BRITISH JUNGERMANNLÆ.
BRITISH JUNGERMANNIÆ:

BEING

A HISTORY AND DESCRIPTION,

WITH

COLORED FIGURES, OF EACH SPECIES OF THE GENUS,

AND

Microscopical Analyses of the parts.

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INTRODUCTION

To a work, professing to give a description of the various species of Jungermannia yet ascertained to be natives of the British isles, it appears desirable, if not indispensable, to prefix, by way of introduction a short historical account of the genus itself accompanied with some remarks upon its structure and peculiarities, and a few observations on those families which are most nearly connected with it.

SECTION I

History of the Family

The Roman botanists, who have taken notice of the plants belonging to this genus, have almost universally designated them by the appellations either of 
\[\text{Mnec} or \text{Lachen}.

By the latter term, Falzoni Colonna has described the first Jungermannia that we find any where upon record, his "Lachen ater monos e caulis calcis" being very obviously both from the description and figure, intended for our \text{J. epiphylla}*, to which Dillenius and other subsequent writers have referred it.

It was not till the beginning of the last century that the name of Jungermannia was first adopted; a name given by Ruppius, to perpetuate the memory of Louis Jungmann, a German botanist, who was born in 1672 and died in 1685, after having published a catalogue of the plants of the neighborhood of Akerl and a work untitled Carroccopia Florae Akeriensis. His likewise gave considerable assistance to Breda in his Hortus Eystettensis.

In the Flora Jussiniana however, we find no particular relative to the characters of this new genus, nor do we, till Dillenius imperfectly indeed, described the fruit of it in the \text{Prod. Nat. cur. Com.}, ii, and in the Appendix, p. 59, and again in his \text{Flora Gisa}, where he attributes to this tribe of plants, which he calls \text{Lacheninae}, "Capillae monocarpae (qui aus et pedunculo brevissimo a Lachenus differunt), ant and a, ant pollinulo molem, ant petalodes quiet habentia, secum semper nonovotum quadriradium humilem, quam aestiv loco simplicis seculations constitutum plantarum, licet semina desiderantes" p. 81. He further speaks, in the Supplement of the same work of a double covering to the young capsule, evidently alluding to the calyx and corolla as they have since been termed.

* In his "Magiae academicae rarioresque mitissimi curiosorum Scripta quibus deputi," 1678, p. 336.

† Flora Jussiniana.
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Vaillant has described these plants under the name of Hepaticae and Hepaticoides, but
has added little to what Kuntze had done, except noting, in many instances, the vagrans,
and the quadrangular capsules.

Our countryman Bay, in more particular in this respect "Lachenastrum", 1 ha me,
"set Manu grammae, vol. in placeat, ovula tereangae, sphalla imortentia peduncu-
la minima tenus, quantaque partes conniventia in forma distincta phylla, et
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Thus, however, includes our genus Antherum, which forms has first divided "Lachena-
strum capituli, befarum an xerophyllum. In second comprises our Juergenmannas,
"Lachenastrum capituli in quatuor segmenta floridum tenuissimum petalis in spec-
minutis;" and this is subdivided into "Fulvo nune et minus determinante divinis," our
Juergenmannas formosae and "Fulvo nune magis determinante," comprising the Juergen
mannas foliacea.

Michael with his accustomed talent for discrimination, has divided the genus Juergen-
mannas into three, but has taken characters from the habit of the plant rather than from
the fructification which unfortunately will not bear him out. His first genus, Antheres,
(par Juergenmannas formosae) "set Manu grammae, vol. in placeat, ovula tereangae, sphalla imortentia peduncu-
la minima tenus, quantaque partes conniventia in forma distincta phylla, et
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Ibidem calyce cari, pedicelis inordinatu, non vaginis tubulosis stigmati. Cupulae sunt seminae perascimus in platsa tenus, quantaque partes conniventia in forma distincta phylla, et
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A slight alteration only is made by Haller who, in his Enneamenon Stirp. Helv., retains the genus established by Micheli consisting between the seeds in their characters, and adding to Merulius the peculiarity of the filaments being stalked, and adhering to each sponge, to the middle of the flower (cupulata), which, indeed, in my opinion the case with many at the family except J. cephalophyllum.

Dillenius next comes again to be considered, in his Historia Muscorum, where he has given a more enlarged character to the Lichenaria, and, after saying that the name is derived from the resemblance of its flowers to those of a Lichen add that it is, Muscens genus flora muscorum nuda, et fructus globosus, dum in quatuor horum ad basis acquis duant tetrapodaitas. Hence Genta referente Garinam spargitio ovum muscorum muscorum, et pedicles suorum praebente a nullo angulo inducto, c turba seu calycem fructum duplificat et integra, nunc quod hanc nunc in plures accusat per ommamentem divisa segregatique quibus solet in Lichene characeo descripta non genus. Pedunculum namque sine adnexo latent in pedicula cum fructibus separatis. He has, however, excluded J. Tschernemann of which he does not appear to have known the fructification and has named at a Muscens from the powdery caputula which he saw at the termination of the branches.

Lamarck at length, in the last edition of the Systema Naturae, firmly established the genus Jungermannia and attributed to it the following character

"Musc pedunculatus, nodos. Anthemia quadrivalvis"

Per annulas nodas, seminibus subrotundis.

About twenty-five years subsequently in 1760 the accurate Schmiedel produced his Descriptio de Jungermannia characteris in which, after an elaborate history he described upon the following character: "Jungermannia," he says, " vocamus Alse genus, in angua

Maculans Plurum varius nitum, vel in obscurum vel in distinctum plantas not namo,

Calo albo
Cocc. noda.
Stam. Anthemia nitida, seminaculis vel ferraceis, subquibus filis.

Phanerogama Plana

Cal. multiformis, muscophyllum nit bioloa.
Cocc. monosetalis, lenis variis nectes, incomperitabilibus.
Plat. Germ. notum et subrotundat. carinæ sectum, Stylus secundus impendit, crenatus; Stigma seminominatum
Per. Phanerogama pedunculata necta, ultra calamin et seminariae elevatae, subrotundatae, vel oblonga, multicaule, filamentos reflexa, quadrivalvis, unibus subrotundis.

Sew. Phanerogama subrotundata

Haller in his Algea Helveticæ has altered the character which he had previously given in his Enneamenon, taking advantage of the labors of Micheli, Lamarck, and Schmiedel; making an enumeration, however, of either male or female fructification, but very proudly including in the genus those Jungermannia which Lamarck and Schmiedel had made Alse; and observing Phanerogama Jungermannia, borto et emissa, phanerogama
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Innumerae globulae gerunt, vel oculae, vel pedunculae, quarum inter Linnaea Mathematica accursat. Cumb nam verum vaginae caesi varumque flore semi quadrilaterum, nov capellum calyptrae gerunt, ut habita nunc cum Jungermannii maneat." (Hall Histo. III p. 37)

Yet, on the other hand, he takes in Jacinthus simplicis, whose fructification, however, it should be acknowledged, is to the day unknown.

Hedwig has studied with his accustomed accuracy this genus, confirmed many of the observations of Schöntrich, and made known other new and important facts relating to the organs of fructification among them is that adhering to the vegetation of the seeds of Jungermanniae, which completely controverts the opinion of those botanists who have supposed the capsule to contain the farious peculiar to the male flowers.

The generic character, given in the Appendix to the Species Muscorum of this author, stands thus

"Jungermannia Persoonii monophyllum vel nullum. Calyptra flore persistens.
Sporangium quadrinale, spororum illa linearis, testa.
Sporangiocystula ovata vel globosa, singulae ellipticae simples vel articulato vel multo manibus solitaria vel graminis, semina vel pedunculata, superficii fructi superiores vel inferiores adnatas, vel substanter numerosa semina vel folia sporangiosa interea.
Fragum fermenur, vixi fitum, comprimato-truncato transversum et longitudinem, vel compresso-rotundate margo digerato, vel comprimato-mandato. In sporangium sporangii seminatae, sporangii vae glut calyptra flore, and he adds, that, by characters taken from the sporangium and the sporangiocystulae, the Jungermanniae may perhaps be divided into osomy genera.

The author that next merits our consideration is Schreber, who, having industriously selected the most striking characters from the writings of preceding botanists, has thus defined the genus

Muscorum Plants annual in caules, folius, frondibus glaucescenti.
Col. nix allat.
Cer nulla.
Stam. Filaments vivi allat. Anthorus orbit, unilocularis, apice dextrose.

Frutit Flosca in caulis vel distincta plantis.
Col Feroniolum erectum, tepalous, truncatum, membranum a basi inaperto.
Cer Calyptrae caulis, perasthia minor, uniglobosa marmore claras membranaceas, tenues, stylus brevis, tamquam apicem aperit.
Pet. Grana oblongum, calyptra absoluted, acutum Stylus breve, rotundum, per verticem calyptra transversum Stigma simplex.
Peric Capulei longe longum truncum laminosum, globosum, unilocularum, seminum longitudinalem dehiscere in 4, 5 vel 8 seminibus, rotundatis, persistentibus Sem. plurimum globosum, adnato, fila testa, abscissa, valvis in sando, apice, disco vel margina adexit.

He likewise alludes to the Jungermanniae annual, which, he says, have their anthras buried in the substance of the frond, and want a perianthus to the female flowers, on which account he doubts if they ought not rather to be considered a distinct genus.
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Both has scarcely made a less excellent use of the labors of others, and has drawn up a copious account of the different parts of the fructification summing up the whole in the following words

"Espec. vebratundet, umbra cumula inciden, subglobulata, apnea calcarea vel ciliferaordinundum. Manuerebris tramontum umb rum.

After the valuable discoveries of Habenula and Heidewig and the satisfactory reasons they had assigned for what they supposed to be the male and female fructification, it is rather surprising to find an able naturalist of our day M. Planchon de Beaufaux, connecting their systems and establishing a theory of his own according to which he considers the author's to be the female fructification, and the ♀ the male and forms characters almost wholly from the former, which diffuse an odium on the species that I have had the opportunity of examining. Thus, hunting the Medusa genus Massirica, on his Flora d' Oawe et de Bena, but changed its name to that of Carpechodium by giving the following character:


Ficus Fabrelli. In ramulis distectis, Fructus unico, not globulo, truncatus pedunculato acuminato vere, stylofarum anomum malum non subangulis foliaribus integris. Ramulis medio placentes eramosae subac; infrarum stationem foliorum distectum sustentant.

Hence it appears as well from the above character of the genus as from the species that the notion unappropriated in belonging to it that he has attributed to the female (his male) fructification of J. albicans, J. polypephylla J. tabana, distinguishing marks which they really have in common with all the rest of the species except indeed, when he pursues that their mass is "infundada" which does not hold good in any species. And in describing the male fructification (non female) his character would be such as to include it that I may say all the Juangemezone species, were it not that he wishes the J. fruticos to be "aneceo parce stylofarum anomum," a peculiarity which I cannot find to exist in any species, and certainly not in any of those he points out as belonging to this genus, not even his own Carpechodium fruticosum with specimen of which he himself obligingly favored me.

The genus Massirica, likewise, he has adopted under the name Rhytymphyllum, and proposes treating of it in a part of his Anthemoglosse, which is, I believe not yet published. A short account of it, however, is given in the Flora d'Oawe et de Bena already mentioned, where he thus speaks of it, and of the Cananetha (Jungermenous, Mack.) "Nous ne pouvons bien penser des individus que dans le Rhytymphyllum (Massiroa, Mikh.) les inflorescentes se composent sous l'épiderme, tout à l'extérieur des lobes des feuilles tantôt dans toute leur longueur que dans la fin antéro (Jungermenous, Mack.) une colonne frustes au sommet sont reassemblées en boule un sommet de quelque
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Carpophorum, in its genus, has been observed to be, in some species, and in the Ginnospermatae (Meliaceae, Mich.) in some genera, grains or seeds, which are enclosed in capsules, enclosed in fruits or seeds, which are enclosed in capsules, and in some cases, are enclosed in fruits. In the first and last genera here mentioned, M. Pabot de Bouvier has observed that the grains, which he supposed to be capsules, are to be found with equal facility as the seeds in those species.

The character given by Meisner in his Ed. Cryptogrammen, is, perhaps, the best that has yet been assigned to the genus, "Plantes Cryptogrammen Ordo. Calyptrae. B. Deepercylindrom Phanerogamia quadrivalves (at amoenum internum 8-valvae.)"

Wallenborn is almost equally happy in his definition. "Musci Hepaticae. Capsulae annuloperiolen, longitudinaliter delascens, inferri tamen calyptrae.

Eucarpythus, (an obscure) with its pulveraceum is to the ramulorum vel foliaceum.

Practis Calyx: Perichaetium uncaliforme membranaceum vel caryornum. Germen calyptrae tectum, styligerum, in perichaetio secundum

Capsula ex pedunculo subito clavato et caduceo, univalvis, facialis quinque dente suprahialae. Seminaceae in foliis apiculatae.

And, lastly, Schwaegerle gives the following character in his genus Jangermannia, in his Prodrumus Novi Muse Hepat. Thren quadrivalvulae, nuda, setis impositae Seminaceae plurimae.

SECTION II.

On the different Parts of a Jangermannia.

I ON THE ROOTS, STEM, LEAVES, AND STIPULAE

We shall begin with speaking of the

ROOTS,

Since they are the parts of a plant, by which it is principally nourished and supported. These parts are of two kinds: such as are composed of minute simple, or rarely forked fibres, and such as seem to be a continuation of the stem itself, equalling it in thickness, and, like it, frequently branched.
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And first, it the more common fibrous radicles, of which it is rare that any individual fibres of the genus is entirely deprived. It is true that, in plants which are upright to their growth and very densely rooted together such as J. Tegleri and J. scarabaeus they are discoverable only by means of a very careful examination In some specimens of J. pinguis (tab. 46) alone I have been unable to discover any vestige of roots but those were floating on the water. For the most part they have their origin on the underside of the stem or leaf, in those species which are destitute of bristles, and always, in these, originating upon the neck, if the plant have a distinct nerve. In others, as in the case of J. ephyphylla and J. pinguis, they grow indifferently from various parts of the lower surface.

The highest powers of a microscope have enabled me to discriminate peculiarly minute of structure in these fibres. They seem to be tubular throughout, never exhibiting any appearance of joints or contractures, but with smooth, translucent and of a very delicate membranaceous texture. In general they are colorless, only tinged with light brown, which they might be supposed to derive from the soil on which they grew J. pinguis (tab. 48) in remarkable for the deep purple hue of its roots, and those of J. adenium, J. scarabaeus and J. ciliatum, not unfrequently partake the same tint.

Upon the stipitate species of J. Jungermanniae, the roots generally grow in bundles, fascicules, originating immediately beneath the stipules. In the stipitate, they are thrown out indifferently, and in a more scattered manner from any, or every part of the stem and branches even from these branches proper to the fasciculation of in J. trifoliatum (tab. 70) J. trifoliatum (tab. 5), &c. Given the onlyx of J. Eichsmannii (tab. 76) from its upper part, sends forth a few radicles, but the base which invest the onlyx must not be mistaken for the root since their direction is upwards, whereas that of the roots is always descending.

I have said that the origin of the roots, in most instances, is on the stem. As in the Muscophora, so in the Jungermanniae, the instance occurs of the roots proceeding from the leaf, as may be seen in J. complanata (tab. 63).

In J. platypetala (Spod. tab. 86) an exangus is a bound of the stems being united in close fascicules, so as to appear like one thickened root. What I have described as such, I am more inclined to consider stipulates of a similar nature to those that are seen in J. trifoliatum (tab. 70) and indeed, I have observed in the appearance of fibres similar to those upon two or three individuals.

Mr. Lysell has directed my attention to a singular flattening in the lower extremity of many of the radicles in J. ephyphylla, being more or less the diameter of the radicle itself, and which I am disposed to look upon as a disease in that part.

Roots at the length hand, hinged at the beginning of this section, occur rarely J. ephyphylla (tab. 40) J. quercetorum (tab. 50) J. aphyphylla (tab. 42) J. ephyphylla (tab. 34) and in J. ciliatum (tab. 25). In the second third, and fourth of their species the roots curve horizontally in the vast they descend and are sometimes branched, often themselves arid forth fibrous radicles. In all these there is a difference in structure from the stems that there color is paler, generally smaller, and they are very unambly.
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Those seem to answer to the "Radicina proserina," which Helder describes as the Madas, and the "perdiscinae" of Bredel, whilst the fibrous ones are the "Radicina pseudonana" of the same author. The former are thus defined by him: "Quoad originem, radices sunt vel primordiales, quas a seminibus plantarum usque usque potentem ferant vel accrescunt quae cum parte tota inter se versus divertere poterint." Radix autem primordialis, praecipue in calvis et corpusculis acuti, non vario in ipso sensu, sed inter se diversa, vel simili conspicue non usu, illa absent. (Bredel Flora Nat. p. 3.)

All the species that I have yet observed to possess "Radicina pseudonana," are nearly erect in their mode of growth, and are found growing in earth, where their roots penetrate to various depths on creep horizontally just beneath the surface. In those species which are prostrates in their places of growth, the fibrous roots alone are found and, by means of these, they are more or less firmly attached to soil of various kinds, to rocks, trunks of trees and decayed wood, up to mosses, and even other Jungermannarea, J. pluviosa, and, probably, all the individuals that are so densely interlaced and forth roots, which strike into the leaves of these new stems over which they happen to lie, and from them appear to draw nourishment (See Suppl. tab. 3).

STEMS

Semen.

The stems of Jungermannaceae may likewise be separated into two kinds; such as are furnished with leaves (the Jungermannaceae foliatae of Autoren), and the Jungermannaceae frondosae: J. pusilla (tab. 69) and J. Rhaea (tab. 82, 83, 84) seem to be intermediate but, in general, the character is very clearly impressed upon the plants, and they may be distinguished by their first aspect.

The first are by far the most numerous in point of species, and are, for the most part, cylindrical, or tapering gradually towards the extremity in J. macropus (tab. 16) they are depressed, erect or in their growth in J. Hooker (tab. 54), J. spraguei (tab. 12), &c. and prostrate in J. kauaiense (tab. 11), J. kauaiense (tab. 16), and many others, simple in J. kauaiense (tab. 19) J. macropus (tab. 6), J. macropus (tab. 76) slightly branched in J. pusilla (tab. 17), J. pusilla (tab. 69) very much branched in J. dolichostyla (tab. 60), J. Hooker (tab. 58) and J. serpentina (tab. 62).

In general the branches are irregularly scattered, but in J. reptans (tab. 78), J. Woodia (tab. 68) and J. Tomentosa (tab. 41) they are spreading or spreading sometimes the motos are dichotomous, as in J. kauaiense (tab. 14).

Observations.

Besides these branches, which, if I may so express myself, unfold themselves with the regular growth of the plant, observations are very frequent upon the stems in Jungermannaceae foliata and it is probable that almost every species, at some anther period of its existence, produces them. Just valves may be seen in J. kauaiense (tab. 63) J. compacta (tab. 50) J. crassulae (tab. 87) &c. These must be carefully attended to, or, otherwise, from the shrubs which are an uncommon immediately beneath a calyx, the fructification will appear lateral, which in, in reality, terminal.

What I have said of the stems of the Pedinaceae Jungermannaceae applies equally to the species frondosae, except that in them, the stems, or stems as they are called in these, are
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various cylindrical. In J puberulent (tab. 72) and J furcatum (tab. 35) they appear to be so, but, in J Rhema, J purpureum, and J multifidum, they are much depressed. They are prostrate or procumbent in J Lyellii (tab. 70), J herrenmii (tab. 70), and most of this family except in J multifidum (tab. 45), in which species the leaves are unipinnately and regularly pinnately racemose. In J furcatum (tab. 25) the leaves are crisped and decumbent. In J Gympelia (tab. 77) and J spathylla (tab. 27) innovations are very common.

The principal difference between the Jungfernmannia fruticosa and the Jungfernmannia fruticosa consists in the stem of the latter being provided with processes which from their similarity to the leaves of the phanerogamous plants are distinguished by the same name whilst, in the former the stems are either wholly naked, or are furnished with marginal expansions throughout their entire length which, though of the same nature as the leaves, and though short and more planitudinal, as in J Rhema (tab. 80) are never so deeply cut as to constitute them in that appellation. Among them may be reckoned J spathylla J Lyellii, J herrenmii, J furcatum, and J puberulent and, of the naked stemmed species, J pungens and J multifidum are the only ones with which I am acquainted.

The structure of the stems in very simple and altogether miliar. The vessels arise at small, separated by thin pellucid membranes, their substance filled with a columnar fluid mixed with extremely minute granules, of a greenish or purple color when the plant is in vigour which consequently gives the same tinge to the whole of the stem. When dry these are of a dirty brown color. It arises, probably, from an injured and decayed state of the outer cells and the stem then becomes brittle, in otherwise pliable, and, in the young shoots, even flaccid.

LEAVES

The leaves of Jungfernmannia vary remarkably in their auriculae, structure, and general shape and generally afford excellent specific marks of discrimination among the species.

No instance whatever is known of the leaves of these plants being divided in foot (except the J herrenmii (tab. 35) and J furcatum (tab. 14)) they are deciduous. In almost all the species with bifid leaves they have an obvious insertion: that is to say, one angle of the base is fixed in the hook of the plant, whilst the opposite one is seen before it thus the leaf is obliquely semicircular. In the species with multiseriatus leaves, such as J Herrenmii, J multifidum (tab. 35) &c., the base will unison the stem transversely. In J gympelia (tab. 60) the leaves have their base running parallel with the stem.

In all the plants with bifid leaves, either the superior or the inferior surface of the laminae is more or less concealed by the indumentum of the leaves; and these two kinds of indumentum afford excellent characters for subdividing the genus. Thus, in J herrenmii (tab. 35) and J spathylla (tab. 35) the indumentum is indurated whilst in J Rhema (tab. 80), J Hutchinsia (tab. 1), J Trichomanes (tab. 70), and J dantica (tab. 3) it is impenetrable.
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The bifoliate insertion of the leaves is by far the most common, as in J. cuneifolia (tab. 18), J. squarrosa (tab. 81), &c. J. fuligina (tab. 51), and J. squarrosa (tab. 4), have them quadrangularis; and in J. Hookeri (tab. 54), J. trachycalyx (tab. 2), and J. setacea (tab. 5), they are multiformis, that is to say, they grow in irregularly from all sides of the stem.

The direction of the leaves is liable to considerable variation, even in the same species. In those with leaves disposed in multiformis directions, they generally point upwards, towards the extremity of the stem. In some, whether that be erect, as in J. Hookeri, or prostrate, as in J. setacea (tab. 5), these likewise in their direction in some species with bifoliate leaves, of which we have examples in J. squarrosa (tab. 47) and J. cruciformis (tab. 51), but for the most part, the species with this section are endowed with leaves which are indifferently erect, and those of which are seen in J. australis (tab. 34), J. Sphegoides (tab. 33), J. Taylori (tab. 57), &c. In J. squarrosa (tab. 4) they are remarkable for pointing all one way.

In every British species of the genus, the leaves are alternate and distinct. In two foreign species from New Zealand, I have seen them opposite, united, and perfoliate.

In describing the forms of the leaves, I must beg that the terms made use of may be understood with a certain degree of inclusion; not only because some variation takes place in the leaves themselves, upon the same individual species, but because the terms in use for Phanerogamus plants are not strictly applicable to those of this family. When mention is made of an ovate as an orbicular leaf, the expression is so far incorrect, that, having a broad transverse base, in general, the circumferences will not form more than three-fourths of an ovate or orbicular figure. I allude to these forms more particularly, because, and their various modifications, are the most frequent on which the leaves are subject.

They are ovate in J. australis (tab. 29), J. Sphegoides (tab. 29), and in the upper leaves of J. australis (tab. 24) ovate as in J. squarrosa (tab. 14) orbicular in J. Sphegoides (tab. 23) subquadrate in J. puiggarii (tab. 22) and J. vascula (tab. 21) cruciforme in J. australis (tab. 35) ligulate upon J. Hookeri (tab. 54) cruciforme upon J. squarrosa (tab. 64) and ovate and orbicular leaves are frequently found upon the same plant, as in J. australis (tab. 24) in all they are ovate or ovate.

In very many species they are more or less divided at or near the extremity. Slightly notched in J. cruciforme (tab. 31) and in J. cruciforme (tab. 3) deeply as in J. australis (tab. 9), J. squarrosa (tab. 30), J. cruciforme (tab. 31), J. cruciforme (tab. 30) broad in J. squarrosa (tab. 29) deeply as in J. squarrosa (tab. 4) trid in J. cruciforme (tab. 30), J. cruciforme (tab. 35), J. australis (tab. 29), and J. cruciforme (tab. 30) quadriradi in J. cruciforme (tab. 30). In all these the segments are equal in size and either expanded, as in most species, involute, as in J. squarrosa (tab. 16); or connate, as in J. cruciforme (tab. 15).

A considerable variety is to be observed in the space of the leaves, which are rounded and obtuse in a great number of species, some as J. Hookeri (tab. 58) and many others cruciforme in J. cruciforme (tab. 4) and J. squarrosa (tab. 10); very sharp, and almost
INTRODUCTION.

...and diaphanous in some states of J. berberis (tab. 76) but none of the genera have ever, that I am aware of, a hair-like termination which is so common among the leaves of the Equiseta.

...are many species whose leaves are split into two segments of (generally) unequal size, and these segments are constricted or more or less folded and appressed to each other. I say generally, because, as J. reniforme (tab. 22), we have an example of nearly, and sometimes quite, equal constricted segments. In the rest they differ in size, and somewhat in figure. The division is slight in J. erecta (tab. 16) and J. reniforme (tab. 43) in some others, such as J. complanata (tab. 31), J. Macbain (tab. 32), J. hemisphaerica (tab. 31), and J. montanum (tab. 33), the leaf might rather be described as having a small lateral appendage, which is usually involute, than as being divided into two segments, but a regular gradation from J. montanum, through J. complanata, J. Macbain, and J. complanata, to those which are strikingly two-leaved, is an imperceptible one, that it is not possible to draw a line of distinction.

In other species the leaves are deeply divided particularly as J. mesembria (tab. 23), J. platyphylla (tab. 40), J. complanata (tab. 31), J. mesembria (tab. 31), and J. platyphylla (tab. 97). In these leaves, many of the leaves are divided along the very stem as much as I have been led to describe the two leaves as distinct leaves, which, in fact, they are, in some parts of the plant, whilst, in others, subsequent examinations have enabled me to discover these leaves united, and resembling an early stage of J. mesembria (tab. 94). That I should be tempted to regard it as a variety of that plant, did not my friend, Dr. Taylor, who has gathered it on Mount Anne, believe quite a different opinion.

In every instance, the larger segment of the leaf is plane, as more or less concave, remarkably so in J. montanum (tab. 33), in J. compleanata (tab. 43), J. compleanata. The smaller one is some variable, being plane in J. platyphylla (tab. 40), J. mesembria, J. involute in J. Macbain, J. complanata, J. complanata, and J. compleanata, acute in J. coelostoma and J. coelostoma, J. Hutchinsia (tab. 1), J. dilatata (tab. 9), and J. montanum (tab. 9).

The larger leaf in some species again divided, as in J. Woodsia (tab. 30) and J. rosalini (tab. 84), in J. coelostoma it is matched at the apex. The smaller one, I believe, in every instance entire.

In all the kinds of leaves the stems are for the most part entire, arched in J. alpina (tab. 15) and J. rosalini (tab. 24) erect in J. complanata (tab. 15) spinose-decorticate in J. spinulosa (tab. 14) J. Hutchinsia, and J. Woodsia beautifully ciliated in J. coelostoma (tab. 35) and finely ciliate in J. montanum (tab. 30).

If the structure of the stem be simple, no otherwise is that of the leaves; for it is the structure...
INTRODUCTION.

Sometimes the relative size of the cells will afford, in the absence of the fritillation, tolerably good specific marks of discrimination. Thus in J. Teysman the cells are very large, in J. scalaris much smaller, and in J. sphagni maximus yet the form of the leaves, in all three, is nearly the same. When the leaves of the Jumperamus have been dried, and are recovered by immersion in water, the cells are dark in the centre, and have a cellulosic border around them; a circumstance which arises from the collapse of the juices, and accumulation of the granules, in the middle of the cell. And the same takes place in the Conifers, between the structure of which, and that of the Jumperamus, there seems to be a close analogy.

The leaves of all the species are destitute of any kind of horniness or succulence in one of the kindred species, J. suberosus (tab. 78), the surface of the plant, both above and below, is covered with white, polygonal hairs.

In a variety of J. suberosus, I have seen the cells more prominent and pointed as to give the appearance of a curiously tuberculated leaf (See Suppl. tab. 3). In all the other species the surface is smooth, and even shining in J. sphagni, J. lychnous, and J. bracteata.

Now as there is any thing which precisely accords with the nerve of Mosea in the leaves of these plants. The appearance of a nerve in J. lychnous (tab. 15), is only caused by the different form of the cells, narrower and longer than the rest, but they are not prominent on either surface like the nerves of Mosea. J. prostrata, of Swartz’s Fl Ind. Occ., has a nerve resembling that of J. lychnous.

The perigonial leaves, or those which contain the stamens, in general differ but little from the rest, except in being more closely imbricated and in having a swelling at the base where the stamens is lodged, as in J. aegyptiaca (tab. 13). Frequently these are wanting. In some of the kindred species, as J. Lychnus (tab. 77) and J. aegyptiaca (tab. 76), the perigonial leaf is a scale resembling a stipule in the foliaceous species, and in J. straussa (tab. 55) and J. suberosus (tab. 78) the stamens are inclosed within an innervexation of the leaf which is rolled up into a ball.

The perichaetial leaves, or those which surround the calyx, differ in general much more from the median ones. Even in the foliaceous species they frequently grow from all sides of the leaf, as in J. capitata (tab. 80) and J. concinna (tab. 87). They are wholly wanting in J. Teysmaniana (tab. 79) and in J. aegyptiaca (tab. 80). J. concinna (tab. 21) &c.; they scarcely differ from the rest. In J. Hookeri (tab. 54) and J. concinna (tab. 37) they are very numerous and entirely embrace the young fructification seeming to answer the purpose of a calyx. In J. jumperamus (tab. 4), J. aegyptiaca (tab. 87) and J. scalaris (tab. 9) they are united at their lateral margins, and appear almost convected into a calyx. In many species they are more eleft than the calix leaves, as for example, in J. Teysmaniana (tab. 80) and J. exilis (tab. 8). J. concinna (tab. 87) and J. concinna (tab. 9) they are plicate. In J. pedunculosa (tab. 92) J. sphagni (Suppl. tab. 33), J. regina (tab. 79), and J. teysmania (tab. 76), they resemble small scales and in J. dilatata, J. Teysmaniana, J. Meckelian, J. pedunculosa, J. concinna, and J. concinna (tab. 5, 6, 8, 12, 11, 32), the lobes of these are large and unscaled, which, in the rest of the leaves, are small and involute, or uncinate.
INTRODUCTION.

STIPULES

Beneath the leaves just described, the stems of many species of Jasmermannia are furnished with small scales or foliaceous processes, which, by most authors, are denominated stipules. These in every instance, are produced on the lower side of the plant, whether the leaves are imbricated on the superior or inferior surface. Where they exist at all they are generally found throughout the whole length of the plant, placed at equal distances one between each pair of leaves in J. compressa and J. Spatha they appear only on the younger shoots; and in J. aciformis, J. Tophs, and J. asomatica, they are with difficulty to be discovered. They are widest subtulate in the three last mentioned species ovate and entire in J. silvaticus (tab. 73) of the same shape, and toothed or laciniate in J. Blumei J. stipulatus (tab. 41) and J. mitratus, laciniate in J. longifolia and J. platyphylla bulb and entire in J. Francisci (tab. 40), J. conifolius, J. polygonifolius, J. macranthos, J. hancockisi and bifid and laciniate in J. Woodii J. barbata J. heterophylla (tab. 31), and J. hirtula, four to five toothed or lobed, with the labia entire in J. reptans (tab. 73) and J. ciliata (tab. 70): lobed and ciliated in J. cuspidata quadratus and finely laciniate in J. tomentellus (tab. 80). These margins are mostly plane, but recurved in J. platyphylla and J. Tophs.

II ON THE ORGANS OF REPRODUCTION

A On the Parts of the Fruiting.

ANTHERS

Under the denomination of the anthers of Jasmermannia Hedwig has described two anther kinds of organs, whose structure is extremely different. The one I shall have occasion presently to speak of, that which cannot simply at pollinated granules without any rable internal organization, and which I have, I fear, incorrectly, in the course of my description, described by the name of genus, the other is what I look upon to be the true anthers, at least as much so as the anthers of Mossw with the structure of which there seems to be the greatest affinity, and especially with those of the genus Spicatum. Like them they are nearly spherical in all the species, except in J. Blumei (tab. 52), where they are oval or elliptical externally composed of an extremely thin, pollined, glansenous, reticulated membrane, which reticulum is covered, in all probability, by cells, of which it is the boundary. Within it is filled with a fluid and mixed with a very minute granulated substance, generally of an olive-green or greyish color, but yellow in J. purpurea (tab. 50), and orange in J. Hoodi (tab. 54). This when the anther has arrived at a state of maturity, escapes through an irregularly shaped opening, which bursts at the extremity, and then the cuticle turns brown and decays.

The anther terminates, in the greater number of species, a short filament, or white, pollined, delicate stigmatic footstalk. In J. parasiticus this footstalk is scarcely discernible, and
INTRODUCTION.

In J. ephedra and J. Bigelovii I cannot find that it exists at all, the anthers appear not only sessile but imbedded in the latter species in the substance of the style, and, in the former, in a sexual process no peculiar receptacle. Amongst the Ephedrae the genus *Mausoleum* is found in all the Callianthus species of *Jungermannia*.

In the brandesii species, the anther is, as just observed, sometimes buried in the perianth, sometimes seen in the upper surface of J. Longissima (tab. 77) and J. hibernica (tab. 78) and sometimes on the lower surface, as in J. ferruginea and J. pustulata in either manner covered by a proper perigynial wall.

In most instances the anthers are, in the folius, covered by closely-intertwined perigynial leaves, each leaf unbranched as a definite number, from one to six or six, sometimes they are to be seen on the old branches, sometimes, as in J. platiphylla (tab. 40) and many others only upon the innovations which, after the decay of the anthers, becomes perfect branches. They are on some individuals, as J. Hookeri (tab. 54), in the sutures of leaves that are not closely imbedded and they are then exposed to view but not so much so as in J. lanceolata (tab. 18) and J. pustulata (tab. 80), where they are placed on the stamens, without any covering in protection whatever. Frequently they are found on the stem leaves which bear the female fructification, but more usually on distinct individuals.

CALYX.

