental *H. oreades*.]

[*H. SAXIFRAGUM* (Fries), which differs from the preceding in having a more rigid stem, leafy in the lower part and branched above, lanceolate leaves, and acuminate phyllaries (also enumerated by Fries as British) I omit, fearing that approximating forms of *H. argenteum* or of *H. nitidum* have been mistaken for it.

Professor Grenier informs me that Scottish specimens of *H. argenteum* transmitted to him, are to all appearance precisely similar to his specimens of *H. saxifragum* received from Fries, showing how closely they often resemble each other when in a dried state.]

* *Styles more or less livid.*

21. H. MURORUM. *Light green.* Stem with one or few leaves, corymbose above. Root-leaves ovate, denticulate, or sharply dentate at the rounded or cordate base, slightly hairy, with slender petioles. Stem-leaf stalked. Peduncles short, arcuate. Involucres green, with black-based villous hairs and numerous setæ, floccose. Phyllaries acute, inner ones acuminate. Florets glabrous or slightly pilose at the tips.

H. murorum. Linn. Sp. Pl. vol. ii. p. 1128. Fries, Symb. p. 108. Gren. & Godr. p. 372. E. B. t. 2082. Koch, Syn. p. 522. Bab. Man. Ed. 3, p. 196. Hook. and Arn. Ed. 7, p. 221.

β **ROTUNDATUM.** Stem elongated, frequently leafless. Root-leaves broadly ovate, rounded at both extremities or cordate at the base, denticulate or entire.

H. murorum var. *rotundatum.* Fries, Symb. p. 109.

Abundant in rocky situations in almost every part of the country,

† See note under *H. pallidum*, page 44.

especially on magnesian, oolite, and mountain limestone : ascending to an elevation of 2500 to 3000 feet.

β rotundatum : rare. Canlochen Glen, Forfarshire.

Flowers in 6th, 7th and 8th months.

Plant 1 to 2 feet high, with rather small heads. *Root* descending, with few fibres. *Stem* erect, easily compressed, with scattered brittle white hairs and stellate down (especially in the upper part) or sub-glabrous ; usually with 1 leaf but sometimes leafless or (more rarely) with 2 or 3 leaves ; more or less corymbose at the top with numerous (5 to 12 or 15) heads. *Leaves* thin, light green. Root-leaves ovate, obtuse or rather acuminate, apiculate, denticulate or irregularly and sharply dentate (especially at the rounded or cordate base, where there are frequently long, sharp, deflected or spreading teeth) ; with scattered soft hairs on both sides and at the margins, or sub-glabrous above ; destitute of stellate down ; with long villous petioles. Stem-leaf ovate acuminate ; when large distinctly stalked, frequently incised at the base which is usually rounded or cordate. *Peduncles* rather short, spreading and more or less arcuate ; floccose and setose ; frequently with scaly bracts at the base. *Buds* cylindrical. *Involucre*s dull green, rather ventricose, with black-based hairs, more or less stellate down, and (in the alpine form) densely clothed with black gland-tipped setæ. Outer *phyllaries* rather acute ; inner ones acuminate ; few innermost occasionally attenuate and sub-obtuse ; frequently floccose at the margins and points especially in the alpine form. *Florets* bright yellow. *Styles* more or less livid, rarely pale (almost creamy) yellow.

Though in some instances closely resembling forms of its nearly *H. caesium* when in a wild state, especially when growing at a great elevation, yet under *cultivation* *H. murorum* assumes a widely different appearance ; producing a more leafy stem, thinner, pale or yellowish-green root-leaves, distinctly stalked lower stem-leaves, and a corymbose panicle of smaller but much more numerous heads on more or less arcuate peduncles.

22. H. CÆSIUM. Cæsious or dull green. *Stem nearly or quite leafless, with few heads. Root-leaves ovate or lanceolate, rounded or attenuated to a more or less dentate base; subglabrous above, rather hairy beneath and at the margins; stalked. Peduncles straight, floccose. Involucres ventricose, rounded at the base, with few short hairs, hoary with stellate down. Outer phyllaries sub-obtuse; inner ones attenuate, acute. Florets glabrous. Styles livid..*

H. cæsium. Bab. Man. Ed. 3, p. 196. Hook. & Arn. Ed. 7, p. 222. Fries' Symb. p. 112. ?

Mountain districts, not unfrequent: occasionally found also in the low country. Giggleswick and Gordale Scars near Settle. Clova mountains, &c. &c.

Flowers in 6th, 7th and 8th months.

Plant 12 to 18 inches high, with medium sized or rather large heads. *Root-stock* usually elongated, creeping, thick and woody, with scattered fibres. *Stem* erect, with few scattered hairs in the lower part, minutely floccose above, sometimes nearly glabrous throughout; leafless, or with a single small leaf near the base, or a very small (frequently bract-like) leaf near the middle; sub-corymbose with few (3 to 7) heads on simple or branched peduncles. *Leaves* coriaceous. *Root-leaves* sub-acute, or obtuse and apiculate; irregularly dentate especially at the base, or sharply serrate, with teeth spreading or pointing forwards; glabrous, or with scattered rather coarse hairs above, hairy at the margins and more or less so on the under-side; sometimes glabrous throughout when old: innermost leaves occasionally acuminate or very acute: rounded below, or suddenly narrowed into more or less elongated villous petioles. *Stem-leaf* much reduced, narrowed to a nearly or quite sessile base. *Involucres* rather globose, with scattered, short, black-based, soft hairs, or hoary with dense stellate down;

nearly destitute of glands. Innermost *phyllaries* usually very attenuate and acute. *Florets* bright yellow. *Styles* faintly livid.

The resemblance of this species, in some of its forms especially, to *H. pallidum*, *H. lasiophyllum* and *H. murorum*, is considerable. It may be distinguished from the *first* of these by its smaller stem-leaf, sub-obtuse phyllaries, perfectly glabrous florets, and rather livid styles; also by the absence of the long rigid coarse hairs which usually fringe the root-leaves of that species. From all the forms of *H. lasiophyllum* it differs in having more acute root-leaves, and in the absence of the very coarse hairs which clothe both surfaces of the leaves of that species more or less densely: also in having livid styles. Lastly, it may be distinguished from *H. murorum* by its coriaceous, darker green root-leaves, much reduced stem-leaf narrowed to a nearly or quite sessile base, straighter and longer peduncles, larger and fewer heads, more floccose but less setose involucre, obtuse or sub-obtuse outer and *very attenuate pointed innermost phyllaries*.

Fries describes *H. cæsium* as having "one or few leaves," which character is maintained in specimens from the vicinity of Christiania given to me as the true *H. cæsium* by Professor Blytt. Some of these, indeed most of them, have a large stalked stem-leaf, and seem to be very closely allied to *H. murorum*, if indeed they are distinct from that species. This circumstance makes me doubt the identity of the plant above described (which has a much reduced stem-leaf or none at all) with the *H. cæsium*, Fries' Symb. p. 112.

The species of which the Giggleswick plant may be regarded as typical, agrees well with the description of "*H. cæsium*" in Grenier and Godron's Flore de France. p. 371. On the Clova and Braemar mountains a plant not unfrequently occurs with more rigid less hairy broader-based root-leaves, a rather large stem-leaf, and less attenuate inner phyllaries, which is no doubt the plant described by Fries as *H. cæsium*; indeed specimens of it transmitted to Fries are acknowledged by him to be that species. The Giggleswick plant may eventually prove distinct from this, but as yet I have not found characters sufficiently marked to warrant their separation.

Amongst the numerous roots which I have at different times collected among the Clova mountains for *H. casium*, are several of a plant that assumes under *cultivation* an appearance so conspicuously diverse from both the above, that I feel no doubt of its distinctness; and yet from insufficient acquaintance with the wild form, I object at present to call it a species, but wish to direct attention to it. For the present it may be described by the following character and provisional name.

