CORRIGENDA.

P. 47, l. 4 from bottom, for "*insititia* L." read *cerasifera* Ehrh.
P. 23, l. 23 from top, for "235" read 285.
P. 28, l. 2 from top, for "flavour" read flavon.
P. 53, l. 18 from bottom, for "1805" read 1806.
P. 55, l. 10 from top, for "lawns" read humus.
P. 62, l. 6 from bottom, for "Balbon" read Bolton.
P. 89, title, for "1917" read 1916.
P. 196, l. 18 from top, for "shells" read cells; l. 20 for "in." read μ.

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BRITISH EUPHRASIÆ.

By CEDRIC BUCKNALL, Mus. Bac. Oxon.

Since the appearance of Wettstein's Monograph (1893) and of Townsend's account of the British species of *Euphrasia* (Journ. Bot. 1897), many able botanists have interested themselves in the genus, and by collecting specimens from all parts of the British Isles have greatly extended our knowledge of the distribution of these plants, besides adding four species, one of them new, to the British Flora. Many of the forms are well marked and as a rule are correctly named by collectors, but with others a wide diversity of opinion as to names and position has clearly shown that in estimating the value of distinctive characters and in perception of the limits of variation we still have much to learn.

During the past twenty years I have collected examples of nearly all the species described by Townsend in his Monograph, and have examined a large number of British specimens contained in herbaria; while visits to Switzerland, Tyrol, North Italy, and parts of France have made me acquainted also with a number of Continental forms. Led by this experience I have arrived at the conclusion that, if closer attention were paid to the general habit and more obvious characters of these plants, their study would be much facilitated, and their position could be determined with greater certainty. A preliminary attempt in this direction is made in the analytical keys and in the short diagnoses which follow, and in these more prominence is given to certain characters than is apparent in the minute and elaborate descriptions of Wettstein and Townsend, without, I believe, introducing anything that is at variance with the descriptions or figures of those authors.

The characters of which I propose to make use are:—1. The relative density or laxity of the entire plant, depending on the length of the internodes between the cauline leaves and the branches, and between the bracts of the fruiting-spike. 2. The relative length of the leaves and bracts in the same plant, and their actual length in different species. 3. The length of the fruiting-spike in relation to the entire stem, and whether it is stout or slender. 4. The shape of the teeth of the fully developed upper bracts, viz. those of the younger fruit or of the older flowers. This varies from triangular or ovate to lanceolate and subulate and is often characteristic of the species. In some cases, however, the shape of the teeth is variable, and too much reliance should not be placed on it as a distinguishing

mark. In Wettstein's diagrams of the leaves and bracts this diversity of form is not shown with sufficient clearness, as may be seen by the examination of the actual plants.

The length of the corolla is variable, and is unreliable as a distinctive character, at least in the British species. For example, *E. Kerneri* belonging to the *Grandifloræ*, sometimes occurs with small flowers, especially at the end of the flowering, and in these the lengthening of the corolla-tube is scarcely apparent. Again, *E. latifolia* normally with the corolla 6 mm. long, has a variety *grandiflora* Wetts., with the corolla twice this length. Moreover, the conspicuousness of the flower is not dependent on the length of the corolla "measured along the back," but on the breadth of its lips; so that a flower may be larger and more conspicuous than its length as given in millimetres would indicate. For this reason and because the measurement of the corolla in the dried state is difficult and uncertain, the flower is, as a rule, in this paper, only described as large, small or conspicuous.

The leaves in simple specimens of any species are usually persistent during the flowering, but in branched plants they are deciduous. This is therefore seldom of much value as a specific character.

The student should be reminded that it is of little use to attempt to name immature, damaged or poor specimens, or those which are past flowering, until he is well acquainted with the species in all its stages.

After the diagnosis of each species there follow examples of plants from different British localities. These serve as records of stations for typical plants as well as for variations from the type; in some cases they are of plants which have been distributed, in my opinion, under incorrect names.

Of my own gathering, all the Scotch and some of the English specimens were named or confirmed by Mr. Townsend, and I have been greatly assisted in my studies by the kindness of Mr. Charles Bayley and Mr. G. Claridge Druce, who have placed their valuable collections of *Euphrasia* containing many authentically named examples, at my disposal.

The analytical keys which follow apply only to the normal well-developed form of each species and its principal named varieties. Some of the intermediate forms and deviations from the type are mentioned in the lists of specimens which I have examined. The measurements of the corolla given in the keys of the *Parvifloræ* and *Grandifloræ* are those of Wettstein, but, as already stated, these measurements do not always apply to British plants.

Key to the British Species.

Upper cauline leaves, excluding the few patent teeth at least twice as long as broad; capsule glabrous or with a few decumbent hairs on the margin	19.	*E. salisburgensis.*
Upper cauline leaves at most twice as long as broad; capsule with erect hairs on the margin	1.	

1.	Corolla large, 10–15 mm. long	2.
—	Corolla smaller, but plant with long glandular hairs	22.
—	Corolla small, 4–10 mm. long	4.
2.	Corolla-tube not elongating at the end of the flowering	3.
—	Corolla-tube elongating at the end of the flowering; corolla brightly coloured	21.
3.	Bracts with short, straight glandular hairs	8. *E. brevipila*
—	Bracts eglandular (in the British plant), foliage densely hairy	[f. *grandiflora*. 6. *E. latifolia*
4.	Fruiting-spike ± stout, dense, or, if lax, long and occupying the greater part of the stem; stem simple or branched at or below the middle; bracts usually large	[f. *grandiflora*. 5.
—	Fruiting-spike more slender, lax, rarely dense; stem branching higher; internodes long, rarely short	14.
5.	Fruiting-spike occupying the greater part of the stem or at least half its length	6.
—	Fruiting-spike shorter, seldom exceeding half the length of the stem	10.
6.	Bracts eglandular	7.
—	Bracts glandular	9.
7.	Teeth of upper bracts ovate or triangular, subobtuse; foliage coriaceous, dark green	2. *E. borealis*.
—	Teeth of upper bracts lanceolate or subulate, acute	8.
8.	Stem usually 10–20 cm. high, teeth of upper bracts subulate, aristate; foliage green	1. *E. stricta*.
—	Stem seldom exceeding 10 cm., much branched or nearly simple, teeth of upper bracts lanceolate, acute or subaristate; foliage hairy	4. *E. curta*.
	Foliage less hairy	*E. curta* var. [*glabrescens*.
9.	Stem 4–8 cm. high with few or many branches; fruiting-spike rather stout; glandular hairs not numerous	3. *E. occiden-* [*talis*.
	Plant small, 1–2 cm. high and broad, rarely more; glandular hairs sometimes very few; flowering early	*E. occiden-* [*talis* var. [*præcox*.
—	Stem 5–25 cm. high, simple or with a few branches; flowers larger, usually violet; glandular hairs very numerous	10. *E. Vigursii*.
	Foliage pale green; bracts with narrower more acute teeth; flowers lilac and white.	*E. Vigursii* [var. *pallens*.
10.	Bracts large, with short glandular hairs; stem 10–30 cm. high, lower internodes long	8. *E. brevipila*.
—	Bracts without glandular hairs	11.
11.	Stem tall, 10–25 cm. or more high, internodes very long	12.

— Stem short, 3–10 cm. high, lower leaves broad with a very obtuse terminal tooth which is broader than long ..... 13.

12. Stem pale brown, simple or with a few branches above the middle, and occasionally with 1–2 rudimentary ones below it..... 9. *E. suecica.*

— Stem branched lower, branches usually more numerous, longer and stouter, internodes not so long ..... [*subeglandulosa.* *E. brevipila* var.

13. Foliage very hairy, hairs of stem long ..... 6. *E. latifolia.*

— Foliage nearly glabrous ..... 7. *E. foulaensis.*

14. Stem normally much branched, tall, branches often compound, internodes usually long; leaves at the base of the principal branches patent or deflexed, longer than the bracts... 15.

— Stem simple or with a few, rarely many, branches; leaves and bracts small..... 16.

15. Eglandular; foliage glabrous ..... 11. *E. nemorosa.*

Foliage sparingly setulose ..... *E. nemorosa* [var. *ciliata.*

Stem shorter with short internodes ..... *E. nemorosa* [f. *compacta.*

(Compare subglabrous forms of *E. curta* approaching *E. nemorosa.*)

— Glandular ..... 12. *E. campestris.*

16. Stem 5–20 cm. high, internodes usually long, bracts with acute teeth ..... 17.

— Stem 3–6 cm. high, rarely more, internodes usually short; leaves and bracts very small, with 1–3 obtuse teeth on each side ..... 19.

17. Corolla rather large and conspicuous, violet; flowers and leaves few; leaves and bracts larger than in *E. gracilis*, often patent; stem simple or slightly branched above..... [5. *E. cærulea.*]

— Corolla small, dark violet or lilac and white; flowers and leaves more numerous; leaves and bracts smaller ..... 18.

18. Stem wiry, slender, dark purple, simple or with a few, rarely many, erect branches about the middle; corolla small, often dark violet; leaves and bracts small, often nigrescent ..... 13. *E. gracilis.*

Corolla larger, blue ..... *E. gracilis* [var. *primaria.*

— Stem paler, simple or with 1 or 2 branches, rarely more; corolla white or lilac and white; foliage greener; bracts usually larger; flowering spike broader at the top. (Compare mountain forms of *E. curta* with long internodes.)..... 14. *E. scotica.*

19. Corolla yellow or violet and yellow ..... 15. *E. minima.*

Corolla white or lilac and white ..... 20.

20. Stem simple, 3–6 cm. high, internodes of fruiting-spike long or short ..... *E. minima*
— Stem 2–5 cm. high, much branched, branches often compound ..... *E. minima* [var. *nana*.
21. Eglandular; stem with many, rarely few branches; leaves and bracts small, nearly glabrous ..... 16. *E. Kerneri*. [var. *arbuscula*.
— Glandular; gland-tipped hairs long and flexuous; leaves and bracts larger, setulose ... 22.
22. Stem with a few branches and long internodes; spike relatively short; flowers usually large ..... 17. *E. Rostkoviana*.
— Stem simple or nearly so; spike occupying the greater part of the stem; flowers smaller ..... 18. *E. fennica*.

Alternative Key.