As the phanogamous plants, so in this genus species are to be met with that are quite distinct of a perichaetium or calyx as I have hitherto called it of such, examples are seen in J. tenuiflora (tab. 52) and J. Hookeri (tab. 54). In J. camporum (tab. 39), J. pumila (tab. 4) and J. aculeata (tab. 64) the perichaetial leaves, by their mutual position, perform the office of the calyx in affording protection to the gametophytes within. This part, in the greater number of species, is single and very small and by an organ concealing the calyptra in J. ferruginea (tab. 37) (where it is like a scale) as J. ephedra (tab. 47), J. multifida (tab. 45), and J. pumila (tab. 52), where it is cup-shaped. In J. platiphylla (tab. 40) it is half the length of the calyptra, whilst, in almost every other in the genus, it is much shorter. In most mammoth figures in tubular with the mouth, however, smaller than the diameter of the middle, as in J. tenuiflora, J. aculeata, &c. In J. lanceolata (tab. 18) the apex is depressed acuminate in J. pumila in most a little truncate in J. elegans (tab. 15), J. camporum, J. pumila, and several others. It is incompressive, and before the exsertion of the capsule, is curved at the apex and always a little sinuous as an abortive angular in J. camporum (tab. 37), J. Acaena (tab. 63), J. Mackenii (tab. 53), J. tenuiflora and in J. multifida, in which latter the angles are often serrate-denticate, companionate in J. pumila (tab. 80).

MOUTH.

The mouth is generally rounded, toothed in many species, four cleft in J. phaeocarpa, beautifully cleft in J. megalorhiza and J. prolifica, truncate and flattened in J. undulata and J. elegans.

SUBSTANEA.

The substance is, in almost all the species, very nearly the same with that of the leaves, membranes in J. Blume approaching to carnivorous in J. Turbo, exceedingly so in J. Tschernonu and J. victorion. It is smooth on the surface in every species, except J. dolichos, in which it is tuberculated.
INTRODUCTION.

In regard to situation, the calyx is either terminal, as in J. splendidae, J. crassum, &c. filiforme, lateral mn to J. humifusa, J. calyptrifida, J. reclusa, and J. Trichomanes; placed upon short lateral branches as in J. Temaricii, J. aliciae (Suppl. tab. 3), and J. Sphagmum (Suppl. tab. 4), on upon short branches at the base of the shoot, in J. humifusa (tab. 11) and J. crassum. Lateral upon the upper surface of the stem in J. puniceum arising from the lower side of the stem in J. Sphagmum and J. trichobota.

The insertion of the calyx in every instance, among the British species at least, is upon the base, so that it becomes erect, except in J. Trichomanes (tab. 79) and J. colchicum (tab. 80), where the calyx is inserted to the stem by the side of the mouth, and the calyx itself is thus pendant and buried in the earth. I have seen a similar instance in a species brought by Mr. Buchanan from New Zealand, where however it is terminal upon an upright growing plant, and consequently never buried in the soil like our species.

Among the freudianum, Jungermanniaceae, we find two species which possess the peculiarity of being Calyx of having a double calyx. J. Lygelia (tab. 77) and J. tuberica (tab. 78) of these the outer is small and indistinct, the inner much larger and ovate or obovate in shape. It exceeds the length of the calyptra in the other it is shorter. A still more remarkable circumstance takes place in J. Bleo, where the calyx is imbedded within the substance of the stem (tab. 83). In J. epiphylla it originates on the upper surface in J. puniceum and J. multifida (tab. 35) at the side, and in J. furcata from the undersurface of the stem.

PISTILIA

Of these there are from three to eight or ten which are immediately surrounded by Pistillae. the calyx on, in the absence of that, by the perichaetial leaves. Their form is linear and approaching to lanceolate in some species, but there and ovate in J. puniceum, J. furcata, and J. multifida those mouth is always slightly expanded. Their structure likewise appears to be cellular, their color in which or pale gray with a few reddish longitudinal striae. One, or rarely two, of these pistilae is made fertile, and the lower part swells, becoming the germin, of an olive green color, whilst the upper remains in the style varying in length in different species. Of this germin, the anterior part (which seems to have some affinity with the anulus of the Caruncle) constitutes what is called the CALYPTRA.

This consequently takes the form of the full grown germin, it is now subcuneus or Cipigum, the greater number of species subcuneus in J. epiphylla, J. puniceum, J. multifida and J. furcata; but smooth in all, except the two last, of which, in J. multifida, it is tuberculated, and in J. furcata blunted. When the germin is sufficiently large the anterior part, now becomes the capsule borne with an irregular angular opening at or near the summit, and the capsule elevated upon its white, cellular PEDUNCLE,

is protruded to various lengths, according to the species, being very long in J. epiphylla, peduncularis, and J. multifida, short in J. furcata, J. platiphylla, J. puniceum, &c. In J. heterophylla it
not unfrequently happens that an unequally torn portion of the calyptra is carried up with the capsule, as in the case in the genus Sphagnum among the Musci.

**CAPSULE**

If a young capsule, before it has burst the calyptra, be examined, it will be found to be of an ovate figure, exhibiting an appearance of sutures. Within is seen a pulpy substance, consisting of a cellular tissue filled with a cellular tissue, and numerous granules of a dark or olive green color, varying in size, and the whole traversed by twisted brown lines, formed by the spiral filaments.

When the capsule is protruded beyond the calyptra, the external part of it becomes hardened and the color generally deeper, brown, and glumy; the sutures of the valves, too, are visible. The cellular substance and the locule within are then absorbed and nothing is seen but the granules become seeds, and the spiral filaments traversing them.

The texture of the capsule is somewhat in the greater number of species, almost membranaceous and pale brown in J. platyphylla, J. Hookerii, J. polystyla, and J. echinophylla, quite membranaceous white, and transparent in J. ericoides, J. humatofolium, J. calyptra folium, and its varietates. In the last mentioned species, the capsule opens into four segments, which do not reach more than half way down the capsule, but J. polystyla bursts irregularly into valves of various sizes, but in all the rest four equal valves, extending to the very base. Sometimes as in J. Lyelli, J. Hookeri, J. juniperinum, and, probably, some others, five valves are seen, and sometimes only three, but the same arises from accidental causes. In all these, when the calyptra is removed, the valves become quite expanded; in those species where filaments are attached to the spines or valves, they are sometimes presented from doing so by the entanglement of these filaments.

The structure of the capsule, too, is something remarkable about it, yet nothing, I think, but what might arise from a cellular formation and the cells becoming hardened. They appear to be stratified longitudinally, with strata placed at tolerably regular distances, and connected by cords as less closely placed transverse ones. These lines may be the divisions of the calyptra. Externally they form granules or sutures on the surface of the capsule. Such, at least, is the case in the greater number of species. In J. muticum, and the curious little family to which it belongs, the capsule is irregularly reticulated, like the anther.

The spiral filaments that are lined in the capsules of this genus, and many of the neighboring ones, are deserving of minute attention. How they are attached in many instances, I am wholly at a loss to discover; for, in general, after the bursting of the capsule, they are quite loose among the seeds. In J. racemosus, J. echinophylla, and J. Hookeri, they are formed of a simple sheath, and remain, when the discharge of the seeds, attached to the extreme of the valves of the capsule. In J. ericoides, and its varietates, the point of attachment is the same, but the sheath is double and enveloped by a thin, papillose tubular membrane. A similar membrane envelopes the long filaments of J. echinophylla, which are attached after the dispersal of the seeds, to the central base of the capsule, where they form a handsome tuft as pendant. It is possible that this membrane may shew in all the
INTRODUCTION.

species, in a young state of the capsule, at which period I have sometimes seen as in those in which I have looked for it in vain when the capsule has been ripe.

The substane of the spiral filaments is, as far as their extreme minuteness will allow substance, to judge nearly the same as that of the capsule itself; their color brownish or fulvous and spiny; they are narrowed at each end, and compressed; they are short in J. pseud.; very long in J. cephylus. In all cases they have a strong elastic force, becoming more closely twisted and unstretching with heat and dryness, and expanding with moisture. On the bursting of a capsule, they are instantly, from their exposure to the dry air, put in action, and, by their elastic impulse, discharge the seeds with a sudden motion to a considerable distance; whereas they have not received the term given them by the Germans of wind-dispersors

SEEDS

The seeds themselves are, for the most part, spherical, numerous, minute, brown, seeds and opaque smooth in the greater number of species; rough in J. pseud.; large, and comparatively few in number in the capsules of J. campanula, and of an oblong shape, and a green color. Hedwig has seen the seeds of J. cephylus negretti, and in an annual will be found under my description of that species.

II Of the Gemma.

Hitherto I have found true gemma only upon a few species. In J. campanula, J. cephylus, J. Iurantifolia, and J. cephylus, they appear to be produced upon the stems. In J. campanula upon the margins of the leaves. In J. furcata upon the extremity of the thread, and in J. Blissi within proper tubular receptacles. In all they precisely resemble in structure the leaves or the thread of the individuals which produce them. In the four first as well as in the last-mentioned species, they are spherical. In J. campanula and J. furcata more or less oblong. Those of J. furcata may without much difficulty be observed as they progress towards perfect threads and those of J. Blissi even before their escape from the receptacles, are endowed with roots, and their development into perfect plants has been detected by the attentions of Schmidel and Hedwig.

I believe that I have called by the same name bodies of a much more simple and less organized structure, which are found on the leaves of J. Iurantifolia, J. furcata, J. Iurantifolia, J. pseud.; on the ends of the branches in J. Blissi; (Suppl. tab. 2) J. Trocho- manus, and J. Iurantifolia, &c., in all of which they are collected into more or less compact spherical heads. Each is an ovate or angular, polyhedral, greenish granule or nodule.
INTRODUCTION.

Frequently, on their falling away from the leaves, as in J. cervis (Semp. tab. 11) and some others, the leaves appear incurved and jagged, as if the cells had been torn off, and it is not improbable but that, in certain states of the plant, this may really be the case so that each of these particles may be looked upon as a cellule. Their color, when first formed, too, is generally green, turning to brown in an older state, as in J. nemorosa, and to a tinge red in J. acernia.

SECTION III

On Jungernannia as a Genus, and on the Arrangement of the British Species

As far as my experience enables me to offer an opinion from my acquaintance with the British and many foreign species, the plants that at present form the genus Jungernannia, however numerous cannot be divided into other genera by means of characters taken merely from the fruit. In that respect, those which seem most allied in habit, often differ essentially, so that, with regard to the Jungernannia iridium, for instance, which at first sight appear to demand a separation, unless there are made almost as many genera as species, I do not know any character which they have in common, by which they might be distinguished from the Jungernannia foliosa. Jungernannia nemorosa, J. reginae, umbrosa, and undulata, have a peculiar habit about them, and have, moreover, a remarkably compressed calyx, truncate at the mouth; and we may think here to have discovered a character by means of which they may be removed from the rest of the genus, but an examination of other species will convince us of the inadequacy of this character; since J. erithalon and J. scopulata, two plants very different in other respects, have a calyx of the same shape.

A still stranger peculiarity of habit seems to unite J. erithalon, J. hamato, J. calyptrifolius, and J. montanum, in which also the singular structure of the capsule, and especially its short valves, seem to claim for them the privilege of being considered a distinct genus; yet there are two species, J. Macran and J. platypetalus, which connect them by an easy gradation with J. dilatata and J. Tenuifolia.

The following character of the genus I would propose as liable to fewer objections than any that has yet been given.

CLASS AND ORDER.

Cryptogamia, Heratice. Schreb.

(NATURAL ORDER.


GENERIC CHARACTER.

Receptaculum fructu communissimum nullum
Col. Pericarpium sepalophyllum tubulosum, rarus nullum.
INTRODUCTION.

Calyptra germeni tegens, apice ad capulum emittendam verticaliter ruptus, stylihens. Capitula pedunculata, rara vel sphaerica, in valvam quatuor, pedis minulore longa, longitudinalem sine ramosa nemisiter discontinua.

Colnus valdes.

Semen finem apiculorum clausum incola.


This distinguishes it at once from Menchus by the absence of the common receptacle for the flowers, from Asclepium, by the four-valved capsule, and the want of a columnella from Hapnia, by the monophyllous calyx; and from Ricas and Sphacocarpus by the long footstalk of the capsule. Indeed, were it not for the anomalous capsule of J. panice the Linnian character, "capsula quadrivalvis," would, I think, be admirably characteristic of the whole genus.

I shall now offer an Analytical Table of the species described in the present work, arranged in some degree, according to a method employed by Lamarck and De Candolle in their Flora Francoica, with alterations principally suggested by my valued friend, Mr. Lyell, and I shall then proceed to give full and amended characters of those, with additional notes and synonyma, which will conclude this Introduction, already, perhaps, carried to too great a length.
### Clavis Analytica

#### Jungermanniæ

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- **Frondosæ**
  - 1. **Nervo praeditus**
  - 2. **Nervo obsoletæ**

**Nervo praeditæ**

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<td>Frondibus pubescentibus</td>
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<td>Frondibus luribus</td>
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<td>3.</td>
<td>Caulescens inferius bispædi</td>
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<td>Caulescens superius, lavil</td>
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<td>J hibernica,</td>
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<td>9.</td>
<td>Frondis margine subato</td>
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<td>10.</td>
<td>Frondis marginis insignis lobato</td>
<td>J libata,</td>
<td></td>
</tr>
</tbody>
</table>

**Nervo obsoletæ**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Frondos ramos, compressæ, caulescens inferi</td>
<td>J multîflos,</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Frondos simplex vel aere, caulescens gisind</td>
<td>J pinguis,</td>
<td></td>
</tr>
</tbody>
</table>

* By *caulescens inferior* I mean that it originates on the underside of the stem, as *caulescens superior* does on the upper
<table>
<thead>
<tr>
<th>(FOLIOSÆ)</th>
<th></th>
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<tbody>
<tr>
<td>B. {Exulipulœ</td>
<td>C</td>
<td>H</td>
</tr>
<tr>
<td>Exulipulœ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C {Folios multifariiHum insertis</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>Folios bifariis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Folios quadrifariis
2. Folios abaque ordinem unilaterem dispositis

<table>
<thead>
<tr>
<th>(Folios quadrifariis)</th>
</tr>
</thead>
</table>
| 2       | Calyx foliis parabolicalibus immensus
| 3       | Calyx ascendent
| 4       | Calyx ovato, ore contracto (folia tenax)
| 5       | Calyx oblongo, ore aperto (folia rigida)

<table>
<thead>
<tr>
<th>(Folios abaque ordinem dispositis)</th>
</tr>
</thead>
</table>
| 4. | Folios subovatis, calyce breviss
| 5. | Folios eccentricis
| 6. | Folios falcati, calyce dentatis
| 7. | Folios bilaternal, calyce ciliatis

<table>
<thead>
<tr>
<th>(Folios bifariis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. {Folios univix</td>
</tr>
<tr>
<td>Folios divisas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Folios univixs)</th>
</tr>
</thead>
</table>
| 1 | Folios sursum-dentatae
| 2 | Folios integerrima
| 3 | Folios notandata
| 4 | Folios pilis minutter ovatis
| 5 | Folios obvati, semelbus spinuloso-dentatae
| 6 | Folios ovata, hic lilias integerrima
| 7 | Folios notandata
| 8 | Folios pilis minuter ovatis

* By this I mean that the leaves are inserted on two opposite sides of the stem, wherever their direction may be.
CLAVIS ANALYTICA

1. Calyces laterali (inferiori)  
2. Calyces humerali  
3. Calyces comprimis angulati  
4. Calyces teretes  
5. Calyces solos pericliniimbus immerso  
6. Calyces cirsipes  
7. Calyces superci quadrangulati, folio undulato immanisignis  
8. Calyces per toam longitudinem quadrangulati, foliis caudatimatis, marginatis  
9. Calyces superci depressi  
10. Calyces pilis manubrii acuminatis  
11. Calyces sub dentatis  
12. Calyces arcuati  
13. Folios amplissimis  
14. Folios falcatis, liberos

(Except. fol. def. divisi)

1. Foliorum segmentia pluribus quam duobus  
2. Foliorum segmentia duobus

(Foliorum segmentia pluribus quam duobus)

1. Folium quadrangulare  
2. Folium trilobatum  
3. Calyx campanulatus  
4. Calyx oblongo-cylindraceus  
5. Foliorum segmentia (nunc 3.) integra  
6. Foliorum segmentia lamellatis

(Foliorum segmentia duobus)

7. Foliorum segmentia equallibus (explicatis)
8. Foliorum segmentia inequalibus (cosecundis)

(Foliorum segm. 3, equalibus, explicatis)

1. Folium marginales reversi  
2. Folium marginales non reversi

* J. Sphagii and J. comprimis are sometimes confused but, as I never found them on the older nodes, I have thought it best to place them in the division Explanata.

† Two species have the leaves very incisely divided; yet I think, cannot under any other family than the present,

1 J. comprimens has the leaves somewhat, though rarely, divided, and might be looked for in the following side.
CLAVIS ANALYTICA.

6. Caesia aecta
   Caesia procumbens
7. Caesia folia partitum ulterioribus minoribus
   Caesia folia (fol. extensibus)
8. Caesia similla vel similiacide ramosa
   Caesia vel nervorum sublatitudinibus ramosis
9. Folium segmentis subformulis calycis pyriformis
10. Folium segmentis arctis calycis ovatis vel obtusis
11. Folium emarginatius, stamina obtusa
    Folium emarginatius stamina obtusissimae
12. Folium serratum
    Folium integerrimum
13. Folium segmentis rectis
    Folium segmentis curvatis
14. Caesio terminalis
    Caesio subterminalis
15. Folium segmentis bracteis, seminivertibus
    Folium segmentis tergitis, incurvatis

(Foliorum segm. 2 magisque conduplicatis)

F Segnamenta inferiores minus
1 Segnamenta superiores minus
G Segnamenta inferiores major
1 Segnamenta inferiores major

(Calyces segmenti majoris unibus)

1 Calyx comprimatus
2 Calyx tereus

1 Folium denticulata
2 Folium integerrimum
3 Folium lobis ad basins acutis strictis
4 Folium lobis subgeniculatis strictis
5 Folium lobis ovatis, acutis marginatis
6 Caesia erecta, foliorum lobis inferioribus multis minoribus
7 Caesia procumbente, foliorum lobis subequalibus

(Calyces teretis)

1 Folium lobis acuti conduplicatis
2 Folium lobis intortis incurvis


CLAusi ANALYTICA.

1. Folia asperula
2. Folia asperula
3. Foliolum lobis obtusis
4. Foliolum lobis acutis
5. Foliolum lobis subequivalentibus
6. Foliolum lobis superiusibus (cum antida) minuatuin

(Spetulae *.)

1] Folia indivisa
2] Folia divisa

1] 1
2] 1

1] 1 [Folia indivisa]
2] 1 [Folia divisa]

1] (Segmenta aequallbus)
2] (Segmenta inaequallbus)

1] 1
2] 1

(Segmenta aequallbus)

1] Folia bisecta
2] Folia trisecta
3] Stipula bisecta
4] Stipula lentifolia
5] Stipula integerrima, folias valde asperas, segmenta obtusae
6] Stipulae dentatae, folias plasmallae, segmenta acutae
7] Stipularum segmenta integerrima, calyce terete
8] Stipularum segmenta intus latissima, calyce triangulare
9] Folia aspera acuta bidextata
10] Folia plurumque obtusae bidextatae integerrima

* See more under J. Dogali and J. compressus, in the division Karpodemus.

+ J. minitilus, assuming as many of its leaves, might be supposed to belong to this division, but I have placed it in the genus Plag. foli. aspera, emergent, with important the present once given.
(Clavis Analytica)

(Kolis trifidae)

6. Folia superba concaviscula, fructa terminali... J: lacustris
7. Folia superba convexa, fructa laterali... J: reptiles
8. Folia subquadrata, acutis triangulis... J: reptiles
9. Folia ovata, obtusae bis-ter dentata... J: reptiles

(Follarum segmenta imparidibus)

K: Follarum lobi inferioribus superiores appendis
1. Follarum lobi inferioribus involvitis

2. Follarum lobi inferioribus inlatae
3. Follarum lobi inferioribus plantiscultae

(Segmenta inferioribus inlatae)

3. Folia spatiosa-dentata... J: Haschianar
4. Folia integerrima
5. Stipularum margine plano... J: dilleni
6. Stipularum margine recurvo... J: Temersol

(Segmenta inferiores planeulcullae)

4. Follarum lobi autolique divisae
5. Follarum lobi integra
6. Folia plana
7. Folia superba valida convexa
8. Follae lobi adpressae apicibus -dentatae... J: Woodii
9. Follae lobi adpressae ciliatae... J: ciliat
10. Stipularum segmenta integerrima... J: plastophylla
11. Stipularum segmenta spatiosa-dentata... J: temesia

(Segmenta inferioribus reverberas)

8. Stipula integerrima
9. Stipula acutis emarginata
10. Folia rotundata
11. Folia ovata, acute

9. Folia subcordata
10. Folia subobovata
11. Folia obovata-oblonga

* J. cernua natus is, perhaps, an exception to this character; yet there is often a minute hole, which, if not sensibly leathern, is certainly not appendix to the larger one and the affinity of the species has been a further demonstration with me to place it here.
JUNGERMANNIARUM BRITANNICARUM

SYNOPSIS.

A. FOLIOSÆ.

† STIPULÆ NULÆ.

a. Folio multitubum insertis.

1 J. trochophylla, caule erecto, vaga ramas: folia undulata, imbiculata, macro floresculenta, actinaria, arcuata, panacha, rota, fructa terminalia calyceis oblongis, orae sunt recte, elatiae. (Tab. vii.)


This species is not abundant in alpine countries, creeping over decaying leaves and stones. Mr. Turner has received specimens from Dandachkaha, which were gathered by Mr. Thomsen. Wahlenberg says that it is common throughout all Lapland, not only in the forests, but upon the highest Alps; but he and Moore appear to me to have fallen into an error in attributing it to species. "Stipulae the former observes "sed latius inferri et seculum introductum ad intus, folia paulo breviores et minam patentes, de cutere in simulilium.

Lapp. p. 355

2 J. erecta, caule erecto, subumbonato ramose; folia undulata, imbiculata, binae, actinaria, arcuata, panacha, rota, fructa terminalia calyceis oblongis, orae sunt recte, elatiae. (Tab. viii. and Suppl. Tab. 2.)


In this division I have brought J. epigaea and J. compressa, upon which stipules are found only on the young shoots.
SYNOPSIS.

Dr. Taylor finds this species in Ireland, with calyces of which the perianthial leaves vary somewhat from our figure, tab. 11; and I have consequently figured them in the supplementary plate, where it will be seen that they are divided to three or four long and broad, unequal, slightly toothed segments. Dr. Meeh has the subjoined observation in his "Fl. Celt. Occid.," immediately following his division of Hypnurn: "folii discompostae in numerosa millesima." p. 749. "Hypnum subdivisum dicitum "Jungmanni." Web. Spic. ex ipso hoch lecto vero narratur. Uloia canum es, quad moter habet sed levem stipe, subcylindricum, subglobosum vix oblongum vix notum. "Jungmanni" melius modo est Vix magna interiorum speciem vidit manum. Web. rerum aliorum certe varie quantitative in this description and are such that it is clear how much more is applying to our "Jungmanni". Scarsuri cantos terminales repertae, multisesque vacillantes, longe interdum longiores quam interiores Folia uterum gubernatis sectors, non solutum accurate perspicuam." Wm. Spic. p. 156.

3. J. juvacea, caeli arcuatus, vaginae eis, foliis lobis quadrulobatis, ovatis, acutos, undulatis, erectis usque ad 4 cm, subulos, obovati, subcylindrici, subglobosi, pilosi, per oblongulam quodque fructum terminali calycinum oblongum, superior lobus costatus, denato (Tab. 11.)

J. escharinae Wm. Lapp. p. 284 (excl. de Lebertothe.)

From the description to less than from the reference to the figure of J. juvacea, in English Botany, there is no doubt but Dr. Wahlenberg has quite misunderstood the "J. juvacea" of Liebm. He might not have thought Dr. Wahlenberg the term "J. juvacea" 1. escharinae but why he has arranged them most of the stipulated Jungmannia I cannot conceive. Indeed in order to do this he has here under the second of forming a division, which he names "Helianthus magarnatsonus at figure 72 foliore." this specimen besides the J. juvacea 1. escharinae and J. trichophyllos on one of which have been seen any thing which can be looked upon as stipules. Even in the native region this species is recorded in the highest mountains. "Habitat" says Wahlenberg in terra montanae latitu! justin utraque percussors subcylindrics alpinae paulum.

4. J. juxtaflecta, caeli arcuata, simplicia, foliis distansculis, foliis discompositis, quadrulobatis, ovatis, subcylindriis acutis hilis (per oblongulam similium) fructo terminali, calycinum oblongum, subcylindricum, ore contractum, denato (Tab. 1.

5. J. juniperinae caeli arcuata, saccata, subcylindrica foliis quadrulobatis, foliis discompositis, foliis discompositis, calycinum oblongum, subcylindricum, ore contractum, denato (Tab. 10.)

I have gathered specimens of this species with more remarkable, which is called, Perigynial leaves large and ovate at the base. Anthers of the same, (s Suppl. Tab. 1.)

6. J. Hookeri caeli arcuata, subcylindrica foliis undique undulate ovatis, foliis orbiculatissimum, fructo terminali, calycinum oblongum, calyptrae magnum, involucre, auriculae, levii (Tab. 10.)
SYNOPSIS

b. Folius bisfurcatus.

x Folius unifurcatus

7 J. applemodes, caulis ascendens, ramosae, folia oblonga, rotundata, ciliata-dentata, subterranea. Fructus terminalis, laterali, calyceus oblongus, compressus, obliquus, orae truncato, subalato. (Tab. xii.)


The main character of this species I found in woods at Berry Pomeroy Castle, Devonshire, in great abundance in March and April.

8 J. spinulosus, caulis erecto, ramosae, folia ovata, recurvata, basi margine apiculata, dentata-spinulosa. Fructus laterali, axillari, calyceus subrotundus, compressus, orae truncato, ciliato. (Tab. xiv.)

In Devonshire, particularly in the mountainous parts, J. spinulosus is plentiful; but in the plains of England, I know of only one habitat, near Rufford, near to the New Forest, Hants., where it was gathered by Mr. Lyell. At Powys court waterfall near Dublin, Mr. Taylor finds it with calyces, but never with capsules; and Mr. Lyell in the same state on rocks above the summit of Stock-grill Forest, Cumberland.

Another sort, which may be called J. foliolosus subspinosus has been found by Mr. Lyell at Norwich, and by the late Miss Hutchinson and Mr. Mackay, in Ireland.

9 J. decipratus, caulis erecto flexuoso, subglumis, folia inferioribus minutibus, ovatis, integerrimis, superioribus rotundato-ovatis, seu subquadratis, dente uno alterno apiceo, spiniforme. (Tab. l.)

10. J. decipratus, caulis erecto, subglumis filiformibus, flexuoso, folia acuta, indumento, subglumosis, oblongo-ovatis, concreta, apice basante, subquadratis.—(Tab. xxxix.)

11. J. poeal, caulis ascendens, glumicaulis, folia elliptico-ovatis, fructus terminalis, calyceus oblongo-ovatus, acuminalis; ore contracto, denticulato. (Tab. xvii.)

Mr. Lyell finds this at Kinordy, near Kinross, Scotland, flowering culpy in August.

12. J. lanceolata, caulis procumbens, glumaceae, folia pinnatis, ovato-subquadrate, fructus terminalis, calyceus oblongus, acutangulus, apice depressa, plano, ore contracto, macro-dentato. (Tab. xxi.)

13. J. cordifolia, caulis erecta, flexuosa, dichotomae, folia ovata, reniformis, cordata, circumvoluta, fructus terminali axillari; calyceus oblongo-ovatus, calyptra subapicata, ore minutis, denticulatis. (Tab. xxxi.)
19 SYNOPSIS

14. *J. Spaghui*, caule procumbente, ramuloso, foliolis orbicularibus, fructu in manu proprius terminali, calycibus oblongis, utrinque attenuatis, ovo-contracto, dendroidato (Tab. xixii. and Suppl. Tab. ii.)


Mr. Lyell found geaster in August at Stock-gill Force, near Ambleside, and I met with them abundantly in April on moorland bordering on Dartmoor. Devonshire. The fructification I have been obliged to figure in the Supplement, where, at tab. xx., fig. 1 is a geaster forma plant. magn. 1:1; 1:2: magn. of the same magn. 4:1. 1:5: magn. 3:1. 1:6, the same magn. 1:5, section of a stem with the female fructification magn. 4:1. 1:6, proper part to the fructification, with the pericarpial leaves and valves magn. 4:1. 1:7: outer pericarpial leaf; 4:1. 1:8, 1:9, inner half magn. 3:1. 1:10, a spirellous filament and 1:11 the seeds, both magn. 1.

Wahlenberg quotes under *J. Spaghui*, the *J. melaricis* of Rohndal's *Blue Book*, in which he is probably correct, for the geaster of that figure corresponds sufficiently well with our plant. The Swedish author, however, appears to me to have confounded with this the *J. Taylori* of his book, which is of his description aptly agrees, "veluti mollis vel spargens, a reticulato laxore foliis" which is by no means the case with *J. Spaghui*.

19 *J. eremula*, caule procumbente, ramoso, foliis rotundatis, marginatis, fructu terminali, calycibus oblongis, compressis longitudinaliter quadrangulis; ovo-contracto, dentato (Tab. xixii.)

This is plentiful on Raising Common, near Yarmouth, and Mr. Lyell finds a small but elegant state of the plant on Keswick, bearing calyces in August. The male fructification resembles that of *J. eremula*. It is figured in Suppl. tab. ii.

16. *J. spherocephala*, caule ascendente simplex, foliis orbicularibus, frutico terminali, calyx oblongo-ovato, cylindraceo, quadridisco (capsula spheroidea) (Tab. liii.)

17. *J. ageloides*, caule ascendente, hexaemone, foliis rotundatis, tuboculato, fructu terminali, calyx ovato, angulato; ovo-contracto, quadridentato. (Tab. liii.)

18. *J. compressa*, caule erecta, divisa, foliis orbicularibus, manu mense crescentibus, appressis, utrinque spinosis (capsulae semicirculariae sub globosas). fructu terminali, calycebus semicirsoribus, oblongis, carnosis, ovo aperto, quadridentato (Tab. lxi.)

Planted in Switzerland, particularly in the valley of Geneva near the Grindelwald.

**x x**

*Ficus emarginatus vel bifidus*, segmenta aequalibus

10. *J. emarginatus*, caule erecto, ramoso, foliis laxè imbrevibus, partitibus, orbiculatis, emarginatis, fructu terminali, calyx oblongo, dentatis, foliis imbricatis. (Tab. xxvii.)

SYNOPSIS

20 J costissata, caule erecto, ramoso, folis auctis involucris, erectis conspicuis, oratis, oblongis, emarginatis fructu terminali, calycebus oblongis. (Tab. xxviii.)


21 J crenulata, caule erecto, simplicia, foliis auctis humidis, erectis u. patentibus, cordato-ovatis, margine acuto recurvato. (Tab. xxxi.)

This J was found abundantly in Switzerland, but always bare.

22 J inflata, caule prostrato, simplices vel ramoso, foliis subrotundis, convexus, acutis basi adscendentibus rectis, oblongis fructu terminali, calycebus pyriformibus, ovo constricto, dentato. (Tab. xxviii.)

J inflata. WEB. Lapp. p. 393.

Abundant in front about Torquay and Dartmouth, Devonshire, in the month of April.

23 J oxalis, caule prostrato, plurifluminul, foliis patentibus, subquadranatis, profunda emarginatis fructu terminali, calycebus oblongis, ovo-plano, dentato. (Tab. xx.)


Mr. Emadi finds this plant, in December, with germs of a brownish color, angular, scattered in small loose clusters at the edges of the leaves, and likewise with calyces shorter and broader than in the specimens figured in this work, but I have consequently thought proper observing of a plant in a supplementary plate. (See Suppl. f. 11, where as f. 11 is a geranium, plantum. 6. f 2, two leaves of the same, shewing the corolla marginis of the leaves, where the geranium has fallen mag. 6; c 3, part of the gramine mag. 1. f 4, an oxalis plantum, mag. 6, in which the calyces are shorter than in usual in this species, f 6, leaf of the same, mag. 4.)

24 J costissata, caule prostrato, subramoso, foliis patentibus, subquadranatis, obtusis emarginatis, lateribus incurvis fructu terminali, calycebus oblongis, ovo constricto, pleo, dentato. (Tab. xxviii.)


25 J Trevirii, caule prostrato, ramoso, setululim ramoso, foliis lati ovatis acutis bipartitis segmentis subquadranatis, apicibus patellatis fructu terminali, calycebus haevis oblongis, longissimatis placentis ovar sopinam placentis. (Tab. xxvii.)

26 J basipectinato, caule prostrato, setululim ramoso, foliis subquadranatis, acutis laevis segmentis acutis, rectis integerrimis fructu terminali, calycebus oblongis, pleo, dentato. (Tab. xxvii.)

SYNOPSIS.

The authors of this species I have figured in the Suppl. Fl. 1813; they are axillary, two or three together in a scolopendria leaf and spherical-footstalk short, white.

27. *J. saxicaulis*, caule procumbente, setalibus ramorum folia subquadrate, obtusae, foliis segmentis arctis fructu terminali, calyculus oblongus, plicatis, ore dentato. (Tab. xii.)


Both Moell and Wahlenberg consider this as merely a variety of *J. bisepalum* in which opinion they may possibly be correct; though the ratification is strikingly different, which did not escape the observation of the last mentioned author.

28. *J. saxicaulis*, caule procumbente, setalibus ramorum folia orbicularibus, concavis, apice lunulatis-marginatis fructu in ramis propinquis, brevissimis, terminalibus terminali, calyculi oblongo-ovatis, ore dentato. (Tab. xv.)


29. *J. curvifolia*, caule procumbente, setalibus ramorum folia subrotundis, valde concavis, basi ad segmentis acuminatis incurvatis fructu in ramis propinquis, brevissimis, terminalibus terminali, calyculus oblongus, subapicatis, ore dentato. (Tab. xvi.)


Having, since the publication of tab. xvi., received more perfect calyces of this species from Ireland, I have figured one in the first supplementary plate, where it will be seen that the perichlamal leaves are serrated.

* * * * *

**Folia tri-quadrifida, segmentis aequalibus**

30. *J. capitata* caule prostrato, simplici-mucronato foliis rotundato-quadratis, infernebus bilobis, phyllis tri-quadrifidis fructu terminali calyculis oblongo-ovatis, subapicatis; ore contracto, dentato. (Tab. xxiv.)

31. *J. incurva* caule prostrato, depresso, simplici-mucronato foliis subquadrate, undulato, subtrifolii, segmentis aequalibus, bic ilic decussatis fructu terminali calyculibus oblongis (Tab. x.)

32. *J. pusilla* caule procumbente subapicis foliis horizontalibus, quadrate, undulatis, obtusis bi-tri-ovatis fructu terminali, calycebus campanulatis. (Tab. xii.)

SYNOPSIS

33. J. uniformis, caulis erecto, subamplexus, foliis bifidis, arctè imbricatis, ovatis, quadratis, quadrifolis, angulis intemerrimis marginae bæillis, spinae acutae, dentibus, fructu subrotundo, interno, calycibus oblongis, plicatis, sericeis, (T. xxv.)


This plant grows parasitically over the soil. It has never been found in the Alps, in any part of the north of Europe; nor in the British isles. So far as the same is known to me, it has not been observed in any other part of the world where it has been cultivated. (Lapp.)

x x x x Folia bifida, segmenta irregularia, conduplicata.

34. J. medusa, caulis erecto, subamplexu, foliis inaequaliè æqualibus, semicordiis, dentato-ciliatis, lobis conduplicatis, inferioribus majoribus, superioribus subrotundis, calycibus oblongis, incurvarius, compresse, sericeis, truncatis, dentato-ciliatis. (T. xxv.)