H. OBTUSIFOLIUM. *Yellowish green.* Stem erect with one leaf, corymbose. Original *root-leaves ovate* or broadly elliptical, *rounded at both extremities*, nearly or quite *entire*, *soft*, with short hairs. *Petioles densely villous*. Peduncles spreading. Involucres ventricose, ultimately truncate at the base. Phyllaries acuminate. Florets shortly pilose at the tips. Styles rather livid.

In size this plant is intermediate between *H. casium* and *H. cerinthoides*. It has a rather large shortly-stalked stem-leaf, lanceolate or ovate-lanceolate more or less dentate *inner* root-leaves, and pale *creamy yellow florets*.

When *cultivated* it is strongly marked by having the original root-leaves (the winter rosette) pale yellowish green, soft, *entire and rounded at both extremities*, with short very shaggy petioles. It is corymbose with numerous heads: outer branches and peduncles exceeding the primary head: florets always pale (creamy) yellow.

23. **H. STELLIGERUM.** *Ashy green. Stem rather leafy, sub-corymbose, with few heads, floccose throughout. Root-leaves ovate, obtuse or sub-acute, denticulate or dentate, hoary on both sides with minute stellate down, narrowed into long petioles. Stem-leaves large, half clasping. Peduncles floccose. Involucres ovate at the base, hoary and with scattered whitish hairs. Phyllaries acuminate. Florets glabrous.*

H. stelligerum. Froel. in De Cand. prod. v. 7, p. 214? Fries, Symb. p. 107?

Margins of alpine streamlets at an elevation of 1500 to 3000 feet : rare. Eastern side of Cairntoul and higher part of Glen Dee. Cliffs near Dhuloch and Loch-na-nean. Near Kirktown of Clova.

Flowers in 7th and 8th months.

Plant 1½ to 2 feet high, with rather large bright yellow flowers. *Root* short, rather woody, with numerous fibres. *Stem* erect, with few scattered brittle hairs near the base only, but clothed with minute floccose down; with 1 or 2 leaves (rarely more) and 2 or 3 heads; or branched, usually near the middle, and with 5 to 7 heads. *Leaves* hairy beneath and at the margins, or destitute of hairs; beautifully clothed on both sides, especially when young, with minute stellate down. *Root-leaves* soft and frequently very large; broadly ovate or ovate-lanceolate, obtuse, or sub-acute and apiculate, dentate (chiefly in the lower half) with sharp spreading teeth, or denticulate with gland-tipped teeth; narrowed rather suddenly into long somewhat villous slender or slightly winged petioles. *Stem-leaves* large, similar in shape to the root-leaves, or slightly acuminate; lower one frequently stalked with a winged slightly clasping petiole, and 3 to 5 inches in length: upper leaf (at the base of the branch) nearly or quite sessile and usually half-clasping. *Peduncles* ascending or slightly arcuate, with few scales, more or less elongated, hoary with stellate

down. *Involucres* rather floccose, with numerous brittle black-based white hairs and a few setæ. *Phyllaries* slightly acuminate, or attenuate and sub-acute, innermost occasionally cuspidate. *Florets* nearly or quite glabrous. *Styles* livid, but sometimes so faintly as to appear almost yellow.

In the wild state this plant differs from *H. cæsium* in being floccose throughout and of a more robust habit; also in its taller and less rigid stem, much larger soft root-leaves, and half clasping stem-leaves.

Under *cultivation* this species becomes very robust, bearing a profusion of unusually large soft root-leaves, and branching from every axil on its leafy stem, frequently forming a spreading corymb of 15 to 25 heads. It is conspicuous for its mealy appearance, caused by the remarkable covering of very minute stellate down which clothes the whole plant. This character is sometimes scarcely discernible on the upper surface of the root-leaves when old.

Though differing in some respects from the *H. stelligerum* of Froel. and Fries, I believe that this plant is a form of the same species. The usual presence of *hairs* on the leaves and stem, more robust habit, and occasionally more numerous and somewhat clasping stem-leaves, are but slender authority for the separation of a species; and although neither Fries nor Grenier (to whom I have transmitted specimens) identify our plant with the continental *H. stelligerum*, and I am only acquainted with that species from the descriptions of it in the works of foreign authors, I nevertheless prefer adopting that name rather than giving a new one. Should it ultimately prove to be distinct from the true *H. stelligerum* it may bear the name of *H. flocculosum*, under which (provisional name) numerous specimens have already been circulated.

24. H. VULGATUM. Green or glaucous. *Stem leafy*, simple or branched, *paniculate-corymbose*. Leaves oblong or lanceolate, acute or sub-obtuse, dentate in the middle or nearly entire; with scattered hairs; narrowed to the base. Root-leaves stalked. *Lower stem-leaves stalked: upper ones sessile*. Peduncles straight, floccose, setose. Involucres cylindrical in bud, setose, slightly floccose, more or less clothed with black-based hairs. *Phyllaries equally attenuate, sub-acute*. Florets glabrous. *Styles livid*.

H. vulgatum. Fries, Symb. p. 115. Koch, Syn. p. 521. Bab. Man. Ed. 3, p. 197.

H. sylvaticum. E. B. t. 2031. Gren. and Godr. p. 375. Hook and Arn. Ed. 7, p. 223.

H. maculatum. E. B. t. 2121.

H. Pulmonaria dictum angustifolium. Ray's Syn. Ed. 3, p. 168.

β CINEREUM. Ashy green or glaucous. *Stem short, with few sub-entire leaves*; much branched. Root-leaves few, obovate-lanceolate. *Involucres nearly destitute of glands*. *Phyllaries broad, more obtuse*.

H. vulgatum var. ericetorum. Fries, Symb. p. 116?

γ RUBESCENS. Green. Stem robust, purplish red. *Leaves ovate*. Root-leaves numerous. Stem-leaves few (1 or 2), sub-sessile or slightly clasping. *Heads few, large*. *Phyllaries broad, sub-acuminate*.

Abundant from near the sea level to the Alpine region (at an elevation of 3500 feet on Cairntoul.)

β cinereum. Great Ormeshead, North Wales.

γ rubescens. Giggleswick and Gordale Scars, near Settle.

Flowers in 7th, 8th, and 9th months.

Plant 12 to 30 inches high, very variable in form: usually with numerous heads of medium size. *Root* woody at the neck,

rarely elongated, with strong fibres. *Stem* erect, usually rigid, sometimes rather fistulose; with scattered hairs especially in the lower part (sometimes glabrous when old), more or less floccose above; usually leafy and simple, occasionally branched in the upper part (rarely from the base); forming a corymbose panicle of numerous heads on rigid, erect or diverging rather short peduncles: in the Alpine form sometimes sub-corymbose with few (5 to 7) larger heads on more elongated and remote peduncles. *Leaves* dull or pale green, frequently tinged or blotched with reddish purple. Root-leaves not numerous, sometimes reduced to 1 or 2 when the plant is in flower, and withering before the stem-leaves; lanceolate, ovate-lanceolate, or ovate; hairy or sub-glabrous above; denticulate, sub-entire, or with elongated spreading teeth at the base descending on to the more or less decurrent hairy petioles. Stem-leaves usually numerous and with sharp teeth (pointing forwards) near the middle, entire towards the point, rarely entire throughout; acute or acuminate; lower ones more or less stalked; upper ones sessile, or sub-sessile: occasionally (in the Alpine form) with 1 or few large ovate-lanceolate sharply toothed sessile, or entire sub-sessile stem-leaves. *Peduncles* straight; that bearing the primary head usually short and much surpassed by the more or less diverging lateral ones; uppermost often closely aggregated; floccose, and more or less setose; supported by bracts, never leafy. *Involucres* ovate, or truncate at the base after flowering; sometimes nearly destitute of stellate down and black-based hairs. *Phyllaries* rather broad, evenly narrowed to a sub-acute or bluntly acuminate point: occasionally (in the primary head, when luxuriant in the Alpine form), more attenuate and cuspidate. *Florets* golden yellow. *Styles* always more or less livid.