Bracts eglandular ..... 1.
Bracts glandular ..... 17.
1. Upper cauline leaves, excluding the few patent teeth, at least twice as long as broad; capsule glabrous or with a few decumbent hairs on the margin ..... 19. *E. salisburgensis*.
— Upper cauline leaves at most twice as long as broad; capsule with erect hairs on the margin ..... 2.
2. Corolla large, 10–15 mm. long ..... 3.
— Corolla smaller, 4–10 mm. long ..... 4.
3. Corolla-tube elongating at the end of the flowering; stem usually much branched; bracts small, 5–6 mm. long ..... 16. *E. Kerneri*.
— Corolla-tube not elongating; plant very hairy, bracts 7–8 mm. long ..... 6. *E. latifolia* [f. *grandiflora*.
4. Bracts 7–11 mm. long; fruiting-spike stout ... 5.
— Bracts 3–8 mm. long; fruiting-spike more or less slender ..... 10.
5. Bracts 8–11 mm. long, stem tall with long internodes ..... 6.
— Bracts 7–9 mm. long; stem usually shorter, with short internodes ..... 7.
6. Stem pale brown, simple or with a few branches above the middle and occasionally with 1–2 rudimentary ones below it, internodes very long ..... 9. *E. suecica*.
— Stem branched lower, branches usually more numerous, longer and stouter, internodes not so long ..... *E. brevipila* var. [*subeglandulosa*.
7. Fruiting-spike long in proportion to the stem ..... 8.

— Fruiting-spike short in proportion to the stem; terminal tooth of lower leaves very obtuse, broader than long ..... 9.

8. Fruiting-spike very dense; teeth of upper bracts broad, ovate; leaves and bracts dark green, thick in texture ..... 2. *E. borealis.*

— Fruiting-spike less dense; teeth of upper bracts lanceolate or subulate, acute, aristate; leaves and bracts thinner and greener ..... 1. *E. stricta.*

9. Plant densely hairy with long hairs ..... 6. *E. latifolia.*

— Plant nearly glabrous ..... 7. *E. foulaensis.*

10. Foliage hairy; plant usually short, much branched from the base or nearly simple; internodes short ..... 4. *E. curta.*

Foliage less hairy ..... *E. curta* var. [*glabrescens.*

— Foliage glabrous or minutely setulose ..... 11.

11. Stem ± tall, internodes usually long; teeth of upper leaves and bracts acute ..... 12.

— Stem 3–6 cm. high, rarely more, internodes usually short; leaves and often bracts with obtuse teeth..... 15.

12. Branches typically numerous, often compound; leaves at the base of the branches longer than the bracts, spreading or deflexed; internodes long ..... 11. *E. nemorosa.*

Internodes short ..... *E. nemorosa*

Leaves and bracts setulose. (Compare subglabrous forms of *E. curta* approaching *E. nemorosa.*) ..... [f. *compacta.* [var. *ciliata.* *E. nemorosa*

— Branches none or few, rarely many ..... 13.

13. Corolla conspicuous, violet; leaves and bracts few, larger than in *E. scotica*, patent, stem simple or slightly branched above ..... [5. *E. cærulea.*]

— Corolla small, violet or lilac and white; leaves and bracts smaller and more numerous ..... 14.

14. Stem wiry, dark purple, simple or with a few, rarely many, erect branches about the middle, corolla often dark violet; leaves and bracts small, often nigrescent ..... 13. *E. gracilis.*

Corolla larger, blue ..... *E. gracilis* [var. *primaria.*

— Stem usually paler, simple or with 1 or 2 branches, rarely more; corolla white or lilac and white; foliage greener; bracts usually larger; flowering-spike broader at the top, appearing subcapitate ..... 14. *E. scotica.*

(Compare mountain forms of *E. curta* with long internodes.)

15. Flowers yellow or yellow and violet; stem simple or with few branches ..... 15. *E. minima.*

— Flowers white or lilac and white ..... 16.

16. Stem simple, internodes of fruiting-spike long or short ..... *E. minima*
— Stem with numerous, often compound, spreading erect branches ..... *E. minima* [var. *nana*.
E. minima [var. *arbuscula*.
17. Glandular hairs long and flexuous ..... 18.
— Glandular hairs short and straight ..... 19.
18. Stem branched above or below the middle; internodes long; flowers typically large ... 16. *E. Rostkoviana*.
— Stem simple or slightly branched at the base; flowers smaller ..... 17. *E. fennica*.
19. Stem short, up to 8 cm. high, more or less compactly and strongly branched; internodes short; fruiting-spike dense; densely hairy or glabrescent ..... 3. *E. occidentalis*.
Plant small, 1–2 cm. high and broad, rarely more, very compact; glandular hairs fairly numerous or very few, setæ minute and inconspicuous; flowering early ..... *E. occidentalis* [var. *præcox*.
— Stem taller, not compactly branched ..... 20.
20. Leaves and bracts usually large; spike broad; branches few, internodes long ..... 8. *E. brevipila*.
— Leaves (except those at the base of the branches) and bracts smaller, spike more slender ..... 21.
21. Stem often much branched, branches often compound, internodes long; habit of *E. nemorosa* ..... 12. *E. campestris*.
— Stem simple or with few branches; spike dense, occupying about half the length of the stem, densely glandular; teeth of upper bracts ovate or lanceolate, acute; flowers usually violet ..... 10. *E. Vigursii*.
Plant pale green; teeth of upper bracts lanceolate or subulate, often aristate; flowers lilac or white and lilac ..... *E. Vigursii* [var. *pallens*.

1. E. STRICTA Host. Stem simple or branched below, branches erect, often nearly as long as the stem, or shorter and spreading. Spikes ± stout, occupying the greater part of the stem and branches; internodes longer than the bracts below, usually shorter and hidden by them above. Leaves and bracts 8–9 mm. long; upper bracts with lanceolate or subulate, acute, aristate teeth. Setæ none or fairly numerous on the margins of the leaves and bracts and on the calyx. Wetts. Mon. t. vii. figs. 5, 6; Towns. Mon. t. 374.

Distinguished from *E. borealis* by its paler green colour, and by the narrow teeth of the bracts: but forms occur which approach *E. borealis*.

At the time of the publication of his monograph, Townsend had not met with British specimens of *E. stricta*, and subsequently suggested that name, but with doubt, for plants with erect branches and leaves which in other respects resembled *E. nemorosa*.

Having now met with plants in several localities that are near to, if not identical with, Continental forms, I am of opinion that many of the supposed British specimens, and also many of those referred by Scandinavian botanists to *E. stricta*, are in reality forms of *E. nemorosa*.

England.—N. Somerset. Grassy hill-side above Weston-in-Gordano, Sept. 1915.—Peatmoor, Edington, Sept. 1902. Stem with few or many erect branches, leaves and flowers smaller, internodes short but visible nearly to the top of the spike, margin of leaves and bracts rough with short scattered bristles.—Grassy lane below Rowberrow, Sept. 1907. Tall, with large spreading bracts, the teeth of the upper ones ovate to lanceolate, foliage thicker and darker. In these characters it approaches *E. borealis*. W. Somerset. Rough ground between Minehead and Porlock in great abundance. Similar to the last but rough with minute scattered bristles. Of this Mr. James Groves, having previously expressed the opinion that British plants seemed nearer to *E. nemorosa*, wrote, "far more like the Continental plant than any we possess."—Cambridge. Chalk-pit between Haslingfield and Barrington, Aug. 1912, *G. Goode*. Stem simple or with a few short branches at the base, internodes rather long except at the top. Named *E. nemorosa* by me in Wats. Bot. Exc. Club. Rep., but I am now of opinion that it is *E. stricta*.—W. Gloucester. On a scree in the Gully, Durdham Down, Bristol, Sept. 1915. Young plants were observed during the summer of 1916 when the internodes of the flowering-spike were found to be longer than in the mature plants. These were full-grown and typical on July 27th.—N. Lancaster. On the coast south of Grange-over-Sands, Aug. 1915.

Ireland.—Galway. Very abundant near the lake, and on Urrisbeg, Roundstone, Aug. 1907. Varying greatly in size and in the density of the spike; flowers larger and more conspicuous than in English plants.—Dogs' Bay, Roundstone. *G. C. Druce*, det. *C. Lindman*, 1911. Also with *E. salisburgensis* in the same locality, Aug. 1907, *C. Bucknall*. Flowers large, violet.—Clifden, Aug. 1907. Some of these have a more slender stem, smaller leaves and flowers, and capsules sometimes exceeding the calyx. These are probably *E. gracilis* × *E. stricta*.—Rossmore, Aug. 1907.

2. E. borealis Towns. Stem simple or branched below; branches spreading-erect, often nearly as long as the stem. Spikes very stout, occupying the greater part of the stem and branches, internodes very short and covered by the closely imbricated bracts. Leaves and bracts 7–9 mm. long, thick and coriaceous in texture, dark green. Upper bracts with ovate or triangular, rarely lanceolate, subobtuse or acute teeth. Setæ none or a few very short ones on the margins of leaves, bracts and calyx-teeth; or in var. *pubescens* Towns. longer and more numerous. Wetts. Mon. t. xi. fig. 7, slender and not typical; Towns. Mon. t. 374.

England.—Devon. Berry Head, Brixham, July 1916, *Mrs. Wedgwood*. This gathering consists of a series of peculiar forms, some typical, some with longer internodes than usual, and others with smaller bracts with narrower teeth, and slender spikes. All are more or less stained, especially the more slender specimens

with dark indigo or purple. In some respects these approach *E. stricta*.—N. Somerset. Rough pasture above Cheddar Gorge, Aug 7th, 1907. Very characteristic and typical, 11 cm. high. Also gathered and so named by Mr. C. E. Salmon, Aug. 17th, 1907. A small form gathered in Cheddar Gorge, July 1914, has probably been taken for *E. curta*, but it is quite glabrous and has the broadly-toothed bracts of *E. borealis*.—Rough pasture, Failand, near Bristol, July 1906 and 1916. Stem 4–5 cm. high with 2 or 3 short branches at the base, spike 4-sided when fresh. This is perhaps *F. nemorosa* var. *tetraquetra* Bréb., Wetts. Mon. p. 126 as var. *tetraquetra* Arrond. See also Rouy, Fl. de France, xi. p. 153, where it, *E. curta*, and *E. occidentalis*, are placed together as varieties of *E. nemorosa*.—Brean Down, June 1899 and 1916. Small branched plants already in fruit at this date. Townsend considered that this was an abnormal form, possibly of *E. nemorosa*, but the compact growth and broad teeth of the bracts are characteristic of *E. borealis*. It grew in company with the vernal form of *E. occidentalis*, from which it was with difficulty distinguished, except by the absence of glands.—Between Cadbury Camp and Clevedon, Aug. 1916. On the same range of hills as the Failand plant, but taller, more branched, and bracts with narrower teeth.—W. Gloucester. St. Vincent's Rocks, Bristol, July 1902. A small form sometimes approaching *E. stricta*.—Merioneth. Harlech Golf Links, Aug. 1915, *W. C. Barton*. Similar to the last.