35. J. planifolius, caulis erecto, subamplexu, foliis inaequaliè æqualibus, ad basim angustis, apex rotundatis, dentato-ciliatis, lobis conduplicatis, inferioribus majoribus, superioribus subrotundis, calycibus oblongis, incurvarius, compresse, sericeis, truncatis, dentato-ciliatis. (T. xxv.)

Specimens of this plant, which I have lately had the opportunity of examining, have satisfied me that it ought to be classed in this genus. Indeed, the difference between it and J. medusa is so slight that I am almost inclined to consider it a variety though a very remarkable one of that species.

36. J. urbicae medusæ erecta, subamplexu, foliis inaequaliè æqualibus; lobis conduplicatis, apicibus rotundatis, anguis; inferioribus majoribus, ovario ascendente, superioribus rotundatis, fructu terminali, calycibus oblongis, incurvarius, compresse, sericeis, truncatis, dentato-ciliatis. (T. xxv.)


37. J. usculata, caulis erecto, subamplexu, foliis inaequaliè æqualibus, undulatis, integerrimis, lobis sub-mutatis, conduplicatis, inferioribus majoribus, fructu terminali, calycibus oblongis, incurvarius, compresse, sericeis, truncatis, dentato-ciliatis. (T. xxv.)


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SYNOPSIS

38. J. compactum caule procumbente, simplici-inclusi foliis rotundatis, subaequilater bilobis, integerrima, lobis condivisatis, fructu terminali, calycebus oblongis, incurvatis, conpressoibus, ore truncato, dentulato. (T. n. xiii)

J.紧凑 p. 400.

The last synonym I am enabled to publish through the kindness of my friend, Dr. Souët, who sent me a suitable specimen received by him from Germany. It is, perhaps, not an uncommon species in this country. Mr. Lyell having found it both on Skye and in the north of Scotland.

39. J. officinarum caule erecto, subdistributum, foliis inaequilater bilobis, lobis condivisatis, medio pilis adnatis apud sectae inferiores majoribus, subaequilatero supernebus ovatis fructibus terminalibus, calycibus ovatis, ore truncato, dentatis. (T. n. xvi)


40. J. obtusifolia caule ascendente, simplici foliis inaequilater bilobis, lobis condivisatis, subulato, integerrima, inferioribus majoribus, subaequilateralibus superioribus ovatis fructibus terminalibus, calycibus ovatis, ore truncato, dentatis. (T. n. xxvi)

41. J. Dicksonii caule erecto, subumbilicato, foliis inaequilater bilobis, lobis condivisatis, inferioribus majoribus, utroque angustis ovatis, subintegerrima, acutis fructibus terminalibus, calycibus ovatis, pilosis, ore truncato, dentatis. (T. n. liii)

J. Dicksonii WALL. Lapp. p. 380. ub. m. f. 2. u 2.

I quote this synonym with a note of doubt, solely because the author says, “foliis obtusifolius,” which is not the case in J. Dicksonii.

42. J. monspessulanum caule erecto, subdistributum, foliis hirsutulatis-patentibus, subaequilateralibus supernebus ovatis, inferioribus inaequilatero bilobis, manubio acuminato, fructibus terminalibus, calycibus ovatis, apicem parum placentis, ore truncato, dentatis (T. n. liii)

J. monspessulanum. MILL. Lapp. p. 381.

43. J. erecta, caule prostrato, simplici-incluso, foliis inaequilater bilobis, lobis subaequilatere, placentis, inferioribus ovatis, ovatis, concavis, apice simplex, dentatus, supernebus hirsutis, dentibus subulatis. (T. n. xxix)


Mr. Lyell has gathered, in the New Forest, Habits individuals of this plant with young and very imperfectly formed calyces. They are terminal, or from the shooting fork of an internode, lateral, oblong, with the unexpanded mouth lateral and toothed. The purpl-
SYNOPSIS

chanical leaves are large, at the extremity trifid and quadrifid, having the segments jagged in incisurae. (See Suppl. tab. 1., l. J. erectae, magn. 8., young calyx and perianthial leaves, magn. 4.; l. S, calyx removed, magn. 8.; l. P, perianthial leaf, magn. 8.)

44. J. cochleariformis, caule procumbente subscapulo foliis superius imbrenatis, superior latriculis, conduplicatis lobis superiores majoribus seminantis, apice loboide convessis, inferioribus serratis. (Tab. lxxxvii.)

In the north and north-western parts of Ireland I have gathered it even more abundantly than in Scotland, but always without fructification.

45. J. compositae, scapo repente, vagis ramosis foliis distichis, superius imbrenatis, irreguliter loboide lobis superoibus majoribus orbiculatis inferioribus ovatis, apices, praesumpy, plerumque fructu terminali; calycibus oblunghi, compresso, truncaeat. (Tab. lxxxi.)

†† STIPULATAE

a. Folia integra vel ramosa lato illic emarginata

46. J. ovata, caulo procumbente, simplex folius orbicularibus hem rotundato-ovalibus, lato ovato-acuminatis, stipulis lati subulatis. (Tab. xxiv.)

47. J. Taylori, caulo erecto, subscapulo foliis ovibus rotundatis, stipulis lati subulati latris fructu terminali, calycibus ovatis, apice compresso, truncaeto, bilabiato. (Tab. lxxi.)

48. J. scalarum, caulo repente simplex foliis rotundatis concavis, integris emarginatisque; stipulis brevi subulatis, fructu terminali calycis foliis immersis. (Tab. lxxii.)


Monk is quite mistaken in supposing an J. scalarus to be the same as J. scalaris. Their calyces are totally different.

49. J. polygonale, caulo procumbente, subscapulo foliis horizontalibus, rotundato-quadrate, pleno, integris emarginatisque stipulis oblongis, bifinis fructu in ramis propriae et parte caulis inferiores agglomeratis, lateralis, calycibus calyptido-dumato brev narrowing, bilabiato, lobato. (Tab. lxxii.)


50. J. cossefolia, caulo repente simplex foliis remotisemulibus, conifolius, integerrimis, vel apicibus obtusimmodum emarginatis, stipulis minuatis, ovatis, bilabiato. (Tab. lxxvii.)
SYNOPSIS

31. J. lanceolatus, caule proeminent, ramoso, foliis horizontalibus, planis, ovatis, integris, stipulis laevis, ovatis, dentato-lanceolatis, fructus laterali, calyces subterranee, oblongi, carnosii, seppulae foliaceae simplices. (Tab. xxx.)


The imperfect description that Mr. Buns has given of this species will not allow me to quote him with certainty under our plant.

32. J. Trichomanes, caule proeminent, subscapulico, foliis horizontalibus, convexis, ovatis, integris, encinalisatis, stipulis rotundatis, basi-lanceolatis, fructus laterali, calyces subterranee, oblongi, carnosi, seppulae foliaceae simplices. (Tab. xxx.)

b. Folio bis-aequale, segmentis aequalibus.

33. J. Indentata, caule proeminent, ramoso, foliis late ovatis, deciduis, stipulis scapulicos, ovatis, segmentis inaeque, integerrimis, stipulis bis tritomatis, fructibus laterali, calyces subterranee, oblongi, carnosii, seppulae foliaceae simplices (Tab. xxx.)


In the supplementary plate, tab. xxxi, I have figured a variety of J. Indentata, as I have now reason to think it is which is quoted as under the name of J. stipulifera with the

34. J. heterophylla, caule proeminent, ramoso, foliis rotundato-ovatis, deciduis, stipulis scapulicos, ovatis, stiptulis integerrimis, stipulis bis tritomatis, folio subacutissimo, fructus laterali, calyces oblongi, carnosii, seppulae foliaceae simplices. (Tab. xxx.)


35. J. stipulifera, caule proeminent, simplici, foliis rotundatis, stiptulis acutis, stipulis acutis, stiptulis integerrimis, stipulis basi margine obtuso, fructibus laterali, calyces oblongi, carnosii, seppulae foliaceae simplices. (Tab. xxx.)

36. J. Hespana, caule proeminent, stipulosis, foliis ovatis concavis, acutis, margine obtusi, stiptulis acutis, ovatis, stipulis basi margine obtuso, fructibus laterali, calyces oblongo-cylindricis, seppulae in ramo proemine terminali, carnosii, seppulae foliaceae simplices. (Tab. xxx.)
37 J latifolius, caule prostrato, emplumato, folia rotundato-quadra, tetraquadra, stipulis lanceolatis, unicus bidentis margine faciata, fructu terminali, calycebus oblongo-ovatis, ovo-conjectis, dentatis (Tab. xxxv).

38 J acuminata, caule erecto, ramis foliorum brevibus, propinquis, seminiferis, stipulis ovatis-lanceolatis obtusis, fructibus saepe brevibus terminalibus, calycebus oblongo-ovatis, ovo-conjectis. (Tab. xxxvi et Suppl. Tab. xiv.)

I am happy to be able to offer a figure of the fructification of this species in the supplementary plate above quoted. The calyces are oblongo-ovatis with a contracted mouth and dentate, situated upon short, lateral branches, and surrounded at the base with perichaetial leaves which scarcely differ from the rest but in being larger. The capsule is ovate, splitting into four equal valves. Seeds and spiral filaments deep brown. The plant is extremely common on the more elevated Alps of Switzerland and I met with it bearing capsules as well upon the Grimsel as upon the Säntis, near the limit of perpetual snow. It is from the last-mentioned spot that the specimen here figured was gathered. (Fig. 1. J acuminatus, magn. 6. f. 2, portion of the stem, showing the stipules, magn. 9.)

39 J reptans, caule prostrato, stellatum, ramis saepe brevioribus, subquadra, bicostatis, foliis unicus quadridentatis, stipulis laevo-quadra, quadricostatis, fructu terminali, calycebus oblongo-ovatis, ovo-conjectis. (Tab. xxxv.)

40 J trichobates, caule erecto, flexuoso, ramis foliorum superis subquadra, ovatis, conicos, unicus, palmatis, stipulis lanceolatis, fructibus laevo-subquadra, acutis, semiis in parte civilis inferiorum et gradiente calycebus oblongis, subquadra, ovo-conjectis. (Tab. xxxv.)

C. Folius bifido, segmentis inaequalibus, conduplicate.

x. Segmentis inferioribus seu monobridis, planis.

41 J pleopodyle, caule prostrato, planatum, ramis saepe saepe inaequalibus bifidis, foliis superiores rotundato-ovatis, subquadra, membranaceis, stipulis laevo-quadra, integerrimis, fructibus laevo-quadra, calycebus ovatis, compressis saccatis, inferiores binae longitudinatibus Ticis (Tab. xl. et Suppl. Tab. xiv., where the roots are represented in situ, as described at Tab. xa.)


42 J erecta, caule prostrato, ramis superiores rotundato-ovatis, inaequalibus, stipulis lanceolatis, fructibus saepe brevibus terminalibus, calycebus oblongo-quadra, stipulis binae longitudinatibus, xylis oblongo-quadra, stipulis binae longitudinatibus (Tab. xxxvi.)

SYNOPSIS

63. J. ciliaris, caule procumbente, pinnatim ramosa, folia valde nanae, incompletar biloba, lobus lobulique natan, biparitae, longe breviterque ciliatis, stipula sub quadrata, apices quadri-quinque-lobus, longissimi nanae fructa laterali, calyxibus obvoaxis, ore circumrotato, dentato. [Tab. LXXV.]

64. J. woodii, caule procumbente, bi-tri-pinnata, folia valde convexa, incompletar biloba, folia superiores bipartita, spinuloso-cordata, inferioribus munitissima, oblonga, subintegerrima, stipula magna, nana, bipartita, spinuloso-dentata, basi utrinque calcarata. [Tab. LXXVII.]

65. J. tomentella, caule eccentrico, bipinnata folio plano-recepto, incompletar biloba cipullari-unilobula, lobis superiores bipartitae, inferioribus munitis stipulis sub quadrata, basi inuerta fructa axillaria, calycebis oblongis, cylindraceis, basi aperto. [Tab. XXXIV.]


× × Segments inferioribus, seu minoribus, involutis

66. J. Mackeei, caule repentae, ramosa, folia incompletar biloba, folia superiores rotundata, inferioribus munitis, involutis stipulis magnis, rotundatis obscuris fructa laterali terminisque calycebus obtortis, depressis, triangulatis, ore contracto, elevato, dentato. [Tab. III.]

67. J. wrightii, caule repentae, ramosa, folio incompletar biloba, lobis superiores rotundatis, inferioribus munitis, involutis stipulis rotundatis, acuti bilobis fructu laterali calycebus latissimis, pentagonalibus, ore contracto, elevato, subdentato. [Tab. XXX]


68. J. humilifolia, caule repentae, ramosa, folio incompletar biloba, lobis superiores ovatis, acuminatis, apices erectissim neutilibus munitis stipula ovatis, acuto bisectis fructu laterali; calycebus ovois, pentagonalibus, ore contracto, elevato, dentato. [Tab. XXX.]

A leaf of this Fl. alluded to in the description, is represented in Suppl. tab. 112.

69. J. nanumcaeruleum, caule repentae, ramosa, folio incompletar biloba, lobis superiores ovatis, acuminatis, superioribus munitis, inferioribus ovatis, rotundatis, obtusis fructu laterali calycebus oblongis, apice depresso, plano, quinque dentato, ore minute contracto. [Tab. XXX.]

70. J. calyx profundis, caule repentae, ramoso, folio incompletar biloba, lobis superiores majoribus, calycebus oblongis, inferioribus obtusis quadratis, circumvolubilis fructu laterali, calycebus oblongis, apice depresso, plano, quinque dentato, ore minute contracto. [Tab. XXX.]
SYNOPSIS.

71. \textit{J. Hutchinsae}, caulibus repente, ramosissimis, foliis inaequalibus, bilobis; lobi superioribus ovatis, apiculatis; inferioribus ovatis, acuminatis, basi apiculatae, truncatis, sepalis rotundatis-ovatis, petalis linearibus, fructus laterales, calyces ovatis, triangulares. (Tab. 1.)

Mr. Mackay has found this species in the south of Ireland. Sir J. C. R.玻耶 upon mountains about Killarney, and Mr. Lyell upon rocks, near Lewesbury, Cumberland.

72. \textit{J. dilatata}, caulibus ramosissimis, foliis inaequalibus, bilobis; lobi superioribus ovatis, acuminatis, basi apiculatae, truncatis, sepalis rotundatis-ovatis, petalis linearibus, fructus laterales, calyces ovatis, triangulares. (Tab. 2.)


73. \textit{J. Tenerrima}, caulibus ramosissimis, foliis inaequalibus, bilobis; lobi superioribus ovato-rotundatis, inferioribus ovatis, acuminatis, basi apiculatae, truncatis, sepalis ovatis, petalis linearibus, fructus laterales, calyces ovatis, triangulares. (Tab. 3.)


B. FRONDOSÆ.

a. Enerve.

74. \textit{J. pungens}, frondis oblongis, decumbente, acrari, carnasis, supra planis, ab initio turinita, vel ex ramos, margine spinis et fracta ex inferior parte prope marginem separatâ, calyces brevissimi, ore dilatato, fructibus cylindraceis, ovatis, trunco-cylindraceis. (Tab. 14.)


75. \textit{J. multifida}, frondis linearibus, acrari, carnosis, compressis, ramosis, fructibus ovatis, calyces longiores, ore dilatato, fructibus cylindraceis. (Tab. 15.)


After a careful examination of numerous specimens, upon their native mountains, of what foreign authors have called by the name of \textit{J. palmata}, I can see no reason whatever for separating it from \textit{J. multifida}, nor even for considering it a variety of that plant.
SYNOPSIS

When J. muticolor grows in deep shady woods of trees, and is smaller than usual, he is J. palmata, as much a state as he notes it in the neighborhood of Dhihun, and sent it me under that name.

I knew not what were Mr. Mohr’s ideas of J. palmata as a species when he says that Schottel’s figure (in his Icones), t. 6, f. 3. 16, must, he says, be and all the rest of the plate to J. muticolor.

b. Frondes nervos prædictae.

* Calyces simplicia.

76. J. Flavia, fronde oblonga, submembranacea, robusta, robusta, superbus aequans, aquam aequali succinae, fructu et corno parte superior e ascendente; calyce calyptrata infraflaminera. (Tab. xxvii. xxviii. xxix.)

77. J. epithetis fronde oblonga, submembranacea, vaga, vaga, obsoluta costa, magnum integerrimo, vel sublobite umbilicatum fructu, in superficie parte frondium propo apice parte ascendente, calycebus subcylindracum, plasmatis nec partem dilatato, mono- deciduo calyptris exsertis, levibus. (Tab. xxvii.)


78. J. frondis fronde lineari, robusta membranacea costa, supra lavo subito marginato-plana minuente plamo, fructo ex inferiori parte costa egresso; calycebus trichose, caducissimis, magnum obtuso, calyptris brevibus, levibus. (Tab. xxviii.)


79. J. pubescens, fronde linear, robusta, membranacea, costa, quadri pubescens (Tab. xxviii.)

x x Calyces duplicia.

60. J. Lychnis, fronde oblonga, submembranacea, robusta, costa, magnum integerrimo, fructu e superficie parte frondium calyce duplicia, extorvo parte breviora margine laminae dentatis inferiore longe exserto, cylindracea, multilobata, calyptris calyce superior inaequale (Tab. xxviii.)

81. J. sabulacea, fronde oblonga, robusta, costa, magnum integerrimo, fructu e superficie parte frondium calyce duplicia, extorvo parte breviora, laminae dentatis inferiore longe exserto, ovata-cylindracea, multilobata, calyptris calyce superiori multa inaequale (Tab. xxviii. and Suppl. Tab. ii. 1 J. sabulacea, nat. size. f. 2, portion of stipe magn. 1 + 6, calyce dissectus, magn. 4; f. 4, capsule, magn. 3, L. 5, capsule, magn. 3 + 6. leads and spiral filaments.)
### INDEX

#### THE SPECIES AND SYNONYMS

Those in italics are the synonyms. The first column refers to the page of the Synonyms, at the end of the Introduction; the second to the Plate and accompanying Description, in the body of the work.

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TO

DAWSON TURNER, ESQ.,
MASTER OF ARTS,
FELLOW OF THE ROYAL, LINNEAN AND ANTIQUARIAN SOCIETIES,
\&c., \&c., \&c.,

THE FOLLOWING SHEETS ARE DEDICATED,

AS

A TESTIMONY OF ESTEEM AND GRATITUDE,

BY HIS AFFECTIONATE

FRIEND AND SON,

W. J. HOOKER.
BRITISH JUNGERMANNIÆ

JUNGERMANNIA HUTCHINSIÆ

(Tab. I)

Jungermannia squarrosa repentem ramosa foliis distichis, appressimis, ovatis plano decrescis, laxi atque superne contracta varia, glandulae stipulae rotundato-ovatae, acute biselatae, 1/2 milim. subintegerrimae, calyces subcircularibus, oblongis, triangulis, lindeus.

HAB. Glenmore, near Bantry; along the banks of the first river as you go from Bantry above the waterfall, and in grotto caverns by the side of other mountain rivulets Miss Hutchins.

PLANT: growing upon the ground in dense imbricated patches, of a deep almost blackish-green color and extending some inches in diameter, producing a few whitish, fibrous radicles from various but principally from the lower part of the stem.

Stems scarcely the tenth of an inch in diameter, an inch or an inch and a half in length, filiform, borne furnished here and there with a few rather long scattered patent or horizontal branches, which are again either once or twice bent in the same manner with shorter rami and so frequently happens, divided in a dichotomous manner the whole of them disposed in the same plane as the stem whence the plant has a plantigrade appearance. The texture of both stems and branches is by no means brittle, and rather closely cellular; their color a dark olive green inclining to brown.

The Leaves (F. 3.) which are lanceolate and distichous, are rather densely imbricated slightly decurrent at the base articulately, about a quarter of an inch at length, ovate plano-ovatae or but slightly convex on the upper surface, the margins furnished with rather
BRITISH JUNGERMANNE.

Digitately-placed acuminated teeth, the largest generally forming the apex of the leaf; these teeth give the whole plant a most beautiful appearance, and are of such a size as to be conspicuous even in the naked eye when the plant is held against the light. The part which is in reality a lower division of the leaf, or blade, can at a glance be called by Linnaeus and in the specific character mentioned (F. 5.), is very minute, scarcely measurable, a twentieth part of a line in length appearing as a minute, indistinct appendage, frequently having a spinoid deflected tooth, it is attached near the base of the lower margin of the leaf, or, more correctly speaking, the base to the under surface of which it is closely appressed. The reticulation of the whole is small and opaque, with meshes or cells of a very irregular figure, but approaching to quadrante. The color is a very dark green with an olive tint; when held against the light the meshes appear of a deeper blue in consequence of their figure. This form, indeed, is not the same throughout the whole plant; it may be seen in the terminal leaves (F. 6.), which do not appear to have arrived at their full size; they differ widely from the rest in being divided into two laminae segments; the smaller one of which is the expanded ovate, and nearly a fourth less than the larger division, both are spinoid-dentate. Exactly similar to these are the Perichaetial leaves (F. 1. 7.), of which there are two, embracing with their segments the lower part of the calyx.

Stipules ovate, approaching to ovuliform, divided nearly half way down from the extremity by an acute sinus, into two, equal, slightly-denticulated, sharp segments. There is one stipule to each pair of leaves, which in color and form they exactly resemble.

Male Profection at present unknown.

Female Profection as far as I have hitherto had the opportunity of remarking, always arising from the axil of the branches (F. 8.).

Colpus (F. 1. 8. 9. 11.) rather more than half a line in length, oblong, compressed, and plane on its upper surface, its under side prominent with a longitudinal ridge, so that a transverse section would present the figure of a triangle, the mouth small, contracted, a little elevated and entire.

Colpus, between oblong and ovate, topped with a short style, its texture rather thick and succulent, every where reticulated of a very pale, yellowish-brown color. A few abortive stipules surround the base, which are minute, linear or a little swelling in the centre of a greyish color.

Peduncle three-quarters of a line long, white, succulent, longitudinally and transversely striated, dilated at its upper extremity where it unites with the reddish-brown spherical capsule. Which is externally deeply punctuated; it splits into four equal stout valves, which soon become involute and in that state continue to retain the Spiral filaments (F. 11. 12.) of their extremities. Each of these is composed of a single half of a deep rich brown or fuscous color, surrounded in an extremely delicate transparent tube. The seeds (F. 15. 16.) are of the same color as the filaments, exactly spherical, and under a highly magnifying power of the microscope, are seen to be covered with opaque dots, which are probably minute tubercles.
BRITISH JUNGERMANIA

Capt. I am happy in being able to devote the first plate of a History of the British Jungermannia to a perfectly new and distinct species, and still more so in the opportunity it affords me of deducing that species one of the most beautiful with which I am acquainted, to the discoverer Miss Hutchinson of Baldickery near Burnley; a lady whose valuable communications on the subject of marine Botany are already before the public in the Historia Fecundum, as well as in the British Conferen and whose real and knowledge in the present genus of plants I shall frequently have occasion in notice in the progress of this little work. To her through the kindness of my friend Mr Turner I am indebted for many of the most rare and interesting species which will here be described.

J. Hutchinson was originally found, two years since, growing on a spot of ground which also produced J. trichophylla and Saxifraga Gena. It belongs to a small but very natural family (including J. distoma and J. arietinum) differing from the rest of the Jungermannaceae in having a slender or what, in compliance with the Linnean terminology I must incline to call article which, in by far the greater number of the leaves, is rolled up into a small convoluted appendage, and it having each of the spiral filaments composed of a single hair attached to its base to the exteriority of the segments of the capsule and enveloped in an extremely thin papillated tube. From the two Jungermannia last mentioned, the present species abominably differs in a variety of respects and may at all times readily be distinguished by its dark-green color and still more certainly by the strongly destituted margins of the leaves.

REFERENCES TO THE PLATE

1. Brittle plant of J. HUTCHINSON natural size
2. Portion of the same magnified
3. Portion of the Stem and Leaves seen from the under surface
4. Stipule
5. Leaf
6. Terminal Leaf
7. Peripheral Leaf
8. Calyx (upper surface)
9. Interior of the Calyx with the flower
10. Calyx with the lower Petal and the lower part of the Peduncle
11. Calyx with the two Peripheral Leaves Peduncle and Capsule the latter in the act of bursting and discharging its seeds
12. Upper part of the Peduncle and Capsule; the valves expanded and revealing the spiral filaments
13. Spiral filaments enclosed in their tube
14. Seeds
15. The capsule
JUNGERMANNIA JULACEA

(J. J.)

JUNGERMANNIA, caulii erubescens, viride nauseoso; folia quadripartia ovata, acutis imbricatis erectis acutis hilulide; segmenta ligneastra acuminata subcorysphalata fructus terminalis; valvas inlongae superab plicantes; cor uspexi, dentato.


J. gracilis; caulibus elongatis, foliis parvis, reniformibus.

ELLA. Welsh mountains, Dailwyn; and Mr. Griffith.—Ben Lawers and Craigilinch, in Breadalbane; Ben Navis, Ben Loyal, and Camperdown.—J. On the summit of Ben Navis in wet places at its eastern extremity.

Plant growing in dense patches of considerable extent; when scarce thinly elongated and united together.

Stems in a barren state usually prostrate in fertile specimens erect from half an inch to an inch and a half in length, of an equal thickness throughout, of a dirty brown color rigid and brittle when dry irregularly divided, and generally more or less bent with branches which are equally uncertain in their number disposition, and length, and are subpersistent.

Leaves closely imbricated and appressed, surrounding the stem on four sides (f h) and entirely concealing it, erect nearly erect flat or but very slightly concave, narrowly oblong to about three-fourths of their length into two equal segments which are straight, ovato-lanceolate and acuminate, their margins very obscurely serrated; the terminal leaves, which usually grow in clusters, differ from the rest in having the segments more lanceolate and acute, and in being more acutely toothed, very unequally, serrated.
BRITISH JUNGERMANNIÆ

The rosette (Fig. 7) is large in proportion to the size of the leaf and formed by cells of a somewhat rounded figure which are opaque in the centre. The color of the leaves, when the plant grows in the shady recesses of rocks, is generally a dirty green approaching to olive, but when it is in a more exposed situation, it is a pale silvery white which under the microscope seems to be caused by an extremely minute granulated substance, probably an excretion from the leaves. This color and appearance are particularly prevalent in wet spiny places and may now f (F 18) presents there in a very striking degree.

The perichetal leaves (F. 5 & 8) surround the calyx the nearly a third of its height; the exterior ones differ from those of the stem only in being larger and somewhat pilose; the interior are quadrangular, much resembling the stem-leaves of J. adiformis.

MALE FERTILIZATION I have not seen.

FEMALE FERTILIZATION terminal upon the stem and branches.

Calyx (F 9) oblong, longitudinally pilose in the upper part, and toothed as incised at the margin, where it is white and diaphanous, while the base is of a dirty brown as olive color, the whole comparatively of a rigid texture marked throughout with small incision reticulations (F 10)

Calyces (F 14) ovate, thin of a dirty white color reticulated, tipped with a minute style, and bearing near its base two as three abortive pistils. The base itself is firmly united to the lower part of the calyx, and not separable from it.

Peduncle scarcely a quarter of an inch in length, white, somewhat, longitudinally and transversely striated.

Capulets (F 9) globose of a shining brownish black opening into four equal, entire valves (F. 11 & 12) which after the discharge of the seeds, become revolute. Some of the layers still remaining attached to the calyx.

Seeds and spinae filamentæ (F 13) reddish brown, the former spherical and smooth, the latter slender in proportion to their width, and formed a double helix.

J. adiformis grows in the height of nearly two inches and has its stem and branches slender in proportion to their length bearing also more distinctly placed, smaller and less-pressed leaves than J. adiformis. The silvery hue is as I have before mentioned very striking in this variety.

J. adiformis which is altogether an alpine species and a plant of unfrequent occurrence is by its size its mode of growth and its color readily distinguishable from every other except instead of J. adiformis in which in all these particulars it is very nearly allied. From this it differs, as well in the disposition of the leaves, as in their disposition, they being the appearance of being infertile on all sides though in reality they are quadrifolius whereas arises a quadrangular form in the stamens and branches. These shoot too are of an equal thickness
BRITISH JUNGERMANNIAE

throughout instead of being evidently inclosed towards the extremities, and the calyxes are large in proportion to the size of the plant; whereas I have never been able, in the specimens I have examined of J. macrantha, to satisfy myself of the actual existence of any calyx at all. Truly however and essentially as these two species are distinct, they have been confounded by the older writers, and indeed appear to have been so by almost every author prior to the time of Lichtenstein, so that I dare not venture to speak with certainty of the greater part of the above synopsis. That of Dillenius, indeed, admits of no doubt: and his figures are excellent. The similarity in Bryum argenteum however which he dwells upon and which has given birth to the name* of the species before us arising from its color and from its leaves closely appressed leaves, is more applicable to J. concinna—Linnæan plant, judging from his description as well as from the specimen in his herbarium. Is the same as ours. Weber seems rather to refer to J. concinna when he says it has leaves * its appearance at six am base quidem distinguere numerat (quo quod amicibus facile distinguere); and that the spore mass is when moist * each viride sphesterium* but in a dry state an agrestine sphesterium distanti, seminibus et Bryum argenteum*. Yet in another passage he remarks, * Sed non videt verum velut versus versus quisque incrementa terminatus calyceus usque ramulus pellucida, praelia generalis repetiti, which can only be said of J. jutens* J. concinna being destitute of calyx. Hudson has done no more than copied the words of Linnæus. Lightfoot has well distinguished the two; and we are indebted to him for the first describing J. concinna*. The figure in the Flora Danica quoted by Withering does not represent our plant; though the description of this latter author may be taken as for it as that of Haller certainly is.

Other writers besides those above mentioned, from introduced in their works J. jutens: but those in my opinion all mean J. concinna. Among them are Doctor Roth and Ehrhart, the latter of whom in particular says the leaves of J. jutens are hieratic† which is undoubtedly the case with J. concinna but not with this. Their exact situation however is not easily determinable so as conclusive a plant; nor was it till after a careful investigation that I was able to satisfy myself that they were placed in Jutens.

Mr. Sowerby in his otherwise excellent figure in English Botany has represented the leaves as undivided, which is never the case in the plant; although, owing to the shriveling of the plant and the brittleness of the texture, it is more easy to separate half a leaf from the stem than a whole one.

* Bryum argenteum was called by Dillenius "Bryum predubium jutense, argenteum et sylvem."
† Hieratic even gave further and says, that all the Jungermannia folium have hieratic leaves, in which he is unquestionable mistaken. We read the "Jungermannia jutens L. at last, as we all now believe it but the Jungermannia folium is very different, and which the was text and angulata und so could be written as the latter, from the "Jungermannia jutens L." at the Anger, but that cannot be of good reason."

REFERENCES
REFERENCES TO THE PLATE

2. Female plant. Natural size.
3. For Φ. Natural size.
4. Female plant magnified.
5. Portion of the stem.
6. Leaf.
7. Apex of a leaf to show the cells.
8. 9. Exterior and interior perichastic leaves.
9. Calyx and capsule.
10. Portion of the margin of the calyx.
11. Capsule discharging its seeds.
12. Valve of the capsule.
13. Stamens and spiral filaments.
14. Calyptra, with a portion of the calyx at its base.
15. Portion of the stem of For Φ.
BEITII JUNGERMANNII

JUNGERMANNIA CONCINNATA

(JUNGERMANNIA CONCINNATA)


Hab. Barren spongy places near the summits of the Scotch and Irish mountains abundant.

Plants growing always in very thickly-entwined tufts, often covering a surface of ground of some feet in diameter;compresses at a considerable distance from the silvery base.

Stems nearly erect, occasionally prostrate at the base, varying from 1 to 4 inches in length, and there is a few scattered, patent or suberect branches which as well as the stems themselves, are cylindrical and filiform in their lower parts but towards the apex are more compressed and compressed the color of both stems, and branches in a dull brown, when dry they are brittle.

Leaves (c. 1. 6) erect, bifurcated, closely united in two rows, so as entirely to conceal the stem, resembling (as Lichtenf. well remarks) under a highly-magnifying power the texture of a bushy coat of hair so that it is pliable when held which they are obtuse, acute, acutely acuminate at the extremity, with obtuse and entire segments. The cells are minute the intersections well forming a pellucid reticulation. The color is a yellvish green, more or less billowing to brown bearing a silvery and glossy appearance like that of Erynnus argenteus, which cannot well be represented in the drawing, and in particular circumstances in the dry specimen. Some plants indeed, which grew on much exposed rocks, from this appearance altogether and are of a deep purplish brown almost including to black, in every state much of the margin of the leaf, and sometimes the extremity for one-third of the way down, is diaphanous, whitish, and, as it were, scorched.
BRITISH JUNGERMANNIAE

The petiolated leaves (f. 6 & 7) are imbricated on all sides; the exterior resemble the outline ones; except in being somewhat larger; the rest gradually grow wider in proportion to their length and become less scarce as the margin firmly embracing and surrounding such others; the innermost appear to answer the purpose of a calyx, enclosing the peduncle in the form of a cylindrical tube which, indeed, is nearly distinguishable from a true calyx, except by the longitudinal nature, formed by the involuted margin (f. 7) in color and texture they resemble the other leaves; only that they are paler and have generally a purple or brownish tinge near the apex.

MALE FRUCTIFICATION I have never seen.

FEMALE FRUCTIFICATION terminal on the stem and branches.

Calyx none that I have ever been able to discover.

Calyx (f. 8) ovate, yellow, white, surrounded at the base with a few brown pilusae some of which I have seem attached here and there in various parts of its various peduncle white, succulent, nearly a quarter of an inch long, striated longitudinally and also, though less evidently transversely.

Capsule minute, nearly spherical, of a reddish and shining brown color, strongly punctuated.

It bursts into four equal ovate segments discharging numerous and extremely minute seeds and spirally filaments which I had not an opportunity of representing on the plate; not having received there till the engraving was finished. They are of a deep fulvous color, the former exactly spherical, the latter somewhat longer than those of J. palusae, and composed of a double hull.

This species grows profusely on the summits of the mountains of the North Highlands of Scotland, and appears to be equally common on the Continent. In Scotland it is likewise extremely abundant, come as much as any of the genus, and I suspect is every where more frequently met with than J. palusae which, in already observed under that plant, it greatly resembles in many particulars. Its mode of growth is very uniform, and the even slope of all the shoots is striking, though it occasionally happens that specimens are found, from the centre of the thick blust ends of which are produced small, thin cylindrical shoots, either simple or forked, as in Bartsia umbilicata in Veneti inermcensis described in all probability to supply the flowers of the following season, and then to grow in every respect similar to the stem they proceeded from.