Var. cinereum is conspicuous for its colour, which is intermediate between that of *H. cæsium* and *H. argenteum*. Possibly this plant may be identical with the *var. ericetorum* of Fries, which is described as having "involucres without glands." In our

plant the setæ are scarce and usually hardly discernible. It is permanent under *cultivation*, remaining unchanged from seed, and may not improbably prove a distinct species.

Var. rubescens is the handsomest form of *H. vulgatum* with which I am acquainted. Its robust and highly coloured purplish red stem, numerous large broadly ovate sub-acuminate irregularly toothed root-leaves, few (1 to 3) distant sessile or slightly clasping stem-leaves, and large heads of deep golden florets, present features so unlike other forms of *H. vulgatum*, that were it not for cultivation (which brings it so near to the typical form, that even its right to the name of a *variety* is questionable), few would, I think, suppose it, on first sight at least, to belong to this species.

The following *forms* of *H. vulgatum*, which present a distinct appearance when wild, and yet so closely resemble each other when cultivated as to make their claim to the name of “varieties” very doubtful, may be briefly described as under :

H. vulgatum maculatum. Stem rigid, with numerous strongly toothed leaves; frequently spotted or blotched with reddish purple. Root-leaves usually withering before the plant is in flower. Peduncles short, divaricated. Heads numerous, paniced, contiguous.

H. maculatum. Sm. E. B. t. 2121.

H. vulgatum nemorosum. Leaves lanceolate or ovate, remotely dentate or denticulate; clouded or blotched with purple. Stem-leaves few (1 to 3) distant. Heads few, sub-corymbose.

H. vulgatum ϑ *nemorosum.* Bab. Man. Ed. 3, p. 197.

H. vulgatum montanum. Stem short, with one or few sessile dentate leaves. Root-leaves numerous, large, ovate, sharply toothed at the base (resembling forms of *H. murorum*). Peduncles elongated. Heads few, large, rather distant.

H. vulgatum macrocephalum. Stem-leaves few, entire, sub-sessile. Root-leaves elliptic-lanceolate, with shorter teeth and rather long petioles. Heads few, very large. Phyllaries of the

primary head very attenuate and cuspidate. Intermediate in appearance between *H. vulgatum* and *H. nigrescens*. Cairntoul 3000 to 3500 feet.

[*H. PLUMBEUM*, which differs from *H. cæsium* in having a more leafy stem, dark green involucre destitute of stellate down, cuspidate phyllaries, and fuliginous styles, is regarded by Fries as British, but as no native locality is known to British Botanists, I am best satisfied to omit it. Professor Grenier, to whom I transmitted specimens of our British form of *H. stelligerum*, mentions their strong similarity to his specimens of the *H. plumbeum* of Fries. Our plant differs however so conspicuously from my Scandinavian specimens of *H. plumbeum*, that I cannot identify it with that species.]

d. PSEUDO-ACCIPITRINÆ.

Involucre sub-glabrous. Root-leaves frequently forming a winter rosette, but rarely present when the plant is in flower.

25. H. GOTHICUM. *Dark green. Stem rigid, leafy, sub-corymbose at the extremity with few heads, or branched. Leaves lanceolate or ovate, acute, denticulate or dentate in the middle, sub-glabrous above. Root-leaves shortly stalked, usually evanescent. Upper stem-leaves sessile. Peduncles ascending, floccose. Involucres dark green, globoso-ventricose, with scattered whitish hairs or nearly glabrous. Phyllaries broad, spirally imbricated, obtuse. Florets glabrous. Styles yellow, or with minute livid hairs.*

H. Gothicum. Fries, Symb. p. 121. Bab. Man. Ed. 3, p. 198. Hook. & Arn. Ed. 7, p. 223.

β LATIFOLIUM. Stem branched in the upper part. *Leaves broadly ovate-lanceolate, denticulate.* Root-leaves usually persistent. Heads very large. *Styles yellow.*

Heathy or grassy places in sub-alpine districts. Margin of the Esk, one mile below the Kirktown of Clova. Near Castletown of Braemar. Teesdale. Connemara. Above Llyn-y-Cae, Cader Idris. Snowdon. Llanberis.

β latifolium. Heathy hillocks near the Kirktown of Clova.

Flowers in 7th, 8th and 9th months.

Plant $1\frac{1}{2}$ to 4 feet high, with large and handsome heads. *Root* descending with strong fibres, sometimes rather woody, but scarcely thickened at the neck. *Stem* erect, rigid, wiry, frequently purplish in the lower part, and with rather long scattered white hairs, or nearly glabrous throughout; with numerous (7 to 20) leaves; simple and sub-corymbose at the extremity with few (3 to 5) heads, or forming a corymbose panicle of numerous heads; not unfrequently branched from the base upwards; the branches slender, leafy and elongated, with few heads. *Leaves* dark or dull green, paler or rather glaucous beneath, usually firm in texture and similar in form throughout; acute, or sub-obtuse; denticulate or remotely and irregularly dentate with sharp or blunt teeth in the middle, pointing forwards; entire towards the point, and frequently throughout the upper half. Root-leaves frequently withering before the heads are developed. Stem-leaves more or less aggregate towards the base (sometimes so densely and so near the root as to resemble true root-leaves), shortly stalked or sub-sessile; gradually becoming less numerous, smaller, and sessile or scarcely clasping, as they approach the peduncles; uppermost usually rounded at the base. *Peduncles* erect or ascending, rigid, floccose when young, sometimes slightly hairy; with leaves or bracts at the base. *Involucres* cylindrical in bud, rounded and sometimes truncate at the base after flowering, without

glands, and nearly destitute of stellate down. *Phyllaries* deep green, broad, obtuse, frequently rather lax but incumbent at the tips; sub-glabrous or with scattered black-based or brittle whitish hairs. *Florets* bright but not deep yellow. *Styles* more or less livid, or yellow and clothed with minute darkish hairs.

Var. latifolium is much more robust, but *comparatively* shorter when of equal vigour. Stem purplish red, rather hairy. Root-leaves more persistent, very broad, obtuse, entire or denticulate, rarely dentate. Stem-leaves large, broad, distant. Peduncles more elongated. Innermost *phyllaries* frequently with pale margins.

One of our handsomest species, differing little, when *cultivated*, from the form it assumes in a wild state when luxuriant. Under cultivation the styles of the typical form are livid, but those of the *var. latifolium* (which always retains its short robust habit and broad leaves) are permanently yellow.

This species appears to connect the two great divisions of "*Pulmonaræ*" and "*Accipitrinæ*," exhibiting occasionally the characteristics of both sections.

[*H. DOVRENSE*, which has *oblong* or lanceolate, *irregularly dentate* stalked small evanescent root-leaves, large *cordate* or broad-based *half clasping stem-leaves*, *broad obtuse phyllaries*, and florets pilose at the tips, is stated by Fries to have been found in Scotland (Symb. Hier. p. 129). I have gathered this species near Nystuen on the Fille-fjeld in Norway, and have specimens also from the Dovre-fjeld; but I have never seen anything like them in Scotland, except a reduced high alpine form of *H. cerinthoides*, which approximates to it in appearance, and to which species (or *H. Iricum*) the plant spoken of in Babington's Manual, Ed. 3, p. 197, must probably be referred. I have examined the banks of the Clunie carefully, but find no trace of *H. Dovrense*. It requires further search, and may possibly yet be found.]