Scotland.—Argyle. On the seacoast, Oban, Aug. 1899. Of this Townsend wrote, "Confer *E. borealis* Towns." It appears to me, however, to be quite typical, and is very like the Cheddar plant. A similar plant from Maiden Island, Oban Bay, was named by Townsend *E. curta* var. *glabrescens*. The teeth of the upper bracts are somewhat narrower, but the leaves are quite glabrous, and it must, I think, be referred to *E. borealis*.

Ireland.—Cork. On the coast, Dunboy, Aug. 1908. A slender form with long internodes below, up to 15 cm. high, simple or with 1–3 spreading branches. The simple specimens have distant, persistent lower leaves as in *E. gracilis*, but the fruiting-spikes are those of *E. borealis*.—Galway. On a roadside bank, Recess, Aug. 1902. Similar to the last, but the spike more slender and the bracts smaller.

3. E. occidentalis Wetts. Plant often compact and bushy. Stem short, stout, branched from the base or simple; branches often nearly as long as the stem, compound in large specimens. Spikes rather stout with imbricated bracts. Leaves 7–8 mm. long. Bracts 5–6 mm. long, the upper with ovate, triangular or lanceolate, acute teeth. Corolla small, white, lilac or violet. Glandular hairs short, more or less numerous on leaves, bracts and calyx; simple hairs, long or short, numerous or nearly absent. Wetts. Mon. t. xi. fig. 13; Towns. Mon. t. 375. Both of these figures are taken from poorly-developed specimens.

England.—E. Cornwall. Port Quin, near St. Minver, Sept. 1906. —On the downs, Bude, Aug. 1896, *S. T. Dunn*; unnamed.—S. Devon. Sandy coast near Bigbury, June 1894, *E. S. Marshall*; unnamed; subsequently referred by Wettstein to *E. occidentalis*.—N. Somerset.

St. Thomas's Head near Kewstoke, July 1907.—Cheddar, June 1906. Stem 3 cm. high, simple or with 1–2 branches; glands very few. This might easily be taken for *E. curta*.—Dorset. Grassy slopes on the coast, Swanage, July 1903. Strong compact plants with stout stem about 8 cm. high, and stout compound branches; hairs long and numerous, many of them gland-tipped.—Sea cliffs, the Winspit, Worth Matravers, June 1916, *I. M. Roper*. Stem 4–8 cm. high, sometimes much longer than the branches, or simple.—I. Wight. Open down near Hoy's Monument, Whitwell, 600–700 ft., Aug. 1916.—On the coast, Steephill Cove, Aug. 1916. Stem 9 cm. high, with long fruiting-spike and a few short branches.

Scotland.—Haddington. Marshy places amongst the sand-dunes, Aberlady, May 1911, *McTaggart Cowan*. Referred by me to *E. curta*, but the presence of glandular hairs and the compact habit leave no doubt that it is *E. occidentalis*.

Orkney. Heathery pasture, 90 ft. above sea-level, Black Crag, Stromness, Mainland, Aug. 1912, *H. H. Johnston*, as *E. curta* var. *glabrescens*; *E. borealis*, *fide* E.S.M. "Not *E. curta*" C. H. Ostenfeld. "Corolla pale purple or whitish-purple, with dark purple lines and a yellow spot on throat of lower lip" (B.E.C., corrections in Report for 1912). It is here stated that Mr. Marshall's final opinion was that all the specimens came under *E. borealis* and some of them under the var. *pubescens* Towns. Now all the specimens on this sheet are glandular, as was pointed out by Mr. D. Lumb in a letter to Mr. Druce, and they are in all respects similar to southern *E. occidentalis* except that the flowers are larger—8 mm. long. This plant appears to be distinct from *E. latifolia*, but the question arises as to whether the glandular form of the latter may not be allied to *E. occidentalis*.

Var. præcox, var. nov. Plant small, compact, 1–2 cm. high and broad. Stem branched, internodes very short, so that the stem and branches are often hidden by the leaves and bracts. Corolla small, white, lilac or violet. Stalked glands more or less numerous; setæ minute and inconspicuous on leaves, bracts and calyx.

Planta nana compacta, 1–2 cm. alta et lata. Caulis ramosus, internodiis brevissimis itaque caulis et rami foliis bracteisque celati sunt. Corolla parva, alba, lilacina vel violacea. Folia, bracteæ et calyces, vel solum bracteæ, pilis glanduliferis plus minus numerosis et setis minimis sparsim obsiti.

England.—E. Cornwall. On the coast, Polzeath, May 18th, 1916, *J. W. White*. Plants 2 cm. high and broad, with full-sized leaves and well-developed fruit; flowers white or lilac. Also on the Spire bank, Rock near St. Minver, with stem 1 cm. high, and violet flowers.—N. Somerset. Brean Down, July 1911 and June 1916. Similar to the Cornish plants but stem up to 4 cm. high, not so compactly branched; glands very few, best seen in the fresh plant on the upper surface of the spreading bracts.—Purn Hill, Bleadon, May 1916. Like the Cornish plants, 1 cm. high. In the Somerset localities plants occur on which no glands can be detected except on the corolla.

The question therefore arises as to whether these are eglandular *E. occidentalis* or small forms of *E. borealis*.

4. E. CURTA Fries. Stem generally short, stout, with few or many branches below the middle, internodes short or in some mountain forms long; branches spreading or ascending, sometimes compound. Spikes rather stout, occupying the greater part of the stem and branches, internodes short, generally hidden by the bracts. Leaves and bracts 5–7 mm. long, the upper bracts with triangular or lanceolate subobtuse or acute and apiculate teeth. Hairs long and numerous or, in var. *glabrescens*, short or minute and few.

Fries's description is, "*E. officinalis*, β. *montana*, γ. *curta* pyramidata, ramosissima, foliis squarrosis, floribus exiguis amethystinis." Fr. Novit. Flor. Suec. ed. 2, p. 198 (1828).

Wettstein describes the stem of *E. curta* as "thick, rarely thin, generally branched below as far as the middle." He also refers to slender and only slightly branched forms, and his figure, Mon. t. 7. fig. 11, of an original specimen, represents a slender plant 7·5 cm. high, with a pair of branches at the middle. Townsend's figure, Mon. t. 375, represents a plant from Moidart, with two or three branches nearly from the base. Many diverse forms have been referred to *E. curta* and its variety *glabrescens* which are, in my opinion, more or less hairy or even glabrous forms of other species. Some of these are noticed under the species to which I believe them to belong. My experience is that *E. curta*, as described by Fries and Wettstein, is much less common in this country than *E. nemorosa*.

ENGLAND.—SOMERSET. On turf behind the sand-hills, Berrow, July 1915. Stem not exceeding 11 cm. high, more or less branched. Spike with short internodes, stout or slender; teeth of the upper bracts ovate to lanceolate; leaves and bracts very sparingly setulose. A small glabrous specimen from this neighbourhood was referred with doubt by Townsend to *E. curta* var. *glabrescens*. The present gathering consists of forms some of which approach *E. curta* and others *E. nemorosa*.—DORSET. Middlebere Heath, Corfe Castle, June 1916, *I. M. Roper*. Plants about 6 cm. high and broad; leaves and bracts thinly setulose. Characteristic examples of var. *glabrescens*.—DENBIGH. Great Ormes Head, Llandudno, Aug. 1916, *Mrs. Wedgwood*. This is a peculiar form with many compound branches from the base to the middle, and, in consequence, the larger plants resemble in habit *E. nemorosa*. The leaves, bracts, and calyx-teeth are stained with purplish black on the margins and are minutely and sparingly setulose; the flowers are small, and vary in colour from dark violet with an orange spot to lilac and white or entirely white. I place these plants here with considerable hesitation.—W. LANCASTER. On flat sandy places between St. Anne's-on-the-Sea and the lake at Fairhaven, Aug. 1902, *C. Bailey*. Stem stout, up to 8 cm. high, plant densely hairy, principal cauline leaves sometimes longer than the bracts.—St. Anne's-on-the-Sea, Aug. 1897. The same as the last, but taller.—Sea-embankment, Fairhaven, Aug. 1901. Similar to the last, but with broader, less hairy spikes. Mr. Bailey's gatherings on this coast are much more distinct and characteristic than many of the forms referred to *E. curta*, and, in my opinion, may be regarded as typical

of that species. Nevertheless, some of the specimens show, in the less hairy foliage and laxer habit, an approach to *E. nemorosa*. Similar plants from Ansdell, Aug. 1914, were distributed by the Rev. E. S. Marshall (W.B.E.C.).—Westmorland. On Helvellyn, between the Red Tarn and the summit, c. 2500 ft. Stem 5 cm. high, with a few slender branches about the middle; internodes longer than the leaves; spike broad, lower internode about as long as the bract; leaves small in the specimens seen, about 7 mm. long, more or less densely clothed, as well as the coriaceous bracts, with long hairs; bracts large, 9 mm. long, with ovate or lanceolate subobtuse teeth; flowers small, white; capsules large, longer than the calyx-teeth. This appears to form a transition to *E. latifolia*, to which it is similar in habit, but is less hairy.

Scotland.—Perth. Ben Laiogh, Aug. 1899, *fide* F. T. Weak forms up to 16 cm. high, simple or with one or two branches and long internodes; hairs long, fairly numerous. Also more compact forms with shorter hairs, named *E. curta* var. *glabrescens* by Townsend.—Cruach Ardran, Crianlarich, Aug. 1899.—Near Tyndrum, Aug. 1899. Var. *glabrescens*, *fide* F. T.—Argyle. Craig Ghorm, Ballachulish, Aug. 1899. Rather densely hairy. *E. curta*, *fide* F. T.—Maiden Island. Oban Bay, Aug. 1899. *E. curta* var *glabrescens*, *fide* F. T.—Allt a Bhalaich, Kingshouse, Aug. 1899. *E. curta* var. *glabrescens*, *fide* F. T.

Ireland.—Galway. Urrisbeg, Roundstone, Aug. 1902. Typical *E. curta* was not seen here, but plants which appear to be *E. curta* × *gracilis*. See under *E. gracilis*.