It is to Mr. Lightfoot, as has been also observed under the description of J. palusae that the credit is due of first distinguishing the two plants and accurately defining their characters. J. containing has indeed, long been well-known on the Continent, though not separated from J. palusae under which name many of those authors have described it; and, perhaps, by a remark of Ehret, in his Beiträge, where he says that J. palusae has bifurcated leaves. The
BRITISH JUNGERMANNIAE

(J communis.)

figure in Flora Dacica is good, except that the terminal or perichaetial leaves are not represented as bifurcated on all sides, and something like a calyx is there given us rising above the leaves which I have never been able to observe in the many specimens that have come under my observation. Roth also describes a calyx in male val ramosa terminalis, mono-platyphillus, tribulhus truncatus, probably mistaking the inner perichaetial leaf as I myself did at first for a true calyx. I however was afterwards induced to be of a different opinion, and in various dissections have uniformly found this species to possess, instead of the calyx an inner and tubular perichaetial leaf, as above described. If I have not been deceived in my examination of this specimen, by the minuteness of the object, the absence of a real calyx in this plant may be considered as connecting it more closely with the order of Musci, and especially with the genus Adonis, to two of the species of which (A repens and alpina) it approaches also, in habit and ramifications.

REFERENCES TO THE PLATE.

2. Female plant natural size.
3. Same plant magnified.
4. Portion of the stem and leaves.
5. Leaf
7. Internel perichaetial leaf.
8. Extremity of a fructified stem, with a portion of the inner perichaetial leaf calyptra peduncle and capsule.
JUNGERMANNIA JUNIPIRINA.

(ТАB. IV)

JUNGERMANNIA: diversa erecta, singulariter rigida; folia subrenata, lanceolato-falcata, bipartita, meandrina, fio.


β JUNGERMANNIA, ortha erecta, sereno, subaequiloba. folia quadrifaria, undique lubricata. folium lanceolatum linear-lanceolatum, bipartitum, segmenta recta, acuminate, retusa terminalis; calyculum ovatum, basilaria, perhison e assimile.


Our. The variety β alone, of this species, having been found in Britain, to that I shall confine my description.

Plant growing erect in densely-crowded tufts of several inches in diameter. Stems compactly so thick as peck-thread, and of rather a bright reddish-brown color, from two to three and even five inches in length, sereno, having the spines slightly incurved, either simple, or now and then producing a solitary short lateral shoot. so is sometimes the case, divided near the extremity into five or six branches of nearly equal height.

Leaves in four rows in some specimens thickly imbricated, in others more widely placed of a lanceolate figure, folio-second divided for nearly three parts of their length by an acute slant into two equal, entire, acuminate and acute, or at most but little diverging segments: the terminal leaves if 4 are more inclining to ovate, and have always the lower half disphalous, the upper one being of the same color as the whole of the other leaves, a yellow brown, pale in general, but deeper in
more exposed situations. The substance is extremely rigid, composed of distinctly
pliaceous oblong: opaque siliques the internodes of which are pellucid.
Perichaetial leaves numerous, crowded, all united together at their bases so as to constitute
a complete calyx, their acuminate segments alone are free, and form a lancet-like
margin.

Male Fruitionation I have never seen.
Female Fruitionation.

Calyx (6.8) about three-quarters of a line long, not ovate, plicate tubular membranous,
formed, as before observed, by the union of several of the perichaetial leaves, the lower
unarticulated halves of which, grow so entirely tossed that we cannot discern, while the
segments remaining separate exhibit the appearance of a quantity of erect lanceolate
leaves exactly equal in number to double the quantity of leaves connected
Calyx+ ovate white, semi-transparent tipped with a short brown style and sur-
rounded at the base by numerous greyish offensive paraphyses, which are almost linear
and slightly incurvate towards the base.

Petiole short, scarcely two lines in length, white, papillose, collabens
Calyx subcampanulato-ovate dark brown: divaricate with four equal ovate valves
Seeds and spore dimension (1.7) of a deep fulvous color, the former spherical, the latter
composed of a double hole, slightly attenuated at each extremity.

_J jungermani_ has no affinity whatever with any British species, but approaches so well in habit
as to the texture of its leaves, in a Jungermannia not yet described, gathered in New Zealand,
by Mr. Meares. After a most careful examination of authentic specimens of Mr. Dickson's
species compared with others of _J. jungermani_ which I have received from Dr. Swartz, I
am not able to find any characters which can induce me to keep them separate. The latter
plant is indeed of a larger size than the former and possesses one striking peculiarity which is
that, on immersing a dry specimen in water the absorbent vessels are immediately put
in action and the remarkable dissimilation of the segments of the leaves noticed by Dr. Swartz
appears almost at the same moment the capsule of the calyx son become relaxed. Our
British mosses quite on the contrary recover extremely slowly in water; and after an immersion,
even of very long duration, the segments of the leaves remain strount, and those of the calyx erect.
It is a singular fact that the only stations of this plant at present known are the summit
of the British Isles and the Blue mountains in Jamaica.

Specimens in fructification of any var. are of rare occurrence. I possess them only
through the kindness of Mr. Dickson, who gathered them in Scotland. The figure and
description of the specimen in the "Flora Plant Cypet" are good except that they represent it as
having undivided leaves. The peculiar structure of the calyx does not escape the observation
of the author of the "Flora Indica Occidentalis," who has accurately described the Jamaican variety
in the following words: "Perichaetium a folliculo extenso, valvulis bipartitis patentibus, initia
acuta indivisa, cernentibus, commissibilis, pallida, rigida."
BRITISH JUNGERMANNIAE  (J. juniperina.)

I have already, in a paper printed in the Transactions of the Linnean Society, v 3, p 336, taken the opportunity of remarking, under the description of *Andreae nigra*, the general resemblance which that plant at first sight bears to the present one. Their planes of growth are the same, as are their lanceolate second leaves and the incurved extremities of the branches as well as the color of the whole plant. The *Andreae*, however, possesses really satin leaves, which are furnished with a strong nerve.

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REFERENCES TO THE PLATE

FIG.

1. 1, 1  Bare leaves of *J. juniperina*, natural size.
2.  Sterile plant natural size.
3.  Portion of the stem and leaves magnified.
4.  Terminal leaf.
5.  Fructified extremity.
6.  Calyx.
7.  Seeds and stigmas.

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BRITISH JUNGERMANNIAE

JUNGERMANNIA DILATATA

(TAB. V)

JUNGERMANNIA surcula repens, vagh ramulis fulis distichis suberectis suberectis, cursoria, navicula, integerrima; lobi caulis variculosis, anastomis marantia, rectangulis stipulis rotundatis, planis, emarginatis calyces terminalibus oscentes, tuberculatis, triangulatis.


JUNGERMANNIA, fulis unitatis alternis, articulatis, solis brevissimis. Hall. Iso. 111 p. 82.

HAB. On the trunks of trees, most abundant everywhere—in fruit during most of the winter season.

PLANT firmly attached to its place of growth where it forms dense, compact and circular, brownish-purple patches, from two to many inches in diameter.
Succulent about three-quarters of an inch in length, oblanceolate, one or two irregularly divided into many short, patent branches, of which the fertile ones are somewhat incrassated upwards, the rest are filiform throughout. Leaves (f. 5) biUNCuate and alternate, articulated distantly placed in the lower part of the plant, the rest an entirely unarticulated, bearing the upper side of the succulent; the calyx more nearly exceeding the fifth of a line in diameter than in the fertile about exceeding rather larger as they approach the calyx they are of a coriaceous figure above slightly convex, varying in color from a deep purple to an olive-green in more sheltered situations entirely devoid of gloss, furnished at their base with an exscapa (f. 4) which generally inclines more in a greenish hue and less in its appearance widely unlike the leaf in different parts of the plant putting on a different appearance (f. 5). In the lower branches the margin is about one-fourth of the size of the leaf attached to its lower margin and closely approximated to its inner surface, nearly spherical with an opening beneath, whereas Macha has aptly applied to it the term "sessilis." In the fructifying branches the same formation of the succulent is apparent in the lower part but in proportion as it approaches the extremity the lower succulent gradually unfolds in the fourth pair from the calyx the opening appears wider, in the next above them the margins still are remarkably revolute, in the succulent pair the margins are so far unafshed as to exhibit a lateral tooth, while the uppermost pair or Periclinial leaves (f. 7) have the article an oblong-acute leaf-like appendage, the margins still a little revolute, and the exterior furnished with one or sometimes two long and sharp teeth; this article is approximated with its inner and convex surface to the under side of the calyx while the leaf, which is here more inclining to ovate than in any other part of the plant has its lower surface applied to the upper side of the calyx. The texture of these leaves is exactly similar to that of the perianth composed of exceedingly minute roundish cells barely visible but with a high power of the microscope. Perigynial leaves from twenty to thirty or more in number, very closely articulated, upon short branches; rather smaller than the smaller ones and remarkably convolute or ventricose, the article is about one-third of the size of the leaf entire convolute, each closely overlain over the one above it. Sigmoid (f. 8) somewhat wider than the stem; one or each pair of leaves curve approaching to round, quite plane, heart at the extremity with rather a sharp and acute notch; these likewise after their figure or they approach the calyx becoming larger and divided into three or four unequal leaves, of which in the calyx species there are five or six (f. 8). Their texture resembles that of the leaves; their color from being less exposed to the light and air partakes less of the purple tint, and generally is of a lighter green.

MAHR. FRUCTIONS. Situated on the axils of the perigynial leaves, upon the short lateral succulent. These perigynial leaves are remarkably closely articulated so much so that the succulent seen from above has very much the appearance of that of J. orientalis, and the whole length
of it is marked with a deep lene in form. In each calyx are two and sometimes three anthers, small spherical and when perfect of an olive-green color; after the discharge of the pollen, a reticulated diaphragm inside remains open and insinuated at the top. The filaments is about the length of the anthers, white, paler and transversely striated. In January 1866, I gathered specimens of this plant upon the under sides of the stems and branches of which were clustered clusters of minute spherical granules (ἐ.κ. 9 16), whitish but inclining to flesh-colored, seated on an extremely short footstalk. These, however, as I was unable to perceive any thing resembling the usual reticulated structure of the anthers of the genus, I was (even before I became acquainted with the true male organs) rather inclined to suspect were some adventitious substances in which opinion I am now more fully confirmed.

**FEMALE FRUITION**

Cornell upon the branches.

Colours (ἐ.κ. 11 12 13 14 18) two-thirds of a lena long, oblong, approaching to obcordiform, plant on its upper surface (ἐ.κ. 11); convex on its under surface there is a projecting ridge on angle (ἐ.κ. 16 15) rounded at its base which together with the two angular ribs of the calyx form a triangle in a transverse section. The whole is externally biform with numerous minute fleshy tubercles; the mouth is exceedingly contracted, and forms a small dome-like appendix, which divides into lobes for the emission of the capsule. The color is usually a deep purplish brown above, below more or less green.

Germination (ἐ.κ. 17) when arrived at its full size of a beautiful green color surmounted by a long and slender style (ἐ.κ. 18) dilated at the mouth streaked longitudinally with reddish lines, and transversely with greyish dots. At the base of the germinum are attached a few bony pistils, of a greyish color swollen at the base

Capsule (ἐ.κ. 11) oblongo-sessile, rather fleshy white, of a compact texture, closely appearing reticulated.

Podashes white, succulent, cellulos about half as long again as the calyx.

Carpole (ἐ.κ. 18) spherical pale yellow brown, bursting into four acute oval valves (ἐ.κ. 13)

The seeds being discharged the naked extremity of the podashes becomes visible within the capsule and forms a greyish, semi-pellicular orbicular base (ἐ.κ. 12)

Seeds (ἐ.κ. 30) oblongo-sessile, fleshy, covered with minute tubercles, so as to have a spotted appearance.

The spiral stamens (ἐ.κ. 15) consisting of a simple box, enveloped in an extremely delicate, transparent tube, both adhering by their bases to the capsule with the valves of the capsule, where they represent a beautiful tuft or even an 

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* Scaldert. was non equales locum. His was not being able to discover an error or guess correctly at the elevation of the number in the species. * Pseudanthea juncea * he may. * plica conicum jam est adnata, in quo female horn; spinae fere volvata, sui multae sunt suis carnosis. Hortus inordinatus celebratus, ad portam etiam ab illo foliis disjectis pilis et albis foliis disjectis. * An in apicem ramosum quondam adnatum capillum conscribitur. * Scaldert.Enumn. 8 259

BRITISH JUNGERMANNIA (J. dilatata)

ment to the anthers are destitute, in all probability like the fruit bearing nutshell of many species of Ficus to form with their leaves larger nutshell, and such as are produced in other parts of the plant. Thus at least is certain, that in these among them in which are found anthers and pericarp and fast approaching a state of decay the leaves appear in full vigor and of an equal firmness with the common common ones.

The male fruitfulness at sight to be remarked may be seen on the same individual as with the female, though it is by far more abundant as separate plants. So that in this instance, as I have also had occasion to observe in some others, the genus is to be considered both monocious and dioecious. The greater number of anthers, in the month of March, had performed their destined functions, in the discharge of the pollen so too, had the greater number of capsules ripened and dispersed their seeds.

Of the synonyms here quoted I dare not venture to speak with confidence of any except that of Schmiedel. I think however, I am correct in those of Engel and Roth and Schmerber

REFERENCES TO THE PLATE.

1. J. dilatata, natural size.
2. The same magnified.
3. Extremity of a fertile shoot, lower surface.
4. Leaf and capsule.
5. Stipule.
6. Portion of a capsule with stigmas and stigmas.
7. Pericarcal leaf and anther.
8. Calyx and stigmas.
9. Portion of a capsule, with male fructification (?).
10. Anther (†).
11. Upper surface of the calyx.
12. Under surface of the calyx with the capsule.
13. The same with the capsule expanded.
14. The same in the act of dispersing its seeds.
15. Inside of a portion of the calyx.
16. Calyptra and inner part of the pedicel.
17. Stigma with its style and a barren pistilum.
18. Style.
19. Inside of an expanded capsule.
21. Spiral filaments, enclosed in their tubes.
JUNGERMANNIA TAMARISCI

(TAB. VI)

JUNGERMANNIA, succulents cephalas, plumes renascence, cela diaphylia incertis, costa-retinacula recurrente, integumenta marginalia 1 marginalia minuta obovatis, ventricosa stipula subquadrate, amagrandia marginalis rosacea calyces in ramulis lateralis terminalis, obovatis, involucro obtuse trigonum.


Jungemmannia foetida subovata valvulata, apicali alternae, connexae inferior quadratis. Hall. Phil. II. p. 67.

Han. On the ground, and creeping over low branches; in much exposed, sub-alpine situations, plentiful.

a Some writers, and even Linnæus himself, in his flora Suecia, have adopted the name coccifera. Tamarisc is the one that is in the Systema Naturae and species Plantarum, for which reason, as well as because it applies to the name applicable than coccifera, I have thought proper to retain it.
BRITISH JUNGERMANNIÆ

Plants spreading in large patches of great extent, loosely attached to its place of growth.

Surfaces from two to four inches in length, laxly imbricated, creeping, borne filiform of a deep brown sometimes a black color, branched in an unbranched or bifurcated manner with patent or horizontal planes for the most part alternate and standing two or three lines from each other short, but of unequal lengths and lost with still shorter patient ganet

Lowers (6-8) basiscissus and distichous at the base the shoot is generally bare, or at each has the lower distant and much elongated while in the other parts they are densely and alternately imbricated over the whole upper surface of the surace they are about one third of a line long in the larger branches except at their apex where, as well as on the smaller branch they are much smaller and scarcely extending half that size in the fertile shoots on the contrary they are smaller at the base and gradually increase in size towards the extremity; their shape ovate or semi-ovate, less or more obovate, less or more or less convex above the margins a little revolute, especially towards the midst of the leaves which indeed, as is well apparent, are generally as much as as to enhance the under side of the surace their color like that of J. obtusifolia varieties from a deep purplish brown to a yellow or dull green; above they are glossy, the cells of which the leaf is composed, are small, roundish, forming a most beautiful minute reticulation. Attached to the lower margin of the leaf in an insered as opposed to its lower surface near the point of insertion, scarcely equaling the twentieth of a line in length opposite united, having no visible opening below at the base, as the third or fourth pair from the apex of the fertile shoots, however, an oblong opening is evident and in proportion as they are situated nearer the calyx, this ventrally appendage becomes more expanded on that, on the second pair from the calyx, it is about one fourth of the size of the leaf oblonger, ovate, obtuse convex on its upper surface, obtuse on its upper the margins revolute.

The perigonal lavers from six to eight in number are closely tied over each other of a roundish figure ventricose their surfaces too, are acute, ventricose, and closely imbricated.

The perichaetial lavers (5-7), of which there is one pair to each calyx, are ovate, acute and strongly accrescent, having their suraces about one-fourth of their size, oblong and acute, with revolute and incisedulate margins; they are oppressed with their inner and hooked surface to the side of the calyx.

Stipules (6-7) one to each pair of leaves, subtruncate longer than they are broad, and wider than the rim to which they are closely oppressed, the margins are revolute, the apex emarginate obtuse for the most part, but, as they approach the calyx (6-8) they become larger and more deeply and acutely emarginate and the extreme or calyces one in bilt, with long recurved incisedulate segments.

Many Faucticarpus situated upon lateral ramuli as short, that, taken with the perigonal leaves they are of a roundish figure, inclosing to ovate; the leaves are, moreover as remarkably convex or rather ventricose that the margins where they meet on the upper surface are defined by a deep longitudinal groove or furrow In such wicks are two or more spherical clusters in every respect resembling those of J. obtusifolia.
FEMALE FruITATION always terminal upon short stems.

Calyx (1 f. 9. 10) three-fourths of a thin long obovate, smooth plane on its upper surfaces, below projecting with a blunt longitudinal ridge or angle; the mouth is formed by a long and acute tubular point, which divides into four equal segments for the escape of the capsule.

Carpels (f. 11) obovate, or rather pyriform, yellowish-white, subporose, reticulated, tipped with a long style (f. 19) longitudinally and transversely striated; at the apex a little dilated.

Perianth projecting a very short way beyond the calyx, white, unicellular, vasculess.

Carpel (f. 1 9 10) exactly spherical of a pale reddish-brown or fuscous color longitudinally furrowed; it divides into four equal acute, oval valves. Within at the base in near the orbicular semisublobular, grayish extremity of the fruitstalk, around which and upon its margin the valves appear to be situated.

Seeds and spined filaments numerous: the former (f. 14) very spherical, black, tuberculated; the latter (f. 15) composed of a mucilaginous envelope in a transparent tube, as in the same in J. dilatata and J. Hutchinsii.

J. Distans: a very common, or common in species, or the case last described. It inhabits more exposed situations, and is generally found on the ground or low bushes and rocks, most plentiful in healthy and sub-alpine districts, where it forms large struggling patches compactly formed by deep reddish-brown or purple, nodous, which in summer the beard of porcelain, greyish extremity of the fruitstalk, around which and upon its margin the valves appear to be situated.

Seeds and spined filaments numerous: the former (f. 14) very spherical, black, tuberculated; the latter (f. 15) composed of a mucilaginous envelope in a transparent tube, as in the same in J. dilatata and J. Hutchinsii.

Under the description of J. dilatata I have mentioned the characters which will most readily help to distinguish the two species: In this I may add, that the present plant is a more pinnatifid ramification and that its calyx is usually distinct at the tubercles. The fertile branches are always short, the perichaetial leaves acute strongly serrated, and even before the appearance of the calyx, in those plants which are destined to produce it, this peculiarities is evident. In this state, before or after the flowers, the calyx does not seem to be much terminated (see f. 9, 10). Both is the first person who has remarked this circumstance, and it is from his having done so, as well as from his description of the capsule that I have been induced to make his J. dilatata to my Thamnaiet. Under the name of J. distans he seems to have described dilatata. Lamark, in the Flora Franca, says that this species has "La gaine cylindrique composée de feuilles dentées", which is by no means the same, nor have I ever seen the capsule or the observa, elsewhere, et un noir brillant.

Dichotoma has well distinguished the habit of this species: "Poulores et longifolius, arc his roots, sere Leucanthemum viviparum minor-approxi-cumosus racemosus (J. dilatata) habitat succulent. Tomaricetum Norvegicae non nobis habitus magis rumosus et magis liberos a corticis et nive, quibus submersa albo-nectlower et phaeo-ventrici phaeo albo lacunobrachi, colore in puncto alvo viscid coherentes villos oblongo sub-uro-rubens." I have not observed however that the difference in color arises from the age of the plant, or that it depends upon its barren or fertile state.
The male fructification of this species as well as the last, was found by Mr. Lyell at the same time and place as is described under J. distachya. I shall in a future number have occasion to notice the authors of J. plantaginea, who communicated to me by that gentleman. Except Micheli I am not aware that any writer has taken notice of the male organs of these three species. In his work, the Genera Plantarum, they are figured at the natural size in a very satisfactory manner, but in the magnified representation the author has completely failed, and indeed does not appear to have seen in any of the species the filament of the anther. To those who are acquainted with Micheli's system it will be needless to mention that this scale observer mistook the male fructification for the female; yet the error into which he has fallen has not prevented him from making many interesting discoveries relative to the fructification of the genus of plants, and such as seem to have escaped the researches of almost every subsequent writer upon the subject.

Ncthese's J. elegans, upon the authority of a specimen which Mr. Turner has received from Dr. Esper is nothing new than our J. Turneri

REFERENCES TO THE PLATE

1. J. Turneri, larger plant, natural size
2. Fertile plant, natural size
3. The same, magnified
4. Portion of a calyx
5. Leaf and calyx of a fertile shoot
6. Perichaetial leaves
7. Stipe
8. Under side of part of a fertile branch
9. Upper side of the same and calyptra
10. Calyx, under side
11. Calyptra
12. Style
13. Spinal filaments, much in the tube
14. Seeds
BRITISH JUNGERMANNIAE

(J. trichophylla.)

JUNGERMANNIA TRICHOPHYLLA

(TAB. VII.)


Licheneastrum tripartitum, capitulum foliaceum, e ramulis ramularum ignotissimae inclusis.


Hab. Turfy heaths near North Biever. Yorkshire. M. Richardson.—On Craiglenoch and Seaburnhall, in Breckland, Pethelands, and on Ben Loyal, in the North of Sutherland.—About Ballycarry. Miss Pitcher.—Near Belfast. Mr. Templeton.

Plant growing in loosely-matted tufts of seven inches in diameter. Root consisting of minute whitish fibres proceeding here and there from the under side of the stem. stems creeping, from half an inch to an inch and a half in length, their thickness never exceeding that of the human hair sometimes ample, but mostly more or less forked the shoots bent with short, pointed, patent branches, which are often again divided.
(3 stechophyla.)

BRITISH JUNGERMANNIAE

Leaves growing in alternate clusters, each at a small distance from the other so that the stamens in every where visible. These clusters are composed of two or more, frequently three, but occasionally six, and proceed from every side of the plant particularly near the apices, where they form tufts on prostrate (1 3), but, when the plant is closely attached to the ground, the under side a base of leaves, and, in such cases, those which originate from the other parts of the succulence have a similar appearance; the whole are erect, patent, pubescent, straight, nearly the size of a long and of a yellowish-green leafy, paler when dry generally simple, but occasionally forked, or even branched (1 5 6) which is more particularly the case with those which form the terminal tufts, all of these are divided throughout their whole length with transverse disciplets forming joints, which are a little longer than they are broad, and perfectly cylindrical, when dry they are frequently alternately contracted in the same manner as the joints of Conffera confluens of Roth and Carv. diffusa, and the coloring-matter either contracts into a dark green globules in the centre of the joint, or is reduced to the borders of the disciplets at the same time that the other parts of the leaf are quite pallid.

Of the periadenal lemma (1 6) the external are similar in these just described, the internal nearly ovate, entire at the base and for about a third of their length thence not into many branched capillary segments of various lengths.

Males Fruitarian. Situated in the axil of these leaves which are collected into a tuft at the extremities of the samall (1 3)

Stamens (1 7) exceedingly minute, terminal of an olive-green color, externally marked with reticulations within containing a fine powdery mass which gives the color to the otherwise transparent polline, they are supported upon a white, extremely delicate and palisade-cylindrical filament of nearly the length of the globules.

Females Fruitarian terminall

Calyx (1 2) elliptical, inclining to oblong about a half a line long pilate, contracted at the mouth where it is fringed with short tails, which are sometimes bimodal, its color is paler than that of the leaves and more inclining to yellow it is somewhat transparent, and its whole substance a mass of small ohlong compact cells.

Carpels ovate, very thin and delicate, reticulated nearly white tipped with a short style. Abcissae purplish linear-lanceolate.

Pericarp about a quart of an inch long, pilate white in color.

Capsule at first ovate, more conically splitting open into five equal, lanceolate segments of a dark reddish-brown color longitudinally and transversely furrowed.

Schumidt says that the leaves are not always regularly disposed, for that an intermediate stage is occasionally to be found; and such good hortist. and observer of the plant, both a few tails, very elevation, terminate.

Of these I have seen no hortist.

Dr. Roth describes a variety near him by Terrapontal as a fleshy-green color.
BRITISH JUNGERMANNII

(*J. trichophylla.*)

**Seeds** and *spiral filaments* forked; the former nearly spherical and smooth, the latter composed of a double hair continuing to adhere to the margin of the valves of the capsule (according to Schmiedel) in a pectinated manner as in *J. seteas* becaupaedia and others.

Ours. In the middle of summer or in autumn, if the weather was dry, Schmiedel remarked at the extremity of the branches and in the bosom of the terminal leaves or on the spines, minute globular masses with transparent bodies of the color of honey which in a few days skinned and totally disappeared. These from their being seen at the same time with the young calyces he was led to consider as the male fructification a thing that it is scarcely necessary to say he would not have done had he seen the anthorn been figured. I entertain little doubt of what he describes being genuine such as are found in the *Anthericum* and in other *Jungermannii* also in which both the male and female fruit are present.

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Although, from the history of this elegant species of Jungermannia given by Schmiedel, it appears to be widely scattered throughout Europe, being found from the Alps of Lapland to the Pampas, and covering in Germany whole rocks yet in Britain, it seems to be of rare occurrence having been entirely overlooked in this country till the time of Hudson, who first published it in his *Flora Anglica.* Upon the authority of specimens gathered in Yorkshire by Mr. Richardson. Since that period, however, it has been met with both in Scotland and Ireland; and from the latter country alone I have received five specimens in fructification, gathered by Mr. Hutchins. Both of these species I have ventured to make a synonym to the following *J. setaeas.* The leaves described in this place as well as by all preceding writers as simple and clustered, might perhaps with more propriety both in this and the following species, be considered as simple and free from the very base into a number of segments, an opinion which is strengthened by the peculiar structure of the peripheral leaves; for these appear to be composed of a number of small, ones connected below and having as many bases as there are leaves united. Dr. Smith has happily remarked that this species, as a dry state, is distinguished from the species among which it grows by its narrower appearance, arising from the minute capillary or setaceous leaves in the form of there at agree with the other British species of Jungermannia, except *J. setaeas* under the description of which will be found the characters that more particularly distinguish them.

Schmiedel says that the female fructification is generally in point of situation and he both figures and describes some calyces growing on the middle of the succulent. I been in vane un-masked a great many specimens to see any thing similar and I am led to suspect that he must either have confounded *J. trichophylla* and write together (which, from the planed modification of some of his unеntified figures I still worse inclined to think the case) or that what he saw were old calyces, originally terminal, but then appearing lateral, on account of the elongation of a shoot as I have myself not unfrequently remarked.

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<td>Seeds and staminal filaments</td>
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BRITISH JUNGERMANNIÆ

(J. tetras.)

JUNGERMANNIA SETACEA

(TAB. VIII)

Jungermannia trichopodia var. S. R. C. Cern. II. p. 268.
Lichensulcites multiflorus sole folia singulatim. Phot. Naut. & 89. f. 4. a. b.?


Plant sometimes forming dense tufts; but frequently growing almost singly in thick beds of Sphagnum, among which it is not uncommonly met with, drawn up, and affecting the same mode of growth as the mean.

Roots a few minute whitish simple radicles proceeding from nearly the whole length of the under side of the plant, especially near its base.

Branches varying exceedingly in length from two or three lines to nearly two inches, or even more, scarcely so thick as the human hair; finally creeping generally once or twice irregularly forked, with segments of uncertain length and irregularly pinnated with rather distant, short, patent branches.

Laminae rarely single; generally growing in pairs (f. 6): and sometimes though seldom three together (f. 7); placed at short distances from each other on every side of the plant; very coherent so that their form is imperceptible to the naked eye; not being much more than the twentifith of a line long; under a microscope they are found to
BRITISH JUNGERMANNIAE

be succulent, patent, incurved, furrowed, as in J. trichophylla with transverse discapments which form plicate rather longer than broad, 1 hath swollen in the middle and often also divided by longitudinal septa, in a manner similar to that of the plants forming the division of the Converse, which Mr. Dilwyn has called "longitudinal stripe" those discapments are visible also in the younger branches but the older ones want them, and have the common cellular appearance of the genus. The colors of the leaves and, indeed, of the whole plant is generally a pale yellowish-green darker and even of an olive brown, when it grows in very shaded situations. In drying, the same disposition of the coloring matter appears as in J. trichophylla and the leaves become much more incurved.

Perichaetial leaves as thickly clustered upon short branches as to form a little spherical head, very evident even to the naked eye. The interior are for the most part simple; the interior from 1 broad and expanded base become at the extremity divided into a number of narrow incises of uncertain lengths, all of them incurved and lying loosely imbricated over each other.

Perichaetial leaves (I 1 8 8) equaling half the length of the calyx, in which they are closely appressed all to them oblong-ovate, and divided nearly to their base into several narrow whitish, and sometimes branching, incises.

The Male Function, which I have received from Mr. Lyell since the engraving of the plate was completed, differs from that of J. trichophylla in being situated upon extremely short lateral ramuli. The anthers arise from the middle of the perichaetial leaves. They are extremely small ovate, approaching to round, when perfect of an olive-green color. The footstalk is about the length of the calyx white pellucid, having numerous transverse septa, which are very evident under a high power of the microscope.

Female Function is lateral sessile or supported upon a very short footstalk.

Calyx (1 2) very small, scarcely exceeding 1 quarter of a line in length, narrow at its base then cylindrical, very pellucid, almost white, of an extremely thin and delicate texture wrinkled all over with oblong reticulations which are large in proportion to the size of the calyx; the mouth is not all contracted but of the same width as the part cut into numerous long erect valves.

Colpites (1 10) ovate white thus and distinct marked with roundish reticulations; at the base surrounded by free or free fimbriate, almost linear grayish 1 sectes pellitidas.

Peduncle rather more than 1 quarter of an inch long pellucid, delicate vascular.

Capsule ovate, deep brown opening into four equal ovate-lancolate transversely and longly divided valves.

Spathe and spiral filaments (1 10) both of them in every respect resembling them of J. trichophylla many of the latter continue to adhere in a similar manner to the margins of the valves of the capsule (1 11), a circumstance not uncommonly observable in many species of this genus.
BRITISH JUNGERMANNIA

( J. acutius )

One in the month of February I have found these abundantly scattered among the terminal leaves, minute variously shaped, but always more or less angular (E. 6) pellicle
of a pale greenish color inclining to brown.

Few Jungermannia seem to have been last understood by Cryptogamic Botanists than
the present, which is not surprising. If we consider the great similarity that exists between
it and J. truncophyllo especially in barren specimens. In each case the most obviously
distinguishing characters are its shorter lateral placed more distinctly and in pairs and
strikingly incurved, so that the plant altogether wants the moss-like appearance pointed out
by Dr. Smith as characteristic of the other species, but most of these circumstances are
liable to some variation in different situations. In fertile specimens, indeed, no difficulty will
be found to occur; the extremely delicate only on its external situation and its long inside
being remarkable on the slightest examination with the microscope.

The specific name of multiforme was, in all probability imposed upon this plant by
Hudson, in consequence of the numerous footstalks represented in the Botanical figure here
quoted, and that in point of priority a right to be retained, but as only the engraving (al)
although noted by Hudson and Linnaeus) but also the original drawing in Sir Joseph Banks' botany of
without much notice in that present plant and especially on this species, in consequence
of the priority of its flowers, has been thought by another eminent botanist, deserving of a
more direct and repeated in its meaning, that of J. multiforme. I have considered it best to do
away an appellation which can only tend to mislead, and in substitute for in its room the very
appropriate one adopted by Weber. It is, indeed, merely in compliance with the opinion of
Bilcotean botanists and contrary to my own, that I have refer to the Bilcotean figure which
appears more like a very common appearance of J. biculaeata and was considered by Weber
as an evident that he quotes it under J. auturia with a mark of uncertainty. I was in
hopes of ascertaining the fact by examining the specimen corresponding with the number of
the Bilcotean Herbarium but to my great disappointment what was there preserved in an
injured condition of J. auturicosus, Darley a plant to which neither the figure nor description
bears the smallest resemblance! It appears to admit of no doubt but that Dr. Roth who
in general must accounts, and many other botanists, have confounded these species with
J. truncophyllo and even the most learned botanist who, by his close attention to the genus Junger-
mannia, has added several new species to the catalogue and mustered our investigation with
many interesting observations on their structure at the same time that he seems to have
known the present plant under the name of multiforme was not common of the deformer
between it and J. truncophyllo. His last consequence fallen into an error in his Botanica
which renders but scarce remark on the Swedish botanists in that plant. On the last unusual
" J. truncophyllo Linn., Sp. (he says) J. multiforme Linn., Aut. and J. truncophyllo Linn. Sue
Methus all three one and the same plant whatever may be said against it. But is it not
angular that the Swedes who would wish to lord it over the whole vegetable kingdom and
every the botanist of all parts of the world, do not know the plants of their own

* Beitrag. vi. p. 16.
BRITISH JUNGERMANNIE

I have quoted under this, rather than under J trichophysis, J norvegicoides of the Methuen Nomenclur on account of the lateral calyces, although the author has remarked a J norveg Wau (multiflora Dill. & Linn.) differs Felix capillacea, equilibra, articulata. The leaves however at both the one and other are rather scarceous than capillary. The same observation is equally applicable to the synonym of Methuen, as, indeed must be the case with almost every author who attempts to describe these minima vegetables within the compass of a few words or sentences.

The leaves of this Jungermannia, though not in reality verticillate have the appearance of being so, from the circumstance of their growing on all sides of the stamens, and the general resemblance of both J norveg and J trichophysis, under the microscope to Conferren verticillata is worthy of remark.

REFERENCES TO THE PLATE

1. J trichophysis, spicata species, natural size
2. J norvegicoides, natural size
3. Portion of a female plant magnified 6
4. Portion of a ramulus bearing gonoma 6
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6. Perichelial leaves 4
7. Crisp 6
8. Calyptra 3
9. Calyptra discharging its seeds and filaments 2
10. Seeds and epical filaments 1
Jungmannia acuta
JUNGERMANNIA EXCISA

(TAB. IX.)

JUNGERMANNIA excisa prostrate, simpliciangularis foliis patentibus, subquadrate, profunde exarantibus fructu terminali corylliforme oblongo aequilabiis areis pilosis, dentatus.


Σ. CRISPATA Siphon longitudinaliter undulatus, segmento inaequilabium crispatum.

In shady woods. Mr. Dickson.—On Holt and Edgesfield Hills, in wet places, plentiful. Rev. R. S. Francis.—Abundant upon Montsheld Heath, near Norwich, and on hedge-banks and by the waysides near Yarmouth.—On the highland mountains of Scotland.—Σ is not uncommon in similar situations with α.

This species Plant is found in scattered patches, sometimes covering several inches of surface, firmly adhering to the soil by means of the numerous simple pellucid, fibrous radicles.

The stems which are usually dark green, though sometimes inclining to deep brown or black, vary considerably in their extent, from half a line to five or six lines that length, and are about the tenth of a line in diameter, throughout cylindrical, simple, or here and there producing a lateral shoot.