THIRD DIVISION.

A C C I P I T R I N A .

WITHOUT TRUE ROOT-LEAVES. FORMING IN AUTUMN, AT THE BASE OF THE STEM, CLOSED BUDS, WHICH THE NEXT SEASON BECOMES LEAFY STEMS. PHYLLARIES IN MANY ROWS. HAIRS OF THE PAPPUS RIGID, UNEQUAL.

a. PSEUDO-PULMONAREÆ.

Stem leafy, occasionally forming small rosettes of leaves at or near the base, similar in appearance to those of the "*Pulmonareæ*," but not persistent during winter. Stem-leaves never clasping.

26. **H. TRIDENTATUM.** Stem leafy, sub-corymbose. *Leaves lanceolate or ovate, dentate in the middle with few teeth; lower ones obtuse, narrowed into petioles: upper ones acute, sessile, rounded at the base. Branches and peduncles slender, nearly or quite leafless. Involucres ovate or rounded at the base, ultimately truncate and constricted in the middle; with scattered blackish hairs or setæ. Phyllaries green, with pale margins, obtuse or sub-acuminate. Florets glabrous. Styles livid, with dark hairs.*

H. tridentatum. Fries, Symb. p. 171. Gren. & Godr. p. 183. Bab. Man. Ed. 3, p. 197. Hook. & Arn. Ed. 7, p. 225.

H. rigidum. Koch. Syn. p. 530.

H. rigidum var. β Hartmann, Scand. 3, p. 187.

Banks and margins of woods: not uncommon. Teesdale. Near Thirsk. Langwith, &c. near York. Cheshire. Dorking and Ockham, Surrey. Walls at Petworth, Sussex. Tunbridge Wells, Kent.

Flowers in 8th and 9th months.

Plant 2 to 5 feet high with numerous small or medium sized heads. *Stem* erect and rigid, or rather flexuose, usually hollow and easily compressed, hairy in the lower part, glabrous above, with numerous leaves (10 to 20) gradually diminishing in size from the middle of the stem upwards, and frequently reduced to leaf-like bracts, or altogether absent at the base of the peduncles; corymbose, sub-racemose, or paniced, with filiform elongated branches and peduncles. *Leaves* green, paler beneath, falsely 3 veined,* sub-glabrous above, rather hairy beneath especially on the midrib which is villous at its junction with the stem; dentate towards the middle with 3 or 4 usually large distinct sharp teeth spreading or curved upwards; lowermost leaves lanceolate or oblong, more or less obtuse, narrowed into petioles: intermediate ones shortly stalked or sessile, lanceolate or ovate-lanceolate, acute: uppermost sessile, broadly ovate and rounded at the base, or lanceolate, acute or rather acuminate. *Peduncles* erect, rather elongated, floccose, sometimes with few scattered hairs. *Involucre*s frequently forming an acute cone from a rounded or ventricose base, finally truncate. *Phyllaries* more or less obtuse, occasionally sub-acuminate, rarely acute. *Pappus* rufescent.

The above species may be distinguished from *H. vulgatum* by its taller and more leafy stem and the (usual) absence of true root-leaves; also by the villous base of its petioles, or (when the leaves are sessile) of their midrib, which is often curiously tufted with short hairs at its junction with the stem. It also differs in having few sharp and usually large teeth towards the middle of the leaves

* For the description of the term "sub-reticulate" or "falsely 3 veined" see Preface, page viii.

(which frequently give the idea of distinct teeth set upon an otherwise entire leaf), sub-glabrous involucre more or less constricted in the middle and truncate at the base after flowering.

H. tridentatum is usually destitute of root-leaves, but occasionally produces a small rosette at or near the base of the stem. It does not however (so far as I have observed) retain any rosette during the winter months. Under *cultivation* it becomes extremely luxuriant, frequently 6 feet high, and forms a racemose corymb.

b. APHYLLOPODÆ.

Stem leafy, never forming persistent rosettes at the base. Inner phyllaries more or less obtuse.

* *Florets minutely pilose or sub-glabrous at the tips.*

27. H. PRENANTHOIDES. Without root-leaves. Stem leafy, hairy, with a spreading leafy branched *corymbose panicle*. Leaves reticulate and rather glaucous beneath, sub-denticulate, hairy; *lower ones tapering into a clasping petiole; intermediate with an auricled clasping base; upper ones cordate, sessile. Peduncles short, densely floccose and setose. Involucres cylindrical in bud, rather floccose, densely clothed with black gland-tipped setæ. Phyllaries few, obtuse: outermost small. Florets pilose at the tips. Styles with dark hairs.*

H. prenanthoides. Fries, Symb. p. 160. Koch, Syn. p. 527. E. B. t. 2235. Gren. & Godr. p. 379. Bab. Man. Ed. 3, p. 198. Hook. & Arn. Ed. 7, p. 224.

Not unfrequent in the sub-alpine districts of Scotland, but scarce in England. Banks of the South Esk, Forfarshire. Castletown of Braemar. Bredalbane district, &c. Near Settle and in Hackfall woods near Ripon, Yorkshire. Allendale, Northumberland.

Flowers in 8th and 9th months.

Plant $1\frac{1}{2}$ to 3 feet high with numerous small heads. *Stem* erect, sometimes rigid and frequently reddish; hairy or glabrous, leafy throughout forming a lax spreading corymbose panicle. *Leaves* green, paler or glaucous beneath, reticulated with slender loosely anastomosing veins, minutely and remotely (often obscurely) denticulate, more or less hairy on both sides, ciliated; lower ones oblong, more or less obtuse, attenuated at the base into winged half-clasping petioles: intermediate leaves (including the greater number) narrowed below the middle and usually again enlarged into an auricled clasping base: upper ones broadly ovate, cordate and strongly clasping; few uppermost (at the base of the branches or peduncles) attenuated gradually from a broad rounded base. *Peduncles* short, spreading, rather lax, hoary with stellate down, densely clothed with black setæ. *Heads* very small. *Phyllaries* incumbent in bud, in two series of very unequal length. *Florets* bright yellow, shortly but distinctly pilose at the tips. *Styles* yellowish or livid, with minute dark hairs.

A strongly marked species, retaining all its distinctive characters under *cultivation*, with scarcely any change.

28. **H. STRICTUM.** Without root-leaves. *Stem* leafy,* irregularly corymbose at the top. *Leaves* glaucous and sub-reticulate* beneath, denticulate, *scarcely clasping*; lower ones lanceolate; intermediate ovate or oblong-lanceolate; upper ones rounded at the base. *Peduncles* straight, simple or slightly branched, floccose. *Involucres* elliptico-cylindrical; with scattered stellate down; setose, or with brittle whitish hairs; or glabrous. Outer phyllaries sub-acute: inner ones obtuse. *Florets* nearly glabrous. *Styles* with dark hairs.

H. strictum. Fries, Symb. p. 164. Bab. Man. Ed. 3, p. 198. Hook. & Arn. Ed. 7, p. 225.

H. fruticosum latifolium glabrum. Ray's Syn. Ed. 3, p. 168.

Sub-alpine districts. Patterdale and near Lorton, Cumberland. Inverarnan, Oban, and Arroquhar, Argyleshire. Fall of Foyers, Invernesshire. "Ochills and Bredalbane." Glenmalure, Co. Wicklow.

Flowers in 7th and 8th months.

