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THE ANNALS AND MAGAZINE OF NATURAL HISTORY.

[SECOND SERIES.]

No. 26. FEBRUARY 1850.

IX.—*On the British species of Chara.* By CHARLES C.
BABINGTON, M.A., F.L.S. &c.*

SINCE the genus *Chara* ceased to be considered as Phanerogamic and was placed as a Natural Order of Cryptogamic plants, its species have been excluded from our popular floras, and consequently suffered undeserved neglect from British botanists. The kindness of my friend Professor Henslow having recently placed in my hands a set of foreign specimens of *Chara*, which had been sent to him by Professor Alex. Braun of Freiburg in Breisgau, together with that botanist's notes upon some English *Chara* submitted to his inspection, I have been induced to attempt the arrangement of our native species in a more complete manner than has as yet been done.

Since the time of Smith, who described all the British species known to him in his 'English Flora' (i. 6) which was published in 1824, only one complete account of our species has appeared, viz. that by Hooker (Eng. Fl. v. pt. 1. 242) in the year 1833, for Hassall's notice of them (Brit. Freshwater Alg. i. 94) cannot be considered as original. In that work Sir W. J. Hooker has characterized eight species, viz. 1. *translucens*; 2. *flexilis*; 3. *nidifica*; 4. *gracilis*; 5. *vulgaris*; 6. *Hedwigii*; 7. *aspera*; 8. *hispida*. More recently two have been added to this list, one by the Rev. M. J. Berkeley (Eng. Bot. Suppl. t. 2824) as the *C. pulchella* (Wallr.), which is considered in this paper as forming one species in combination with *C. Hedwigii* under the name of *C. fragilis*; and another by Mr. D. Moore (Lond. Journ. Bot. i. 43) as the *C. latifolia* (Willd.). The former botanist has also greatly elucidated the obscure subject of specific distinctions in this genus by his elaborate remarks in the same work under *C. Hedwigii* (Eng. Bot. Suppl. 2762). We have still to add an elegant little plant detected many years since in the fens of Cambridgeshire by Professor Henslow, and formerly supposed to be *C. gracilis*,

* Read before the Botanical Society of Edinburgh, Jan. 10, 1850.
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but confidently referred by Professor Agardh, when in the year 1833 we had the pleasure and advantage of his company in an excursion into the fens, to his *C. hyalina*. Owing to the total absence until recently of nucules or globules from the specimens obtained, this plant has not, I believe, been published as a native species, although very many named samples of it have been distributed amongst botanists by Professor Henslow and myself. In this paper I have identified it with the *C. tenuissima* (Desv.), as is indeed done by Agardh, although he has preferred the name of *C. hyalina*; and have added to the list the *C. polysperma* (A. Braun), *C. syncarpa* (Thuil.), *C. mucronata* (A. Braun), *C. prolifera* (A. Braun), *C. Borreri* (Bab.), and *C. crinita* (Wallr.), thereby raising the number of our species to sixteen.

All these species, except two, are preserved in the herbaria of Prof. Henslow and myself, and as neither of us has paid any peculiar attention to this genus, but only collected such specimens as came accidentally under our notice, it is highly probable that several additions to the list will soon be made, and it is chiefly with the view of leading to such discoveries that it is now published.

In France, according to the list given by Lamotte (Cat. des Pl. Vasc. de l'Europe centrale) in 1847, nineteen species are found; in Germany we learn from the same book that there are eighteen species. Reichenbach (Fl. Germ. exc. 148 and 843) in 1833 described sixteen German species; and Fries (Summa Veg. Scand. 60) records fifteen species as natives of Scandinavia, but adds the remark, "spec. nondum pl. explor."