[**5.** E. cærulea Tausch. Stem simple, rarely with one or two branches at or above the middle; internodes long. Spike with few flowers, when in fruit occupying about half the stem; internodes long. Leaves opposite, 5–7 mm. long, the lower cuneate or obovate-cuneate, obtuse with 1–3 obtuse teeth on each side, upper and middle ovate or ovate-oblong, broadest towards the base or middle, with 3–5 non-aristate teeth on each side. Bracts 5–7 mm. long, subopposite, similar to the leaves but broader; teeth more acute, not aristate, all green or nigrescent towards the top of the stem, usually plicato-striate below. Corolla 5–7 mm. long, violet. Capsule shorter than the calyx-teeth. Setæ minute, scattered, on leaves, bracts and calyx; a few glandular hairs occasionally on calyx. Wetts. Mon. p. 115, t. vii. fig. 9.]

? Orkney. Damp pasture on hill-side, 300 feet above sea-level, Wart Hill, Hoy, Aug. 15th, 1912, *H. H. Johnston*. "Corolla lilac, with dark purple lines and a yellow spot on throat of lower lip." As *E. curta* var. *glabrescens* Wetts. "I think this is a form of *E. curta* var. *glabrescens* with handsome violet-blue flowers." E.S.M. "?" *C. H. Ostenfeld*. (B.E.C.)

The Orkney plant is so near to *E. cærulea* that it is extremely probable that it will prove to be identical if looked for earlier in the season, and it is therefore permissible to give the description of *E. cærulea* as a provisional British species. Wettstein associates it with *E. curta*—the one as a "summer species" and the other as an "autumnal species" (see Wetts. Mon. pp. 43 and 117, and Towns. Mon. p. 7)—and states that *E. cærulea* differs in the simple or only

slightly-branched stem with the branches at or above the middle, the violet flowers, the less hairy leaves and bracts, and in the early flowering. In all these particulars except the last the Orkney plants agree. Having, by the kindness of Mr. Charles Bailey, compared the plants with specimens in his herbarium from Bohemia, Silesia and Brandenburg, the only difference I can detect lies in the more numerous and less widely-spaced leaves and bracts. Wettstein states that the flowering season is from May to July, and those I have examined are dated June and July, some bearing fully-formed fruit. The Orkney plant, gathered on Aug. 15th, still bears flowers in good condition, but the fruiting-spike is longer and more advanced than in the Continental examples.

E. cærulea is recorded from isolated areas in Central Europe from Bohemia to Silesia and Pomerania, the latter station being on the Baltic, about 700 miles distant from the Orkneys.

6. E. LATIFOLIA Pursh. Stem simple or with a few branches at or below the middle, stout; internodes long. Fruiting-spike very broad with short internodes, which are hidden by the bracts. Leaves obovate with cuneate base, or broadly ovate with an obtuse terminal tooth which is broader than long, and 1–4 triangular or ovate, obtuse teeth on each side, the largest 8–11 mm. long. Upper bracts closely imbricate with many, up to 7, triangular or lanceolate, subobtuse or acute teeth on each side, 7–8 mm. long. Corolla 5–7 mm., or in f. *grandiflora* 12 mm. long, pale or dark violet. Capsule exceeding calyx-teeth. Hairs long, flexuous, white on the stem, especially below the nodes, on leaves, bracts, and calyx long and dense, or occasionally shorter and scattered. Wetts. Mon. t. xi. fig. 13; Towns. Mon. t. 375.

This is described more fully to avoid confusion with *E. curta*, from which it is distinguished by the habit, by the shape of the leaves and bracts, and by the dense clothing of long white hairs. The British plant appears to be generally eglandular.

W. SUTHERLAND. Tongue Bay, July 1900, *E. S. Marshall.* — Bank above the Naver, near Betty Hill, July 1897, *E. S. Marshall and W. A. Shoolbred.* This is the f. *grandiflora* Wetts. with corolla 12 mm. in length and stem attaining 12 cm. in height. Plants from Melvich, Sutherlandshire, distributed by Townsend in 1897 as *E. curta*, and from Reay, Caithness, by Mr. Marshall in 1915 under the same name, are, as far as my specimens are concerned, very similar to *E. latifolia.*

7. E. FOULAENSIS Townsend. Stem 1–10 cm. high, shorter and less branched than in *E. latifolia*; internodes long or short. Spike stout, dense. Lower leaves obovate, with obtuse subquadrate terminal lobe, which is broader than long, and 1–3 ovate obtuse teeth on each side. Bracts closely imbricate, broadly ovate or subrotund, obtuse, with 3–4 ovate obtuse teeth, or the uppermost with acute teeth. Largest leaves and bracts 7–8 mm. long. Flowers small. Capsule longer than calyx-teeth. Leaves, bracts, and calyx glabrous or sparingly setulose. Wetts. Mon. t. xii. figs. 7, 8; Towns. Mon. t. 376.

Scotland.—W. Sutherland. Coast, Melvich, Aug. 1897, *Marshall and Shoolbred*. My specimens are shorter, and have shorter internodes than in the figures given by Wettstein and Townsend.

Plants from the south side of Buchaille Etive Mor, near Kingshouse, Argyle, Aug. 1899, closely resemble Wettstein's figure. Concerning these Townsend wrote: "My acquaintance with *E. foulaensis* is as yet very limited. I can only say confer *foulaensis*." These are more or less setulose, and the broad capsules are deeply emarginate. They are possibly transitional between *E. curta* or *E. borealis* and *E. foulaensis*.

8. E. brevipila Burnat & Gremli. Stem often tall, simple or with few, rarely many, branches from below or, more rarely, above the middle; internodes generally long, short only at the top of the spike. Leaves and bracts large, 8–11 mm. long, broad and spreading. Upper bracts with lanceolate or subulate, aristate teeth. Corolla 6–12 mm. long. Glandular hairs short and straight, few or many on the bracts and calyx, wanting in f. *subeglandulosa*; setulæ few or many. Wetts. Mon. t. vii. fig. 8; Towns. Mon. t. 374.

England.—N. Somerset. Peatmoor, Shapwick, June 1898, *fide* F. T. Stem simple, 20 cm. high; leaves and bracts large. July 1896. Stem branched; bracts still larger, with 6–7 short lanceolate teeth on each side.—Ashcott Moor, Sept. 1896, *S. T. Dunn*.—On Mendip, near Wookey, Aug. 1907.—Small simple plants with small bracts from Edford, July 1900, and a small much-branched form with small crowded bracts from Tining's Farm, Mendip, formerly referred to *E. brevipila*, are probably forms of *E. campestris* var. *neglecta*.—Cook's Wood, near Flax Bourton, Bristol, June 1916, *I. M. Roper*. Young plants, but well developed and characteristic.—Merioneth. Dolgelly, June 1906, *A. Loydell*, as *E. curta* var. *glabrescens*, *fide* E.S.M. These are glandular, and typical *E. brevipila*.—Berwick. Between Ayrton and Cairncross, July 1900, *C. Bailey*.—Kincardine. Roadside, Rickarton, near Stonehaven, July 1901, *C. Bailey*. Some of these are the eglandular form—var. *subglabra* Towns. Mon. p. 18 = f. *subeglandulosa* Towns. (as var.).

Scotland.—Perth. Ben Laiogh. Aug. 1899, *fide* F.T. Stem short, simple, spike occupying its greater part. More typical plants have been gathered on Ben Laiogh.—Inverness. Glen Nevis, Aug. 1899. "Some of the specimens are the eglandular form" (F.T.).—Argyle. Allt a Bhalaich, Kingshouse, Aug. 1899, *fide* F.T. Stem 10 cm. high, simple or with 1 or 2 branches. Fruiting-spike stout and dense, in appearance like that of *E. borealis*, but glandular.—Island of Kerrera, Oban Bay, July 1899.—Craig Ghorm, Ballachulish, Aug. 1899, *fide* F. T. A small weak form, with small leaves and bracts.—Clyde Islands. Bute, July 1847, Herb. G. C. Druce as *E. officinalis*.—E. Sutherland. Near Golspie, Aug. 1897, *Marshall*. (B. E. C.). This is named *E. borealis*, *teste* Wettstein, but one specimen is glandular.—Near Tongue, July 1897, *Marshall*, *teste* Wettstein. This is mentioned on account of the large flowers, which are at least 12 mm. long.

With regard to eglandular *E. brevipila*, see pp. 22, 25 of Townsend's Monograph, where he discusses the question as to whether

E. borealis is an eglandular form of *E. brevipila*. The answer to this is, in my opinion, in the negative, *E. borealis* being short with long dense spikes, and bracts with short, broad teeth; while *E. brevipila* is tall and lax, with less dense spikes shorter in proportion to the stem, and bracts with longer, narrower teeth. Thus understood, there should be little difficulty in determining with which species a plant should be placed, irrespective of the presence or absence of glandular hairs.

Ireland.—E. Galway, Woodford, Aug. 1907. Fairly typical but bracts rather small and flower small, blue. In company with this grew *E. gracilis* var. *primaria* and a series of forms which I can only refer to hybrids between the two species. Some of these are tall with numerous slender branches, with smaller bracts than *E. brevipila* and rather small blue flowers; others tall and slender, simple or with 1 or 2 short branches and larger, conspicuous blue flowers. All these bear numerous short glandular hairs. The branched specimens are scarcely distinguishable from *E. campestris* var. *neglecta* except by the colour of the flowers; and the simple plants are very similar to *E. gracilis*. Townsend records a hybrid between these species under the name of *E. difformis* Towns. (Mon. p. 33), but his description does not accord with the Woodford plants. I leave them provisionally as *E. brevipila* × *gracilis*.—Loughrea, Aug. 1907. Corolla pale, larger and more conspicuous than in the Woodford plants, 10 mm. long with the lip 7 mm. broad.—W. Galway. Near the lake and on Urrisbeg, Roundstone, Aug. 1907. Variable in height, often simple and slender, with few or many glandular hairs. A short branched form with dense spikes may perhaps be *E. borealis* × *brevipila*.—Clifden, Aug. 1907. Well-developed typical plants, with larger bracts than in most of my Irish gatherings.