Plant $1\frac{1}{2}$ to 3 feet high, with rather small heads. *Stem* erect, hollow, glabrous or with scattered hairs; leafy throughout; corymbose at the extremity with simple or slightly branched peduncles. *Leaves* numerous but scattered, dull green or rather glaucous, usually glabrous above; beautifully glaucous beneath, falsely 3 veined, and sometimes rather hairy beneath, and with very minute glands or glandular hairs at the margins; denticulate or sub-dentate in the middle: lower leaves lanceolate, sub-obtuse (lowest, when close to the root, occasionally with distinct petioles): intermediate ones oblong-lanceolate or ovate, acute, narrowed to both extremities, or rounded at the base and slightly clasping; upper ones (at or near the base of the peduncles) narrowed towards the point from a broad rounded sessile base. *Branches* of the

* See note under *H. tridentatum*.

corymb and *peduncles* straight, erect or ascending; usually leafless, but occasionally with minute leaves; rather floccose, nearly or quite destitute of setæ. Heads not numerous. *Involucre*s with few scattered brittle white hairs and a little stellate down near the base. *Phyllaries* green: inner ones rather broad, with pale margins. *Florets* bright yellow; glabrous, or sometimes obscurely pilose at the tips when in bud. *Styles* livid or nearly yellow, clothed with minute dark hairs. *Pappus* rufescent.

Nearly allied to *H. prenanthoides*, but differing from that species in being more glaucous and less hairy; also in having less clasping leaves (never auricled at the base), longer straight peduncles usually without setæ, a simple or slightly branched corymb, rather larger heads, sub-glabrous involucre, and florets nearly or quite destitute of cilia.

Extreme forms of *H. strictum* sometimes also resemble forms of *H. rigidum*, but differ in having thinner leaves, a less rigid stem, and in never forming the large dense compound corymbose panicle which marks that species.

* * *Florets glabrous at the tips.*

29. **H. UMBELLATUM.** Without root-leaves. Stem rigid, leafy, corymbose, or sub-umbellate. Leaves linear, or oblong-lanceolate, acute, denticulate, dentate or nearly entire, sessile, narrowed or rounded at the base. Peduncles slender, without hairs or setæ. *Involucre*s dark green, sub-truncate or turbinate at the base; glabrous, or with few brittle white hairs. *Phyllaries* broad, obtuse, with recurved points: outermost acute. Florets glabrous. Styles yellow.

H. umbellatum. Linn. Sp. Pl. vol. ii. p. 1131. Fries, Symb. p. 177. Gren. & Godr. p. 387. Bab. Man. Ed. 3, p. 199. Hook. and Arn. Ed. 7, p. 226. Koch, Syn. p. 530. E. B. t. 1771.

H. fruticosum angustifolium majus. Ray's Syn. Ed. 3, p. 168.

β FILIFOLIUM. Stem leafy throughout. *Leaves* elongated, very narrow, entire, revolute at the margins. Heads sub-corymbose.

Pulmonaria graminea. Ray's Syn. Ed. 3, p. 168?

Thickets and margins of woods, especially in sandy or moory soil; also in rocky or stony places in sub-alpine districts. Not unfrequent in England and Ireland.

β filifolium. Rare. Harper's Island, Lough Neagh, Co. Antrim. Flowers in 7th, 8th and 9th months.

Plant 1½ to 4 feet high, with large and handsome heads. *Stem* erect, simple, wiry, solid, hairy or shaggy in the lower part, glabrous or slightly hairy and floccose above; with very numerous leaves gradually diminishing in size and becoming more scattered as they approach the peduncles where they pass insensibly into bracts; sometimes with densely aggregated leaves below the middle: forming a more or less umbellate corymb of few (3 or 4), or numerous heads, on slender, erect wiry peduncles; occasionally racemoso-corymbose. *Leaves* green, glabrous above, or hairy on both sides; linear, linear-lanceolate, or oblong-lanceolate, usually similar in form throughout; remotely denticulate, sub-dentate, or nearly entire; reticulated beneath with ascending anastomosing veins; sessile: lower leaves attenuated or narrowed at the base; upper ones sometimes broad and rounded at the base. *Peduncles* slender, rigid, more or less elongated and scaly; floccose, but destitute of hairs and setæ. *Involucres* broadly ovate or sub-cylindrical, dark green, or (rarely) pale straw-colour; nearly or quite destitute of stellate down, without hairs or setæ. *Phyllaries* of one colour throughout, more or less recurved at the points; inner ones rather broad and attenuate, very blunt: outermost frequently very small, slender and acute. *Styles* yellow, sometimes clothed externally with minute dark hairs.

The "*var.*" *filifolium* differs so conspicuously in appearance from the typical *H. umbellatum* as to lead me to suppose that it will

(when cultivated) remain permanently distinct as a *variety*, though I have not yet had an opportunity of proving it.

One of the most distinct and handsome of our British species, which though varying much in form always retains strongly marked characters. I cannot regard the "*β Taylora*," found near Dunkerran, Co. Kerry as a true *variety*, but merely as an extreme form. A similar plant occurs near York where the typical one is abundant. In Teesdale a form of *H. umbellatum* occurs with few large and handsome heads, dark involucre, and large leaves densely aggregated towards the middle or base of the (reddish) stem; those at the base being deciduous, and those on the upper part being scattered and much reduced in size. A somewhat similar form occurs near Lough Corrib, Co. Galway.

30. H. CROCATUM. Without root-leaves. Stem erect, densely leafy; sub-corymbose. *Leaves linear, lanceolate or oblong, acute, dentate or nearly entire, sessile; broadly rounded or truncate at the base; sub-reticulate beneath: lower ones attenuated downwards. Peduncles with few heads. Involucres sub-cylindrical, obtuse or truncate at the base, glabrous or hairy. Phyllaries appressed, obtuse. Florets glabrous.*

H. crocatum. Fries, Symb. p. 183. Bab. Man. Ed. 3, p. 199. Hook. & Arn. Ed. 7, p. 226.

H. inuloides. Tausch. Bot. Z. 1837. Biebl. 71. Bab. Man. Ed. 1, p. 185.

Mountain districts. Banks of the Clunie near Castletown of Braemar. Teesdale. Glenbally and near Carrickfergus, Co. Antrim. Ballinahinch, Connemara.

Flowers in 7th and 8th months.

Plant 1½ to 4 feet high, with rather large but not numerous heads. *Stem* usually rigid, glabrous or with soft brittle white

hairs, frequently reddish. *Leaves* green, glabrous above, paler and hairy beneath, falsely 3-veined, ciliated, remotely denticulate or irregularly dentate with sharp teeth ; sometimes nearly entire : lowest oblong or linear-lanceolate, much attenuated downwards, obtuse and apiculate ; intermediate and upper ones linear or attenuated upwards from a broadly rounded and rather clasping or truncate base, acute or obtuse. *Branches* and peduncles straight, erect or ascending ; few headed (1 or 2, rarely 3), leafy. *Peduncles* more or less floccose, thickened at the top. *Involucres* dark green ; usually glabrous, but sometimes rather densely clothed with black-based whitish hairs, and stellate down at the base. *Phyllaries* broad ; inner ones sometimes with pale margins. *Florets* deep yellow. *Styles* yellow, or rather livid and with minute dark hairs. *Pappus* nearly white.

A very variable species, often closely approximating in appearance to forms of *H. rigidum* and *H. corymbosum*. From the *former* it may be distinguished by its leaves being linear, lanceolate, or rarely oblong (*not ovate* or ovate-lanceolate) ; from the *latter*, in having narrower leaves with ascending (*not loosely anastomosing*) veins ; while from *both* these species it differs in having *few sub-monocephalous branches and peduncles*, and in never forming a large dense leafy corymbose panicle.