Since a considerable part of this paper was written, a valuable memoir by Prof. A. Braun has appeared in the 'Kew Miscellany' (i. 193), entitled "*Charæ australes et antarcticæ*," but including remarks upon the differences between the supposed genera *Chara* and *Nitella*, and pointing out new characters for their distinction. Notwithstanding the apparent value of these characters, I have thought it better to retain the name of *Chara* for the whole of the group until they have been carefully studied in the living plants, and their constancy and universality more fully proved. They are prefixed to the usual sectional characters in the ensuing arrangement of the species, in which I have followed that given by Prof. Braun in the above-mentioned memoir. I have also largely availed myself of the same distinguished botanist's valuable paper in the 'Flora, oder Botanische Zeitung' of Regensburg (xviii. 49), and his "Esquisse monographique du genus *Chara*" in the 'Annales des Sciences Naturelles' (ser. 2. i. 350), and have found the account of the species given by Mutel in his 'Flore Française' (iv. 159), and the plates in the 'Atlas de la Flore de Paris' by Cosson and Germain, very useful.

Nat. Order. CHARACEÆ, Rich.

Genus CHARA, Linn.

Section I. *Nitella*. Crown of the nucule of "ten cells, forming two circles one lying upon the other, never spreading, generally falling off before the maturation of the seeds" (A. Braun). Stems more or less pellucid, composed of a single tube.

A. *Nitellæ veræ*. Globules terminal at the furcation of the branchlets.

a. *Furcatæ*. Branchlets only once divided with one-jointed segments, 6-8 in a whorl, similar.

1. *C. flexilis* (Linn.); monœcious, stem slender equal flexible transparent, *branchlets pointed but not mucronate nearly equally forked* or trifid, nucules and globules together in the forks of the branchlets without bracts.

C. flexilis, Linn. *Sp. Pl.* 1624 (in part); *Eng. Bot.* t. 1070; *A. Braun in Flora*, xviii. 50; *Ann. Sc. Nat.* ser. 2. i. 351.

C. Brongniartiana, Wedd. in *Cat. Fl. Paris*. 152.

Nitella Brongniartiana, Coss. et Germ. *Fl. Paris*. 682; *Atl.* t. 40 C.

Rather slender, green, pellucid. Primary branchlets seldom more than once divided. Sometimes the axillary branchlets are much more divided and clustered, when it has passed for *C. nidifica* with collectors. Nucules with six striæ.

Henley near Ipswich, *Buddle*. Yarmouth, *Mr. D. Turner*. Berrington Pool, Salop, *Rev. E. Williams*. In the river at Bedford, *Dr. Abbot*; *Smith*. Richmond, Yorkshire, *Mr. J. Ward*. Stowting, Kent, *Rev. G. E. Smith*. Whitehorn, Wigtonshire; Clova, Forfarshire, *Prof. Balfour*. Reche Lode, and Lord's Bridge near Barton, Cambridgeshire.

Annual. May. "April to August," *Sm*.

2. *C. syncarpa* (Thuil.); diœcious, stem slender equal flexible transparent, *branchlets bluntish apiculate nearly equally forked* or trifid, nucules or globules at the forks of the branchlets without bracts.

C. syncarpa, "*Thuil. Fl. Par.* 473;" *A. Braun in Flora*, xviii. 51; *Ann. Sc. Nat.* ser. 2. i. 352; *Mutet Fl. Franc.* iv. 160.

Nitella syncarpa, Coss. et Germ. *Fl. Par.* 682; *Atl.* t. 39 (not good).

A slender diaphanous plant closely resembling *C. flexilis*, but diœcious. Nucules with five striæ and scarcely any crown. It is the supposed *C. gracilis* of Mr. W. Wilson in Hook. Bot. Misc. i. 336. No. 2.

Woodmancote, Sussex, *Mr. Borrer*. Cwm Idwel, Caenarvonshire. Ma'am, Galway.

Annual. May.

- b. *Mucronatæ*. Branchlets usually repeatedly divided, terminal segments of two joints, last joint usually resembling a mucro. Branchlets 6–8 in a whorl, similar.

3. *C. translucens* (Pers.); monœcious, stem thick equal flexible transparent, *sterile branchlets simple* not jointed, *upper ones ending in two or three short points*, fertile whorls of small trifurcate branchlets very small and closely placed, nucules small oblong usually in threes just below the three bracts surrounding the terminal globule.

C. translucens, *Pers. Syn. Pl.* ii. 531; *Eng. Bot.* t. 1855; *A. Braun in Flora*, xviii. 51; *Ann. Sc. Nat.* ser. 2. i. 352; *Hook. Eng. Fl.* v. pt. 1. 245; *Mutel Fl. Franc.* iv. 160.