9. E. suecica Murb. & Wetts. Stem rather stout, 12–20 cm. high, pale brown, thinly pubescent, simple or with 1–4 branches above the middle, and occasionally with 1–2 rudimentary ones below it; internodes very long. Leaves up to 11 mm. long, opposite, in 3–6 pairs, ovate cuneate, with 0–3 ovate, obtuse or the upper with acute teeth on each side. Bracts 10 mm. long, broader than the leaves, with 3–5 ovate, subobtuse or lanceolate-acuminate, flexuous, subaristate teeth on each side. Spike short with fairly long internodes below, stout at the top. Corolla conspicuous, 9–10 mm. long, pale lilac and white. Calyx shorter than its bract, teeth aristate. Capsule shorter than the calyx-teeth. Leaves, bracts and calyx minutely and thinly setulose.

This is the description of plants distributed by H. Möller as *E. tenuis* (Brenner) Wetts. v. *eglandulosa* Murb. ad int., gathered at Skåne, Kungsmarken, Sweden, July, 1895. The name was subsequently altered to *E. suecica* Murb. & Wetts., and Wettstein refers to this locality on p. 298 of his Monograph. On p. 297 he states that it is an early-flowering parallel-form of *E. stricta* and is "distinguished from this by the stem being unbranched or branched in the upper part, by the elongated internodes, the less acute teeth of the leaves and the earlier flowering (May to July)

It is usually extraordinarily like *E. tenuis* Brenn., but is distinguished from it by the absence of stalked glands."

England.—W. Yorks. In grassy places above Grass Wood, Grassington, June 1902, *Druce*. Name suggested by Lindman and confirmed by Wettstein. The specimens being young, the teeth of the leaves are broader and more obtuse than in the Swedish plants.

Scotland.—E. Ross. Sedgy swamp near Tain, Aug. 1897, Marshall, as *E. borealis*. Stem attaining 30 cm. high. This only differs in the more elongated fruiting-spike, the plant having been gathered later in the season and being more developed.

10. E. Vigursii Davey. Stem simple or with a few erect branches about the middle. Fruiting-spike occupying about half the stem, internodes a little longer than the bracts below, hidden by them above. Upper bracts with ovate or ovate-lanceolate apiculate teeth. Corolla dark or pale violet, 8 mm. long. Glandular hairs very numerous on leaves, bracts and calyx. Setæ many or few.

England.—Cornwall. Goonhavern, Perranzabuloe, Sept. 23rd, 1906, *F. H. Davey* (W.B.E.C.), unnamed. This is the type.—Newlyn Downs, Sept. 1907, *C. C. Vigurs, Herb. C. Bailey* (B.E.C.). On this sheet some of the specimens are eglandular and minutely setulose; otherwise they are indistinguishable from *E. Vigursii*.—Kynance Down, July 1916, *Mrs. Wedgwood*. Stem simple, 7 cm. high; flowers smaller, paler; short glandular hairs and setæ numerous on leaves and bracts, and long flexuous glandular and eglandular hairs on the stem.

Var. pallens, var. nov. Differs from the type in the pale green colour of the rugose leaves and bracts, in the lanceolate or subulate subaristate teeth of the upper bracts, and in the lilac or lilac and white flowers.

Ab typo differt:—Foliis bracteisque rugosis pallide viridibus, bractearum superiorum dentibus lanceolatis subulatisve subaristatis, floribus lilacinis vel lilacinis et albis.

Ireland.—Cork. On a roadside bank on the way to Berehaven from Glengarriff, Aug. 15th, 1908. This corresponds in habit and in the abundant glandular hairs with Cornish specimens, and only differs from them in the above characters. In other respects this variety is as distinct as *E. Vigursii* itself from other glandular species. Some of the specimens are eglandular, as in the Newlyn Downs gathering, but are more setulose.

11. E. nemorosa H. Mart. Stem branched to the middle; branches often very numerous and compound, spreading at a right angle, then ascending, shorter than the stem. Spike slender, internodes generally long except at the top. Leaves greyish green, those which subtend the larger branches 8–14 mm. long, spreading or deflexed. Bracts 5–8 mm. long, the upper with lanceolate or subulate rarely ovate, acute or shortly aristate teeth. Setæ none or a few on the lower leaves, or, in the var. *ciliata* Drabble, more or less numerous on the margin of the leaves, bracts and calyx-teeth. Wetts. Mon. t. viii. fig. 1; Towns. Mon. t. 375.

When growing the colouring of the plant is noteworthy, the stem being dark purple clothed with hoary pubescence and the foliage dull grey-green. Thus young plants are easily distinguished at sight from *E. stricta* and *E. borealis*.

Dr. Drabble in Journ. Bot. liv. p. 73 (1916), has rendered a service to students of the genus by pointing out that slightly hairy forms of *E. nemorosa* are sometimes taken for *E. curta* var. *glabrescens*, and has separated these under the name of var. *ciliata*. When well grown this species is easily recognized, but is extremely variable in the amount of branching, length of internodes of the stem and fruiting-spike, and in the size of the leaves, bracts and flowers. All these forms may be found growing together, in considerable numbers, and it is then evident that, although so variable in form, they are all essentially the same, and can be distinguished at a glance from any other species. This variability is doubtless due, partly to the amount of nutriment that the host-plant is capable of providing, and partly to the space for development allowed by the surrounding vegetation.

As forms of *E. nemorosa* have been taken for *E. stricta*, *E. curta* and *E. gracilis*, it may be well to give an extended list of localities for the typical plant, and also for those forms which have been or are liable to be misnamed.

England.—N. Somerset. Slope over the Caves in Cheddar Gorge, July 1900, *J. W. White, fide* F. T. Small plants, 7–16 cm. high.—Grassy lane, Rowberrow near Churchill, Sept. 1900, *fide* F. T. —The Mineries on Mendip, Aug. 1905, and Wookey Hole, Mendip, Aug. 1907. Some of these are typical and others have unusually large spreading bracts 11 mm. long, and large flowers; resembling *E. brevipila* but not glandular, and the branching that of *E. nemorosa*. —Limestone ridge from Failand to Cadbury Camp, July, Aug. 1916; on roadsides and in rough pastures, together with a glandular form which I name *E. campestris* var. *neglecta*; this is so similar to *E. nemorosa* that only the glands distinguish it.—Queen Charlton, Sept. 1901. Some of the plants are setulose and come under the var. *ciliata* Drabble.—Roadside above Bathampton. Stem not tall, much branched, internodes short, flowers large. This recalls *E. Kerneri*, but the leaves are larger and the colouring different.— Wilts. Chalk downs, Boreham near Warminster, Sept. 1914. With the typical plant grow some copiously and compactly branched plants not exceeding 10 cm. high, with small leaves and bracts and more brightly coloured flowers. These may form a transition to *E. Kerneri*. —I. Wight. Apesdown, Aug. 1916. Approaching var. *ciliata*.— N. Hants. Odiham, on bank above Chalk-pit, Sept. 1903, *C. E. Palmer*, as *E. stricta*. "*E. nemorosa*," *E. S. M.* (B. E. C.). These vary in the same way as the plants growing on chalk at Boreham, Wilts. See above.—W. Sussex. Roadside, Colgate, July 1900, *J. W. White, fide* F. T. Near Cross-in-Hand, Aug. 1906, *W. A. Vice*. Stems tall, stout, with short slender branches throughout their length. This form is not uncommon growing with the ordinary type.—Surrey. Haslemere on railway-banks, Aug. 1894, *E. S. M.*, as "? *E. nemorosa*." Leaves small, but typical *E. nemorosa*.—

KENT. Higham, Canterbury, Sept. 1904, *C. E. Palmer*. Not tall but much branched, internodes short.—W. ESSEX. Amongst tall grass, Fordham Heath, Aug. 1913, *G. C. Brown*, as *E. stricta*. This is tall weak *E. nemorosa*.—Tiptree Heath, 1912, *G. C. B.* as *E. gracilis*. Dr. Lindman writes "this is *E. stricta* forma." I consider it to be typical *E. nemorosa* with rather large flowers.—HERTS. Welwyn, Broxbourne, *W. J. Blake*, 1820.—BERKS. Chalky bank of the Kennet, Newbury, Aug. 1906, *A. B. Jackson* (B. E. C.).—OXFORD. Crowell, Sept. 1892 (B. E. C.).—Minster Levell, 1912, *G. C. B.* as *E. stricta*.—SUFFOLK. Chalk-pit, Somersham, *G. C. B.* 1912 as *E. gracilis*.—HUNTINGDON. Holme Fen, 1886, *A. Fryer*. "Very luxuriant *E. curta* var. *glabrescens*" E. S. M. This is very large and bushy *E. nemorosa*.—NORTHAMPTON. Helpstone, "*E. curta* var. *glabrescens*" E. S. M., "*stricta*?" Lindman.—E. GLOUCESTER. Cranham woods, Sept. 1912.—Kilcot Valley, Cheltenham, July 1910, *C. Bailey*. An abnormal form with slender stem and long slender branches, and bracts equalling or exceeding the leaves.—W. GLOUCESTER. Symond's Yat, Huntsham Hill, Sept. 1900, *D. Fry* and *J. W. White*. Very slender, like the last. Of this Townsend wrote, "*E. nemorosa* simulating *E. gracilis*."—Amberley, near Stroud, Sept. 1907, *C. Bailey*. Short and compact plants with numerous compound branches. Others, less branched with more brightly coloured flowers, appear to approach *E. Kerneri*.—Grassy lane on the borders of Westridge Wood, Wotton-under-Edge. Very luxuriant plants with stout stem 35 cm. high, and very numerous spreading compound branches, forming small bushes nearly 30 cm. across; the largest cauline leaves 12 mm. long. *E. nemorosa* probably attains the largest size of any European species, and the Wotton plants are the largest I have seen. On the open ground on the oolite which caps this hill many forms are found,—tall and simple or with more or less numerous branches; with leaves and bracts large or small; with small flowers or with large ones like those of *E. Kerneri*, and some of these are apparently hybrids with that species. On the label of some small specimens with erect branches Mr. Townsend wrote "confer *E. stricta*," and on another "*E. borealis*," but on comparing and studying all the forms, I am forced to the conclusion that these belong to *E. nemorosa*. Up to the present time I have not met with any other species in the neighbourhood except *E. Kerneri*; even this is scarcely typical, and may be a transitional form.—Syston Common near Mangotsfield, Sept. 1901, f. *compacta*; strong plants, 14 cm. high, with very numerous compound branches nearly as long as the stem, short but distinct internodes, and small nearly included flowers. This and the Amberley plant may be compact forms due to exceptional conditions of the soil or of the host-plant.—HEREFORD. In short turf, Bishop's Wood, July 1906, *S. H. Bickham* (W. B. E. C.).—SALOP. Chetwick, Sept. 1903, *J. C. Melvill, teste* Wettstein (B. E. C.).—GLAMORGAN. Débris of lime-kiln, Oystermouth near Mumbles Head, Sept. 1909, *C. Bailey*. This is a well-marked example of var. *ciliata* Drabble.—MERIONETH. Pant Evion, Arthog, Aug. 1915, *W. C. Barton* (W. B. E. C.).—DENBIGH. Sand-dunes between