- 23. H. RIGIDUM.** Without root-leaves. *Stem erect, rigid, with a leafy branched corymbose panicle. Leaves ovate or oblong-lanceolate, denticulate or sub-dentate in the middle, rounded and sessile, or slightly clasping at the base, sub-reticulate beneath with prominent ascending veins, nearly glabrous: lowermost attenuated into petioles. Involucres ovate at the base, ultimately conical, with scattered hairs and setæ. Phyllaries appressed, obtuse, Florets glabrous.*

H. rigidum. Fries, Symb. p. 173. Bab. Man. Ed. 3, p. 198.

H. corymbosum. Bab. Man. Ed. 3, p. 199.

Mountain districts. Yorkshire side of the Tees between the High Force and Winch Bridge, and many other stations in upper Teesdale. Near the Kirktown of Clova. Glen Ariff, Co. Antrim.

Flowers in 8th and 9th months.

Plant 3 to 4 feet high, with numerous heads of medium size. Stem firm, very rigid, usually purplish red especially in the lower part; glabrous, or slightly floccose in the upper part; more or less densely leafy throughout, and forming a large, sometimes aggregated, branched leafy paniced corymb. Leaves dull green, paler or slightly glaucous beneath; glabrous, or with scattered hairs on the underside, with very minute glands at the margins; usually denticulate, but sometimes with a few rather elongated irregular sharp teeth near the middle: lowest ones obovate-lanceolate, sub-acute, attenuated into winged petioles: intermediate oblong-lanceolate, acute, narrowed to a more or less clasping or rounded sessile base: upper ones broad, sub-acuminate, half clasping, or sessile when at the base of the peduncles. Branches of the corymb spreading or ascending, rather slender, always rigid, scabrous; very leafy, especially at the base. Peduncles minutely glandular or floccose. Involucres deep or blackish green, with scattered whitish brittle hairs, or gland-tipped setæ.

Inner *phyllaries* obtuse, sometimes with paler but scarcely membranaceous margins. *Florets* bright yellow. *Styles* yellow, or rather livid and with dark hairs. *Pappus* rufescent.

One of our most strongly marked species which I cannot but regard as more nearly allied to *H. crocatum* and *H. corymbosum* than to *H. tridentatum*. From *H. tridentatum* it may be distinguished by having larger heads, a broader and very leafy corymb, more obovate leaves (rarely strongly dentate) and involucre not constricted in the middle after flowering.

It is the plant which has hitherto been regarded by British botanists as *H. corymbosum*, but specimens transmitted to Fries are considered by him as identical with his *H. rigidum*, and distinct from the true *H. corymbosum* of Scotland. Upon his authority I attach the name, feeling satisfied that the *species* is a well marked and truly distinct one. It does however appear to be so closely allied to the true "*H. corymbosum*," and so different from my dried Norwegian specimens of "*H. rigidum*," and especially of its "*var. levigatum*" (*H. Friesii* Hartmann) that I do not feel fully satisfied of its identity with the continental *H. rigidum*.

32. H. CORYMBOSUM. Without root-leaves. *Stem* densely leafy, with a *spreading leafy branched corymbose panicle*. *Leaves* ovate lanceolate, acute, irregularly dentate, *sessile, clasping, glaucous and reticulated beneath with loosely anastomosing veins*. *Peduncles* scaly. *Involucre* ovate and ultimately rather truncate at the base, with scattered hairs and setæ. *Phyllaries* appressed, obtuse. *Florets* glabrous.

H. corymbosum. Fries, Symb. p. 185.

Mountain districts : rare. Banks of the Clunie near Castletown of Braemar.

Flowers in 7th and 8th months.

Plant 3 to 4 feet high, with numerous heads of medium size. *Stem* erect, rather floccose, rigid, reddish and more or less clothed with scattered soft whitish hairs in the lower part, leafy throughout, and forming a broad spreading leafy corymb, or branched corymbose panicle. *Leaves* rather hairy on both sides, floccose beneath, sharply dentate with irregular sometimes elongated teeth, entire towards the point, acute: lowest ones lanceolate, narrowed to a sessile or slightly clasping base: intermediate broadly ovate-lanceolate, or attenuated upwards from a rounded clasping base: uppermost leaves (at the base of the branches) nearly or quite sessile. *Branches* of the corymb spreading, leafy, with many heads on more or less elongated and hairy floccose scaly *peduncles* thickened at the top. *Involucres* sub-globose in bud; with scattered black-based or brittle white hairs and setæ, intermingled towards the base with a little stellate down. Inner *phyllaries* rather blunt and pale at the margins: outermost more or less acute. *Florets* bright yellow. *Styles* yellow, or with minute dark hairs. *Pappus* rather tawny, scarcely rufescent.

Closely allied to *H. rigidum*, from which species it differs in being less glabrous and rather less rigid; also in having shorter, broader and strongly toothed leaves, sessile throughout, more clasping, glaucous beneath, and with much more loosely reticulated veins. The corymb also of *H. corymbosum* is usually rather more paniced and the peduncles more elongated. I am willing to admit it as a species upon the authority of Fries, to whom specimens from the banks of the Clunie (Aberdeenshire) were transmitted, and who pronounced them to be unquestionably his *H. corymbosum*. Hitherto I have not had an opportunity of cultivating this species and of ascertaining thereby its character under those circumstances.

33. H. BOREALE. Without root-leaves. Stem leafy, with a paniced or racemose leafy corymb. Leaves ovate or ovate-lanceolate, denticulate or dentate: lowest sub-petiolate: upper ones broad, sessile or slightly clasping. Peduncles ascending, floccose, scaly. Involucres ovate at the base; dark green or blackish throughout; sub-glabrous, or with scattered hairs. Phyllaries broad, obtuse. Florets glabrous at the tips. Styles livid or fuliginous.

H. boreale. Fries, Symb. p. 190. Bab. Man. Ed. 3, p. 199. Gren. & Godr. p. 385. Hook. and Arn. Ed. 7, p. 227.

H. fruticosum latifolium hirsutum. Ray's Syn. Ed. 3, p. 167.

H. sabaudum. E. B. t. 349.

H. heterophyllum. Bladon in Phytol. vol. ii. p. 961.

Hedge banks and margins of woods. Very abundant on railway embankments, &c. in many parts of the country.

Flowers in 8th, 9th and 10th months.

Plant 2 to 4 feet high, with numerous heads of medium size. *Stem* erect, rigid, frequently reddish; more or less clothed, especially towards the base, with long soft or brittle white hairs, intermingled in the upper part with stellate down; sometimes scabrous with the rough glandular bases of the fallen hairs, nearly destitute of stellate down; leafy throughout, (often densely so in the lower part), forming a leafy racemose corymb or branched panicle. *Leaves* dull green, paler beneath, and falsely 3-veined; glabrous or hairy beneath (especially on the midrib) and at the margins; denticulate or dentate with teeth pointing forwards, entire towards the point: lowest leaves lanceolate or ovate-lanceolate, sub-acute, narrowed or attenuated downwards into short or sometimes rather elongated villous petioles: intermediate ovate, acute, narrowed or rounded to a sessile or somewhat clasping base; upper ones sub-acuminate, broad, rounded and sessile, or slightly cordate and clasping at the base. *Branches* of the raceme or corymb erect or ascending, very leafy, always supported by leaves at the base; frequently elongated and hairy. *Peduncles* densely

floccose, thickened at the top. *Involucres* globose, or sub-cylindrical in bud; ultimately oblong and ovate at the base; very dark (greenish black) or sometimes dull green; nearly glabrous (usually with a few scattered brittle white hairs) but nearly or quite destitute of setæ and stellate down. *Phyllaries* broad, of one colour throughout; inner obtuse; outer ones frequently narrower: all usually appressed, but sometimes (especially late in autumn and when past maturity) lax or almost reflexed at the points. *Pappus* dingy white.

A very distinct but variable species, retaining strongly marked characters under *cultivation*. It may be distinguished from others of the group by its broad scarcely clasping upper leaves, usually hairy stem and erect or ascending leafy branches and peduncles, blackish green involucres and dark styles.