Nitella translucens, *Coss. et Germ. Fl. Par.* 682; *Atl.* t. 40 B.

A strong plant. Fertile whorls so disposed amongst the branchlets as to appear to be capitate. Globules solitary. Nucules with seven striæ. The fruit appears to be wrongly drawn in 'Eng. Bot.'

Deep stagnant pools. "Near Shrewsbury, *Rev. E. Williams*; Brownston and Belton, Suffolk, *Sir W. J. Hooker*; Scotland;" *Sir J. E. Smith*. Bagnley Moor, Cheshire, *Mr. W. Wilson*. Totteredge, Middlesex, *Mr. E. Forster*. Loch Lubnaig, Perthshire; Lochnaw, Wigtonshire; near Liverpool; *Prof. Balfour*. Near the Fairlop Oak in Hainault Forest, Essex.

Annual. July.

4. *C. mucronata* (A. Br.); monœcious, stem slender equal flexible transparent, *branchlets strongly mucronate* nearly equally forked or trifid, *nucules and globules* together at the forks of the branchlets without bracts.

C. mucronata, *A. Braun in Flora*, xviii. 53; *Ann. Sc. Nat.* ser. 2. i. 351; *Mutel Fl. Franc.* iv. 161.

Nitella mucronata, *Coss. et Germ. Fl. Par.* 683; *Atl.* t. 40 D.

Rather thick for its length. Secondary branchlets once or twice forked or trifid, the terminal subdivisions rather shorter than the others. "Nucules with four or five striæ."

Marsh ditch at East Grinstead, Sussex, *Mr. Borrer*.

Annual. July.

5. *C. gracilis* (Sm. !); monœcious, stem slender equal flexible transparent, *branchlets in lax whorls* repeatedly divided into three or four segments, terminal segments mucronate shorter than the others, globules and nucules each solitary but together at the subdivisions of the branchlets without bracts.

C. gracilis, *Sm.!* *Eng. Bot.* t. 2140; *Reich.!* *Iconog.* t. 793; *A. Braun!* *in Flora*, xviii. 53; *Ann. Sc. Nat.* ser. 2. i. 351; *Mutel Fl. Franc.* iv. 160; *Hook. Eng. Fl.* v. pt. 1. 245 (in part).

Nitella gracilis, *Agardh Syst. Alg.* 125; *Coss. et Germ. Fl. Par.* 683; *Atl.* t. 41 E.

A very small and slender plant, its branchlets spreading in a lax open manner, and much longer than those of *C. tenuissima*. Nucules subglobose, with four or five striæ, large in proportion to the plant.

My judgement of this species is formed from the plate in 'Eng. Bot.' and a small but good specimen of the original plant, for which I am indebted to Mr. Borrer.

Mr. Wilson's *C. gracilis* from Cwm Idwel is *C. syncarpa*.

St. Leonard's Forest, Sussex, Mr. Borrer.

Annual. September?

6. *C. tenuissima* (Desv.); monœcious, stem slender equal flexible transparent, branchlets short in dense compact subglobose whorls repeatedly divided into 3-7 segments, terminal segments mucronate longer than the others, globules and nucules each solitary but together at the subdivisions of the branchlets without bracts.

C. tenuissima, Desv. "Journ. Bot. ii. 313;" Reich. ! *Iconog.* t. 792; *A. Braun!* in *Flora*, xviii. 53; *Mutel Fl. Franc.* iv. 159.

C. glomerata, *A. Braun!* in *Ann. Sc. Nat.* ser. 2. i. 351, not *N. glomerata*, *Coss. et Germ.*

C. batrachosperma, Reich. *Iconog.* t. 794.

Nitella tenuissima, *Coss. et Germ. Fl. Par.* 681; *Atl.* t. 41 F.

N. hyalina, *Agardh!* *Syst. Alg.* 126, not *DeCand.*

A very small slender plant, its short much-divided branchlets forming little globular compact masses which are often much incrustated. Nucules subglobose, with 6-8 striæ, three times the diameter of the branchlets and placed outside of them. Globules much larger than the nucules.