Leaves (f. 4-5) a quarter of a line long, rather closely placed patent or horizontal, (except in var. β) subquadrate, approaching in orbicular slightly convex semicircular, at the base, at the extremity sharply angulate, with an obtuse angle, the segments acute strait and equal in size; the color is rather a deep green; the radicles small and formed by calicles of a roundish figure.

The perichaetial leaves (f. 6) differ from the rest only in being most frequently tridentate.

Male PROSPECTUS I have not been able to discover.

Female PROSPECTUS terminal, most abundant upon each plant as are going into a state of decay.
BRITISH JUNGERMANNIAE

Calyx (f 3 7) nearly a line long and three-twenty of a line as diameter, oblong, cylindrical at the base, above longitudinally oblongated, the mouth narrowly at all contracted. Color a very pale whitish green, diaphanous, and unarranged at the extremity near the middle, it is frequently marked with a faint purple ring, which sometimes, and more especially in autumn, becomes nearly the whole of the color.

Calyx (f 10) ovate-pallidish whitish, reticulated, style short. A few lance-oblongo-ovato-pallidish purple surround the samara (f f 8 10).

Petals a line and a half long, white, muscule, celledose, terminated by the ovulo-substansed, deep brown.

Capsule which divides into four equal oval valves.

Seeds and apular filaments red brown, the former exactly spherical, the latter composed of a double shell.

In the var. B (f 11 12) the leaves are almost constantly erect, some crowded, longitudinally undulated and pilose, with the segments of unequal size, curved and disturbed.

J arctica, which was first noticed by our excellent cryptogamist, Mr. Dickson, seemed to be by no means rare occurrence in this country, and during the season of fruitification is rendered more conspicuous by the large diaphanous samara. By the foliage. The purple flowers are most frequent in exposed situations, but in other altogether wanting. The form and size of the calyx (in proportion to that of the plant itself) afford the most striking marks of distinction between this and small specimens of J. nutans; but in the leaves I am unable to point out any marks of separation. From J. nutans, indeed, with which it occurs in size and general habit the shape of the leaves will furnish a sufficient difference although Hoffmann in his Flora Germaniae seems to have confounded the two at least he applies to the stems of this species the words "upone ferrante" and in another place he describes them as subconvex and terete which are remarkable in J. arctica, but not that I have ever observed in the present plant. Both have, with a mark of interregnum quoted Hoffmann's synonym to his J. lyracron, that no two plants can be more unlike. The same author appears to have united with his J. glaucopas not only Mr. Dickson's J. arctica and Schumach's J. arctica but judging from some part of his description, the specimen is also included in the number. His character of the calyx, which, however, has not appeared to me in any part of it to be constantly absolutely triangular, no other respects as well accord with this species that I shall transcribe his words. Calyx pallide viridish pilosus, subdulcis triangulis, ex oblongo ovato ultra lineare, five convoluto-ovato longae apice truncata alloca, membranaceus, teretascens, praecipe utrinque convolute pora, in cotyledones constrictio terenabilis, quaevis longitudinem sua non aspera.

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JUNGERMANNIA INCISA

(TAB. X.)

JUNGERMANNIA, coryle pustulato, depresso, simpliciunculo; folia subquadraat sequalis, sub-triata segmenta basquiilobae, ut sine denticulata unica terminalis, valvatis obvallatis; una contracta, laevissima.


Han. Holt Lewis and Edgefield Heath. Rev. K. B. Francis.—Harrington near Yarmouth. Rev. B. Turner.—Rocky places upon Ingleborough, Yorkshire.—Near Romsey, Ireland, Miss Hutchins.—Lambeg Bog, Ireland. Mr. Templeman.—Found in fruition near Crowden, Surrey in July 1811 by Mr. Dicker.—Bogs Westleton, Suffolk.—It delights chiefly in moist places, and is often found among Sphagnum and other mosses.

Plant forming small, but very dense patches of a pale green color, the surface appearing exceedingly beautiful from the numerous crisped and dentated leaves resembling in miniature a suit of armor. It firmly attaches itself to the ground, or moss upon which it grows by means of its abundant fibrous radicle, which proceeds from the whole length of the underside of the stem, and are much entangled and matted together.

The stem, which are prostrate about a quarter of an inch long and cylindrical at the base, gradually become wider towards the extremity, where they are depressed, and equal the width of a line in diameter; in general they are quite simple, though sometimes furnished with a small ramulus, their color is a very pale and pleasant green.

Leaves (1 4 7 10) at the base of the stem rather distantly placed, the root more approximated at the extremity of the barren plants frequently forming thick tufts or bands; they are subquadrate longitudinally undulated, at the base semi septulescent and dentate the upper margin a little involute the apex obtus or quadridentate; but here and there a lower leaf (5 6) is seen to be only enarinate the segments are of unequal sizes, crisped and distorted; their margins very frequently dentate with one or two small teeth. The color of the leaf is an extremely pale green, approaching that of J. inermis. The reticulation (1 14) is perfect the cells are quadrate rounded.
BRITISH JUNGERMANNIA

The pseud download leaves (f. 7) are trifid or quadrate, the segments never equal in size or
than those of the smaller leaves, and more frequently and regularly dentate.

Make Fructification I have never seen.

Female Fructification terminal upon the stem.

Calyx (f. 8) obsolete, about half a line long, and pilose towards the outside. The
mouth is contracted, small, and toothed in summit. In color and texture it exactly
resembles the leaves.

Cypresse abaxialis: staminal, terminated by a short tubular style.

Podome are nearly measuring twice the length of the calyx, white and cellulos.

Capule are seeds and spiral filaments exactly as in J. erucoides.

On 1. Upon the terminal leaves of this Jungermannia, towards the latter end of December,
are situated capsules (f. 13 14 18 15) collected together in a small, pale yellowish-green,
spherical mass; but in the middle of January they are for the most part, dispersed about
the plant in the form of a minute powder. Each particle is semi-transparent, and under a
microscope appears somewhat spherical in its outline, but beset with a number of acute,
protruding angles (f. 13)

Haller is the first author who seems to have noticed this species to which the name of
J. erucoides was applied by Schröder in his Systematische Jaenung Kryptogamen-Caverne in
the year 1786. In the British dominions it has for many years been known to Mr Francis,
as an inhabitant of healthy places in the neighborhood of Manchester, and this gentlemor's
has long been in cultivation. Among the manuscripts a figure and description of it, under the appellation of
J. erucoides. Subsequent to its discovery by Mr Francis, I have been accustomed to see it in
the gardens of a native of Ireland and Yorkshire, and during the last summer 1813, when the
 engraving of the plant was completed, ripe capsules were brought to me by Mr Dickson, which he had been fortunate
enough to find near Crayton in Surrey. Jungermannia erucoides has been already remarked,
be that the least affinities with the present plant; but the undulate and almost universally
tridentate leaves, together with the compressed stem, are circumstances which will readily
 distinguish J. erucoides from that as well as from every other species of the genus.

Dr Boll's description of J. erucoides accords so well with our British plant that I feel no
hesitation in adopting his synonym: but he appears to have fallen into a strange mistake,
when he says, "Habitus (J. erucoides) problema novum et eorum aliquot, Jungermannia hermaphroditica,
from simpliciter plantae foliis tridentatis florulis paniculatis Schreberii, Icon et Analgo,
fol. 64 f 1 Habitus notatus plantae carnibus curn noceunt, quam in foliis constatibus boves
accurate quae in nostrum regionem plantae non sive in manu et phalerum nostrae observantur.
In another place the same author expresses a doubt whether J. erucoides be really distinct
from his J. globulifera, a species which he has been observed elsewhere appears to me to include
J. erucoides, J. hermaphrodita, and J. erucoides.
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<td>13.</td>
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BRITISH JUNGERMANNIAE

JUNGERMANNIA BICUSPIDATA.

(TAB. XI)

Engl. Bot. 1839. (see 1 301.)

Jungermannia venosa Stem. Grad ed. 2. n. 144. (see Bot. Rar.)
Jungermannia hamosa Fl. Dec. I. 888. a. (see 1.)
Jungermannia minima repens. f. bisulcatum. Germany. Flora. p. 9. 1 6, f 77.
p. 60. 1866.
p. 62. 1870.

S.retty. follicum segmenta persistentes.

Jungermannia. Extremely common on moist hedge-banks and on heaths producing fructification
most profusely in the early part of spring—§ in marshy places, growing among
Sphagnus.
(J. bipinnulata.) BRITISH JUNGERMANNIA

Found growing in large tufts, loosely attached to the soil by means of the fibrous roots, which proceed from every part of the succuli but especially towards their base.

Succuli dilute in size, on each or on each and a half long, divided in a somewhat stipitate manner so that the branches for the most part unite in the centre of the plant; they however occasionally throw out other short, scattered, and usually with a few of the pale green color and semi-pellucid, the substance delicate, succulent and composed of large oblong cells.

Leaves (f. 3) rather distinctly placed, patent, or sometimes erect nearly a quarter of an inch in length, oblonga-quadrate, divided for rather more than one third of the way from the extremity by a acute sinus, into two acute, acute and equal segments, which are now and then a little incurved, and have in it few imbricate observed them in be recurved; the color exactly resembles that of the stem, a pale pellucid green; the cells are more approaching to round, forming a large and elegant reticulation, their surface is slightly convex.

The perichaetal leaves (f. 4) are numerous, and surround the base of the calyx growing closely subconical. The interior are the largest, and generally divided into two acute segments; the exterior are frequently trifid, and have their points not unusually recurved. They are of a pale whitish green color.

Male Fertile: at present unknown.

Female Fertile: arising from the base of the succuli, where the male are the most numerous.

Calyptra (f. 5) situated upon a short proper footstalk, which is covered by the perichaetal leaves, a line or a line and a half long, oblong, narrowly at all inclining to ovate, nearly white, starved, longitudinally reticulate; the mouth irregularly dentate, it is elegantly reticulated and has ovate acrospore. These calyces remain long after the decay of the capsules and footstalk, and then become tinged with brown.

Calyptra includes a thin delicate whitish reticulated membrane tipped with a short style having at its base numerous linear lanceolate barren ovules (f. 7), which I have seen accompanied by what appears to be an abortive germin (f. 9) ovate with a contracted base and an acuminate point, throughout of an olive-brown color.

Peduncle three quarters of an inch in length, or sometimes more, white, cellulose, terminated by the

Capsules (f. 8) which is oblonga-ovate, deep brown longitudinally and transversely furrowed. Shortly after the peduncle has reached its greatest height the four valves of the capsule separate, and the numerous remainish

Seeds are discharged, together with many of the double spiral filaments (f. 8). Some of these, indeed, remain attached to the margin of the lanceolate valves in a pertinated form, pointing however obliquely and forming an acute angle with the valve (f. 8) thus they continue till the margins of the valves become involute, which soon takes place if the atmosphere is dry. Both seeds and spiral filaments are of a reddish-brown or chocolate color in the winter season (or in the autumn more frequently, according to Schleidt) the ends of the succuli of many of the sterile points become erect, having leaves very distinctly placed, especially towards the
BRITISH JUNGERMANNAE.

(J bicuspiseta)

... extremity in which case the apex itself supports a cluster of gemmae (f 11) collected into a spherical mass* of a pale yellow color. These in a few weeks dissolve and disappear. Under a high magnifying power each particle (f 12) appears semi-transparent, very irregular in its figure, and always more or less angular. These gemmae, which Schindel has represented less angular than I have ever observed them to be, are regarded by that author as the male fructification.

My Fgr. f (f 13) is perhaps scarcely worthy of being noticed as a distinct variety I found it lengthened out and much exceeding its usual size among Sphagnum. The greater number of leaves had the segments divaricating (f 14) in a manner that appeared rather to arise from accident than to be the natural growth of the plant. In specimens of this kind I remarked gemmae loosely collected together in the axils of the terminal leaves which precisely corresponded with them just described as forming a globule at the extremity of the sarcus.

Few species of Jungermannae are more generally diffused throughout the temperate parts of Europe than the present. It may be seen in almost every wood as well as every moor by hedge-bank and damp brine. In the latter situation, especially its white summer calyces which are so plentifully produced, may be found at almost all seasons of the year. Its size and color as well as the situation of the calyx will prevent its being confounded with J hygrosta and there is no other species that I am acquainted with, for which it can at any period of its growth be mistaken. I have had occasion to observe whilst describing another species (St eurica) that the Dillenian figure (Syst. Bot. t. 62, f 4 a) was probably intended for this plant, though subsequently taken up by Helm and Liebm as a new one, under the name of multiformis, and I am happy to add in confirmation of that opinion that Schindel, who considers it to be the same as a variety which he had discovered "in que earni setta longi fimb. altera instructa instructa suo raro, foliis formis admodum angustis, et inodoro adnoto parte comparae vel adonaeque, ut pro individuo princeps intimis pterrarius habitus distinctus in ordine consideranda et serres inferioris vel foliis foliis, et egressis foliis ut haec species nactus solet." It may not be improper here to repeat that neither the J multiformis of Linnæus (St. section) of this work) nor J bicuspiseta in the least accord with the original specimen in the herbarium at Oxford, which is J eurica. The figure, however, is accurately copied from the Dillenian drawing in the possession of Sir Joseph Banks.

The following observation from an accurate investigator as Schindel is too important to be omitted, and, as I have not had the opportunity of confirming the existence of what.

* Gemmae considered here a similar mass and in like manner situated upon the exterior of the leaflet, as found upon Jungermannia Trichomania. From this circumstane I imagine Sir Rook has been led even as near in quoting an synonym of the species the figures and description of Michaux, p. 1 f 11 and 120, p. 287 f. 31 f. 8, which evidently belong to J Trichomania, though the only represented by Michaux bears no resemblance in that to either of the plants in question,
(I bicornipila.)

BRITISH JUNGERMANNIE.

he saw I shall offer no apology for transcribing the whole of his remark. "In varietas hujus (I bicornipila) Mense Novembris et Decembris reperti capitula pulverulentia, quae summar
secta corpora lata uterque extremo tota comprehendit; quae aliquando in aqua soluta
fugavat undique vertent in ignem, et ut distincta visum parvis molubridos depressos
dum vertunt non velut magnis capitis. Inter alia mense corporeolum pet alipet congelationem
explicationem solutum est, et formam quaelam relinquat parvum aliquum molubridum (sero ad alios
corporas adscriptos). ad loco hanciam substitut autem hoc magis corporeolum in motum
akta utique in longum protrahitur, hae ut sihul ex scoe percursae, nec amplius reperirens
Schmidt Icnavus, p. 347.

Haller's description, p. 1870, does not so well agree with our plant as his n. 1870, but he
feels, so that the forms in the name as Schmidt's plant Thaum jugfu. 16.

Ehretiae I bicornipila (Crypt 392) which I have never seen Dr Smith assure us, is
a very different plant from the present and more like that figured in Engl Bot. t. 391,
which I formerly supposed was only a variety of I bicornipila but which I am now inclined
to regard with Dr. Travers and Dr. Schmidt as containing a distinct species, though very
closely alluded to it. It is I heterophylla of Schrad's Systematische Sammlung.

I bicornipila. I heterophylla I convicera and I carvifolias form a very natural family,
agreeing in general habit and in their manufacture which has always more or less of a
stellated appearance, the consequence of the fruit emerging from the centre of the plant,
and the branches diverging on all sides nearly equally

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<td>14</td>
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| 15  | Genome of pet. &
BRITISH JUNGERMANNIA.

JUNGERMANNIA BYSSACEA

(TAB. XII)

Jungermannia sericea prostrate (Fig. 4). Stems 
a little subquadrangular; laminae, 
segments ovate, 
fruits terminal; calyces oblongis plicate, 
setae dentate.

Jungermannia byssacea. Roth Cat. Bot. p. 168; Roth, Germ. Bot. p. 167; and 
syn. Fussmanai.

Jungermannia hylida. Schmarda, Icones p. 129. f. 64; f. 2, at 1; f. 67; f. 2, 19, at 30. 
(planta gemmifera.


Jungermannia. First discovered in this country by the Rev. R. R. Prinsep on heathy and exposed 
situations in the neighborhood of Heli.-Far from uncommon in similar places in 
various parts of Norfolk and Suffolk. Mr. Dawson Turner finds it growing in 
great profusion, but always barren, on the sand-hills at Hemsby near Yarmouth. Near 
Bantry in Ireland. Miss Hutchinson. About Belfast. Mr. Templeton. On the Scolt 
mountains, by no means of rare occurrence.

Plant most frequently growing in dense tufts or ramulose, conspicuous from their dark 
green, and frequently almost black color.

The stems, which may be reckoned among the smallest of any of the genus, are scarcely 
so thick as the human hair and not more than two or three lines in length, throughout 
filiform somewhat rigid, branched like J. dissipata, in a kind of eellated form; the 
brances often again divided, and procumbent, but the fertile ones pointing upwards at 
the tips; their color varies from an olive-green to a dark brown; the latter is the most 
usual appearance.

Leaves (Fig. 4) densely placed, though occasionally clustered at the extremity of a 
ramus, yet in general so small that without great care, even under a microscope the plant 
appears almost leafless; they do not exceed the tenth of a line in length are 
appressed or patent, subcorneous in figure nearly quadrate, at the base connate, and 
at the extremity divided for about one third of their way by a rather amused line;
the segments are acute occasionally a little spreading which induced Dr Smith to adopt in English Botany his manuscript name of american. The color of the leaves corresponds with that of the stem and is equally subject to vary from a dark (for I have seldom seen it of a pale) green to a deep brown when dry the leaves are rigid and brittle. The reticulation is small, formed by subquadrate cells.

Perichaetal leaves (1-3.4) numerous, surrounding the base of the calyx and slowly incised subquadrate approaching to round the exterior ones for the most part divided by an obtuse sinus into two equal, acute sector segments; the interior cut into three four as are unequal ones. They are all of a paler color than the rest of the leaves, but resemble them in the size and form of the cells of which they are composed.

Male fructification according to Dr Smith, within the axils of the terminal tufts of leaves. Antlers small spherical yellow situated upon short pellucid footstalks.

Female fructification always terminal upon the stems and branches.

Calyx (1-3.6) large in proportion to the size of the plant about a quarter of an inch long, oblong pilate the mouth which is by no means contracted, is cut into small obtuse teeth. The whole is extremely delicate appearing like a thin membrane though under a high power of the microscope the reticulation formed by oblong cells is very apparent. At the base the calyx has generally a faint tinge of green, the extremity is white and diaphanous.

The calyptra is ovate extremely delicate and pellucid.

Petals are remarkably slender a line or a line and a quarter long white, sanguine, shining.

Cypselae (1-3) oblong-ovate deep red-brown, longitudinally and transversely forrowed.

Seeds and staminal filaments (1-8) of a reddish-brown, the former perfectly spherical, the latter composed of a double helix.

One The nearly capillary stylel in consequence of the diminution of the leaves which are scarcely to be distinguished by the naked eye, are compared by Dr Roth to Rpsus rubrum, whence his specific name.

That the present plant is the \textit{J. ignea} of Roth I believe there will be found no reason to doubt. Authentic specimens in Dr Smith's herbarium exactly correspond and the description in the Flora Germanica is excellent. This author justly observes that \textit{solitaria} and \textit{obtusa} form the same species and that \textit{american} \textit{fulva} \textit{fulva} \\

I cannot however converse with him in considering it a variety of \textit{obtusa} supposing it has any kind of affinity with \textit{Hoffmann}. J. erica which, to judge both from the description and remark at the end of it in the name species at Dr Dickson's plant of the same name, Dr Roth further.
observes that Schumacher's figure of *J. exuopoides*. Dicr. *Jung. f. 16* accurately expresses the habit and situation of the leaves of *J. hirsutum* and that he should certainly have quoted it as a synonym were it not for the generic terms being here represented as confined upon the extremity of the naked stems which is the present species it a matured an inflorescence (spatula) of carpels. To me however, it appears that Schumacher's figure was intended for the true *exuopoides* and though I have quoted, should note, fig. 2, 3, 6, 8, 20, all that authors *hirsutum* as the generic terms of *J. hirsutum* I have much more reason to think it was really intended for the species than the figure as has *Dainton* referred to above. Mere occurrence of the same manner plantulae monstrabilia et leae mensurabilis has an *Jung. exuopoides* (J. uncata) quasam plantulae globosae monomorphae abor *Jung. hirsutum* et plena hortus cultus et adnataque en hortus tabularum et salutarium portant quod *Jung. hirsutum* utar mensurabilis quam 1,64 f. 3, postem ex hortum. Thus reference to f. 3, 4, 6, 8, 20 will further substantiate for me in reference this plant just mentioned as belonging to Dainton's *hirsutum* as although Schumacher was of opinion that the name referred to was probably a variety of his *J. hirsutum* (*J. uncata* *Huds.*) and notwithstanding some of the lower leaves of the figure more nearly resemble those of *J. exuopoides* yet the different shape of the calyx in the former of these *Jung. hirsutum* and the generally simple mode of growth of the latter forbid their being united with it. It is surely not wrong to the accustomed accuracy and notions of the author of the *Icones Plantarum*, and leaves me so far uncertain as to its identity that I have not ventured upon the name of *hirsutum* which Schumacher the editor of the third fasciculus has in a more proper should be given to it.

With regard to the situation of the *Genus* upon *J. hirsutum* I might naturally be expected from its close affinity with *J. exuopoides* that they would be found plentiful in similar spherical clusters and in the main situation as to that species. Such too appears to be the case from Schumacher's figure so that in all probability what Roth has found in the clusters of terminal hortus and looked upon as analogues to the granules in *J. exuopoides* are real members such as are noticed by Dr. Smith in *English Botany*.

Affixed to this species certainly is to *J. exuopoides* and slight as it may appear to be distinguished from it in the specific character put it and be found in dafus remarkably in its mature size in the main situation of the leaves in the shortness of its stems in proportion to the diameter of the saccus in the deeper and browner color of the whole plant and more particularly in the calyx being always terminal upon the saccus in their being surrounded at the base by pericarps leaves, which are less deeply divided and which have segments never that I have been able to discover in the least recurved.

In their places of growth a difference may be remarked for while *J. exuopoides* affords moist and shady banks or the laggery parts of heaths *J. hirsutum* is most commonly met with on open and exposed situations in by foot-paths, and even forming upon sand-hills blackish patches, visible at some distance from the dark green of the saccus and foliage.

* Since the above has been printed I have been favored by Mr. Lyell with a new fasciculus prove of *Jung._hirsutum* which agrees in more particulars with the plants figured in Schumacher's *f. 32, 39, 152*, and *f. 63, 7*, then *J. exuopoides* and which I have very great reason to suppose is the same.

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<td>A single plant natural size</td>
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<td>8</td>
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BRITISH JUNGERMANNIAE

JUNGERMANNIA ASPLENIOIDES

(TAB. XIII.)


Hab. Frequent in most woods, and shady hedge-banks, producing fructification in the south of England very rarely; in the subalpine counties of the north more frequently; and also in Ireland. According to Dr Stokes.

Planta sometimes growing in dense and nearly erect tufts, but more generally in loose and struggling patches among heath and other masses.
BRITISH JUNGERMANNIA

Surculi either erect or procumbent, throwing out a few fibrous radicles from their base and here and there from the whole extent of their lower surface. About the thickest part of the main radicle from two to four to five inches in length, the stems now and then bent with simple ramuli, furnished with young shoots which in their more advanced period of growth resemble divisions of the uncus. The color varies from a dull green to a reddish brown. In substance the surculi are firm but flexible, the cells very compact.

Leaves from one to two lines in length, alternately placed in two rows on each side of the surculus, often closely arranged towards its extremity, the rest being or best reserve all of them are incised, having the edges slightly recurved so as to prevent a convex upper surface. Their base is usually triangular, the lower margin very recurved. In shape the leaves are obtuse, approaching in round their margins either entire (f 4) slightly dentate (f 5) or as is most frequently the case dentato-ciliata (f 5) and not at all striking a moment so as to be often visible to the naked eye. The color is a dull yellowish green. The reticulation small in proportion to the size of the leaf formed of rounded cells.

Perigonial leaves ten to twelve in number (f 13 and 14), closely imbricated on each side of the surculus and entirely surrounding it roundish, somewhat ventricose at the base; the margins more or less dentato-ciliata, some of them a little reserved.

Pericentral leaves exactly resembling the calyx leaves only that they have their internal margins more recurved and often revolute, they are too, erect.

Male strobili are in the midst of the perigonial leaves and sometimes situated also in various parts of the surculus, but most frequently occupying the extremity. The strobili (f 13 and 14) are in clusters of from two to four or five. They are ovate when perfect of a grayish color. I have seen the apex open, where the pollen has been discharged, leaving the capsule white, pallid, and resublimated. The filament is about half the length of the surculus, white, transparent, transversely striate.

Female strobili are terminal upon the surculus and shoots. Occasionally two lateral or perhaps only appearing at an consequence of the production of a shoot immediately beneath it (f 5).

Color (f 5) from two to three lines in length, generally leaning on one side so as to be somewhat convex, flattened. The base is almost cylindrical; the mouth transversely very much compressed (except when forced apart by the capsule and peduncle). The opening extends a little way down on one side of the calyx, where it is as well as on the whole of the upper margin it is dentato-ciliata. In color and texture the calyx much resembles the leaves.

Calyptra (f 5) obsolete, or rather pyriform tipped with a short style, of a delicate texture strongly incised at the base. It is surrounded by numerous fibrous tubes (1 to 8) each of which is furnished lanceolate longitudinally and transversely striate, the mouth is open and a little expanded.

Peduncle from an inch and a half to two inches long, white, shining, basally tuberculate. It is inserted into the receptacle by means of a fibrous bulb (1 to 8) at an oblong convex shape which is with drawn out along with the peduncle. A similar cluster
of these I have remarked upon the peduncles of two or three large exotic species of the genus.
Capsule ovate dark purplish-brown, approaching to black opening with four equal lancolate valves, each of which is marked with longitudinal furrows (f. 11)
Seed spherical reddish-brown; epispalous filaments of the same color and formed of a double disk (f. 12)

Almost every author has followed Linnæus in making the *Lichenaria Applanata fascia plantis confertissima* (Fl. Bras. p. 463. 8) a variety of the present plant. Villarèns, who was induced to describe it as a distinct species only out of deference to preceding botanists remarks: *...Lichenaria est hinc procedent (I cæplæ.) nec alii, si distinctus, vel quod folia densitas magni et magis intimae linæa impaneæ nervum magis protractum, piastrum externæ et marginis internæ ephialta eburnea at quod spinulos.*—These little differences in the leaves are to be found not only upon points growing in the same patch, but are even to be met with on the same individual, so that I have not thought it proper to retain them even as varieties. The Michelian synonym *Jungermannia major, folio brunneo et obtusissimo non distincta* and that of Vaillant *Hepaticola Palmaris fasciata,* I have excluded from the reference here made because both from the descriptions and figures of their respective authors, I am led to consider the plant they allude to as *J. polymorpha,* rather than *J. applanata.*

The species, though sufficiently well marked to render it needless for me here to point out the distinguishing characters, is nevertheless, in general habit, in the strong demarcation of the leaves, and more particularly in the circumference of the opening of the calyx, not confused by its externa, but continued in a little way down on one side, nearly allied to *J. applanata,* and it is not improbable but they may hereafter constitute a distinct genus apart from every British species at least. Founded upon characters taken from the form of the calyx. To these in some respects, Swartz's West Indian *Jungermannia adnativa* and patula, bear a considerable affinity, but in both of them the calyx is described as formed "a foliis convolutis," as in the case in *J. jungermanni* of Swartz and of this work, in *J. semina* of Kuntz. and in *J. concava,* but not in *J. applanata.*

The distinction of the main flowers in the different species of the genus is well worthy of attention. The present is one of the few species belonging to a division that I am acquainted with whose simple leaves in which the perigean leaves take a different form from the rest, and, by their bifurcated and closely-intervolted disposition are rendered conspicuous at first sight. These, however, according to the observation of Hottinger fall off when they are no longer wanted to protect the stamens "calix est in corde loco, ubi flores sunt tegumentum antisulcatus sedunct vel commissarius." The authors of *J. applanata* have also been seen by M. L. Abdul Haq in France as we learn from the *Encyclopédie Méthodique.* The words of this gentleman are: *Cette plante porte sur sa partie postérieure de l'extériorité des ramifications, qui sont pris un certain accroissement de petits boutons ou des points noirs très semblables, portés par des espaces de pédoncules fort courts et appaissis. Ces points sont*
The barrens plants of some of the larger species of Hymeon, as H. punctatum and, more especially, the trailing scutellum of H. caperata, B. typhoeum and B. rostratum may occasionally be confounded with this Jungermannia, but, besides the different shape of the leaves, the nectar in those of the panicas will at once afford a distinguishing character. From Hesperia and Hesperias, with the leaves of which it bears a still greater resemblance, it may always be known by the bifarious and never trifarious insertion of its barrens, by their rounder figures and by their strong staminalium. The Hesperias has the nectaries of which the last is composed, much larger and of a more ovate figure than H. asplenoides: Laurerick says of the plant before us, that it has something the habit of Hymeon aduncus (Hesperias Henck) but is much larger and has the leaves of a rounder figure; an observation that will scarcely be considered as made with his usual happiness of remark.

The female fructification, which in England is not of frequent occurrence in France seems to be still more rare, and as the authors of the Flore Francaise observe, that they have never themselves seen it.

Under this species, Weber in his Systematis Flora Hesseiensi observes "Vagina extremitatis ovarii. Interior ovuloe in silico intus spinolae infraspinae inserta est. Et spinola infraspinae inaequale, aucta, et atque inaequale ad extremam ovuli." By "spinola infraspinae" he probably alludes to the style, which, however, I have always remarked to be exactly terminal.

REFERENCES TO THE PLATE

1. Bareen plant of J. asplenoides, natural size
2. Female plant, natural size.
3. Extremity of the scutellum of a male plant, natural size
4. Portion of the scutellum and leaves
5. Leaf, seen from behind
6. Petiolar leaf
7. Calyx and perichalial leaves
8. Calyptra
9. Bareen plant
10. Lower part of the podsol, showing the stroma built at its base
11. Capsule burst, discharging its seeds and spiral filaments
12. Seeds and spiral filaments
13. Anthers (the petiolar leaf being removed to exhibit their insertion)
14. Single anther
JUNGERMANNIA SPINULOSA

(Fig. XIV.)

Jungermannia, corolla sericea, ramosa; folia albo-rubra, resinosa, bracteae apiceque dentata; spinaeque infra-ramosae, sessilis subrostrata, compressa, orae truncata eiliata.


Jungermannia sericea Roth, Cat. Bot. i. p. 144

Lichenostegium spinulose, quae spinulose, Hill, Misc. p. 489. t. 79. f. 10. (num.

Lichenostegium spinulosum, folsa trinoda Dill. Misc. p. 489. t. 79. f. 10.

A THELEPTICULA, folia minora, supinose, spatulata trinoda spinulosa.


Hab. Wales. Diffusius.—On the Scotch Alps Mr Dickson.—Not uncommon in the mountainous parts of England, Scotland and Ireland.—On mountains near Duntre Hill, Miss Cuningham.—Cwmamara, Mr Mackay.—(The Calypso are according to Miss Hutchinson to be found at all seasons of the year.)

This Plant grows in densely-crowded tufts or patches, of several inches in diameter.

Sori oror varying in length from two to five inches, erect, flexuous, rarely simple, for the most part beset with a few narrow, short branches, sub-patent and again divided both the main and secondary branches, growing out normal processes. The leaflets of the sub-collum are firm and compact, when dry rigid and brittle; the color in the younger plants, and in the shoots a dull yellow-green, in the older ones it varies from a yellowish to a reddish-brown.

Leaves (F 4) a line long, distantly placed in the lower parts of the corolla, at the extremity more generally crowded. In shape they are obtuse, having, however, in J. spinulosa a very decurrent and semi-unipinnate base; the extremity is more
BRITISH JUNGERMANNIA

or less bent back, especially in the young shoots, and, in a dry state, so much so that they often sweep behind; the margins too are revolute of these; the lower or anterior one is entire; the upper or posterior margins are cut into many spiniform teeth which are of unequal size but all very conspicuous to the naked eye. The color of the leaf is a pale yellow-green, inclining to brown, tinged with red at the point of insertion; after having been kept some time in the herbarium the whole plant becomes a pale brown. The texture of the leaves is very compact, brittle when dry. The reticulated appearance (f 2) is here very obscure, the cells being small, ovate, and distinctly placed, requiring a very high power of the microscope to distinguish them accurately.

The perfoliate leaves do not, in the least, differ from the rest.

MALE FRUCTIFICATION unknown.

FEMALE FRUCTIFICATION lateral upon the stem and frequently arising from the axils of the branches. I have never seen it absolutely terminal.

Colpus (f 1. 5. 6) a line or rather more or less length resembling at the base and swelling out a little at the upper end and incorporating the mouth in fructose, and dentato-spiralose; the opening, as in the last species, extended a little way down on one side of the calyx.

Barren placilia (f. 8) might or too in number, situated at the bottom of the calyx, linear in a greyish color with longitudinal reddish streaks. The mouth is a little expanded. I have not seen the fructification, as present, in a more advanced state.

For f. (f 2. 9. 10) which has a most elegant appearance scarcely exceeds an inch in length.

The leaves are throughout very remotely placed, and at the upper extremity are cut sometimes into two, but more generally into three, large and acute teeth.

It is a little remarkable that J. spinulosus, which is not only an inhabitant of the alpine regions of Great Britain but of North America, and, as it appears also of Scandinavia, should be noticed by every traveler on the Continent of Europe. Widely because to the plant itself is diffused, no part of the fructification had been known in any country, till Messrs. Buxton found specimens in Ireland producing calyces in profusion. The greater part of these were old, and entirely sunburnt; others had barren placilia, but none had the fructification further advanced. Calyces in the same state I have also found in Scotland.

According to the Dillenian barbarisms the two plants above quoted from the Historia Montium belong undoubtedly to the same species, not affording even sufficient marks to be considered as varieties of each other. The "Lichenarium vernum fruticosus" might, indeed, from the description of Dillenius, be supposed to be the same as my For f 2, but,
BRITISH JUNGERMANNIAE

Although the original specimen at Oxford is much smaller than the representation on the plate, and in that respect approaches more nearly to my variety, yet the leaves are by no means generally tri-epiniae as the copper by far the greater number are much dentated, and the only difference appears to be that they have their teeth rather smaller and more numerous than in the common state of the plant.

The present species may be considered as one of the largest and handsomest that the genus can boast, whether European or exotic. Its affinity with J. spiculifera has been already noticed.

REFERENCES TO THE PLATE

1. Small specimens of J. spinulosa, natural size.
2. A larger appearance of the plant with calyx, natural size.
3. Extremity of the stem, magnified.
4. Portion of the stem and leaves.
5. Calyx.
6. Horizontal section exhibiting the interior of the calyx.
7. Portion of the calyx showing its structure which is much the same in the leaves.
8. Barren podetia.
10. Portion of the same, magnified.
JUNGERMANNIA CONNIVENS

(TAB. XV)

JUNGERMANNIA exserta procumbente, stellatae rosacea, folia orbicularis connivens, apice hastato-constricta fructu in rostro protrus. Fructus terminalis seminiferus, ovulum ochreae-ovalis, semilla ellipsoide.