A plant occurs near the hamlet of Clova, with a more branching but much less elongated stem, broad strongly clasping leaves loosely reticulated beneath, a more spreading corymb, and green involucres narrowed to the base, which requires further examination. These characters appear to be permanent under cultivation, which circumstance makes me feel doubtful of its identity with *H. boreale*. Specimens sent to Fries were however regarded by him as belonging to that species.

[*H. VIRESCENS*, which is described by Fries as differing from *H. boreale* in having a taller and more leafy stem, leaves all sessile (never clasping), light green involucres attenuated at the base destitute of stellate down and almost glabrous, floccose-tipped phyllaries attenuate upwards, and nearly yellow styles, is mentioned by him at page 192, Symb. Hier. as a native of Surrey. Without some opportunity of examining the plant referred to, in order to satisfy myself of its being specifically distinct from *H. boreale* or *H. tridentatum* (broad-leaved forms of which, very closely resembling the description given of *H. virescens*, occur in Surrey), I do not feel warranted in acknowledging it as a British species.]

TABLE

SHOWING THE DIFFERENT ELEVATIONS AT WHICH THE VARIOUS SPECIES OF *HIERACIUM* ARE FOUND IN BRITAIN; ALSO INDICATING THEIR GENERAL GEOGRAPHICAL RANGE.

LOWLAND REGION. (0 to 500 ft. elevation.)

Inhabiting rough or stony places, hedge banks, copses, thickets, margins of woods, railway embankments, walls, quarries, &c.

H. Pilosella.—Common throughout Europe generally, except within the Arctic Circle, where, as in Northern Asia, it is comparatively rare.

H. aurantiacum. *—Norway (especially inland districts of the southern part). Pyrenees. Carpathian Mountains.

H. murorum.—Throughout Europe (Sicily to Lapland. England to Caucasus).

H. cæsium.—In most of the mountain districts of Europe.

H. vulgatum.—Throughout nearly the whole of Europe: also in Siberia. Greenland and other parts of North America.

H. tridentatum.—Throughout nearly the whole of Europe, especially in the northern and central parts.

H. umbellatum.—Europe generally (*Sicily excepted*); also extending to Kamtschatka and Persia.

* Naturalized in most if not all of the known British localities.

H. boreale.—Throughout most of Central and Southern Europe. Scarce in Norway. (*Not known in Central Russia, in Siberia, or within the Arctic Circle.*)

H. umbellatum frequently occurs on a moory or sandy soil.

SUB-ALPINE REGION (500 to 1500 ft. elevation.)

Inhabiting rocky or stony places, grassy margins of streams, &c.

H. Pilosella.—(See above.)

H. cerinthoides.*—Mountain districts of southern Europe (Italy, Spain and France).

H. iricum.—Only found hitherto in Great Britain and Ireland.

H. pallidum.—High mountains in most parts of Europe, but not abundant except in the north (Scandinavia.)

H. lasiophyllum.—Northern and Central Europe. (Norway. Germany. France. Pyrenees).

H. Gibsoni.—Not hitherto described by Continental Authors except from British specimens; so that its existence elsewhere is doubtful.

H. argenteum.—Norway; especially in the south and in Finmark.†

H. murorum.—(See above.)

H. cæsium.—(See above.)

H. vulgatum.—(See above.)

H. gothicum.—Norway and Western Sweden. Germany. Poland.

* Though usually found in the sub-alpine region, *H. cerinthoides* occurs in Aberdeenshire close to the sea level; but as casual instances of this kind are probably not unfrequent in the North of Scotland, with other "sub-alpine" species also, they must be regarded rather as exceptional cases than as *belonging* to the "Lowland Region."

† Though in a high latitude, the coast of Finmark has a comparatively mild climate, owing to the influence of the gulf stream.

Inhabiting woods, thickets, bushy places, &c.

H. aurantiacum.—(See above.)

H. tridentatum.—(See above.)

H. prenanthoides.—Mountain districts of Europe generally : also in Siberia.

H. strictum.—Mountains of Central and Northern Europe ; but not frequent. (Not known in the north of Scandinavia.)

H. umbellatum.—(See above.)

H. crocatum.—Northern Europe, especially in the Arctic zone. Lapland, Russia and Siberia. Also in Greenland.

H. rigidum.—Central and Northern Europe.

H. corymbosum.—South Norway. Lapland. Caucasus. Newfoundland.

H. boreale.—(See above.)

LOWER ALPINE REGION. (1500 to 2500 ft. elevation.)

Occurring on exposed cliffs or among debris ; also on grassy slopes and by the margins of alpine rivulets : rarely reaching 3000 feet elevation.

H. pilosella.—(See above.)

H. nigrescens.—Central Europe (Bohemia. Silesia). Norway.

H. lingulatum.—Not certainly described by Continental Authors, but probably a native of Northern Europe and Siberia.

H. senescens.—North of Sweden and Norway (within the Arctic Circle). Siberia. Altaian Mountains, &c.

H. chrysanthum.—Arctic zone of Europe and Asia?

H. cerinthoides.—(See above.)

H. iricum.—(See above.)

H. pallidum.—(See above.)

- H. lasiophyllum*.—(See above.)
H. argenteum.—(See above.)
H. nitidum.—Not described by Continental Authors.
H. murorum.—(See above.)
H. cæsium.—(See above.)
H. stelligerum.—Southern Europe (France. Piedmont.)
H. aggregatum.—Not described by Continental Authors.
H. vulgatum.—(See above.)

UPPER ALPINE REGION. (2500 to 4000 ft. elevation.)

Occurring on exposed cliffs: rarely found BELOW 2500 feet elevation.

- H. alpinum*.—Arctic zone of Europe, Asia and America (Greenland. Iceland). Also in Central and Southern Scandinavia. Germany. Switzerland. Hungary. Scarce in Southern Europe, and not known in the Pyrenees.
H. holosericeum.—Probably occurring in the regions where *H. alpinum* is found. Norway? France?
H. eximium.—Not yet distinguished by Continental Authors.
H. calenduliflorum.—Not yet distinguished by Continental Authors.
H. globosum.—Not yet distinguished by Continental Authors.
H. gracilentum.—Northern and Central Europe.

SUMMARY.

	Piloselloidea.	Pulmonarea.	Accipitrina.
LOWLAND REGION	2	4	3
SUB-ALPINE REGION	2	10	8
LOWER ALPINE REGION	1	15	—
UPPER ALPINE REGION	—	6	—

The above-mentioned divisions bear relation to the ZONES OF ALTITUDE accepted by many Botanical Geographers as follows :

LOWLAND REGION	= {	"Inferagrarian zone."
		Part of "Midagrarian zone."
SUB-ALPINE REGION ..	= {	Part of "Midagrarian zone."
		"Superagrarian zone."
LOWER ALPINE REGION =	{	"Inferarctic zone."
		Part of "Midarctic zone."
UPPER ALPINE REGION =	{	Part of "Midarctic zone."
		"Superarctic zone."

TABLE

*Illustrating the principal Localities of Hieracia hitherto explored
in the Three Districts of*

TEESDALE, CLOVA AND BRAEMAR.

TEESDALE.

Basalt and Mountain Limestone.

Vicinity of Winch Bridge, Banks of the Tees or main tributaries	{	H. pilosella	H. vulgatum
		H. cerinthoides—	H. gothicum
		β anglicum *	H. tridentatum
		H. iricum	H. umbellatum
		H. pallidum	H. crocatum
		H. murorum	H. rigidum
		H. caesium	H. boreale
Road sides, or open fields in Upper Teesdale	{	H. Pilosella	H. gothicum
		H. iricum	H. rigidum
		H. vulgatum	H. boreale
Falcon Clints, Cronkley Scars, or other <i>basaltic</i> cliffs	{	H. pilosella	H. vulgatum
		H. cerinthoides—	H. gothicum
		β anglicum	H. rigidum
		H. iricum	H. boreale
		H. pallidum	
Limestone cliffs	{	H. Pilosella	H. vulgatum
		H. murorum	

* The names printed in stronger type indicate the species which are *abundant* in the localities or situations described.