I have recently (Aug. 6, 1849) found a profusion of ripe nucules and a few globules upon this plant in Bottisham Fen, and with the assistance of Messrs. J. D. C. Sowerby and J. W. Salter have succeeded in satisfactorily ascertaining their positions to be in accordance with the section in which the plant is here placed.

In peaty ditches and pits in the fens of Cambridgeshire.

Annual. July, August.

B. *Tolypella* (A. Braun). Globules placed laterally on the nodes of the chief ray of the branchlets between the lateral rays (bracts) which are always shorter than the chief ray.—Rays of many gradually decreasing joints.

Note.—This little group of singular plants presents more difficulty than either of the other sections, and I am very far from being convinced that a correct view of it is taken below. My

original idea was that the plants only formed one species, but further study has convinced me that they are far too different to allow of their being lumped to that extent, and I am reduced to the necessity of considering them all as distinct. They appear to be very short-lived, and in all probability will be found to produce two crops in the year, one in the spring and the other autumnal.

7. *C. Smithii*; dioecious, stem slender equal flexible transparent, branchlets blunt those forming the primary whorls simple sterile long jointed (?), the others on axillary branches numerous densely crowded bearing four (three short and one long) bracts at their first node, globules stalked subtended by the three shorter bracts, nucules unknown.

C. nidifica, Sm. Eng. Bot. 1703 (principal figure).

A small plant remarkable, like the following species, for its bird's-nest-like masses of branchlets which spring from the axils of the simple branchlets forming the primary whorls. It is only known to me from the figure in 'Eng. Bot.' and from some remarks for which I am indebted to Mr. Borrer, and upon which the above specific character is founded.

As the *C. nidifica* (Müll.) is stated by Professor A. Braun (Hook. Kew. Misc. i. 200) to be "peculiar to the north of Europe, and particularly to the Baltic," and can therefore scarcely be the same as this plant, which was found "in a ditch which I believe the tide never reaches" (Borrer in Eng. Bot. Suppl. fol. 2762, note); and as the plate in 'Fl. Danica' is far too imperfect to allow of its identification with either of our *Tolypellæ*; I have thought it better, with the concurrence of Mr. Borrer, to confer a new name upon this plant, which was unfortunately made the representative of his *C. nidifica* by Smith by placing a figure of it in the principal place on the plate in 'English Botany.' I have the authority of the same botanist for saying that the following species was the plant really intended to bear that name. The confusion has originated from the idea prevalent at the time when the figure was published, that the dioecious plant from Lancing was a form of the monœcious one found at Cley. Unfortunately these plants are so evanescent that it is only by chance that they are again found in their original localities, where their seeds probably remain dormant until favourable circumstances cause them to germinate.

Lancing, Sussex (1804-5), in a ditch which the tide probably never reaches; not in Shoreham Harbour, as erroneously stated in 'English Botany.' Mr. Borrer.

Annual. Autumnal.

8. *C. prolifera* (A. Braun) ; monœcious, stem slender equal flexible transparent, *branchlets blunt those forming the primary whorls simple sterile long usually of three or four joints, the others on axillary branches numerous densely crowded bearing four (three short and one long) bracts at their first node, globules sessile (?) in company with one or more nucules and " subtended by the three shorter bracts."*

C. prolifera, *A. Braun in Flora*, xviii. 56 ; *Ann. Sc. Nat.* ser. 2. i. 352.

C. glomerata, *Mutet Fl. Franc.* iv. 161, not *A. Braun* nor *N. glomerata*, *Coss. et Germ.*

A small plant easily confounded on a superficial view with the preceding, from which it is distinguished by being monœcious. Nucules small with faintly marked striæ. Granules apparently sessile. The presence of decided bracts distinguishes this plant and the preceding and following from *C. polysperma* and *C. flexilis*, the species with which they are in the most danger of being confounded. There can be no doubt that the three smaller appendages are really bracts, although, in all probability, the longer (fourth) one is a subdivision of the branchlet.

In brackish (?) ditches. Cley, Norfolk, *Mr. D. Turner*. Copford, Essex.