Hab. In umbrosis humida et Dickson. In boggy places in the neighborhood of Hall and Edgfield, Norfolk. In B. B. Pines. At Westleton, Suffolk, among Sphagnum and other mosses. I have also received specimens gathered by Mr. Templeton, near Belfield, and by Mr. Mackay, from a marsh in Caernarvon. — New Forest, Hants. Mr. Lyell.

Obs. The fructification is produced in April and very profusely in May, according to the observations of Mr. Lyell.

This plant grows in small and loosely-entangled patches, of a pale yellowish-green hue, throwing out here and there, from the whole length of its under surface, roots which consist of minute, white, woolly and pellucid fibres.

Sporangia diffusum florescente procumbente varying from half an inch to an inch or even to two inches in length; in certain situations, about the thirtieth part of a line in diameter; semi-pellucid, subcubical, or subquadrate of a minute equally dissected with that of the leaves, the primary ramification as in the congers of this species (J. acuminata and J. saccata) is disposed in a somewhat scattered form, the branches being often again simply divided by subpeltate ramuli, or as may be seen in 2.3 producing small innovations.

The leaves (1.6) which have a bifurcate insertion are patent or erect, and more or less distantly placed, the main stem, measuring from the fifteen to the tenth of an inch in length, sublinear but divergent at the base, above somewhat spreading below slightly recurved at the extremity by an orbicular notch in a very unusual manner so that the segments are contracted; whereas the main stem. The substance of the leaf appears peculiarly succulent and subquadrate, the cells large, irregularly subquadrate their surfaces slightly prominent. The color is a very pale yellowish green.
BRITISH JUNGERMANNIA.

The petaloid leaves (f 7) vary in number from five to ten, and occupy the short stalk that supports the fruit to the exclusion of such leaves as are produced on the rest of the plant; from which they differ materially in shape; the anterior ones being broad or oblong, with linear-lanceolate and staminate segments; the intermediate ones more oblong in their figure, with trifid extremities, as in the former, while the inferior are oblong, divided into four or six linear-acute segments, forming what might be called a palinate leaf. The calyces of all resemble those of the cauline leaves; the color is somewhat paler.

 Male Fertile Branches at present unknown.
 Female Fertile Branches supported upon short branches, suddenly destined to this sole purpose, which are situated at the base of the surcul, and are consequently, varied with regard to the whole plant.

 Calyx (f 9) large in proportion to the size of the plant. I have observed it to be nearly a line in length oblong-ovate, attenuate at the base, of a whitish color, semi-transparent, elegantly marked with oblong reticulations, formed by the sepalae, or calyces which are more compact than the one in the leaves; the mouth of the calyx is contracted, and fringed with five or six erect alae.

 Cypripedium (f 8) ovate, whitish reticulated, tipped with a short style, and surrounded at the base by a few

 Bartsia pilula (f 9) of a greyish color obscurely marked with longitudinal and transverse lines of which some of the former are of a red color

 Peduncle rather more than a quarter of an inch in length while, succulent, varicose.

 Caput (f 10) ovate of a deep brown color evidently under the higher power of a microscope, longitudinally and transversely furrowed.

 Seeds and spored flowers (f 11) a rich chocolate brown; the former spherical, the latter formed of a double helix.

J. commissum. Though it does not appear to be a very local species, was entirely unnoticed, till Mr. Dickson described it in his valuable publication on British Cryptogamic Botany; nor do I find it has been noticed by any subsequent author. From Sweden I have received specimens by the kind communications of Mr. Swartz, under the name J. kansae; with the remark a rare species in England uniform. Its fructification appears to be extremely rare. I never saw it, except upon a specimen which I found in a boggy part of Holt Wood, in the beginning of April, and upon others which I have received from Mr. Lyell in the present month of May; indeed, at the present the description is going to the press.

The deep maroon or red leaves and dull purplish segments, not unlike compared to the form of the new moon, will at all times readily distinguish this species from all the rest of the genus, even if the calyx should not be present which is equally unlike that of any other Jungermannia, and is rendered singularly beautiful by the delicacy of its texture (a peculiarity it has in common with every other part of the plant), and by the elliptic outline.
British Jungermannie

I have had occasion, in another part of this work, to observe that a specimen of J
commissum exists in the Dilkeian Herbarium, at Oxford, and is numbered no. 33 to correspond
with fig. 4, p. 156, of the Historia Pluricornis, which, however, more nearly resembles
J. bicostata; though I have in compliance with preceding botanists quoted it with a mark
of doubt, under the description of J. utraca (p. 111 of this work).

References to the Plate

210.

1. Partial plant of J. commissum, natural size.
2. Lower specimen with leaves more distinctly placed than usual.
3. Portion of the same, magnified.
4. Female plant.
5. Smaller portion of a spore, with leaves.
6. Spore, end on.
7. Perichaetium leaves.
8. Calyptra.
9. Upper part of a leaf.
10. Capsule.
11. Spore and spiral filament.
JUNGERMANNIA CURVIFOLIA.

(TAB. XVI)

JUNGERMANNIA, sericeo procumbente, stipulatis renatis solis subaesentia valde concavis bifidis, segmentis aequaliis incurvatis, fructu in ramis propriis bracteisque seminibus terminalibus calyceis obovalibus subplicatilis; sicc. dentata.


Hab. In ripissimum weste. M. Incolas 1 a. c.—Many places in the west of Cwm-y-Didbear, from Lineberri, and on the summit of Camentos Llewelyn, also near Lism. Drumane and Denishire. Mr. Griffith in With.—Llansawel-Evon Gwy South Wales. Mr. G. Secker.—On stony ground by a mountain lake, near Bady. Miss Hibberd.—On Ben Lamen on Ben Nornie, and in a place called Woodburn, in the north-western part of Ross-shire.—Cranes of rocks, Mourne mountains Ireland. Mr. Templeton.

Plant forming small and loosely-crunched patches of a few inches in diameter. and of a deep purple color.

Root consisting of multiple, whitish fibres, proceeding here and there from the upper side, and most profusely from the lower part of the plant.

Succulently less than half as large as the whole length, branching out from a centre in a sort of spiral manner, procumbent, diffuse, these branches simple or as is more generally the case, once again divided; their diameter about the twelfth of a line; their color a pale yellow green, purple towards the extremity; their substance delicate, cellulosic, flexible, has more rigid and brittle in a dry state.

The leaves (f f 4, 5) were so thin, for the most part closed closely placed; they have a bifurcate insertion, though, from their upright position, they have a second appearance; they are remarkably small, and measure from the eighth to the eighth of a line in length; those at the extremities of the succulent being the smallest; their shape is round, approaching however to ovate; from the apex they are divided about half way down the middle by a rather obtuse sinus of which the segments are acuminate and recurved towards the hollow of the leaf in a very striking manner. The reticulations is large, formed by oblong cells, the color a pale green changing, in these parts which are most exposed, to a fine purple.
BRITISH JUNGERMANNIA

The perichorial leaves (1 ≤ 0.7) six or seven in number resemble the rest in every particular excepting only that their segments are less acuminate and by no means recurved.

Main Fructification hitherto undiscovered.
Female Fructification arising from the base of the ovary.—Short ramuli support the Calyptra (f 1 & 2) which are oblong or oblongo-ovate, in their color and cells much resembling the leaves. Towards the apex they are a little pleated, and at the mouth which is somewhat contracted, are seen a few short teeth.

Calyptra (f 1) ovate, whitish, reticulated. Style short.
Barren pedicles (f 10) surrounding the base of the calyptra each is linear-lanceolate longitudinally and transversely striated.

Peduncle half an inch or more in length of a silvery whiteness, often becoming spirally twisted.

Carpels ovate, deep brown opening into four equal, ovate to oblongo-ovate valves.
The seeds and spiral filaments I have but lately had an opportunity of examining in a perfect state; they exactly resemble those of J. decandella and concinna.

The natural affinity of this plant with the two species just mentioned is very striking even to a superficial observer; more particularly so the form of them from which, however, it essentially differs in the great length and in the recurved segments of the leaves, as well as in the stem (and by no means recurved) spines of the perichorial leaves. The places of growth too, of the three plants are very different: the present species seeming to be altogether alpine and partaking of the rich purple hue which is so common in other plants of the genus in similarly elevated regions.

We owe our first acquaintance with this Jungermannia as well as with the one last described, (J concinna) to the benevolence of Mr. Dickson. The figure given in English Botany does not exhibit the leaves so much recurved as is the case in my specimen and indeed, the whole plant, in that work appears to bear a nearer approach to J. decandella than I have ever observed it to do.

REFERENCES TO THE PLATE

1: A leaf of J. curviseta, natural size.
2: A single plant of the same
3: The same magnified
4: Portion of the stem and leaves
5: Single leaf
6: External perichaetal leaf
7: Internor perichaetal leaf
8: Calyx peduncle and sepals
9: Calyx opened showing the calyptra, &c
10: Barren pedicel
JUNGERMANNIA PUMILA

(TAB. XVII)

Jungermannia caule ascendente, simplicidentato. Folia elliptico-ovata; fructa terminali; calycrea oblongo-ovata, acuminata; nem exsultante, dentiforme.

Licharensis Trehambert f. ete amsis. ubi extremitate forns. Will. Musc. t. 70. f. 10.

S. ericareae; omittit ramulis. folia ramosissima. nigrae foliis.

Han. Owen Lovell. Mr. Griffith in Wilth,—On mountains near Bantry Ireland. Mr. Mutchmr.—Near Baltimore. Mr. Templeton.—Both Dr. Stokes and Dr. Taylor found it in the Dargle, near Dublin.—On rocks at Stanley, Yorkshire.—S. On Craighead, in Breckningmore.

Obs. It produces capsules in May and June.

The plant grows in small and loosely-entangled patches, here and there sending forth, from the under side of the stem.

Roots which are simple, polarised, and of a whitish colour.

Stems about half an inch in length and the tenth of an inch in diameter, either wholly procumbent or as is generally the case, ascending towards the extremity by the most part simple, though occasionally divided and in Var. A (€ 8) not unfrequently throwing out young shoots from their nodes.

Leaves about the third of a line in length, rather closely placed especially in their position varying from horizontal to erect, not only in different individuals but often on the same plant; their figure ovate, approaching to elliptical, sometimes nearly round in fertile specimens the uppermost are the largest (€ 3). In durable ones the contrary in the case (€ 3) all of them are somewhat concave and at the base semi-amplexicaulis at the extremity I have, in two or three instances, remarked a slight and very obscure notch, but whether it arose from accident or not I am unable to
BRITISH JUNGERMANNIA

The texture of the leaves is thin and delicate; the reticulation small, zonordish; the color a pale yellowish green, changing in different situations to an olive green and even to a brownish black.

The leafless petioles not differing from those of the other parts of the plant, except that the two uppermost pair are the largest of all, and are more uniformly erect in their position (f. 3 & 9).

Male Plant Smaller Known

Female Flower greatest terminal, though it may now and then have the appearance of being lateral, in consequence of the elongation of a shoot immediately beneath it (see f. 9).

Calyx (f. 4) large in proportion to the size of the plant, somewhat exceeding three quarters of a line in length, and two quarters of a line in diameter in the widest part. It is lengthened out at the base largest in the middle and acuminate at the extremity, where it is slightly pleated. The mouth is small contracted, and bore with angular teeth of unequal size. Its substance and color exactly resemble those of the leaves.

Corolla (f. 5) ovate, white, strongly and elegantly reticulated, at the apex tipped with a short tubular style; at the base surrounded by a few arrow-shaped petals.

Peduncle from two to two and a half inches in length, white, glossy transversely and longitudinally striated.

Capsule ovate, deep brown, divided into four equal segments (f. 3).

Seeds brown, spherical, smooth. The spiral filaments, ate of the same color and composed of a double helix (f. 9).

This Jungermannia was first discovered in Wales by Mr. Griffith and by him sent as a new species to Dr. Withering. In whose work an imperfect figure and description are given. Without all meaning to contradict these gentlemen as to the plant being really a new species, I find it as well accord with the Dillenian plant figured 1. 70. f. 10, as so that I have thought it right to refer to that author though without a mark of doubt. Linnaeus refers to this synonym under his J. lanceolata, from which the authentic specimen in the herbarium at Oxford prove it to be quite different. These in the calyx which is most remarkable exactly correspond with the present plant, and the leaves, too, seem to bear an equal resemblance, as far as can be judged from the very injured state in which they now are. The figures however of Mitchell, quoted by Dillenius, certainly belong to J. lanceolata.
BRITISH JUNGERMANNIAE

Jungermannia pumila is distinguishable from barren specimens of J. elongata and J. previculata by its more erect leaves and much smaller size; from J. lanceolata by its leaves being uniseriately in the species last mentioned, their surface is always plane. The singular form of the calyx will serve to keep it distinct from every other species.

Although an alpine plant, J. pumila seems not at all particular in its choice of soil. Some of my Irish specimens are attached to a stiff clay; in Yorkshire I have found it growing upon hard lime-stone rock; and in Scotland I have gathered it from the micaceous schistus of the Grampian mountains.

REFERENCES TO THE PLATE

Fig.
1. A small patch of J. pumila, natural size.
2. A single plant of the same, natural size.
3. The same, magnified.
4. Extremity of a fertile shoot.
5. Calyptra and young capsule.
7. For $b$, natural size.
8. The same, magnified.
9. Extremity of a fertile plant of $m$, with the shoot projecting beyond the calyx.

4
BRITISH JUNGERMANNIA

JUNGERMANNIA LANCEOLATA

(TAB XVIII)

JUNGERMANNIA, spatia procumbens subaxillares fulloatra ovato-substipulata fissa a fissa terminali, calyces oblongi, cylindricos subrotundos, apices depressos, plano; omnes contractos, laciniam dentata.


PLANT growing in small dense clusters of a pale green color.

Roots a few minutiae, whitish, simple threes, proceeding here and there from the under side of the plant.

Stems about a quarter an half an inch long cylindrical, procumbent, simple, or new and then furnished with one or two short lateral shoots.

Leaves (f 2 & 4) rather closely placed, always patent or horizontal, quite entire ovate, having however a broad and semi-amplexical base. Those at the base and the extremity of the humus shoots are the smallest (f 1). The rest are about a quarter of a base in length, their color is a light yellowish green, varying in the lower leaves to a duller brown the relicturum is large composed of oblong cells.

Pseudobrachial leaves (f 9) larger and more oblong than the rest, at the base conune, and condensing the lower part of the only the upper part patent.
BRITISH JUNGERMANNIÆ.

Male Fructification (l. 8) composed of anthers (l. 6) united in clusters of two or three at the base of the ovule leaves, and most commonly of those that approach the extremity of the plant. They are quite exposed, as is the case with those of \( J. \) pumila. Each is exactly spherical, minute, consisting of an exterior reticulated cuticle and the silvery crumose pellicle, which is at length discharged from a ragged aperture at the extremity (l. 7). The style, which is about the length of the anther, is white, pellucid, and transversely striated.

Female Fructification terminal.

Calyx (l. 1 f. l. 10) very large compared with the size of the plant, full in length and one-third of a base in diameter, a little incurved, cylindrical throughout, or slightly incurved upward. The apex is reflexed and flattened so that the extremity is nearly a plane surface, as wide as any part of the calyx, and in the centre of it is situated the nectarine, contracted, and slightly toothed mouth. The whole is perfectly distinct from the foliage. Its color and texture are not distinguishable from those of the leaves, except that the former uncommonly varies to a rich brown, appearing almost as if it were burnt.

Cyme (l. 5) small, of a yellowish-green color, terminated by a small hollow style. A few brown pistillate envelop its base.

The more forward state of the fructification I have never had an opportunity of seeing.

As well the figures here given, as the description have been made from German specimens sent to me by Dr. Schreder and Dr. Röber, and I am induced in representing the species in this work with a view of calling the attention of the botanists of my country to what I conceive to be the true \( J. \) pumila of Linnaeus thus far. The earliest author who has noticed the plant in which \( J. \) pumila is now referred by Linnaeus is the same Linnaeus and almost every subsequent botanist but I have not had the advantage of comparing the \( J. \) pumila, given my reasons for supposing that this synonym form probably belongs to that species. Haller in his Besch. Pat. 1777 p. 61 and \( J. \) 1674. amender \( J. \) pumila to \( J. \) pumila var. saxicola var. saxicola ex \( J. \) jungermanniæ, quotes Linnaeus as well as the two other authors just alluded to, but in his description he says \( J. \) pumila var. saxicola somewhat in \( J. \) jungermanniæ pumila var. saxicola incrus, and in another place \( J. \) jungermanniæ 1 89 Bleicher (J. Lichtenstel) var. saxicola, and differs \( J. \) jungermanniæ 1 89 Bleicher (J. Lichtenstel) var. saxicola var. saxicola from \( J. \) jungermanniæ, so that I am rather induced to think that the great botanist has confounded the present species with one that I propose calling \( J. \) obtusifolia, which certainly approaches in many particulars to \( J. \) obtusifolia. Wes has the same remark as Haller and it is unfortunate that neither of them take any notice of the form of the calyx. Schreder and Röber are more particular on this point, as that I can quote with confidence their descriptions while that of almost every other author is at least doubtful. Those given by Hudson, Langbrot, and Withering are particularly unsatisfactory, and the \( J. \) jungermanniæ figured
BRITISH JUNGERMANNIAE  (J. lanceolata,)

under the name of lanceolata in English Botany is J. emersus, a plant which I have observed in collections not unfrequently mistaken for it, although the species before us abundantly differs, not only in the absence of stipules but in the large and regular calyx.

In drying as well observed by Dr. Roth, the leaves become crinkled, but they rapidly recover their original figure on being immersed in water.

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REFERENCES TO THE PLATE.

1. 1. Fertile plants of J. lanceolata, natural size.
2. A fertile plant magnified.
3. A barren plant natural size.
4. The same magnified.
5. Extremities of a male plant.
6. Anther in a perfect state.
7. The same after the discharge of the pollen.
8. Perichephal leaf.
10. Calyx dissected longitudinally.
11. German.
Jungermannianae assecta
BRITISH JUNGERMANNIA

JUNGERMANNIA EXSECTA.

(TAB XIX.)

JUNGERMANNIA, caules prostrato, simplicissima, foliis distichis, imbricatis, basim flavo-pilosulis, calycinum ovatum, orbe tenuissimo, glabro undulato.

Jungermannia globulifera, var. Roth., Gem. Ill. p. 691.
Jungermannia filica denticulata, in spica fragilis - Hall. Sylva, t. IV p. 80. (sec. syn.)

Hab. Moist and especially boggy heaths in various parts of Norfolk and Suffolk, as Holt and Edgefield Heath (where it was for the first time discovered in England by Mr. R. H. Francis) and Mousehold Heath in the former county. In Suffolk Mr. Turner finds it near Yarmouth, it is also abundant on Westleton Heath, near Dunwich.—Near Harlow Miss Hertsham.

Plant firmly attached to the earth in small scattered patches, which are frequently disposed in a somewhat stellated form, and are rendered conspicuous by their yellow line, or in the globuliferous specimens, by the reddish color of the stem.

Root consisting of thick tufts of minute, whitish, simple fibres, issuing conspicuously from every part of the under side of the shoots, which are often, as Mr. Francis remarks, affixed to each other by means of these radicles.

Stems prostrate not much exceeding a quarter of an inch in length, fragile, greenish, densely cellular, simple or somewhat, though rarely producing a small shoot near the base.

Leaves (f. 4. 9) rather closely imbricated, distichous, patent or horizontal, about the third of an inch long, gradually however becoming smaller towards the base of the plant, where they closely surruncate and firmly embrace the stem so as entirely to conceal it.
BRITISH JUNGERMANNIA

their figure is oval - cone shaped or rather conduplicate, at the extremity very acute, and,
which marks the apex as distinctly furnished in the middle of the upper margin with
a strong and sharp tooth, pointing a little upwards in a direction oblique with regard to
the apex of the leaf. If Sprengel be correct in his account, which I have great reason
however to doubt, the leaves are generally unequally trilobulate, while
Schmidt's, Mr. Deane and myself have observed them to be almost constantly unlobulate,
(provided the sharp apex may be allowed the appellation of a tooth,) though occasionally
the lower ones, as may be seen in fig. 6 of the plate, are trilobulate. The texture of
the leaves is particularly firm; the cells are very small and numerous, requiring a good
magnifier to distinguish the reticulated appearance formed by their interstices, but with
the highest power of the lens the cells will be seen to be of a very irregular figure
and disposed throughout the substance of the leaf without any sort of order (fig. 5). The
edges of the leaves are pale green, very much approaching to yellow.

MILE FICILLIATRAN SEMICN.

FEMALE FRUIT (according to Schmidt) who have but pubished account of it, or
ever seen it), terminal, and produced (in Germany) in abundance in the months of May and
June. If the weather should prove moist, it will be found on those plants which bear the powdery
glomerules, but upon such older individuals which are bare, and approaching to a state of decay. The
carps are described to be of an oval-oblong figure, cut at the mouth into four oblique teeth
or lobes, and surrounded by four or five pairs of unequal siliques, and closely
inflated leaves, the corolla ovate, tipped with a rather thick villous petal; the
peduncle white, pilose, and about three times as long as the calyx; the capsule
roundish, approaching to ovate, bearing six or four lancet valves that are obtuse at their
extremities; the spindles very slender, composed of a double helix of a nut-brown
color. The seeds extremely numerous, minute, and of a pale hue, thin the filaments.

The German (fig. 3) of this species are very abundant and peculiarly conspicuous; no leg.
from Here! deep orange color than from their situation. In the months of December and
January they make their appearance, collected together in small spherical masses
(fig. 3, 4) about the tooth of a leaf, in diameter occupying the extreme points at night
afternoon, or more of the terminal leaves. The minute particles are glands of which
these balls are composed are in their most perfect state scattered on the surface of
which is a very slight pressure is sufficient to cause them to separate, and a number
of pollen grains adhere; which (fig. 5) are observable floating in the liquid.
In February they become thick and diurnal, and are scattered over the leaves and stem
of the plant in considerable quantity; having much the appearance of the
flowers of some phanerogamous plants.
This singular species of Jungermannia seems to be confined to the two most eastern counties in the kingdom; at least I have never heard of its being found in any other place, excepting, indeed, very lately near Heysham, by Miss Hutchinson; of whose it may almost, with truth be said, that she finds every thing. It affects elevated and exposed situations and is most frequently met with on those burning soils which are not far removed from the sea. My friend, Mr. Francis, has long known it as an inhabitant of his neighborhood, and has preserved a drawing and description of it in his manuscripts under the name of J. erecta. Schmadel discovered it about Barrow and Ernangen, in 1738; but though he has given an accurate figure and elaborate history of the barren state of the species, I cannot feel satisfied that his representation of the sterile plant belongs to the same; the drawing itself of that part being unsatisfactory. This suspicion however has not kept me from translating in my description what he says of the fruit. That he should have fallen into an error of this kind supposing him really to have done so in the less remarkable when it is recollected that he finds the fructification not upon young healthy and vigorous plants, and in wetlands et pluscertamen, so that he was very much disposed to think that he may like Dr. Roth have confounded J. erecta and J. erecta together. Of the Halkrian synonym, I am by no means certain. The description in some respects is at variance with our plant, yet I am still disposed to think that this is what the author really intended, from his speaking of the extremity of the leaves, as subteratrum quasi fragum forma. The greater number of synonyma too, that are cited by Schmadel have been here omitted, because it appears to me that they do accord with the characters of Jungermannia erecta, which, if really permanent, as I have every reason to hope they are, are so striking and so dissimilar to those of every other species of the genus, that I feel it would be quite needless to say any thing more respecting them.

REFERENCES TO THE PLATE

1. J. erecta natural size
2. Barren plant unfruited
3. Globule from plant
4. Portion of the stem and leaves
5. Leaf
6. Apex of a leaf
7. Cluster of Gemmae
8. Gemma
BRITISH JUNGERMANNIA.

(J setiformis.)

JUNGERMANNIA SETIFORMIS

(TAB XX.)

JUNGERMANNIA roscæ strictæ, subbulbosa, foliis bifurcatis, arcuibus inductis, erectis, quadratis quadrifidibus; angulis inferiores margine bicili spinuloso-dentatis. Fructus terminalis interdubius; selyctum oblongum, glabrum, ac spreta.


JUNGERMANNIA compacta: Link, Fl. ed. Smith, p. 343.

α: stelligera; foliis minoribus; segmentis integerrimis.

Han α has not hitherto been found in Britain.—β grown in great abundance upon the summit of Carn-gorm, and I have also received it from Mr. Dickson and Mr. George Down of Forfar, both of whom gathered it upon the Scotch Alps.

Plant growing in densely matted tufts of some inches in diameter.

Root scarcely any except that a few fibres may now and then be seen to proceed from the lower part of the plant.

Stems from two to three inches in length, spiral, slender, saccate, of a rich or reddish-brown colour and firm texture erect simple, or once or twice irregularly dichotomous.

The Leaves (β 4. 7. 11) are bistratose: erect, appressed, and as closely uniserial as to conceal the stem on every side. They are about a quarter of an inch in length, of a quadrangular figure, but rather broader than long, semi-circular, divided from the extremity to within one-fifth of the base in a (in β to within one-third of that distance) into four equal, lanceolate, erect, serrulate, which are keeled on their inner surface and downward on the outer; their margins are recurved, those of a bare and those blunt with unequal, but strong teeth generally pointing downwards, while in β, these margins are quite entire though in the lower angles of the leaves, in both the varieties, there are, immediately adjoining the base, two deflected teeth, the lowest of
which is the largest. The leaves of the leaves is rigid and brittle when dry; the
coated which are of a roundish figure are distantly placed, yet somewhat regularly
in longitudinal rows (f. 9) The color is a pale yellowish brown, loosing up closer to the Scotch variety.

Persicaria leaves (f. 10) larger than the rest, and proceeding, as it appears to me, from
all sides of the stems. The diameters of these leaves too are much numerous, frequently
six or seven thick margins which recurved their teeth larger and more abundant.
In other respects they exactly agree with the sideline ones.

Male Fructification unknown

Female Fructification both terminal and lateral,

Calyx (f. 10, 11) nearly as long as length of peduncles; the mouth toothed, but not at
all contracted; the calyx tube and rather dilated much more as than that of the leaves; the reticulation small; the stamens oblong; the color a pale yellow brown.

Calyx obvolute reticulated, white; style rather short, slender and tubular. The
filaments pistillate are numerous situated at the base of the calyx; each in linear
swelling out a little in the middle; its mouth slightly expanded.

The Capsules I have only seen within the calyx at the growth period of its growth it is
exactly spherical, and of a deep olive-green color.

That the two plants here figured belong to one and the same species I believe there will be
found no reason to doubt. My variety differs from only being smaller and of a more
olive-green color and in having the segments of the leaves entire. The drawing of a I have been
under the necessity of making from foreign specimens for this I from no apology will be
considered as necessary as I could not otherwise have represented the fructification which is now
described for the first time, though my description has been taken from the very specimens
which are found in wood, whereas our British plant inhabits the highest of the
Scotch Alps, and the difference in the place of growth may perhaps be considered as a more in
some measure of the different appearance they put on. From Dr Swartz, also, have been
obtained with fructified specimens, exactly agreeing with those here figured.

Ehrhart who first discovered J. subterraneus in the Harz Forest in Germany pretty remarks
that the leaves are as deeply divided; that each individual may be taken for four separate leaves
but I cannot agree with that author in thinking that the segments are as strongly
surrounded as this back me in representing a leaf of Fontinaria subterranea. He further
adds that he knows of no other plant which has such a peculiarity in the leaf.

There is in the general habit of this plant particularly in the mode of growth, a considerable
allanry with J. pilosa. In both the leaves are rigid and brittle and those, which clothe the stem
of the former correspond very nearly in figure with the petioled ones of the latter. The form
of the calyx is the same in both, as is also that of the capsule.
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BRITISH JUNGERMANNIÆ

JUNGERMANNIA NEMOROSA

(Tab. XXI)


Jungermannia nemorosa, folia ovata. J. Lam.: Nov. Gen. p. 7. 2. 5. 10.


S. purpurascens, folio purpurascens.

Jungermannia ochleariformis, Wisse. III p. 338.

Jungermannia purpurea, Angl. Bot. I. 1823. (excluding the magnified figure on the left side of the plate which belongs to J. ochleariformis.)


V. SCHOTTIUM: foliis lobi lobis lobulosis revolutis.

P. HERBATA: foliis lobi lobulisque oblongatis.
BRITISH JUNGERMANNIA

Bar. In woods, on hedge-hanks, and among rocks.—3 on the South mountains abundant chiefly in much exposed and very wet situations.—In woods and hedges on the mountains of North Wales. Mr. Griffith.—Mountains near Dunkirk. W. S. Hutchison.—About Norwich. Mr. Lowes.—W. S. Hutchison.—W. S. Hutchison.—6 grown intermixed with a, in woods and hedges places.—At Edingford. Rev. R. B. France.—Woods near Norwich.

Oss. The fructification is observable during the greater part of the summer months, among the mountains.

Plant growing for the most part in densely-matted tufts not two or three inches in diameter. 

Each a few minute peduncled sori proceeding in branches from the lower part of the stem. 

Stems erect, varying from one to three or even four inches in length about the height of a line in diameter, generally of a dirty brown color, but sometimes a yellowish red and occasionally a wet situation becoming quite black; twen or three divided as an irregularly dichotomous ramification; branches which also produce ramification which are like the parent branches, few-nerved and fliform.

Leaves (4 in a row) kidney-shaped and distichous, rather loosely undulated, patent, their margins strongly dentate-ciliate; at the base of the plant they are the smallest being there scarcely half a line in length, but they gradually increase in size as they approach the extremity, where they are nearly one line long; they are semi-uniform, decurrent divided into two unequal constrictuous lobes, of which the upper is parallel with the stem, and consequently vertical with regard to the horizon, the lower one a twen the size of the upper alternate, more or less acute, slightly serrate above, and serrate in the under side of the stem; the upper lobe or lobe on a ciliature; obtuse a little ciliature, with its base embracing the stem, so as scarcely to conceal it in these parts of the leaves we are at all acquainted: their surface is dentate, the cells (5 or 6) compact, very minute roundish; the color a pale yellow green, more or less inclining to brown; in S., a deep purple.

Perigonal leaves closely imbricated, and much resembling the smaller ones except that their base is more conspicuous, and their spines always recurved.

The perichaetial leaves differ from the rest only in being a larger size, and in having the margins frequently recurved.

Maxa Fructification. Actors (1 2 10) intermixed in the axils of the perigonal leaves ovate or roundish, when perfect of an olive-green color, but appearing after the discharge of the pollen a pale yellowish, striated, extremely delicate membrane. Each is intermixed on a transparent, transversely striated footstalk which scarcely exceeds the anther in length. In

It was my intention to have adopted the term sulciate for the upper and generally lower division of the leaves, in this species and in affinis, in compliance with the Linnaean terminology. No little however, does this term denote one or two of the apertures from the lower lobes, that in separate or I shall reject any description most simple and intelligible, by considering the leaves in question as divided into two lobes which are either equal or one or more. In the same sense, the larger one may be termed inferior and the smaller superior, as suggested by the Smith in Nephilum p. 521. The word sulciate, might I think, with more propriety be confined to those lower divisions of the leaves of Tempanum w., which in every part of the plant essentially differ in figure and size, from the larger division: remarkable variations of which may be seen in J. C. Polunin's and J. Fraser. Yet even in the species of this new natural division of this family the variations of the perichaetial and of the young terminal leaves seem to form an exception to this rule.
BRITISH JUNGERMANNIA

The naries of the pteridinal leaves also, and intermixed with the authors are frequently seen pointed, simple or slightly branched filaments (1 1 1 1 1) but whether they belong to the floridulation or are to be considered as some parasites (perhaps a Conifer) I am unable to determine. I have found them on British specimens as well as on others which I have received from Sweden. Had I not seen in some of them small branches, I should have supposed they had been abortive footstalks. For their structure, in other respects seems to be exactly the same.

Family Hydropiperaceae terminal upon the stems and branches.

Calyx (2 4) about a line and a half long at its base narrow and cylindrical, but then gradually increasing in width towards the extremity which is half a line in diameter. It is remarkably incurved in its early stage but becomes erect when the capsule is protruded. The mouth is truncate and dentate-ciliate. In color and texture it resembles the leaves.

Calyptus (1 15) a white thin, delicate membrane of a peristom form marked with rather large recemulations. The style is short and indistinct. Of abortive petiols (1 14) there are a few at the base of the calynx, linear, greyish, longitudinally and transversely striated. The mouth slightly dilated.

Peduncle short, scarcely exceeding twice the length of the calyx, white, cellulosic, aborning.

Capsule oblong-ovate, deep purple brown opening into four equal lateral valves, in which the entire surface are long radially and transversely striated.

Seeds and Spire Elements (1 16) numerous of a deep lilacous color, the former exactly spherical; the latter composed of a double layer of a greater length than in small s the gynoecium.

Genus (1 7) are not uncommon in this plant. In the month of July forming a compact granulated wart or tube. In the extremity of both the lobes of the leaves which are slender at the tip of the stem at first, they are green; on a more advanced period brown; and at length about black in which state the particles of which they are composed, more readily separate and are seen under a high power of the microscope, to be oblong, pellucid and by no means angular.

Fur $\delta$ (1 15) scarcely differs from $\alpha$, but in the deep purple color of the whole plant. In both kinds the figure of the leaf is subject to some slight variation, from entire to reniform-alate.

The labiate in the lower part of the plant appear occasionally to have teeth nearly obsolete. The Fur $\alpha$ has a pointed and unequal appearance, from the circumference of the lobes and lobules of the leaves being in its means coalescent but irregularly bent back as is represented at (1 1 1 and 8). The color tone is more inclining to a yellowish-brown.

Fur $\delta$ (1 1 1 1 1) approaches, in the figure of its leaves, Jungermanium unknown but may be distinguished by the greater proportional length and tenderness of the plant in having its leaves more distinctly placed and in being for the most part quite entire at the margins. The upper leaves indeed are slightly dentate. It is an extremely minute variety, scarcely attaining to half an inch in length and is always found intermixed with a. The color of the stem and leaves is a very pale yellowish-green.
The strongly dentate-serrate margins of the leaves in *J. nummularia* will readily serve to distinguish it from *A. macrophylla* and especially from *J. nodulosa* and *J. aquilina*, in which, in general habit and mode of growth, it bears considerable affinity. Micheli appears to be the earliest writer who has noticed this species and has twice represented it in t. 8 of his *Genera Plantarum*. Thus acute observers have also remarked the Genus, which he must seek for seeds, but his figure of them is by no means accurate. Huzeyr has admirably illustrated this part, though he has likewise fallen into an error in considering it to be the male flower from which it differs essentially in form, structure, and situation. Belloniact. 71 f. 18, is very characteristic of the plant—infinitely more so than his t. 81 of the same plant, which however I have ascertained by an examination of the original specimen to be a variety possessing a purple tinge. Tab. 71 f. 19, also belongs to the same species.

Dr. Smith and Willhering have confounded the purple variety of this species with *J. purpurea of Wetts* (*M. nummularia Lindl.*), with which it corresponds in color and place of growth, though in every other respect it is widely different. The three figures above quoted in *English Botany* unquestionably all belong to the same plant.