CLOVA DISTRICT.

Mica Slate, and Micaceous Quartz.

Banks of the Esk, or margins of streamlets, road sides, &c. not at a great elevation	{	H. Pilosella	H. prenanthoides
		H. argenteum	H. crocatum
		H. vulgatum	H. rigidum
		H. gothicum	H. „ var. ?
		H. „ β latifolium	H. boreale
Cliffs of Glen Fiadh, Glen Dole, and other high glens or “corries”	{	*H. alpinum	H. cerinthoides
		H. holosericeum	H. „ β anglicum
		H. eximium	H. pallidum ?
		*H. calenduliflorum	H. lasiophyllum
		H. gracilentum	H. argenteum
		H. nigrescens	H. murorum
		H. lingulatum	H. cæsium
		H. chrysanthum	H. vulgatum

Mica Slate, Porphyry, Quartz, Hornblende and Felspar.

Canlochen Glen, Caness and Glen Isla	{	H. Pilosella	H. cerinthoides
		H. holosericeum	H. „ β anglicum
		H. eximium	H. pallidum ?
		H. gracilentum	H. argenteum
		H. nigrescens	H. murorum
		H. lingulatum	H. „ β rotundatum
		H. senescens	H. cæsium
		H. chrysanthum	H. vulgatum

* Where names are marked with an asterisk the species are, so far as I have observed, of very rare occurrence in *this* locality.

BRAEMAR.

Micaceous Quartz, Porphyritic Felspar and Mica Slate.

Banks of the Dee, Clunie, or streams not at a great elevation	{	H. Pilosella	H. vulgatum
		H. cerinthoides	H. gothicum
		H. „ β anglicum	H. prenanthoides
		H. „ γ acutifolium	H. crocatum
		H. iricum	H. corymbosum
		H. argenteum	H. boreale
		H. murorum	

Heathy or stony situations at a low elevation	{	H. Pilosella	H. argenteum
		H. lingulatum	H. vulgatum
		H. iricum	H. gothicum
		H. lasiophyllum	H. boreale

Mica Slate, Compact Felspar and Hornblende.

Head of Glen Callater, and Cove of Loch Ceannidin	{	H. eximium	H. cerinthoides
		*H. „ β tenellum	H. „ β anglicum
		H. nigrescens	H. pallidum
		H. lingulatum	H. argenteum
		H. senescens	H. murorum
		H. chrysanthum	H. cæsium
		H. cerinthoides	H. vulgatum

Granite.

Lochnagar and Craig Dhuloch	{	H. holosericeum	H. chrysanthum—
		*H. eximium	β microcephalum
		H. calenduliflorum	H. iricum
		H. gracilentum	H. argenteum
		*H. nigrescens	*H. aggregatum
		H. lingulatum	H. murorum, form?
		H. senescens	*H. stelligerum
		H. chrysanthum	H. vulgatum

BRAEMAR—Continued.

Granite.

Ben-na-bourd, Ben-na-muic-dhui and Ben-na-main	{	H. alpinum	H. globosum
		H. eximium—	H. chrysanthum
		β tenellum	H. nitidum
		H. gracilentum	H. vulgatum

Granite.

Cairntoul	{	H. alpinum	H. cerinthoides—
		H. eximium—	γ acutifolium
		β tenellum	H. pallidum
		H. globosum	H. argenteum
		H. nigrescens	H. nitidum
		H. lingulatum	H. aggregatum
		H. chrysanthum	H. murorum?
		H. cerinthoides—	H. caesium
		β anglicum	H. stelligerum
			H. vulgatum

Felspar, Mica Slate and Micaceous Quartz.

Little Craigindal	{	H. holosericeum	H. nigrescens
		H. eximium	H. lasiophyllum
		H. „ β tenellum	H. aggregatum
		H. globosum	H. vulgatum

ADDENDA AND ERRATA.

ADDITIONAL LOCALITIES.

- H. cerinthoides* β *anglicum*. Macgilligan, Antrim. Connemara.
H. iricum. Ben Bulbin, Sligo. Glengariff, Antrim.
H. pallidum. Connemara.
H. prenanthoides. Near Garvagh, Co. Derry.
H. strictum. Garron Head, &c. Antrim. Co. Derry.
H. gothicum. Near Carrickfergus.

ERRATA.

- Page 13, line 19, & page 15, line 8, for *H. pilosella* read *H. Pilosella*.
,, 15, ,, 23, for **Involucre** read **Involucres**.
,, 21, ,, 11, for *H. Globosum* read *H. globosum*.
,, 28, ,, 26, for *H. pulmonarum* read *H. pulmonarium*.
,, 30, ,, 9 for *H. Saxifragum* read *H. saxifragum*.
,, 40, ,, 9, & page 41, line 15, for *H. Iricum* read *H. iricum*.
,, 76, ,, 1, for **23** read **31**.

INDEX.

	Page.		Page.
<i>H. alpinum</i>	17	<i>H. lasiophyllum</i>	45
<i>H. aggregatum</i>	52	<i>H. Lawsoni</i>	36
<i>H. amplexicaule</i>	42	<i>H. lingulatum</i>	30
<i>H. anglicum</i>	36	<i>H. maculatum</i>	61
<i>H. argenteum</i>	49	<i>H. melanocephalum</i> (Tausch) .	18
<i>H. atratum</i>	34	<i>H. murorum</i>	54
<i>H. aurantiacum</i>	15	<i>H. nigrescens</i>	28
<i>H. auricula</i>	16	<i>H. nitidum</i>	50
<i>H. boreale</i>	79	<i>H. obtusifolium</i>	53
<i>H. bifidum</i>	53	<i>H. oreades</i>	53
<i>H. cæsium</i>	56	<i>H. ovalifolium</i>	48
<i>H. calenduliflorum</i> ..	23	<i>H. pallidum</i>	43
<i>H. cerinthoides</i>	36	<i>H. Pilosella</i>	13
<i>H. chrysanthum</i>	34	<i>H. plumbeum</i>	64
<i>H. cinerascens</i>	45	<i>H. prenanthoides</i>	69
<i>H. corymbosum</i>	77	<i>H. pulmonarium</i>	28
<i>H. crocatum</i>	74	<i>H. rigidum</i> ..	76
<i>H. divaricatum</i>	30	<i>H. rupestre</i>	34
<i>H. dovreense</i>	66	<i>H. sabaudum</i>	79
<i>H. dubium</i>	15	<i>H. saxifragum</i>	54
<i>H. eximium</i>	20	<i>H. Schmidtii</i>	44
<i>H. Friesii</i>	77	<i>H. senescens</i>	32
<i>H. gracilentum</i>	24	<i>H. stelligerum</i>	59
<i>H. Gibsoni</i>	47	<i>H. stoloniflorum</i>	15
<i>H. glaciale</i>	16	<i>H. strictum</i>	71
<i>H. globosum</i>	26	<i>H. sylvaticum</i>	61
<i>H. gothicum</i>	64	<i>H. tridentatum</i>	67
<i>H. heterophyllum</i>	79	<i>H. umbellatum</i>	72
<i>H. holosericeum</i>	19	<i>H. villosum</i>	41
<i>H. hypochæridis</i>	47	<i>H. virescens</i>	80
<i>H. inuloides</i>	74	<i>H. vogesiacum</i>	39
<i>H. iricum</i>	40	<i>H. vulgatum</i>	61
<i>H. Lapeyrousiæ</i>	40		