Annual. April. "August to October," *Sm.*

9. *C. Borreri* ; monœcious, stem slender equal flexible transparent, *branchlets strongly mucronate those of the primary whorls simple sterile long jointed, the others on axillary branches numerous densely crowded bearing four (three short and one long) bracts at their first and also sometimes second node, globules stalked or sessile in company with several nucules and subtended by the three shorter bracts.*

C. nidifica, *Borr. ! in Eng. Bot. Suppl.* fol. 2762, note.

Closely resembling *C. prolifera* and *C. nidifica*, but considerably larger ; agreeing with them in most respects, but essentially different in its branchlets being " suddenly contracted below the acute apiculus." It also differs by sometimes producing a second cluster of bracts and fructification on its branchlets, and also occasionally having one on the larger " bract," which is thus shown to be more correctly a subdivision of the branchlet than a bract. The three true bracts are placed on the under side of the branchlet and at right angles with it, the fourth supposed " bract " is lateral and usually points upwards ; and their arrangement is believed to be exactly like that in *C. prolifera* and *C. Smithii*. This plant is chiefly known to me from the description in 'English Botany,' and from some manuscript notes, for

which I am indebted to Mr. Borrer; and as it does not seem to have been noticed elsewhere, I have ventured to record it as a new species, and honour it with the name of my valued friend.

In a marsh ditch at Henfield, Sussex, Mr. Borrer.

Annual. July.

10. *C. polysperma* (A. Br. !); monœcious, stem slender equal flexible transparent, *branchlets finely pointed those of the primary whorls sterile once or twice unequally branched*: middle subdivision longest, the other branchlets on axillary branches numerous densely crowded much subdivided with short internodes, nucules and globules placed at the nodes of the branchlets "between the lateral rays" (or bracts?).

C. polysperma, A. Braun "*Fl. Bad. Crypt.*;" *Flora*, xviii. 56; *Ann. Sc. Nat.* ser. 2. i. 352; *Mutel Fl. Franc.* iv. 162.

C. fasciculata, "*Amici*," A. Braun.

A small plant resembling the preceding species, and having like them bird's-nest-like masses of branchlets. My specimens are slightly incrustated, as is stated to be the case in those found in France. Nucules small with faintly marked striæ. Granules small.

I gathered this species in the year 1833 near Haslingfield in Cambridgeshire, but have not been able to find it there again. As numerous specimens were obtained by a party at that time, it is probably preserved in many collections under the name of *C. nidifica*, with which denomination it was sent to Prof. Braun and named by him as above. Mr. Borrer possesses specimens found at Livermere near Bury St. Edmonds by the Rev. G. R. Leathes.

Annual. April.

Section II. *Chara*. Crown of the nucule of "five cells forming a simple circle and sometimes spreading, persistent" (A. Braun). Stems usually coated with smaller tubes.

Charæ veræ. Granule taking the place of one of the bracts.—

Diplostephaneæ (A. Br.). A double row of spines (stipules) at the base of each whorl.

- a. Stem coated with as many tubes as there are branchlets in each whorl.—Branchlets coated.

11. *C. crinita* (Wallr.); diœcious, stem slender *coarsely striated thickly beset with setaceous patent clustered spines*, branchlets abbreviated, bracts whorled slender equal, *nucules narrowly oblong* shorter than the bracts.

C. crinita, Wallr. *Ann. Bot.* 190. t. 3; A. Braun in *Flora*, xviii. 70; *Ann. Sc. Nat.* ser. 2. i. 355; *Mutel Fl. Franc.* iv. 165.

C. canescens, Reich. *Fl. ex.* 150.

Hippuris, &c., Plukn. *Phytog.* t. 193. f. 6. Wallr.

Stems slender, erect, flexible even when dry, smooth, not opaque, densely crowded, slightly branched, pale green. Lower whorls rather distant, upper ones gradually closer, of 8-10 short branchlets each with six nodes and a whorl of five bracts at each node. Bracts usually as long as the internode. Nucules solitary with thirteen striæ and a prominent crown. My British specimens are of the male plant only.

Wallroth refers Pluknet's Irish plant to this with certainty; I have doubts.

In stagnant ponds. Burdock Pool, Falmouth, Cornwall, *Rev. W. L. P. Garnons*.

b. Stem coated with twice as many tubes as there are branchlets in each whorl. Branchlets coated, uppermost joints sometimes naked.