Llandudno and Deganwy, Sept. 1909, *W. G. Travers* (B. E. C.). Named by me, with doubt, *E. borealis*, on account of the rather large bracts, but I now place it without hesitation with *E. nemorosa*. —Leicester. Salt Way, Aug. 1906, *C. B. Headly* (W. B. E. C.). Bugworth, Aug. 1911, *W. Bell* (W. B. E. C.).—Groby, July 1912, *A. R. Horwood* (W. B. E. C.). This is probably shade-grown and is in consequence much altered in appearance. The stem is simple or nearly so, of a pale brown colour when dry, and the internodes are very long.—W. Lancaster. Sand-hills near the lake at Fairhaven, St. Anne's-on-the-Sea, Sept. 1902, *C. Bailey*. Stem 26 cm. high, branches very numerous, erect, spikes long with short internodes. Presumably growing with *E. curta*, which is abundant in this locality, and resembling it in some respects, but it is quite glabrous. It appears to be a transitional form.—W. Yorks. Between Scaleber and Attermire, Aug. 1891, *J. A. Wheldon*. "*E. nemorosa*" F. T. "*curta* forms, though in some respects simulating *E. nemorosa*," E. S. M. (B. E. C.). The specimen before me has unusually long internodes, is quite glabrous, and is undoubtedly *E. nemorosa*.—Westmorland. Arnside, Aug. 1915. Well-grown, typical plants.

Argyle. Glen Etive, Aug. 1899. Respecting this Mr. Townsend wrote, "Confer *E. stricta* Host," but in my opinion it is a form of *E. nemorosa*. It has many erect compound branches with the large characteristic leaves of *E. nemorosa* at the nodes; the spikes are rather dense, but more slender, on account of the small bracts, than in *E. stricta*.

12. E. campestris Jordan var. neglecta var. nov. Stem 10–30 cm. or more high with many or few spreading-erect branches above and below the middle, internodes generally long; branches shorter than the stem, sometimes compound. Fruiting-spikes with internodes generally longer than the bracts except at the top. Cauline leaves 6–8 mm. long, ovate or ovate-lanceolate, more or less spreading or deflexed, subobtuse. Bracts 6–7 mm. long, the upper with lanceolate or subulate subaristate teeth. Corolla about 8 mm. long, white and lilac or violet with yellow throat. Glandular hairs short, straight, more or less numerous on leaves, bracts and calyx. Setæ small, few. Towns. Mon. t. 77.

Ab *E. campestri* Jordan (*E. Tholeyroniana* Gandoger) differt:— Caule 10–30 cm. alto, in parte inferiore superioreque ramoso, ramis non congestis neque corymbosis; spica laxiore; floribus minoribus; pilis glanduliferis brevioribus, paucioribus.

This is the description of the British form, and also applies to some plants with flowers of medium size distributed by Continental collectors, and to Townsend's figures of specimens from Chambéry and Matlock. The form distributed by Gandoger under the name of *E. Tholeyroniana*, differs in the large, conspicuous flowers, the crowded, corymbose branches springing from the middle of the stem or still higher, rarely lower, in the crowded leaves and bracts forming dense spikes, and in the more numerous and rather longer glandular hairs. It is therefore necessary to enquire as to which form is the type of *E. campestris* Jordan, and for this purpose I give the essential

points of Jordan's description and those of Gremli and Rouy:—"Corollæ (haud parvæ) tubo calycino *fere superante* . . . foliis parvis . . . patulis pube minute sæpe glandulifera adspersis ovato oblongis basi in petiolum angustatis profunde dentatis, dentibus utrinque sæpius 4 lanceolatis, foliorum superiorum breviter acuminatis, caule ramosissimo, ramis tenuibus *subarcuato-patulis*." Jord. Pugil. p. 131 (1852); Wetts. Mon. p. 193 (1896); Towns. Mon. p. 40 (1897). Gremli describes it as a variety of *E. Rostkoviana*:—"Plant less glandular with shorter hairs, branches more spreading and leaves smaller." Gremli, Fl. Switz. Engl. ed. p. 303 (1889). Rouy describes it as *E. Rostkoviana β. campestris* Chabert:—"Tige plus raide et plus elancée, rameuse plus haut; bractées plus courtes et moins larges; glandes plus courtes; floraison tardive." Rouy, Fl. France, xi. p. 147 (1909). These descriptions, as far as they go, are not inconsistent with each other, but contain no definite statement as to the size of the flowers. Jordan only says "corollæ haud parvæ," which may mean anything between large and small, but, as Gremli and Rouy associate the plant with *E. Rostkoviana*, it may be inferred that they consider the flower to be large.

Wettstein, as he had not seen the plant living, simply quotes Jordan's description, but it may be gathered from his analytical key (Mon. p. 71) and the remarks on p. 194 that he attributes to it the following characters:—Corolla large, 10–15 mm. long; stem branched above the middle or above as well as below it; bracts small; glandular hairs short. He distinguishes it from *E. Rostkoviana* by the stem of the latter being branched below the middle, by the longer bracts, and long glandular hairs. His figure t. xii. f. 1 of an original specimen represents a tall bare stem branched at the top, and is not unlike a weak specimen of *E. Tholeyroniana*. It is also similar to an authentic specimen in Herb. Mus. Brit. of which Mr. E. G. Baker has kindly furnished me with a sketch, and this has large flowers. Wettstein quotes *E. Tholeyroniana* (spelt *E. Tholeyriana*) as a synonym of *E. campestris*, and it is to this that the description given above applies. It is evident that he looks upon this as the type, and makes no mention of a small-flowered form. He may not indeed have seen this, or, considering it as weak or undeveloped, passed it over as unworthy of notice.

The *exsiccata* which Wettstein quotes being represented in Herb. C. Bailey, I am able to give an account of the different forms they contain, which are as follows:—*Billot* 3671 *E. campestris*, Chambéry 1861, leg. Paris. This has small flowers and is very near to the British forms, except that it is more densely glandular.—*Schultz* x. 930. *E. campestris* Chambéry 1861, leg. Paris. This sheet contains the large-flowered *E. Tholeyroniana*, small-flowered *E. campestris*, *E. stricta* or *E. nemorosa* and *E. salisburgensis*.—*Schultz* n. s. cent. 1. 930 bis *E. campestris*, Bourges 1869 leg. Ripart contains *E. Tholeyroniana* and *E. stricta*. *Baenitz* No.—*E. Tholeyroniana*, Arnas 1873, leg. Gandoger.—*Gandoger* 404 *E. Tholeyroniana* Arnas 1874.

Taking all things into consideration, it appears to me that the

large-flowered form must be regarded as the true *E. campestris* Jordan, which is a very well-marked plant, not yet found in Britain; that this is well separated by definite characters from the small-flowered form, and that the latter should be distinguished by a varietal name. I therefore propose the name of var. *neglecta*, not disregarding the possibility that further observation and study may show that some of the British plants are of hybrid origin.

The following scheme will show concisely the characters which separate *E. campestris*, the var. *neglecta*, *E. Rostkoviana* and *E. brevipila*:—

Corolla large, its tube elongating at the end of the flowering	1.
Corolla smaller, its tube not elongating	2.
1. Stem branched below, internodes long, spike lax except at the top, leaves and bracts large, glandular hairs long	*E. Rostkoviana.*
— Stem branched above, often corymbosely, branches crowded, spike dense, leaves and bracts smaller, glandular hairs shorter ...	*E. campestris.*
2. Stem branched below, internodes long, spike broad with long internodes below, leaves and bracts broadly ovate with numerous teeth	*E. brevipila.*
— Stem more often with more spreading branches above and below the middle, spike more slender, leaves and bracts more narrowly ovate with fewer more acute teeth	[var. *neglecta.* *E. campestris,*

England.—N. Somerset. Failand near Bristol, Sept. 1898, *C. Bucknall.* Recorded in White's *Bristol Flora* (1912) as *E. brevipila.* In 1916 this was observed from July to the end of September, and its known area greatly extended. It is plentifully distributed at intervals along the limestone ridge on grassy roadsides and in rough pastures from Failand to Cadbury Camp, a distance of 4 miles, and is everywhere mixed with *E. nemorosa.* To this it is so similar in habit that I have only been able to distinguish it by the short glandular hairs. I have suggested above the possibility of its being of hybrid origin, and this point requires further investigation.—In a thicket, Charlecombe Bay near Clevedon, Sept. 1916, *I. M. Roper*: fine specimens attaining 40 cm. in height.—Glamorgan. Oystermouth near Mumbles Head. Sept. 1909, *C. Bailey.* Stem nearly 30 cm. high; similar to the Somerset plants.—Derby. Matlock, Aug. 1915, and Middleton-by-Wirksworth, Sept. 1915. These, kindly sent by Dr. Drabble, differ slightly in the branches springing from the stem at a sharper angle, in the principal leaves being less spreading, and in the rather broader corolla.

13. E. gracilis Fries. Stem slender, wiry, dark purple, simple or branched about the middle, internodes often very long, seldom short; branches much shorter than the stem, erect. Spike long and slender, lower internodes long. Leaves 5–7 mm. long. Bracts 5–6 mm. long, the upper with lanceolate or subulate acute or

apiculate teeth. Leaves and bracts glabrous rarely pubescent. nigrescent. Corolla small, white, lilac or dark violet. Capsule, in the specimens seen, generally shorter than the calyx, but according to Wettstein equalling or exceeding it. Wetts. Mon. t. viii. fig. 2; Towns. Mon. t. 376.

England.—Cornwall. Kynance Downs, July 1916, *Mrs. Wedgwood*. Stem 3–6 cm. high, seldom branched, internodes much shorter than in northern plants, leaves blackish when dry, flowers with violet upper and white lower lip.—E. Somerset. On Exmoor above Porlock, Sept. 1910. Stem slender or comparatively stout, flowers rather large, blue.—Dorset. Stepe Heath, Corfe Castle, June 1916, *I. M. Roper*. Stem and internodes nearly as short as in the Kynance Downs plant, but more branched; flowers dark violet.—Carnarvon. Lake Padarn, Llanberis, Aug. 1916, *Mrs. Wedgwood*. Similar to Scotch plants, but some of the specimens have long, narrow leaves nearly 12 mm. long.—Westmorland. Bank of a rill above Elmhow, Grisedale, and slopes above the east shore of Ullswater, Aug. 1915. Small plants with very small leaves; flowers lilac and white.