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Juggermannus aculeatus
JUNGERMANNIA UNDULATA

(TAB. XXII)


Hab. Wet situations in various parts of the kingdom, in the alpine districts most abundant.

Ova. It produces fructifications in May and June. Mr. Lyell finds the male fructification in July.

Plant growing in large and closely matted tufts of a considerable size.

Now consisting of a few simple short-peduncled fronds produced from the lower part of the 
Stems which are from one to three or four inches high; either simple or once or twice divided, with nearly erect dichotomous branches; their color in the young state a dirty green at a more advanced period almost black; sometimes also a yellowish-brown, their texture rigid brittle when dry.

Leaves (f 5 8) disposed in 3 sessile at a bifidium and distichous manner (f 5 8) the lower ones small most distantly placed, the upper ones more crowded slightly oblong from a line to a line and a half long, all of them patent but, as the base decurrent and semi-amplexicaul divided into two unequal semiduplicate, vertical lobes, the lower one of which is the largest, and opposed to the hinder part
BRITISH JUNGERMANNIAE.

Of the stem the upper one or lobule is smaller by one half; they are both of a roundish figure, sometimes a little pointed slightly waved or undulated, the margin entire or at most obscurely serrate in a few of the terminal ones. The texture is fir so large a plant peculiarly thin and deliquescent; the rhizomatum small composed of roundish tubers. The color varies from its most usual appearance of dark dull green with often a purplish tinge to deep purple and even almost to black.

The Perigynial Leaves (fig. 4 & 9) are scarcely distinguished from the common earlier ones except that they are more crowded and umbonated; their base, too, is somewhat ventricose. They are situated at or near the extremity of a stem.

Perichaetal Leaves (fig. 6) somewhat larger than the rest, which they in other respects resemble, and are, like them either encircle or slightly revolute, but so slightly as to be visible only with a microscope.

Male Fruition (fig. 9) situated in the sinus of the perigynial leaves. Anthos (fig. 10) small, in clusters of three in flau or six of them form pellicid distinctly reticulated, filled with a greenish pollen, the fruit itself somewhat longer than the anther white pellicid, and transversely jointed.

Female Fruition (fig. 1, 2, 3, 6) terminal upon the stems and larger branches.

Calyx (fig. 6) about two lines long, its base is narrow attenuated and cylindrical, thence it becomes broader compressed and incurved towards the mouth, which is truncate and entire. As the fructification advances, the calyx becomes nearly erect. In color it resembles the leaves. Its substance is less delicate.

Calyx tube somewhat somewhat pyriform, with a short tubular style and a few brown papillae at its base.

Fertile half an inch long, white, shining, velvety often having a twisted appearance, terminated by the stamens-oblong.

Capsule of a deep brown or chestnut color which splits into four equal, nearly horizontal valves.

Seeds and Spores Filaments (fig. 7) much resembling those of J. nemoraceus but the filaments are much elongated.

Upon the summit of Ben Norie in the month of July I found Gemmace (fig. 12, 14) upon this species collected together in ovate masses one or two of which were situated in the terminal cluster of leaves. Their color was a pale yellow green; each particle was oblong-ovate pellicid, and entirely free from angles.

Valuable description and figure, above quoted are imperfect, that so Dr. Smith no doubt observes they cannot with certainty be referred to any thing. No account of the gemmace,

Some of the terminal leaves, as is remarked by Columbus, have the upper side nearly of the same size as the under one; but this appears to me to apply only to such as have not reached their full size, and are almost surrounded by the older surrounding ones.
however which are evidently what he took for the seeds, very exactly correspond with those of our plant. After speaking of the leaves he says, 'L'extrémité de ces feuilles forme des voiles de toile, dans le milieu desquelles se voient de petits grains jaunâtres et transparents, qui selon toutes les apparences sont les sémen des cette plante.' Delicaux has so well described the structure of the leaves of this species, that I shall here quote his words: 'Aquatium numeros suscilethis en fenoque viridis folia sunt pallideve superius versus magius inferiorius versus minusubstanti. subirruen, infundamque ev olivaceis lavantie ad basam multies et complicatis compositis, laminae superius superi sunt albo pinos impositor. Ex parte differuntia observation: quod extrema folio a breviti prode equidem constant. Quomunque saevis lata sunt nec foliorum structura facit per cubitoque neque vero absimilis sequitur apogeumus (J. nemorosa resupinata et silicinata) foliis similibus formant esse, hinc ob magnitudinem non tantum distinctum minus per foment non neament apparent.'

The most mode of growth, much larger size of the plant, and the smallness of the leaves compared with the former are marks by which J. undulata may always be known from J. nemorosa; while the entire margins of the leaves and mouth of the calyx as well as the more delicately structure and undulated appearance of the former (which is particularly the case when the plant is dry) will equally distinguish it from J. nemorosa. The genus also differ both in color and situation.

Polish remarks, that the barren surcull of this plant produce at their apices "globules agrinamnus position sex ante septem octam plano nodules," which accord rather with the generic of J. nemorosa than with those that I have seen of J. undulata.

REFERENCES TO THE PLATE

2. Female plant. Natural size.
3. Female plant magnified.
4. Extremity of a male plant.
5. Portion of a stem with its leaves.
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9. Perigynial leaf with the tube expanded for the purpose of exhibiting the situation of the anthers.
10. Anthers.
BRITISH JUNGERMANNIAE. (J. resupinata.)

JUNGERMANNIA RESUPINATA

(TAB. XXIII.)

JUNGERMANNIAE omnis procumbentae, simplicissimae, foliolis bilobatis rotundatis, subaqueatis, tabulis jungermanniae lobis superduplicatis fructu terminali, calycebracte aequali, incurvato comprimite etra pusculo minutissimo cernulo.


Has. About Edgworth, on a sandy soil, and on the heath at Hempsall-hill, Norfolk. Rev. R. G. FRANCES.—Not unfrequent in various parts of Norfolk and Suffolk, in shady places, under the heaving stones of Estone.

On. It produces capsules in May and June. In the early part of the spring, Mr. Frances finds plants bearing spicula.

Perw. When fertile generally found in small and rather dense tufts; barren individuals more frequently grow distant and straggling.

Root a few whitish, pilose shrub, proceeding later and there from nearly the whole length of the upper side of the plant.

Stem from half to three-quarters of an inch long, simple sometimes, though rarely more or twice forked, terete procumbent their 1-1.11 erect only when in a state of fructification, or when the shoots are crowded together. Their color is a reddish brown.

Leaves, in fertile plants, rather closely imbricated, especially towards the extremity; in barren ones, generally more distantly placed, always bifid, horizontal about half a line long, of a roundish figure (1/1 1/1 1/1 1/1 1/1), divided into two nearly equal, cuneiform parts; and with regard to the stem, vertical lobes which however are not so closely folded as those of J. nemorosa and J. undulata; each of them is convex on its outer surface;
on the lower part of the plant the inferior leaf is somewhat larger than the other; the rest of the leaves have their bases equal in size, and everywhere entire, except that some of the terminal ones with the assistance of a good microscope, may be observed to be very minutely though sharply crenate; at the base they are decurrent and most laminal so that except where they are distinctly placed the unduplicate leaves entirely sheath and conceal the stem on both sides. Their color is a yellowish brown with but little of a green base. Their texture less delicate than that of the leaves of J. andicola; the cells are small and roundish.

Perigonal leaves, situated at or near the extremity of a stem and like the smaller ones, except in having a ventricose base and in being generally more crowded.

The Pericentral leaves differ only in a slight degree from the rest, their bases are equal in size, and bluish or bluish-blistered (1-5)

Main Fructification placed in the axils of the perigonal leaves, anthers exactly similar to those of J. semuentrae and andicola, growing in the axils of from one to five, or seven in the axils of each leaf.

Female Fructification terminal.

Calyx (1-8) three quarters of an inch or more in length at the base narrow and cylindrical, theore becoming depressed, and at the extremity quite flat. In a young state it is much recurved, but as the fructification advances within it becomes erect and much less depressed. The mouth is truncate and scarcely arculate.

Corolla (1-10) oblong, white, accrescent, reticulated, terminated by a short style. At its base are a few abortive stamens (1-10) linear or a little ovate towards the base marked with longitudinal and transverse lines; their mouth is a little expanded.

Pedicel nearly half an inch long, white, slightly villous.

Capsule ovate deep brown.

Seed (1-10) at a fibrous brown, cylindrical, spina filaments (1-10) of the same color, composed of a double helix.

Although the Dillenian figure (t. 8) has been quoted by almost every writer upon the subject as a synonym to this species, yet it is certain that it only represents a small variety of J. andicola. It requires, however, to be remarked, that in the original specimen there are no traces of any lateral fructification as the plate and description would lead us to imagine. With regard to the other references which I have been led to retain I regret to my self it is by no means in my power to speak with the certainty I wish. Polish a plant is very3 doubtful, and I suspect that both this author and Lightfoot may have confounded J. andicola with J. semuentrae. Webster's description accords well with our species except where he remarks that the leaves are decurrent, membranaceous. Of the articles he purposely observes that they are in superior auriculate superficie alterea; coniuncta follis non in aliquam minores rotundatae. Lebæ has done no more than copy the Dillenian character. Both as usual original says that
BRITISH JUNGERMANNIAE

(J. repens.)

the species is distinguished by the auricles being but little less than the leaves, which is certainly true; but he unfortunately gives a second character quite the contrary. the lateral situation of the calyces, which are undoubtedly terminal. Linné's descriptions are particularly imperfect and unsatisfactory.

J. repens has in many respects a resemblance to J. undulata but is to be distinguished from it by its much smaller size, its procumbent mode of growth, and its nearly equal, compound, lobes. The entire margins of its leaves and their figure will always prevent it from being confounded with J. undulata and J. sertulosa. Schraden, a plant very abundant on the Continent, but one which has not yet been detected in Britain, approaches the present species in color and in the division of the leaf into two nearly equal lobes. Of this plant, however, the leaf is unknown and the lobes not compound but remarkably involute and pointed.

It has been in another place observed that the figure in English Botany named J. repens belongs to J. nemorosa. Dr. Smith like both probably relying upon Dillenius describes the fructification of his species as usually growing from the side of the stem; but this, as far as I have had the opportunity of remarking, is always as above remarked, terminal, though it is probable that it may occasionally have the appearance of being lateral when a young shoot emerges immediately beneath it.

The male fructification I had an opportunity of seeing till some time after the plate was engraved, so that it would not be inserted.

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Jungemanium umbrosum
JUNGERMANNIA UMBROSA

(TAB. XXIV)

JUNGERMANNIA carne erectisculo sublargana folia biserrata inequilateralis lobatis labis conduplicatis, apice acutis acuminatis inferiores majores ovatis superioribus rotundato-ovatis fructus terminalis calyces oblongi incurvatis capsulis ovatis linatis integerrimis

JUNGERMANNIA UMBROSA SCHLECHT. Samml. in p. 5 Roth, Germ. I p. 390.

Hab. On Ben Nevis, and in the Den of Reckyl near Dunkeld.—Mountain near Peverstock Waterfall, Ireland. Mr. Martyn.—Gathered in flower in the month of April and May upon Doolowes Mountain, in the county of Wicklow by Dr. Taylor and Mr. Martyn.

PLANT growing in rather small and dense patches, among other Jungermannia and Mosses;

Most consisting of a number of minute fibrous rhizomes, principally issuing from the lower part of the plant.

STEM short, generally not much exceeding half an inch in length, erect or ascendant.

Because, of a pale reddish-brown color, simple or once or twice dichotomous, but producing also young lateral shoots, sometimes singly, sometimes two or three together from near the extremity (I 3).

Leaves (r 1 5 6) bifurcate dichotomous, horizontal, rather closely placed, lubricated at the base into two unequal conduplicate approached and vertical lobes of which the inferior is much the largest, and a half a line long ovate, acute, recurved, especially in those that approach the apex of the stem (I 3), and sharply serrated, though the serrations are irregular in size and distance, and do not extend more than half way down the margins from the point; the superior lobe is not so large by two-thirds as the inferior; plus of a roundish-ovate figure, acute its exterior surface forms its apex sharply but unequally, serrated. The color of the leaves is pale and bright yellow green sometimes changing to brown, the terminal one often tipped with a fine purplish tinge. The texture is rather firm and equal. The cells roundish, acute.

In the perpendicular leaves which I have only bistrato observed to be situated about the middle of the stem, the lobes are almost equal in size, and not at all recurved. These are closely lubricated.

The perichaetial leaves resemble the cauline ones in every thing but in having the inferior lobes more recurved, and the superior about half their size.
(J ambrosa)

**BRITISH JUNGERMANNIA**

**MALE FRUCTIFICATION** axillary. **Stamens** in small clusters of three or four in each perigonal leaf ovate reticulated situated upon a long transversely-striated, pedunculate stalk.

**FEMALE FRUCTIFICATION** terminal upon the stems and branches.

_Calyx_ (5) nearly three quarters of an inch long at the base cylindrical or when the ovary has arrived at its full size, somewhat broader becoming depressed and quite flat at the mouth, which is truncate and entire. Its texture and color the calyx corresponds with the leaves.

_Calyptra_ (5) obvolute membranaceous, reticulated, tipped with a short tubular style. At its base are a few short and nearly linear horny filaments.

_Peduncle_ about half an inch long white succulent striated transversely and longitudinally

_Capsule_ (16) ovate-brown opening into four equal ovate-hemispherical valves.

_Seed_ and spiral elements fulvous brown. The former spherical, the latter composed of a double helix.

At the time when the plate of _J ambrosa_ was engraved, my Scotch specimens of this elegant species of Jungermannia were the only ones known in Britain, but I have since been able to make considerable additions to my description of the plant by means of others which I have lately received from Dr. Taylor and Mr. Mackay gathered in a fine state and containing both male and female fructifications. All of these agree well with authentic individuals sent to Mr. Turner by Mr. Schraden as well as with the admirable character of it given by the latter gentleman in his _Spit Sexual Cryptogams_.

The plant has a peculiarly handsome appearance, from the recurved leaves at the apices of the stems and branches which is more striking in the young shoots. It is distinguished from its associate, _J membranacea_, by the more narrow bases of the leaves their more acute figure and especially by their being truly serrated (by no means dentate-elliptic) and by the entire mouth of the calyx.

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**REFERENCES TO THE PLATE**

1. _J ambrosa_ leaves on the natural size.
2. _Fertile plant_ on natural size.
3. _Seeds_ on a magnified.
4. _Fertile plant_.
5. _Extremity of a fertile shoot_.
6. _Leaf_.
7. _Calyptra_.
8. _Capsule empty, having discharged its seeds._
BRITISH JUNGERMANNIA

(§ aubletii)

JUNGERMANNIA ALCICANS

(TAB XXV)

Jungermannia cana erecto subdivisa foliis bifaria, angulatis basibus; lobis oblongo-lanceolatis, supra pulcherrimo aures natales; infernebus semperbus submarginiformibus; superioribus oblongo-ovatis acutis fructu terminals; culmis obscuros cylindricis; ore euncto, clavato.


Lichenostomum fruticosum frutescens foliis planis magnum majoritate maioribus minor Rait Sp. p. 112

Lichenostomum fruticosum Rait Sp. p. 112

Jungermannia repens foliis cordatis laminarum Michaux, Nou. Gen. p. 216. f. 9

Hepaticae nitescens foliis planis variovar. Rait Del Pér. p. 100. f. 13. f. 9

Lichenostomum parvulum fruticosum planum planum, variovar. Batsch, Mutt. t. 71. f. 90.

Lichenostomum fruticosum, Batsch, Mutt. 473. f. 36.

β parvulum: cana protrudente, folia crassula.

Hab. Abundant in England, Scotland, and Ireland, in various situations, though generally preferring a loamy soil in hedge banks. β was found in Scotland, by Mr. Dickson, upon a staff clayey soil.
BRITISH JUNGERMANIA

Gen. Fruited on, both male and female, is produced plentifully in the spring and early summer months if the weather prove moist. Consolideria plants are equally common throughout the summer.

Plant. for the most part growing in large and closely-crowded tufts, covering a surface of ground six or seven inches in diameter at other times shooting up among Menzies and various species of Jungermannia in a more loose and straggling manner.

The Roots in general originate from the lower part of the plant and consist of minute fibrous, pelleted, simple radicles.

Stems erect from an inch to an inch and a half or two inches in length, simple in one or twice divided in a dichotomous manner and often producing innovations; they are lacerate and filiform of a pale yellowish-green color approaching in a red.

Leaves bifurcate and dichotomous more or less closely placed in their lower part unipinnate and slightly decurrent divided from the extremity in within one-third of the base into two unequally-armed cymbiformly appressed verticillate lobes, of which the inferior is the largest and at half a line or more in length oblong acute plae and a little curved on one side, or as to be somewhat cymbiform-shaped, the superior lobe of lobes, differs from the one just described in being only about half its size and of an elongately-ovate figure acute and by no means cymbiform-shaped. It is closely appressed in a diagonal direction to the inner side of the larger lobe, both are serrated at the point, though the lobes in so in a slighter degree than the lobe. The stipes of the leaf are of two kinds, the greatest part being composed of ovate cells forming a very regular. though minute, sort of reticulation, whilst from the central base arises a pellucid mark which branching off at the division of the leaf forms a dotted V (I 1) and disappears a little below the point of the lobe. In this mark the cells are seen to be extremely narrow cylindrical tubes, very much longer than those at the circumference of the leaf. The color is sometimes a deep, but more frequently a pale yellowish green, with a brownish tinge in those leaves which are nearest the extremity of the plant and which thus appear as if scorched with heat. When dry the color is universally paler and after having been long kept in the herbarium becomes almost white.

Perigonal bracts (I 10) more crowded than the rest and situated upon a swollen part of the stem (I 9) they resemble the cauline leaves, except in having a ventricose base, where the centers are plumed and the apex is not infrequently much recurved.

The Perigontial bracts are large and with their base entirely sheath the lower part of the calyx that lobes, too are recurved at the apex.

Male Fertiliization (I 1 1 12) I have seen upon the same plant with the female, as well as upon different individuals. The authors are placed in clusters of three or four in the axil of each perigonal leaf and are more or less approximating to round, strongly reticulated in the older ones, which in the younger authors this appearance is scarcely perceptible. Their color is at first a deep green before the emission of the pollen at times white and pellucid. The footstalks are about the length of the calyx white and round.
FEMALE FruITATION Terminal.

Calyx a line in length acute, rather attenuated at the base toward the extremity longitudinally plicate, the mouth contracted and toothed. The reticulation is throughout formed of minute somewhat acute teeth, the color is a yellowish green.

Calyx ovary reticulated whitish, tipped with a short hollow style and surrounded at the base by a few short arena plates which are a little raised below and are, throughout both longitudinally and transversely marked with darker lines.

Pedicels three quarters of an inch in length, white, pubescent, shining, shining.

Capsule ovary red-brown.

Seeds spherical, spiral, fleshy, composed of a double holie, both of a dark brown color.

The Blu grows in distant and struggling patches, the stems instead of being erect, as usual with the plant are procumbent and throw out a few nodes here and there from nearly the whole length of their under side.

The Leaves are erect and the whole plant is of a dull, yellowish-red color.

Genus are produced upon the extremity of the terminal leaves, there lying in small scattered clusters, which are very dense dispersed. Each particle is somewhat spherical, with many acute protrusions as angles of a pale yellow color and some transparent.

OF the JUNGERMANIACE oilate which has been known divided into two unequal and conspecifics below, four species have been already described according to general habit as well as to the peculiar shape of the ovary, which is compressed, incurved, and truncate at the extremity. There is still another species, family of the JUNGERMANIACE oilate, folia longissime foliata, which, though resembling in many respects to the species just alluded to, are not otherwise found to differ from them essentially in the figure of the ovary. So in those it is cylindrical erect, and pubescent, and to mouth it is contracted and shriveled. Of such I can mention with certainty one species above, the subject of the present description, which has fallen under the observation of preceding writers; but two others, which I have named J. obtusifolia and J. Didyma, have lately been added to the British list and will soon make their appearance in this work. From these, J. obtusifolia may be readily distinguished by its much larger size, and as well as by two ranks still more distinct, one of which is to be found in the structure of the leaves: the other in the pedicle, forked nerve which originating in the base of the leaf occupies the centre of both teeth and renders a little below their points. The difference in the shape and nature of the cellules, which is the cause of the appearance of so far as I have the opportunity of observing peculiar to this species of the genus, and although very evident and observable even with the naked eye it is not, that I am aware, been noticed by any author except Welw., who well remarks of the leaves, that "per leuetae nervae major divisa sunt et protrusa."

A celebrated French Botanist, M. Pellew, Beuvrere, has not only endeavored to controvert the Blew's can system with regard to the sexual organs in males, but in the order Hepatica.

\[ J \] armeniac, \[ J \] indalac, \[ J \] europaea and \[ J \] umbros.
BRITISH JUNGERMANNIACE.

Illustrates the theory of the same eminent Naturalist. Strange however as it may appear, there are very organs (the authors of Hedwig) which, in the leaves he considers merely as "simple connules unpliantes," that I am known dans quelques Liliacées, in Botanique & c., and so distinct from the essential organs of locomotion, as the Jungermannia he raises in the mass of fruit and capsules. To this, he refers when he says Juncus marinum pour l'institut la preuve que les Jungermannias sont un fruit et une capsule bien prononcée et différente de la petite pochette qu'on d'ailleurs en croix et qui contient une première adherente à des tigesues irritables.

Proceeding upon these grounds, considering the same fructification as the female, and the male in the male he has termed in his splendid work, the Florae Suensi et Beati, a new genus of these Jungermannia called by Michelina "Lamiaequin," to which he has applied the type Coriopesiphon and proposes that it also be comprehended besides some new species and the L. dichotoma of his work, J. minima. But, in the character which he has given of this genus, there is nothing in distinguishable from the rest of the Jungermannia fites ibidem "coriopesiphon," except in that part of it, where he describes what he calls the capsule on fruit (our stamens), and then, he says, "certaine et glabresce lenticellatum pedunculatum arrecto parce, styeformes acuminates."

The stelliform petals, however, have no existence in the authors of any of the British species of this genus. With the Coriopesiphon dichotoma I am unacquainted. In its foliage according to Dr. Bauers' figure, it bears a considerable resemblance in Jungermannia whose authors are likewise distinct of any point.

The Bulbosa plant 173 I. 71 of the Huit Meur (J. sp. L.) differs in no respect from the species represented at 171 I. 30. of the same work (J. obliqua L.) although every author has followed Bulbosa in keeping them distinct. Not by any of the descriptions of J. obliqua of subsequent Floras so ill served as our plant to induce me to exclude them from the above synonymy. That of Michelina, however, cannot be quoted without a mark of interrogation, since he says that the divisions of the leaves are an equal size.

Michelina's figure and description are extremely important, and according to the character that the plains of the leaves seem rather to belong to J. obliqua, than to Bulbosa, but the only is widely different. Each indeed quotes this figure to his J. complexus a species, which, by means of autographs specimens that I have lately received from Dr. Swartz, I am enabled to say is nothing more than J. complexa of this Monograph. To that plant therefore, the following synonymy may be added Jungermannia complexa Born. Germ. in 1. p. 313.

Michelina has endeavored to set in my opinion that those who will give themselves the trouble of examining the Hedwigian Aranum and the Jungermannia, may no are represented in the "Theoria" upon J. obliqua and J. pseudobulbilis and will compare their structure with that of the authors in question; but, that autographs I think, unless written with respect to the species of these plants, they will be entirely dissimilar, destined to both in perhaps smaller branches. It must be one plant of an extreme redunclancy, and almost circular membranes, which are separate as entirely as could have been done, and at length upper at the end for the discharge of these branches. In both, they are extended upon amsme. These figures, in the meaning, are the more, as among a mass of exceptions, however, sufficiently in the genus Sydney, where these form is over or subordinated as in the Jungermannia. Nor are the authors of these plants of such rare occurrence as an extreme to be dissimilar, and I think all of "Boivin's" would lend an extension; and by the combination of my leaves in my own examination I am already in possession of the whole of the Jungermannia of the genus number of the British species. For these reasons indeed, I must acknowledge that the list of the specimen was often difficult and Boivin's must calculate. In their researches into Jungermannia, I am observing "on ne sait bien mesurer que ce qu'il se permet d'abuser les INTO TE".

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Jungermannia clausifolia
JUNGERMANNIA OETUSIFOLIA.

(TAB. XXVI)

JUNGERMANNIA crisa ascendente, simplex foliis bifurcatis, inaequaliter bilobis lobis nonduplicitatis abaxialibus integerrimis, infernebus magnisibus subuligiformibus; superioribus ovatis fructu terminali calycibus obrutis, seminibus desuetis.

JUNGERMANNIA crisa plurifolia 10 foliis infra, 3 spicis floriferis. HALL. Man. v. p. 519
(ser. II. p. 89. 21.)

Hab. Near Huddon on the Wall, Northumberland. Mr. Thornhill.—Very rare in Ireland, where Miss Hutchinson has discovered it only in one spot near Dunsley.

Not, it bears fructification in March and April.

Plant growing in densely-matted tufts, two or three inches in diameter, firmly attached to the soil, by means of their numerous thick roots, which consist of simple parallel fibres, and some most copiously from every part of the stem, these one ascending, or, when much crowded, nearly arched, seldom exceeding three or four lines in length, simple though there is often an appearance of their being branched, from young shoots, which are not infrequently produced towards the extremity of the plant. The color is a bright green more or less approaching to a pale brown.

Leaves bifoliate, distichous and bisemical, rather closely interwoven as much so, as entirely to conceal the stem; they are smallest at the base, larger and more rounded at the apex, particularly of the sterile plant, from a quarter to half a line long, somewhat of a roundish figure (supposing the leaf to be expanded 2.45), divided about half way down, from the extremity into two unequal, conduplicate, vertical lobes, of which the inferior is the largest, obtuse and a little curved on one side, as to be semicircular-shaped; the superior, on the other, is ovate, or oblong-ovate in the upper ones, and is closely appressed, in a diagonal direction, to the larger portion of the leaf; both are remarkably obtuse at their apices and rounded, their margins every where entire except indeed, in a few of the terminal leaves, which, under a high power of the microscope
**BRITISH JUNGERMANNII**

may be seen to be adversely create. The reticulation is small, formed by roundish
cells of nearly the same size throughout the outer of the leaves a pale green,
having still paler after having been kept for some time in the Herbarium.
Perpendicular leafs very closely interlocked and placed at the extremity of the plant
much inflated at the base; at their apices bent in the lobes and lobules, remains
Perichaetial leafs (2 3) longer than the rest, and more erect, a little waved at their
margins; with their almost cylindrical base they entirely envelop the lower part of
the calyx.

_**Male Fructification**_ always, as far as my observation enables me to judge, upon distinct plants
from those which produce the female. The males are studded in small clusters in the axils
of the perichaetial leaves and upon short white footstalks. They resemble, in every respect,
those of _J. nivalis._

_**Female Fructification**_ constant in reality; though the chances or innovations, before
alluded to as originating not unfrequently from the extremity of the stem, often take their
rise immediately below a calyx, and thence make it seem lateral.

Calyx (3 5) ovate or rather obovate, acute periclypse in its upper half; sicri mouth contracted,
and cut into several small, sharp teeth. In color and texture the calyx resembles the
leaves, except that in a more advanced state it is white and more sise at the orifice.
Calyx is obovate, whitish, strongly reticulated, so transparent that the young capsule
and its peduncle may very distinctly be seen within it (f. 4). Style short and tubular
Barren pelvic six-segment or eight in number, linear, slightly serrated both longitudinally
and transversely.

Peduncle two or three times long white, shining, succulent, cellular.

Capsule ovate, approaching to round, of a deep reddish-brown color. It divides into
four equal parts, and obtrudes valves and discharges its numerous
Seeds and spore JUNGERMANNII (2 3) of a folious color; the former spherical the latter
compressed of a double axis.

I cannot quote the Hallerian synonym above alluded to, without entertaining considerable
doubt so to the propriety of my doing so; since the description is of such a nature
that little can be collected from it to aid our conjectures, and the reference given by the author all belong
to a different plant. Haller indeed, observes, that the leaves are _passim tuberculatum,_
and further says of his species, _J. Jungermannianus Dill. 20._ (J. alboaurora) provide assiduiit, and
feet suffer compositiones.

The nature margins of the leaf in _J. obtusifolia_ (or at least these being only very slightly
crenated to a few that are situated at the extreme part of the stem) the most of the poliulid
central mark, and the diminutive size of the whole plant, will always distinguish it from
_J. alboaurora,_ as well the obtuse and rounded ends of the leaf from _J. oblonga._
BRITISH JUNGERMANNIAE

We owe the discovery of this plant to Mr. Thornhill, of Gatehead, near Newcastle, who found it in 1806. Miss Hutchinson has since met with it in Ireland, in greater plenty and perfection; yet, even here, it is confined to one spot. The male and female fructification are neither of them of rare occurrence; though I was not so fortunate as to be acquainted with the former before the engraver had finished the plate. The individuals producing anthers are rendered conspicuous by their swollen spines. Calyces seem to be abundant throughout the year, and it appears that they remain upon the plant long after the peduncle and capsule have decayed.

REFERENCES TO THE PLATE.

1. J. oblongifolia, female plant, natural size
2. The same magnified
3. Extremity of a sterile stem
4. Leaf with the lobes expanded
5. Colpus
6. Perichaetal leaves
7. Calyptra, enclosing the young capsule
8. Seeds and aerial filaments
BRITISH JUNGERMANNIA

JUNGERMANNIA EMARGINATA.

(TAB. XXVII)

JUNGERMANNIA, vanda croceo, numerosa; folia bifaria, laciniae imbricatae, patet, ebracteata, acuminato spinis succumens. Fructus terminalis, calyptrae croceo-viride, periostylum luteum.


HAB. Plentiful in the alpine districts of England, Scotland, and Ireland, dwelling in very wet places, even in the waters of rapid torrents, and in situations where it is continually exposed to the spray of a water-fall. It blooms fertilization in the early months of summer.

PLANT: growing in large patches more or less densely crowded.

Roots proceeding almost entirely from the lower and leafless part of the stem, from half to three-quarters of an inch long, nearly as thick as human hair; rigid, often branching into one to three or even four times long, dilatate in increasing somewhat in size towards the extremity; crested, sometimes simple, but more frequently crenate in tendency, with segments of uncertain length, and, besides producing numerous, which are either lateral or originate, in clusters of three or four, from the bottom of the stem, leaves the surface somewhat rugose; when dry, very brittle.

Leaves from a quarter to half a inch long at the base of the plant almost always much decaying, but more perfect and of larger size towards the centre of the stem; they are bifid to crenate, dusky beneath, with shallow margins, slightly subcompressed, patent or erect-patent, nearly obsolete (75) sinu-parallel near the base; the lateral margins, especially that part of them which is nearest the stem, much narrower, the apex divided by a rather deep and acute notch into two very obtuse rounded segments the texture rather firm; the cells are extremely minute, round, and the colour exceedingly variable, in different situations; in less moist, but more exposed places, it is generally of a deep brownish purple hue, when dried in vultures, as Mr. Smith very well observes, it loses its purple tints and becomes dark green.
BRITISH JUNGERMANNIAE.

The perigynial leaves differ in no respect from the rest, except in having a ventricose base.

Pedicelled leaves attached to the exterior surface of the calyx in which they grow, and surrounded on all sides, as entirely to conceal it; they are erect and smaller than the main leaves but in other respects, much resembling them; the inner ones however, are less deeply incapsulate.

Male Flowers case attached in the axils of the perigynial leaves, and usually near the maturity of the stem. Anthere (f. 5 & 7) spherical, reticulated, before the discharge of the pollen a pale dirty green, afterwards a yellow-brown. The footstalk about the length of the anther white and transversely striated.

Female Fruiteation terminal,

Calyx (f. 8) ovate, immersed in the pedicelled leaves of a thick exuval substance, in consequence of the united bases of these leaves; the mouth close and numerous, and, as may be seen by a careful section of the calyx and its covering, cut into an or eight rather large teeth, two of which I have in several instances, observed to arise from a larger interior appendage, somewhat resembling a leaf, but much narrower plane, and scarcely perceptible at the extremity.

Chalaza ovate, whitish, delicate, reticulated, surrounded at the base by a few abortive placenta.

Peduncle seldom exceeding half an inch in length, white, alabaster, transversely and longitudinally striated, terminate by a rounded disk.

Capsule of a brown color, scattered on its exterior surface, and opening into four equal valves.

Seeds (f. 10) spherical, alabaster, accompanied with spiral elements of the same color composed of a double helix.

It is remarked by Dr. Smith in English Botany, upon the authority of the Linnean Herbarium, that this species was first found and named by Dr. Swartz, many years before it was published by Elcharnt. The same eminent Swedish Naturalist who has met with many aoomen, has further looked upon the harden and dark green appearance of this plant as a distinct variety and in his manuscript has named it \( \beta \) equino. Yet, notwithstanding such high authority, I find intermediate states of the plant so common, and the gradations between them so imperceptible arising solely from the greater or less degree of tadpole with which they are supplied, that I am inclined rather to include the \( \beta \) of Swartz in my general description than follow his example in separating it. The same given to this species by our countrymen. Mr. Dickson, who published it so new in his second fasciculus, is so expressive of one of the most obvious of its characters, that there is much reason in regret the necessity of laying it aside.

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* Dr. Schleiden also describes what he considers a singular variety of this, in the Hortus 9000, in the following terms: *Hakenbusch usus variae a Hortus 9000 viridibus tali praestans, quae nunculatus Holmii, ramificata, et alia alii Gomphostachys longitudinalem praestans, in salina hortorum aut alibi ubi, multiplex sinuosa * Spic. Phil. Gen. p. 24.
BRITISH JUNGERBAUAE (J. emarginata.)

Dr. Schreber mentions having seen capsules occasionally lateral which Dr. Roth attributes to innovations of the stem or opinion in which I am the more inclined to coincide since I have at this moment, before me, a specimen from Mr. Lyell, which has young fructification, and, immediately below the calyx, a cluster of three or four young shoots arising from the axils of a leaf. These would in the course of a little time have given such an appearance of a continuation of the stem, that the fructification might without a careful inspection, have been supposed to be lateral. The same author also describes the genus as really simple, and merely taking the appearance of being branched from their annual innovations, in which he is also probably right.

Besides the singularly large and branching roots, already noticed, of J. emarginata the shape of the leaves (which Ehriart aptly compares to a heart cut out of paper) and the immersed calyx afford characters so distinctive, that this may be considered as a species the most distinct of any in the genus. In general habit indeed, and somewhat in the shape of its leaves, it has an affinity with J. costatum, but so slight a one, that it will be needless for me to enlarge more upon the subject.

In August, 1869 Mr. Dobson and myself found, upon the summit of Ben Nevis, small specimens of this plant whose calyces contained two and sometimes three fertile capsules, and, what was more remarkable, capsules of very diminutive size, situated upon peduncles so short that they were not equal to the length of the calyx; yet these capsules were fully formed, and many of them were even discharging their seeds and stamens whilst under the microscope. This appearance is represented at § 11.

REFERENCES TO THE PLATE

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1. Whole plant of J. emarginata, natural size.
2. Sterile plant, natural size.
3. Female plant, natural size.
4. The same magnified.
5. Leaf.
6. Perfect anther.
7. Anther after it has discharged its pollen.
8. Interior of a calyx.
9. Calyx and pericarpial leaf.
10. Seeds and spiral filaments.
11. Receptacle, with the calyx torn away to exhibit the small capsules.
BRITISH JUNGERMANNIAE (3 subgenros.)