12. *C. vulgaris* (Linn. ?); monœcious, *stems scabrous finely striated* brittle, upper part of the branchlets without external tubes, bracts only on the inner side of the branchlets long: two 2-4 times as long as the nucules, and two equaling them.

C. vulgaris, *Linn. Sp. Pl.* 1624 (in part); *Eng. Bot.* t. 336; *Ag. Syst. Alg.* 128; *Hook. Eng. Fl.* v. pt. 1. 246.

C. fetida, *A. Braun "Fl. Bad. Crypt.;" Flora*, xviii. 63; *Ann. Sc. Nat.* ser. 2. i. 354; *Mutel Fl. Franc.* iv. 162; *Coss. et Germ. Fl. Par.* 679; *Atl.* t. 37.

Plant diffuse, almost always incrustated. Branchlets appearing, at the first view, jointless, minutely pointed. Nucules with thirteen striæ and a short crown, accompanied by the globule. Bracts thick.

Varying greatly in appearance, size and roughness, sometimes hispid, sometimes much denuded of the outer tubes in the upper part. A very much condensed form is the *C. montana* (Schultz), *Reich. Fl. exsic.* 2143. The Linnæan *C. vulgaris* appears to include this and several other species.

Ditches and streams: common. *C. montana*, Gilsland, Cumberland, *Mr. W. Christy*.

Annual. June to August.

13. *C. hispida* (Linn.); monœcious, *stem thickened upwards spirally sulcate rough brittle* beset with setaceous spines, branchlets elongated, bracts whorled (inner ones much longer), *nucules ovate* shorter than the bracts solitary, accompanied by a globule.

C. hispida, *Linn. Sp. Pl.* 1624; *Eng. Bot.* t. 436; *Wallr. Ann. Bot.* 187. t. 4; *Hook. Eng. Fl.* v. pt. 1. 246; *A. Braun in Flora*, xviii. 66; *Ann. Sc. Nat.* ser. 2. i. 355; *Mutel Fl. Franc.* iv. 163; *Coss. et Germ. Fl. Paris.* 679; *Atl.* t. 38 B.

Stems opaque, greenish white, usually incrustated, covered with

minute tubercles; spines generally very numerous, sometimes almost wanting; whorls of elongate, acuminate (by having the terminal segment denuded of outer tubes) branches, each of which has about six nodes and a whorl of 4-5 short bracts at each node.

Pits and deep ditches, especially on a peaty soil.

Annual. May to August.

14. *C. tomentosa* (Linn.); diœcious (?), stem thickened upwards spirally sulcate rough brittle armed with *scattered obtuse papillæ*, branchlets incurved, bracts unilateral ovate-oblong mucronate-acute, nucule shorter than the bract on each side of it longer than the three in front.

C. tomentosa, Linn. *Sp. Pl.* 1624; *Fries!* *Herb. Norm.* v. 100; *Mutet Fl. Franc.* iv. 163; *Reich.!* *Fl. exc.* 150.

C. latifolia, Willd. *!* "*Berol. Schr.* iii. 129;" *Hook. Icon.* t. 532.

C. ceratophylla β . *macroptila*, A. Brown in *Flora*, xviii. 65; *Ann. Sc. Nat.* ser. 2. i. 355.

The granules and nucules are probably upon different plants. Stem opaque, whitish green, covered with very minute tubercles, and bearing distant somewhat whorled short obtuse papillæ. Branchlets like the stem; their terminal division thicker, inflated, of one pellucid tube. Bracts pellucid, barren ones unilateral (?). "Nucule with a large ovate bract on each side, and three small linear-oblong ones in front, also having three minute acute tubercles on the opposite side of the stem. Globule from a whorl of two or three large bracts not having smaller ones in front, but with two or three tubercles on the opposite side of the stem." *Hooker*.

In the foreign plant (*Reich. Fl. exsic.* 92, which is the authentic *C. latifolia*, Willd.), the bracts are apparently whorled. *Fries's* specimen (*Herb. Norm.* v. 100) is without any incrustation, smooth and scarcely twisted. Our plant is certainly the *C. tomentosa* (Linn.), *C. latifolia* (Willd.), and the *C. ceratophylla* (Wallr.) is a variety of it.