Scotland.—Inverness. Glen Roy, Glen Spean and Glen Nevis, Aug. 1899.—Argyle. Ben Cruachan, Glen Etive and Island of Kerrara, Oban Bay, Aug. 1899. All these Scotch plants were confirmed by Townsend.

Ireland.—Galway. Woodford, Aug. 1907. Stem tall, attaining 22 cm., simple or with 1 or 2 branches, flowers large, blue. This may be var. *primaria* Fr.; the flowers are like those of specimens from Kinlochewe which Mr. Townsend referred to this variety. Wettstein describes it as having flowers entirely violet and leaves tinged with red. The Irish plant has the leaves and bracts rather greener than usual, and the upper bracts with subulate, aristate teeth.—On the banks of the Shannon, Rossmore, Aug. 1907. This also has bracts with subulate, aristate teeth; the flowers vary from white to lilac and violet.—Moors near Roundstone, Aug. 1902, and on Urrisbeg, Aug. 1907. On Urrisbeg also there occurred plants which may be × *E. Areschougii* Wetts.—*E. curta* × *gracilis*. The habit is that of *E. gracilis*, but the leaves, bracts and calyx are clothed with fairly long hairs as in *E. curta*. The latter plant, however, was not seen on Urrisbeg.—Clifden, Aug. 1907.

14. E. scotica Wetts. Plant greener and stem more often simple or with fewer branches than *E. gracilis*, and consequently the fruiting-spike often longer in proportion to the stem; internodes long. Leaves and bracts 5–7 mm. long; teeth of the upper bracts triangular, lanceolate, or subulate and shortly aristate. Flowering-spike broader at the top and appearing subcapitate. Leaves, bracts and calyx glabrous or minutely ciliate and setulose. Wetts. Mon. t. viii. fig. 8; Towns. Mon. t. 376.

Wales.—Carnarvon. Cwm Idwal, Aug. 1909, *G. Goode*. Weak plants 8 cm. high; spike with long internodes and few flowers; leaves and bracts with 1–3 ovate, obtuse rarely acute teeth on each side, sparingly and minutely setulose. Flowers nearly white. I refer this to *E. scotica* with considerable doubt, as it bears some resemblance in the shape of the leaves and bracts and

their obtuse teeth to some forms of *E. minima*. Further information on the *Euphrasiæ* of this district is desirable.

Scotland.—Inverness. Glen Spean, Aug. 1899.—Argyle. Oban, Aug. 1899. Strong plants with 2–4 branches from near the base of the stem. Normal plants were gathered at Cam Glen, Buchaille Etive Mor, Ballachulish and on Ben Cruachan. All these were named by Townsend.—Ross. Wet boggy moors east of and near Poolewe, Aug. 1897, *F. Townsend* (B. E. C.).—W. Sutherland. Near Betty Hill, July 1897, *E. S. Marshall* (B. E. C.).

Ireland.—Galway. Boggy slope on Urrisbeg, Roundstone, Aug. 1902. Small plants not exceeding 8 cm. high.—Clifden and Woodford, Aug. 1907.

15. E. minima Jacq. Stem simple or branched below the middle, internodes, in the British forms, generally short. Fruiting-spike with long or short internodes. Lower cauline leaves obovate-cuneate with a large obtuse terminal tooth and 1–2 ovate obtuse teeth on each side. Bracts ovate, obtuse or subacute with 2–3 rarely 4 ovate or lanceolate obtuse or acute teeth on each side. Flowers yellow, violet or white. Capsule nearly equalling or exceeding the capsule. Leaves, bracts and calyx nearly glabrous or minutely setulose. Wetts. Mon. t. viii. figs. 10–14; Hiern in Journ. Bot. xlvii. 165, t. 497 A (1909).

Wettstein describes the mature capsules as exceeding the calyx, but, in many undoubted examples of *E. minima* gathered in the Western Alps, the capsules usually fall short of the calyx, and rarely exceed it.

Somerset. Great Cornham, Exmoor, perhaps nearly 1250 ft. alt., 24th August, 1908, *W. P. Hiern*. Corolla yellow. See Mr. Hiern's elaborate paper on the discovery of *E. minima* as a British plant, in this Journal, *loc. cit.*

Var. nana Rouy? *Flore de France*, xi. p. 155 (1900). Stem 3–6 cm. high, simple, lower internodes very short so that the leaves are crowded below. Fruiting-spike with short or long internodes. Leaves 3 or at most 4 mm. long, the lower obovate cuneate, with a large rounded terminal tooth and 1 small ovate tooth on each side, the upper with 1–2 teeth on each side. Bracts ovate with 1–2 rarely 3 triangular or oblong-lanceolate obtuse or subacute teeth on each side. Corolla 5 mm. long, white or lilac and white, with violet veins and a yellow spot. Capsule generally exceeding calyx-teeth, large in proportion to the size of the plant. Leaves, bracts and calyx minutely setulose.

On the boggy banks of a rill above Elmhow, Griesdale, Westmorland, Aug. 12th, 1915, and (the taller form) on slopes above the east shore of Ullswater, below Place Fell.

Rouy's description of var. *nana* is as follows:—"Tige de 3–5 cent., simple, filiforme; feuilles très petites, paucidentées, à dents obtuses; bractées crenelées, à dents obtuses." With this, as far as it goes, the Westmorland plants agree exactly. Bearing in mind that Wettstein considers *E. scotica* to be nearly identical with *E. minima* (see Mon. p. 171), the Westmorland plants differ from the former in the very short lower internodes, in their small size and in the still more obtuse

terminal and lateral teeth of the leaves and bracts. From *E. curta* they differ in the peculiar form and small size of the leaves, and in the very short pubescence.

Var. ARBUSCULA, var. nov. Plant small, 2–5 cm. high, green. Stem much branched at the middle; branches spreading then ascending, often again branched, nearly as long as the stem.

Planta nana, 2·5 cm. alta, viridis. Caulis in media parte ramosus, ramis arcuato-ascendentibus, sæpe iterum ramosis, caulem quasi æquantibus. Folia 3 cm. longa vix excedentia, inferiora obovato-cuneata, dente terminali magno, subquadrato vel rotundato, dentibus utrinque 1–3 ovatis, obtusis. Bracteæ ovatæ, dentibus utrinque 2–3, ovatis vel lanceolatis obtusis vel subacutis. Calycis dentes lanceolati acuti bracteam superantes. Corolla 4–5 mm. longa, alba vel lilacina, striis violaceis et maculâ luteâ notata. Capsula oblonga, calycis dentes sæpe superans. Folia, bracteæ et calyces minutissime pubescentes.

WESTMORLAND. On the slope under Place Fell, south of Ullswater, Patterdale, Aug. 17th, 1915, *C. Bucknall*, and Aug. 1916, *R. Nixon*.—DERBY. "Chelmerton—very high part of the Peak. The common size—Sept. 20th, 1862," *C. E. Palmer*, as *Euphrasia officinalis* (Herb. Druce).

This is remarkable for the small size of all its parts, for its intricate branching and for the few obtuse teeth of the leaves and bracts. Excessive branching is sometimes caused by the main stem being bitten off or otherwise damaged, but that it is not so in this case is proved by the presence of the main stem and by the regular development of the plant.

It is with considerable hesitation that I place these two forms here as varieties of *E. minima*, and it is only after careful and repeated comparison, and after having failed to find a closer relationship with any other species, that I have at length decided to leave them temporarily in this position. The chief differences, perhaps not very important ones, that distinguish them from *E. minima* are: (1) the crowding together of the lower leaves in var. *nana*, and the numerous, often compound branches of var. *arbuscula*, which are unlike those of any form of *E. minima* with which I am acquainted; unless Schur's "*E. humilis ramosissima* = *saxatilis*" to which Wettstein refers (Mon. p. 153) is connected with the Patterdale plant. (2) The constantly pale colour of the flowers, without any tendency to the yellow and violet which is often seen in *E. minima*. As there is, however, a var. *pallida* of *E. minima*, the pale colour of the flower does not of itself exclude our plants from the group. Notwithstanding their similarity in many respects, it remains doubtful whether they have been evolved from the same ancestors as *E. minima*, and the two varieties appear to be so closely related that if one is rejected the other can scarcely retain its position.

16. E. KERNERI Wetts. Stem shorter than in *E. nemorosa*, stout, copiously branched, rarely simple; internodes short; branches spreading-erect, often compound. Spike with internodes short, but not hidden by the bracts except at the top. Leaves and bracts

smaller, more acutely and deeply dentate, more erect and more shining than in *E. nemorosa*; leaves subtending the principal branches largest, 6–8 mm. long; bracts 5–6 mm. long, the upper with triangular, lanceolate or subulate aristate teeth. Calyx-teeth and veins often purplish or blackish. Corolla brightly coloured, 7–10 mm. long; tube elongated after the flowering, but in small-flowered plants not conspicuously so. Leaves, bracts and calyx appearing glabrous, but rather rough with very minute setæ. Wetts. Mon. t. ix. fig. 10; Towns. Mon. t. 375.

Small-flowered plants are sometimes distinguished with difficulty from *E. nemorosa*, and, on the other hand, large-flowered forms of that species simulate *E. Kerneri*. There are also forms which appear to be intermediates or hybrids between the two species.

England.—Devon. Near Plympton, Sept. 1902. Stem attaining 16 cm. high, with longer internodes and therefore less compactly branched than usual.—N. Somerset. Rowberrow Down, Mendip, on boggy ground, Sept. 1900, 1901, 1908 and 1916. Concerning the specimens gathered on Sept. 15th, 1900, which were in bad condition on account of the lateness in the season and from having been bitten by rabbits, Townsend wrote: "I can only put this to *E. Kerneri*, but the remarkable diffuse branching, the branches compound and the lower ones very slender render it remarkable. On carefully examining the central stem, it will be seen that it has often been arrested from grazing by cattle, causing growth and developments from the lower leaves, but this does not seem in all cases to account for the unusual development of branches. . . . A specimen from W. H. Purchas from Cheddar, Sept. 5, 1853, approaches the Black Down (Rowberrow) form."

Having observed this plant in succeeding years under more favourable conditions, I can now state definitely that it is *E. Kerneri*. As far as I have explored the locality it is sparing in quantity, although other forms now to be mentioned are very abundant. The most remarkable of these is a plant which Townsend named *E. Levieri* Wetts. (*E. curta* × *Rostkoviana*), but which I now feel compelled to refer to × *E. Rechingeri* Wetts. (*E. Kerneri* × *Rostkoviana*).

The following is a description of this plant:—Stem 3–10 cm. high, with numerous, crowded, compound branches often as long as the stem; internodes short, but longer in the taller plants with fewer branches, which resemble *E. Rostkoviana*. Leaves and bracts ovate, with ovate obtuse or triangular acute teeth, all, as well as the calyx, pubescent with long or short hairs, and often with few or many long glandular hairs. Corolla large, its tube elongating after the flowering, brightly coloured. Capsule usually short and broad, rounded and deeply emarginate at the top.

Having had the opportunity of thoroughly exploring the ground in the middle of June 1916, I found in a grassy lane which leads to Rowberrow Down an abundant crop of young *E. nemorosa* and a few plants of *E. borealis*, which, however, was more abundant in a neighbouring valley. *E. Kerneri*, *E. Rostkoviana* and the hybrid plant grew in the boggy valley, and the two latter also on the higher and

drier ground in deep, spongy turf. In September *E. nemorosa* was still abundant in the lane, but was apparently a second crop, badly nibbled, small and not well developed. This extended into the boggy ground, where it was often excessively branched as in the specimens of *E. Kerneri* examined by Townsend. The plants were quite glabrous and could not be taken for *E. curta*, nor is that species to be found in the neighbourhood. Under these circumstances it must be acknowledged that *E. Kerneri* is more likely to be one of the parents of the hybrid plant than *E. curta*. This was described by Wettstein under the name of *E. Rechingeri* in Osterr. bot. Zeitschr. xliv. Bd. No. 12 (1894). See Wetts. Mon. p. 289.

Wilts. Chalk downs, Boreham, near Warminster, Sept. 1914. Stem 8 cm. high with numerous crowded branches; flowers small.—Surrey. Colley Hill, Reigate, *C. E. Salmon*.—Bletchworth Hill, *E. S. Salmon*.—Chipstead, *R. S. Standen*.—Guildford, *J. Comber*, as *E. stricta*. All these are characteristic *E. Kerneri*, with flowers varying from 7 to 10 mm. in length.—Riddlesdown 1885. Herb. Bailey ex herb. Eyre de Crespigny. Small plants with large flowers 12 mm. long and lip very broad.—Buckingham. Kemble, Aug. 1909, *F. L. Foord-Kelcey*.—W. Gloucester. On the oolite above Wotton-under-Edge, Sept. 1907 and 1914. Some of these are fairly typical, but others partake of the characters of *E. Kerneri* and *E. nemorosa*, and appear to be intermediate or hybrid forms. They have stems 16–30 cm. high with few branches, and internodes much longer than the Surrey plants; corolla conspicuous, 9 mm. long, lilac and white. Neither Wettstein nor Townsend records a hybrid between these species.—On ground below Amberley Inn, Amberley, near Stroud, Sept. 1907, *C. Bailey*. Very strong, copiously branched plants, forming small bushes 15 cm. high and broad; flowers rather small. This also is on oolite and deviates from the type.—Westmorland. Roadside through woodland above Arnside, Aug. 1915. Small plants with a few short branches; corolla 8 mm. long, conspicuous and brightly coloured.

17. E. Rostkoviana Hayne. Stem with few, rarely many, long branches from below or above the middle; internodes long. Spike stout, lower internodes often much longer than the bracts. Leaves large, 8–11 mm. long. Bracts 7–10 mm. or more long, the upper with triangular or ovate teeth in young plants, ovate-lanceolate or subulate, acute, apiculate or aristate when old. Corolla normally large, the tube elongated after flowering. Glandular hairs numerous, long, flexuous, on the stem, bracts and calyx, often shorter and less numerous on the leaves; eglandular hairs long and spreading on the upper part of the stem and branches, short on the leaves and bracts. Wetts. Mon. t. ix. fig. 1; Towns. Mon. t. 377.

Easily distinguished from all other British species except *E. fennica* by the long, flexuous, glandular hairs.

England.—N. Somerset. Peatmoor, Shapwick, June 1898 and July 1906. Stems simple or much branched. Aug. 1914, *I. M. Roper*. Stem simple, 36 cm. high.—Peatmoor, Ashcott, July 1915. Stem 7 cm. high with leaves and flowers smaller than usual.—Cheddar, July 1907. *I. M. Roper*.—Rowberrow, Sept. 1907. Stem

30 cm. high, fruiting-spike long and stout. July 1916. Stem 9 cm. high, with numerous long slender branches and large conspicuous flowers.—Edford, July 1900. Stem 10 cm., simple; internodes short and flowers small.—Broadfield Down, near Bristol, Oct. 1908. Simple or branched; fruiting-spikes long with short internodes.—Dorset. Scotland Farm, Corfe Castle, June 1916, *I. M. Roper*. Small, young plants with nearly simple stem, suggestive of *E. fennica*.

Scotland.—Perth. Meadow at foot of Ben Lawers, July 1906, *C. Bailey*.—Kincardine. Seashore at Bervie, July 1891, *C. Bailey*.

Ireland.—Cork. Glengarriff, Aug. 1908.

18. E. fennica Kihlman. Stem 14–18 cm. high, simple or with 1–2 slender branches at the base. Fruiting-spike occupying the greater part of the stem, with internodes long below, regularly decreasing upwards and visible nearly to the top. Leaves about 5 mm. long, narrow with 3–4 ovate or lanceolate obtuse teeth on each side, those subtending the branches 7–8 mm. long with ovate teeth. Bracts opposite with 4–5 teeth on each side, the lower with ovate, the upper with lanceolate or subulate acute subaristate teeth. Corolla about 5 mm. long, with included tube. Capsule shorter than the bracts and calyx-teeth. Glandular hairs long, flexuous, abundant on stem, leaves, bracts and calyx; simple hairs short, setose, principally on the lower leaves.

Not having seen a description of *E. fennica*, I have described specimens kindly furnished by Mr. Druce: these were named by Dr. Lindman and corroborated by Wettstein. They differ from *E. Rostkoviana* in the nearly simple stem, the smaller bracts which are regularly disposed in pairs throughout almost the entire length of the stem, and in the small flowers.

England.—Somerset. Exmoor, *Druce*, det. Lindman.

Ireland.—Galway. Clifden, Aug. 22nd, 1911, *G. C. Druce*.—Clifden, Aug. 16th, 1907, *C. Bucknall*, as *E. Rostkoviana*.

19. E. salisburgensis Funck. Stem simple or branched below. Leaves and bracts narrow, with a few distant spreading teeth and the sides between them nearly parallel. Capsules glabrous or with a few decumbent hairs on the margin. Wetts. Mon. t. x. figs. 6–10; Towns. Mon. t. 376.

Ireland.—Galway. Turfy ground near the sea, Dog's Bay, near Roundstone, Aug. 1907. Stem not exceeding 6 cm. high, slender as well as the flexuous branches. This differs from Continental forms in the branches spreading nearly horizontally.

Not having had the opportunity during the preparation of this paper of consulting original descriptions, I have taken Wettstein's Monograph as the starting-point, and must refer the student to that work and to Townsend's Monograph of the British species for the bibliography and synonymy of the genus. Further, this being solely an attempt to simplify the study of the species as they occur in Britain, I have omitted any reference to Wettstein's views on the evolution of the species, and have only touched upon his theory of the relationship between æstival and autumnal species which he calls "parallel forms." We have, however, one or perhaps two instances of this supposed

relationship to which it is well to draw attention. These are *E. suecica* and *E. cærulea* (?), which Wettstein considers to be related to *E. stricta* and *E. curta* respectively as æstival forms. When these two species are better known—if, indeed, the latter proves to be identical with the Continental plant—it will be interesting to learn to what extent they give support to that theory. As far as morphological characters go, I must confess that to me a close connection between these species is not very evident.

I venture to hope that the general conclusions at which I have arrived will be acquiesced in by those who take an interest in this genus. At the same time, I cannot expect that all my determinations of doubtful and apparently intermediate plants will be always accepted. In many cases a more accurate knowledge of the circumstances of growth, of the other species which grow in the same locality, and, above all, a more representative selection of examples in regard to form, size and stage of development might lead to a different decision. Collectors will do well to bear this in mind.

ADDENDA ET CORRIGENDA.

P. 2. l. 33, for Bayley read Bailey.

„ 4. „ 23, after *campestris* add var. *neglecta*.

„ 7, „ 8, for 16 read 17.

„ 7, „ 10, for 17 read 18.

„ 7, „ 27 after *campestris* add var. *neglecta*.

„ 16, „ 4, for June 1902 read May 1906.

„ 18, ll. 18 from top and 7 from bottom. Miss E. Armitage writes: "Huntsham Hill is in Herefordshire: it closely adjoins Symond's Yat, which is in W. Gloucestershire, the boundary running at the foot of the Yat Rock. The Bishop's Wood locality is also on Gloucestershire border in Herefordshire, a few miles higher up the River Wye."

P. 23, after l. 40 add:—Carnarvon. Cwm Meillionen, Beddgelert, June 21, 1916. Very near to *E. minima* var. *nana* from Griesdale, except that the bracts are rather larger, the spike broader and the flowers more brightly coloured. These specimens tend to show that the varieties described on pp. 23, 24, are correctly placed with *E. minima*. This and the other two interesting plants here mentioned are contained in a parcel of *Euphrasiæ* received from Mr. C. E. Salmon.

P. 24 after l. 16, add:—Monmouth. Slope of mountain (about 1000 ft.) above Llanthony, Sept. 8th, 1916, *E. B. Bishop*. This corresponds in every detail to *E. minima* var. *arbuscula* from Patterdale. It is interesting to find that this form is not confined to Westmorland and Derby, and that its range extends much farther to the south. It will probably be found elsewhere in similar situations in mountainous districts.

P. 27 after l. 31 add:—Perth. Slopes near Lawers Burn, Sept. 12th, 1915, *C. E. Salmon*, as *E. Rostkoviana*. This is similar in habit to *E. fennica* Kihlman, but has larger bracts, broader flowering-spike, especially at the top, and rather conspicuous white flowers. It appears to be intermediate between *E. Rostkoviana* and *E. fennica*.

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