Belvidere Lake, Westmeath, Ireland, *Mr. D. Moore*.

- c. Stem coated with three times as many tubes as there are branchlets in each whorl.

15. *C. aspera* (Willd.); diœcious, stem finely striate smooth flexible beset with setaceous patent spines, branchlets abbreviated, bracts whorled slender (two inner ones longer), nucules narrowly oblong shorter than the bracts.

C. aspera, *Willd. in Berol. Mag. d. N.* iii. 298;" *Wallr. Ann. Bot.* 185. t. 6. f. 3; *A. Braun!* in *Flora*, xviii. 71; *Ann. Sc. Nat.* ser. 2. i. 356; *Mutet Fl. Franc.* iv. 164; *Coss. et Germ. Fl. Paris.* 680; *Atl.* t. 38 D; *Eng. Bot. Suppl.* t. 2738, *Fries!* *Herb. Norm.* iii. 100.

Stems erect, not opaque, pale green, densely crowded; spines usually scattered, often very short, or irregularly collected in whorls (when it much resembles *C. crinita*, Wallr.); whorls of 6–9 branchlets of six nodes and a whorl of 4–5 bracts at each node; bracts as long as the internode or shorter than it. Nucules solitary, with twelve or thirteen striæ and a prominent crown.

Distinguished from *C. crinita*, as is well remarked by Prof. A. Braun in his letter to Prof. Henslow, “by the more slender outer tubes of the stems.” I am doubtful concerning the plant figured by Greville (Scott. Crypt. Fl. t. 339), for he places nucules and granules upon the same plant.

In stagnant water. Orkney, *Mr. Clauston*. Prestwich Car, Northumberland, *Mr. Robertson*; *Greville*. Irthing, Durham, *Mr. Bowman*; *Hooker*. Clefiof Farm, four miles from Holyhead, Anglesea, *Mr. Wilson*. Carlton, Notts, *Mr. Borrer*. Burdock Pool near Falmouth, Cornwall, in company with *C. crinita*, *Rev. W. L. P. Garnons*. Loch of Skail, Orkney, *Miss Watt*. In the river Shannon near Portumna, Galway, *Mr. D. Moore*; *Prof. Balfour*.

16. *C. fragilis* (Desv.); monœcious, stems slender finely striated smooth *not spinous*, last 1–3 joints of the branchlets without external tubes, bracts on the inner side of the branchlets about as long or longer than the oblong nucules.

C. fragilis, “*Desv. ap. Lois. Not. Fl. Franc.* 137;” *A. Braun in Flora*, xviii. 68; *Ann. Sc. Nat.* ser. 2. i. 356; *Reich. ! Fl. exsic.* 94; *Mutet Fl. Franc.* iv. 164; *Coss. et Germ. Fl. Paris.* 680; *Atl.* t. 38 C. *C. pulchella*, *Wallr. Ann. Bot.* 184. t. 2; *Eng. Bot. Suppl.* t. 2824; *Ag. Syst. Alg.* 129.

C. Hedwigii, *Ag. Syst. Alg.* 129; *Eng. Bot. Suppl.* t. 2762.

Slender, green, not incrustated. Main stem and branches usually with equally long branchlets. Nucule with thirteen or fourteen striæ and a long crown, accompanied by the globule. Bracts usually shorter than the nucules, but one equaling them in length; sometimes (*C. fragilis longibracteata*, A. Braun!, *C. delicatula*, Ag.?) longer than them.

The *C. Hedwigii* scarcely differs except in being very brittle when dry, the bracts shorter, and the branchlets of the main stem usually much longer than those of the branches.

Ponds. Sussex, *Rev. M. J. Berkeley*. Derwentwater, *Rev. E. A. Holmes*. Serk, *Rev. T. Salwey*. Paradi, Guernsey.—Var. *longibracteata*; West Chilton Common, Sussex; Berrington Pool, Shropshire.—*C. Hedwigii*; East Grinstead, Sussex; Sandwich, Kent, *Rev. M. J. Berkeley*.

Annual. June to August.