JUNGERMANNIA VENTRICOSA.

(TAB. XXVIII)

JUNGERMANNIA, male prostratae, subameno folliis potentibus subquadrandis, obtusis, amarginatis, interius lineatis, Bracteis terminalibus, calyces subobtusis, septum oblongo-ovatis, utroque, patente, dentata.


Jungermannia heteroptera. Globalisfera. Wall. Spec Pl. Gled. p. 120.


Max. In woods. Mr. Dickson.—Not uncommon in various parts of the kingdom. (The REV. Mr. Prasce has for many years, noticed it in the neighborhood of his residence, attached both to a boggy and bony soil in Holt wood and Lawn, as well as in Edgefield wood and on the heaths—growing also among Sphagnum.)

Mrs. Hethercot has observed this plant in the month of November, about Hunby, where it continues in fruit but for a few days. Dr. Taylor finds it upon Boracrum mountain with equus, in May, and Mr. Mackay, at the same time near Drobro, with salices, in which state. Indeed, it is not uncommon during most of the spring months. In the early part of summer, principally, the Genera are produced; though Mr. Lyell finds them in great perfection in the month of August, and even in the beginning of September.
BRITISH JUNGERMANNIA.

Plant growing sometimes in densely matted patches, at other times singly creeping among Scapanium latifolium and Copel. sedum or Dicranum plumatum.

Roots emerging at rather thick placed, white, simple fibres, shooting out from nearly the whole length of the under side of the plant.

Stems from half to three quarters of an inch in length and the tenth of a line in diameter prominent. Petioles, rarely simply, more frequently once or twice branched, with the branches having the appearance of being again divided on consequence of the innovations they are of a green color sometimes approaching to a brownish-black and I have lately received specimens from Mr. Lyell, in which both the stems and roots have a deep purple tinge.

Leaves rather loosely placed, though scarcely interlaced. Various distributions, patent, or even occasionally deliquescent with the lateral surfaces, always more or less involuted (5 2) about a quarter of a line in length, of a subquadrate figure, divided at the extremity by a wide and obtuse notch of which the points or segments are acutum and in the extreme leaves sometimes involuted the lower ones it is to be remarked are cut into three (5 5) or which are more rare four teeth (5 6) or segments which are frequently of unequal size. The texture is rather felicitous the cells small, numerous, the color a pale green assuming more or less of a brownish tinge in much exposed situations.

The perigonum leaves do not differ from the rest (1 9).

Fructification borne (1 5) close to branching the calyx, cut at the extremity into three, four and even five acute and large, but unequally sized teeth.

Male Fructification Anthers (1 L 0 9 11) situated, one or three together, in the axil of the stemless leaves. All these I have only observed them in distinct individuals from those which bear female fructification. The form of each is ovoid or oblong-obovate; the other ones are of a greenish white color, and strongly reticulated. The fruit with is about half the length of the anthers white and marked with transverse lines.

Female Fruit insertion terminal, though very frequently as is represented in the plate, but the appearance of being lateral (5 3), from young shoots which arise immediately beneath it.

The calyx is remarkable, at being in its early state of a spherical figure (1 3) and I was unfortunately not acquainted with the fructification in a more advanced period of its growth till a long time after the plate was engraved. By specimens however of which I have lately received I have enabled to see that the calyx at the time it produces capsule is oblong-ovate; at all times pleate towards the extremity. The mouth is contracted and minutely toothed.

Calyx with three white, long, tender buds with its tender style.

Barren calyx (f 1 4 16) six or seven or many, as numerous, having a greenish color, long-tenuously marked with reddish lines, their upper a little expanded.

Pods from a quarter to half an inch long, white, shining, transversely and longitudinally ridged.

* Probably Safe I was deceived by this description. His figure, however, gives the idea of the calyx being ovate in the center of a plant which is not the case in any species that I am acquainted with.
Brithish Jungermanniæ.

Capsule ovate, deep brown, furrowed.

Nectary and spiral filament of a tubular brown under 3 the form as exactly spherical, the latter composed of a double hils.

Oas. The spherical cluster of gemmae (f 10), which form one of the most striking features of this species, are situated at the points of the terminal leaves both of the main branches and of the young shoots; they are, when perfect, so compact as to resemble little pale yellow-green balls; when scattered about, however, they are found to be composed of extremely minute, angular pellucid granules (f 12).

Few Jungermanniæ seem to be less understood than the present species, to which, indeed, it is not possible to be wondered at, when we consider the close affinity it bears with J. ecalon from which it may be distinguished by its larger size, more branching habit, the involute margins of the leaves and the abundant and very conspicuous gemmaceæ globules. Of this species the gemmæ are extremely rare, though calyces are frequently to be met with which like the sterile calyces of J. ecalon fall from the plant with a very slight touch.

Mr. Dickson first discovered this species in the tarn, and ascertained it to be J. Jungermanniæ nema repens folio stipitato vernali formæ verticali. of Micheli and it appears to me that the Jungermanniæ nema repens folio stipitato vernali formæ verticali. of the same author may be referred to with equal propriety. With regard to the figures, they cannot certainly be considered as accurate representations of the plant, and what Micheli says of J. repens is wholly applicable to J. vernalis. The gemmæ are particularly ill drawn, and seem to indicate that the clusters were supported by a footstool. Böllingata has done no more than copy the Michelian figure and description. Roth, under his J. globosissima, however, it appears to me, and as I have already had occasion to mention described three species: the present, J. ecalon, and J. nema Böllingata's plant almost quoted, ought perhaps rather to be referred to under this species, than under J. humifusa where I have already quoted it though in both instances with a mark of interrogation. I have inserted Thunberg's J. globosissima as a synonymy, solely upon the authority of Roth. The plant of Haler is hardly be doubted especially as be quotes J. nema of the Das Jung of Schradel, which I think may with equal certainty be said to belong to J. ecalon. The excellent writer has mentioned, however, confounded it with J. tubulosa. Weber has made it his type of the same species. Haller and Weber say that they have observed the globules of the gemmæ to be confined to one point of the leaf whilst Necker very justly remarks, that they are common to both.
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<td>Female plant, natural size.</td>
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<td>Female plant, magnified</td>
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<td>Ovary longitudinally dissected</td>
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<td>Barren pistil</td>
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
BRITISH JUNGERMANNIA

JUNGERMANNIA TURNERI

(ARB. XXIX.)

JUNGERMANNIA TURNERI prostratae, flexuose, aequarii ramoso foliis lati ovatis acuto apicibus segmentis subduplicatis apicem- dentatis fructu terminali, seminibus lineis-oblongis, longitudinales plantis, ore dentilutus.

Plan. Shady bank of a mountain-rivulet near Bantry Miss Hutchins.—(It bears fruit most plentifully about the beginning of March.)

This rare Plant is found growing in small, pale, yellow-green patches of one or two inches in diameter.

The Root, which consist of minute, whitish, simple fibres, descend from the under side of the plant, in various places, but chiefly from its center, and immediately below the insertion of the culms. (28.)

A single individual scarcely exceeds three or four lines in length. The culms are prostrate, divided from a centre with branches extremely slender filiform flexuose, mostly simple, but sometimes, again irregularly divided. They color a very light green; their surface dimples, fleshy with somewhat ovate cells, placed at a distance from each other.

Leaves (1 3 4 5) arranged at very regular intervals and somewhat loosely, in two rows, patent about the twentieth of a line in length, or a little less towards the extremity of the barren shoots, though the reverse is the case with those leaves that approach the culms, each in its base annular, of a heart-shaped figure, divided from the apex, for about one half of its length by an acute angle, into two obtuse or oblong sharp and almost subduplicatate segments, which, at their margins, are remarkably and elegantly fringed with rather large spiniform teeth of unequal size. The color of the leaves is an extremely pale yellow-green; the cellular are ovate, and, as in the spore, placed distinctly yet in regular longitudinal series.
PERICENTRAL leaves (f. 507) closely imbricated on all sides of the calyx, and differing from
the calyx-scales being of a quadrate figure, frequently broader than they are long, and
in being less for only about one third of their length, into three or four ovate, acute,
spiculose-denticulate crested segments.

FEMALE FRUITIFICATION known

Calyx linear-oblong about one third or even half a line in length longitudinally, yet
slightly elliptic at the base, somewhat angular; in a young state little recurved at a more advanced
point erect; in color almost white, having however generally a yellowish tinge.

The calyxes are oblong and, as in the rest of the plant, rather distinctly placed.

Corolla (f. 55) ovate-oblong at the base, tipped with a short style.

Calyx (f. 54) ovate, reticulated brownish-white.

Petals a quarter of an inch long, white, succulent, cellulous.

Capsule (f. 56) ovate, brown, splitting into four valves of equal size.

Seeds and floral elements (f. 75) fusiform, the former smooth and oval; the latter
composed of a double helix.

Throughout the progress of this publication, I cannot promise myself a more grateful task than
that of deducing a small but most elegant species of my favourite genus in David Turner Esq.,
as a memorial of the great and unimpeachable kindness which I have for many years received from
him. To his friendly advice and instructions the present work is indebted for whatever merits it
may possess. J. Turner has hitherto been found alone in the neighborhood of Blantyre, and is one
of the many interesting additions that have been made to the Cryptogamic Flora of the British
Isles, by Miss Hitchins. It is not a little remarkable that this is the second species of
Jungermannia discovered by this lady that is distinguished from all the rest of its affinities (which,
in the present instance I need hardly say are J. bicapitata & J. bissarren &c.) by having the leaves
dentated in a very conspicuous and strikingly beautiful manner. The former plant of this
description is J. Hitchinai represented on the first plate of this Monograph, and I have on this
occasion the greater pleasure in affixing to the species the names of two botanists who have aided
me in the preparation of this work, by their knowledge and discoveries.

Beyond the distinct leaves, there is another peculiarity possessed by the present plant that I
have not observed in any other of the genus. This is in the large cellules with which the whole of
the Spleges and mucuna appear to be studded. In the same manner as the leaves of Hieracium
pulcherrimum and a few other species, for though these are distinctly placed, they are, nevertheless,
arranged in longitudinal and parallel lines.
REFERENCES TO THE PLATE

1. J Turner, female plant natural size
2. The same magnified
3. Portion of the muscule and horn
4. Cauline leaves
5. Exterior perichaetial leaf
6. Interior perichaetial leaf
7. Base of the fructification, with the leaves removed, to exhibit the column of a portion of the muscule
8. Chippita
9. Horns peristome
10. Seeds and spiral filaments
JUNGERMANNIA BIDENTATA.

JUNGERMANNIA, petitole prostrantemente ramosa: folia basi obtusa decurrentibus bidentibus segmentis validis acutis integerrimis; stipula bifida, foliis laminalesquibus, floribus terminalibus, calycibus oblongis, subtriangularibus, ovo basiato.


§ BEITUUS. Folia obtusa emarginatis apice-triangularibus stipulis multiplis dividus.

Him. Very plentiful in moist and shady situations on hedge-banks and trees particularly along moor—β is found by the Rev. E. B. Francis in very wet and boggy parts of Holk Heath—(heabounds with mosses during the greater part of the year. Male fructification has been found by Mr. Lyell and myself in great perfection in the months of October and November.)

PLANT growing in more or less crowded patches of some inches in diameter.

Roots small whitish fibrous proceeding here and there from various parts of the under side of the shoot generally however, immediately below a stipule (f. 5).
BRITISH JUNGERMANNIA.

Succulent from an inch to an inch and a half long; procumbent because branched, with the branches often erect towards the extremity, simple or occasionally producing a short lateral shoot. Their color varies from a pale to a deep and almost black green in certain situations; the texture is rather firm in the twigs compact.

Leaves (1' 6 to 5) from half to three quarters of an inch or even more in length, closely placed, but scarcely so much as to be in a horizontal manner plane; they are very closely lined, horizontal of a simply ovate figure at the base, half surrounding the stem and having the lower margin very much decurrent; at the extremity they are divided for about one fourth or one fifth of their length, with a small more or less acute, into two equal sharp and entire segments; the tips of which resemble calamus ephor or teeth, whereas the plant has no name. The color of the leaves is always a singularly light green, sometimes almost approaching to white, the texture thin; the cellular large and forming with the 3 intersections, a beautiful sort of reticulation.

Perennial leaves about ten or twelve in number, either placed quite at the extremity, or at the middle of a branch, ventricose crowded, and lying closely imbricated over one another in two rows, or in the one with those of J. appendiculatus, in like manner also, their spines are recurved and divided into two, three or even four sharp and often unequal segments.

The Peristome leaves (1 7) may be said to commence with the second pair of leaves from the calyx, which however more or less from the real stem in being longer and more inclined to be erect, the first pair are twice the length of the calyx leaves, squat erect, and appear in the calyx, deeply divided into two, equal, limboed, segments, which are here and there divided or calate on the margin.

Siphonae (1 6) one to every pair of leaves, presented in the under side of the calyx, oblong, generally divided into two, and sometimes three principal segments, which are variously lacerate.

The Midri Fruitingia, which I was not fortunate enough to possess in a good state, till it was too late to add it to the figure, is readily discovered by the singular disposition of the perigonal leaves in the axis of each of which are situated two or three spherical or somewhat oval nodules terminating short, white, translucent, filiform, or filaments.

Fruit and Fruitingia terminal upon the saccus and upon the small lateral shoots.

Calyx (1 3) about a third long, sometimes slightly recurved in an early state of the fruit formation, entire-oblong, obtusely triangular, the upper half strongly contracted, previously to the expansion of the capsule is afterwards somewhat expanded it has a rather deep margin on one side and is bordered with numerous lacerate. The termes and color of the calyx scarcely differ from those of the leaves.

Calyptra (1 3) pale brown, thin, acuminate, short, tubular.

* What describes the leaves to be "as mere subequantia," which does not exactly correspond with those of our place.

† According to Mr. Smith's figure and description in Botanical History, I would appear that the signs were not originally of unequal size, I have never examined them so be as myself.
BRITISH JUNGERMANNIA

Peduncle about three quarters of an inch in length, white and ample, cellulosic a little scarlet when it has reached its full height.
Capsule exactly ovate, deep brown longitudinally and transversely furrowed, splitting at maturity into four equal valves.
Seeds and spores: Cossyria (f. 40) of a rich chestnut brown; the former spherical, the latter composed of a double leaflet.

J. identica may be reckoned among the most common of the tribe, and I was formerly of opinion that it might also be considered as one of the most distinct till my friend Mr. Francis pointed out to me the Var. répens growing in the vicinity of his residence, and Mr. Hatch very kindly communicated a plant which, though it has many peculiarities in common with the present species, yet has marks of discrimination so striking that I am induced to reserve a more full description of it for another part of this publication. It will be sufficient in this place to observe that it is distinguished from J. identica in having the leaves cut into three more frequently than into two segments, and in either case they are very distinctly but irregularly toothed. In the perichaetial leaves this distinction is still more obvious. The stipules also, instead of being variously scarious, are regularly bluish, with the segments only slightly toothed. The characters, which distinguish J. identica from J. heterophylla will be enlarged upon in the following description: so nearly, however, do the two plants approach, that, by some writers on the subject, they have been looked upon as mere varieties of each other; and indeed such was formerly my own opinion.

The agreeable smell that has frequently been noticed as diffused by this plant appears to be by no means confined to it alone. Dr. Schraden under his J. grandifolia (which appears closely allied to our J. trichomanis) remarks "Oder plante res celle graes Sandvall Cossyria habit discarnatus" In J. identica I have observed the smell to be more powerful after the plant has been dried for a few days, and then preserved by an application of moisture.

On the Jungermannia I have more than once had the opportunity of observing that pistillae are formed before the calyx, and, by examining the terminal clusters of leaves they may not

* Both leaves I have generally found to be divided into two, three, or even more segments, as the extremity, and then varying much in size and form. In it is possible that these may point from the only J. heterophylla (not 4.91 f. 71) to J. spicata and J. splendens.
unfrequently be found completely destitute of this part. In J. complanata, also, the calyx is to be seen in an extremely diminutive state at the same time when the pistils are fully formed; and I have reason to believe that this mode of growth far from being confined to these two plants, is not unfrequent in the genus.

Schimper's J. bidensata I have elsewhere mentioned as belonging to J. antirrhinum.

Schröder is the first person who discovered the stipules on this species. They are sufficiently large to be distinguished with a small power of the microscope, and are always present, throughout the whole length of the plant.

REFERENCES TO THE PLATE

1. J. bidensata (female plant) natural size.
2. Var. β natural size.
3. Female plant magnified.
4. Portion of a mericarp and lemma.
5. Leaf seen from its under surface, with a stipule.
6. Stipule.
7. Perichaetial leaves.
8. Calyx.
10. Setae and spiral filaments.
11. Var. β obtusa, magnified.
12. Stipules of Var. β.

* These two figures ought to be redrawn were taken out of the terminal node of leaves of Var. β, probably before the formation of the perigonal leaves, which have been described above.
JUNGERMANNIA HETEROPHYLLA

(TAB. XXXI)

JUNGERMANNIA, ERECTILE PROLIFERUM, RAMEOSA, SOLIDA VERSICATA-OVATA, DESICENTIBUS, APICE RANULI ACUTIS PLEATIQUE, OBSCUA, AMARGINATIS INTEGRIS, STIPULA BIS-TRIA SINI BICULA SUBDISECSICUS PLAUSTA TERNANIA, CALYXIBUS OVAIS, OBOVATIS TRIANGULARIBUS, EROSUM BIFLORUM.

JUNGERMANNIA HETEROPHYLLA SCHUMACHER, IN JOURNAL FOR THE BOTANIC N. J. 1479.


Plant Crypt p. 541 (exsiccatum) MIRBEL. F. 20. f. 33 at Hill. Herb. 1863. J. WARRI. SPEC.


JUNGERMANNIA KRAMERI S. ENGEL, 1695. f. 281. (exsiccatum) MIRBEL.

Zickenzwierum planum alpinum floribus flavis. HOLL. MARS. p. 486. f. 709. f. 12. (exsiccatum) MIRBEL.

HAB. First detected in this country by the Rev. R. B. FRANCIS, growing on decaying stumps of trees in Edgefield Wood, also at the foot of alders in Hanworth Meadows, Norfolk, and in an alder copse at Earl Sheil, Lincolnshire. I have since found it not rare in similar situations in various parts of Southern as well as very abundantly upon rocks at Sandlecombe, Wells. — Mr. Lycett has also discovered it in the New Forest, Hampshire, where he has observed the male fructification to be produced in November. The female is found in the early spring months.

PLANT growing in rather small and loosely-entangled patches, frequently among moss.

The roots in the present as well as in the species last described, originate here and there from nearly the whole length of the under side of the plant, but mostly in small tufts immediately below the laminae (Fig. 8).

Sorci from half to three quarters of an inch in length, prostrate, fuscous, with their axes, as well as those of the simple shoots and rami, erect of a pale green color.

Leaves (Fig. 3. 3. 4. 5. 6) scarcely ever exceeding half a line in length, frequently less especially at the base, and towards the extremity of the plant; more or less closely.
placed in different individuals, plane or very slightly concave, induratus horizontal of an ovate figure approaching to round, at the base emarginant, and dorsum at the extremity varying in a very remarkable manner. Hence the species has most justly been named, by the acute Schneider: *heterophylla*. Sarsely two individuals are found to correspond exactly throughout all the leaves in the figure of this part, though, in general (f 2). It may be considered as being in those placed nearest to the base of the stem acutely divided for about one third of its length from the apex into two acute segments which are distinct to a slight degree, while those of the middle of the pericarps have it obtusely emarginate with the segments also obtuse, sometimes truncate without any notch; and in the leaves approaching the extremity of the plant they are quite entire rounded off and frequently more ovate than the rest. In other specimens, however the leaves are sometimes all oblongate (f 4) or here and there and without any kind of irregularity intermixed with some that are entire, whilst others are acutely entire, and I have lately received from Mr. Lycett specimens among which were individuals having their leaves so nearly entire throughout that had it not been for the calyx and stipules they might really have been mistaken for a distinct species. In all the color is a pale green, varying from oliva into a deeper hue the cells large and ovate.

Portionals leaves as lines of *J. heterophylla* thinly incrustated in two rows at the base ventricose, the extremity somewhat revolute, emarginate or entire; they are found in well upon the same plane with the female fructification, as upon different individuals and often immediately below the pericarpial leaves (f 9 10 11).

These are still more remarkable for their difference of form than the cauline ones. In some they are altogether entire; in others both basif and entire, whilst some again are found which have the third pair from the calyx very obtusely emarginate (f 11) with blunt segments; the second pair deeply but obtusely emarginate with acute points, and these slightly dentated (f 10); and the first or calypella pair, varying with two or three acute acrate segments, of different sizes, distinctly and usually obtuse (f 7 9 8), but not are generally erect and appear to the lower part of the calyx.

Stipular (f 6 7 8) remain in each pair of leaves, appressed in the lower side of the stem, oblong, broad or oval, with the segments more or less distinct, and here and there toothed or incisated.

Male fructification *anthera* situated in small clusters, exactly resembling those of *J. heterophylla*.

Female fructification terminal upon the extremity of the several and short branches, as well upon some so short, that, without a careful examination they might be supposed in the lateral.

Calyx (f 12) coarsely three quarters of an inch long ovate, with the sides very obtusely triangular or even round (supporting a transverse section), the mouth expanded in some way down on one side and much incisated.

Calyces vary thin and delicate; I have gathered plants which had (probably in consequence of weakness in the capsule or stalk), carried up the calypella entire with the calyx, so to the anthera and though not in perfect anthesis as *Anthera* (f 13).
BRITISH JUNGERMANNIA

_Capsule ovate, dark brown, dividing into four equal, ovate-lanceolate valves and discharging the numerous seeds and spiral filaments, which are of a lividous color._

_J. heterophylla_ was well known to Dillenius, who justly appraised it in his _descriptiones_. Planchon _Breveiret et multituda minime praebent se procellatis_ (J. biestiana) et sequentia (J. heterophylla) speciei hiemanteo. Other authors, however, have considered it as only a variety of _J. biestiana_. It differs from that plant in the following particulars. Its mode of growth as far as I have been able to discover, is always in small and straggling patches, even when growing mingled with mosses. Its fructification is far more abundant. Its slat is much less. The leaves, though so variable in figure, are never that I am always at exactly divided into two equal and small segments. The stipules are less basiinvoluted. The style, shorter in proportion to its width, somewhat less angular, and the mouth more open. Some of the leaves undoubtedly bear a considerable affinity with those of _J. biestiana_, and it is probable that Mr. Frascati is correct in his opinion, in regarding this variety as belonging to the present plant. I have, nevertheless, been tempted to consider it as a variety of the former species, from the circumstance of the plants being larger even than the _n. b. _of _J. biestiana_, of the leaves being always unangulate and of the stipules being so much lacunated.

An examination of authentic specimens of _J. heterophylla_ which Mr. Schneider communicated to Mr. Turner leaves me no doubt as to the identity of our British plant; and that author describes the same stations in Germany as those in which it is found with _n. J. tenuifolia_. I am, however, inclined to think that both belong to _J. biestiana_. The _Hallerian synonym_ quoted by Lecoq and Wale, I have more reason to think belongs to _J. biestiana_ (under which species I have placed it) than to the present, and I am inclined to the same opinion with regard to the _Michelian_ synonym of the latter writer.

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<td>4</td>
<td>Portion of + stamens and leaves</td>
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<td>5</td>
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<td>Leaf</td>
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<td>Calyx</td>
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<td>Capsule with its calyptra</td>
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<tr>
<td>13</td>
<td>Seeds and epival elements</td>
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JUNGERMANNIA CORDIFOLIA.

(TAB. XXXII)

JUNGERMANNIA eunea erecta flore dense, dichotome foliis erectis, ovatis, cordatis, cuneatis, ovatis; fructibus terminalibus unilociis; calycebus oblongo-ovatis subplicatis; ore pannato denticulato.

In Highland Mountains of Scotland, in many moist situations.—Mr. Wands finds it in Ireland; and Mr. Lyell, at Iona and Coll, on August 15th. (Calyces were discovered, with ovalum germainum on the thirty-first of August, by Mr. Lyell.)

Plant growing in rather dense tufts, conspicuous from their black appearance, one or two inches in diameter.

Root a very few months; simple fibres proceeding almost wholly from the base of the plant.

Stems varying from one to two and one-third inches in height; flexible, waved, cellular; always erect and filiform; sometimes simple, but more frequently branched in an irregularly dichotomous manner, with branches of uncertain length, simple or at most producing one or two young lateral shoots; their color a dirty green or brown.

Leaves bifidus; rather distantly placed, from half a line to a line or more in length; the lower and the terminal ones generally the smallest; all of them erect or erose-patens, loosely indurated, cordiform; concave with their margins embracing the stem or an entirely to remote; their texture is extremely thin; membranaceous, and subdiamphanous; the cells of a roundish figure; their color a very dark olive or almost black; green-varying, in some situations to a deep purple towards the extremity of the plant. The leaves on the occasions exactly resemble the rest in figure, but are much smaller and have their margins more involute and more closely embracing the stem: the spines, however, are a little patent, so that these young shoots at first sight have somewhat the appearance of a Setaria. In drying, the leaves become much cramped, and do not recover in water without much difficulty.
BRITISH JUNGERMANNIAE.

The Perigonal leaves which radiate from the apex of a stem to nearly half way down, its length scarcely differ from the rest, except in having their base more concave.

The Perigonal leaves are also, in every respect, like the cauline ones.

Male Flower Structure. Anther situated in the axils of the perigonal leaves, large in proportion to the size of the plant, exactly spherical, reticulated, placed upon a short pedicel, transversely striated footstalk. On pressing any of these with an instrument, while under the microscope an extremely minute pollen, or granulated substance, was discharged, each particle of which was roundish, angular and semitransparent.

Female Flowering both terminal and arising from the axils of the branches.

Calyx oblong-oval, much lengthened at the base, the upper part slightly plicate, the mouth small and very indistinctly toothed.

Germen ovate, dark green.

Barren pubescent eight to ten in number, linear longitudinally striated.

The present is one of the most distinct of the British Jungermanniales with which I am acquainted, not even mentioning any to which it bears the smallest affinity either in the form of its leaves, or in the singular manner in which they embrace each other with their involute margins. The color too is very peculiar being extremely dark, so that when seen in water, it appears almost black. By immersion in water for a few hours, a deep brownish tinge is imparted to the liquid.

In the form of the calyx this species approaches J. acuta; but the calyx here is shorter in proportion to its diameter and less plicate; the leaves of the two plants are very unlike, and are strikingly arc those of the present species heart-shaped (when they are expanded, as at f & h) and so much do they in their general direction resemble those of Hypnum cernuum, that I have thought that the same specific name would also be applicable to the Jungermannia as to the Hypnum.

Mr. Dickson was probably the first person who gathered this plant since I find it among a number of untamed species that he has been so good as to send me, which were collected many years ago in the Scotch mountains. Mr. Wood has since gathered it in Ireland, and Mr. Lyall and myself in Scotland.
REFERENCES TO THE PLATE

1. A small cluster of barren plants, natural size.
2. Plants with male fructification and the female in a young state, natural size.
3. Plant bearing anthers and style, magnified.
5. Perigynial leaves.
6. A single perigynial leaf expanded to show the form of the leaf and the auxiliary anther.
7. Full-grown anther.
8. Young anther.
9. Full-grown anther broken, to exhibit the pollen.
11. Calyx.
12. The same longitudinally dissected.
13. Fossilia.
JUNGERMANNIA SPHAGNI

(TAB. XXXIII)

JUNGERMANNIA media presensulcata, simpliesulcata: (lunulatisulcata, gemmae solitariae, solitariis stipulatis!) foliis velerubratis, bracteis in rami propriis terminalis; calycebus oblongis, utrinque attenuatis, ore contracto, dentato-lato.

JUNGERMANNIA SPHAGNI. BRICK. Crypt. Syst. I p. 8. N. L. 
HARRIS. Germ. III p. 88. 

Ha. Marshy places, particularly among Sphagnum Isolatum and capillifolium.—Near Crowden. Mr. Dickson.—Holt Bog. Rev. R. W. Francis.—Belton near Yarmouth. Mr. Turner.—Near Belfast, Ireland. Mr. Templeton.—Bogs, on mountains, near Hanley 
Moss. Hutchinson.—New Forest. Hampshire: most abundant (bearing gemmae in October and November and young fructification towards the end of the latter month.) Mr. Leyl.

This remarkable Plant grows either in loosely entangled patches of some inches in diameter, or more straggling, when attached to the stems of Sphagnum.

Roots of two kinds (1 4), small radicles such as are common to almost all the species of the genus consisting of minute whitish simple, and pellicoid fibres proceed tolerably abundantly from nearly the whole length of the plant, but among these at uncertain distances descend radicles of a much larger size, and from two to three lines long, of a whitish untis rather opaque, though I cannot perceive that they have any of the cellular structure, sometimes simple, but more frequently divided by those or four small lateral and oblonging sheets.

Stems from two to four inches in length prevenient upon the substance that affords them nutriment, and consequently erect with regard to the horizon, when they are attached to the upright plants of Sphagnum (f 8 3), as ferment from simple, or only producing here and there short innovations, which resemble the main stems, and are of a yellowish-green color while that of the principal stems is pale yellow-brown.
BRITISH JUNGERMANNIÆ.

The Leaves (f 4) which are in general about half a line in length, are bifid, alternate, for the most part so closely placed that their margin are slightly imbricated over each other; though sometimes as may be seen at f 5, they are more distant and have often a vacant space between each pair. They are patent or erect, rarely horizontal, through an arborescent figure on the upper side convex, below concave. The cells here are at the abaxial face of the leaf nearly quadrate and regular in figure, giving the edge a slightly margined appearance; in other parts they are rounded and so minute as to be seen only with a tolerably high magnifier. The color varies from a rich yellow brown to a pale yellow-green, having the tips of the leaves and especially of those that are nearest the extremity of the stem, not infrequently tipped with purple.

The Perigonial bracts I have not yet seen.

The Perianthial case are confined to the short proper footstalk of the fructifications and are at the base roundish and entire, after which they become attenuate, and, the more they approach the case, the more frequently are they divided and inclosed; the uppermost are the largest oblong-ovate and cut into five or six incised in toothed segments; their substance is more loosely cellular than that of the other leaves, their color a much paler and more yellow-green.

Stipulae are discoverable on this plant, but only on the shoots which produce the gemmae which are also furnished with leaves of a much smaller size than those of the main stem though similar to them in shape. Each stipula is oblong or ligulate, obtuse, entire, except in those that approach the extremity of the shoot, where they are attenuate.

MALE FRUCTIFICATION UNKNOWN.

FEMALE FRUCTIFICATION situated upon short proper footstalks, which are often lateral originating from the underside of the plant, terminal.

The Calyx is about a line and a half long of an oblong figure, but attenuate at each extremity extremely attenuate, which is semi-peltate (so as to show the young capsule within) and slightly plicate; the mouth contracted and a vein toothed. The fructification I have not seen in a more advanced state.

Gemmae are found in great abundance and perfection in October and November, always upon elongations of the extremity of the plant which are readily distinguishable from the rest of the stem by their smaller size, by their gradually tapering towards the apex by the diagnostic leaves, and still more easily by the stipules which are confined to them. At least Mr. Lyall and myself have a vain searched for them throughout the rest of the plant. Both the terminal leaves and stipules are a little attenuate and bear a few scattered gemmae, which are supported, in the form of little globules sometimes single and sometimes two or three together, on the extremity of the shoot. Each particle is very minute, somewhat bent with a number of angles, semi-peltate, and of a pale yellow-green color.
BRITISH JUNGERMANNIÆ

It is to Charles Lyell Esq. of Bartley Lodge that the botanical world is indebted for most of the above interesting particular relative to the fructification and genome of Jungermannia Sphagni. The industry and research of this gentleman in the tribe of plants which are the subject of this publication have been unceasing, and his success (as these pages will amply testify) has been commensurate with his zeal. Till very lately Mr. Dickson's original specimens, from which his figure and description were taken, was the only one that had been found in fructification, and I exceedingly regret that it has not been in my power to add to the accompanying plate figures of the specimens in that state which Mr. Lyell has so liberally communicated to me. They will however appear in a supplementary number for which they are reserved.

It is almost needless to point out the discriminating marks of a species so distinct as the present, and I shall content myself with observing, that the large radicles, and the peculiar form of the calyx, together with its proper footstalk are I believe, unfailing to this species. The leaves, also, though they bear no small resemblance in general outline to those of a new Jungermannia, which I propose calling J. Tephyra, as well as to some of the leaves of J. amnaria, and to those of J. scalaris, may always be known from those of other Jungermanniæ, by the firmness of their texture and by the remarkable smoothness of the cuticles, combined with their general shape.

Although Jungermannia Sphagni, in a barren state, has been found in various parts of England and Ireland, yet the continental botanists seem to be indifferently acquainted with it. Hoffmann, indeed, Roth and Lamarck, have noticed it in their respective works, but they have copied almost verbatim the description of our English cryptogamist Mr. Dickson. It is certainly found in Sweden, whence I have received specimens from Dr. Swartz.

REFERENCES TO THE PLATE

Fig.
1. 1 J. Sphagni natural size, and magnified 6
2. 2 The same, natural size 6
3. 3 J. Sphagni magnified 6
4. 4 A leaf with a portion of the stem and roots 3
BRITISH JUNGERMANNIAE.  

JUNGERMANNIA ANOMALA

(TAB. XXXIV)

**JUNGERMANNIA anomala** prolance, sempiterna folia orbicularibus his rotundato-ovatis illis ovato-acuminatis stipulis latis angustatis.

**Hab.** Holt Lewis Bog on the south side of Edzell Hill on the road to Holt and at Holt Wood, growing both upon peat earth and among Sphagnum. **Err. & B. Emslie.**—Westleton Bog near Halesworth, Suffolk, and boggy places in various parts of the Highlands of Scotland—Summit of Devil Mountain in the county of Antrim and in Auldeith Bog in the county of Done. **Mr. Temple.**—Near Boundary growing among J evans Miss Hutchinson.**In bog at Kinlochry Kerr's farm and in the New Forest Hills Mr. Eyell**.—(At the best-mentioned place Mr. Eyell finds Anthems in October. The genus are in great perfection in November)

**Plants** growing in loosely entangled and scattered patches either attached to the earth, or more frequently in the stems and leaves of Sphagnum among which it is generally found.

**Root** consisting of numerous, small whitish, pedunculate, simple fibres which descend from nearly the whole length of the under side of the plant.

**Stems** from two to four inches in length and about a quarter an inch or more in diameter, prostrate to ascending; ovoid or orbicular, only one or two short lateral branches from beneath the leaves: **internodes** is rather fine, its color varies from a yellow-green to a dark brown, and in some situations almost to a black; the internodes are of a more delicate texture, and more distinctly cellular and partake more of the color of the leaves.

**Leaves** from half to three-quarters of an inch long, more or less distinctly placed in a sericeous manner varying in their direction from horizontal to patent and (as is frequently the case) to erect, not less variable in their shape, which is either orbicular-ovate or approaching to ovate or altogether ovate with acute apex; the orbicular leaves (f. 11) are in almost every instance concave on the upper surface and convex beneath. Those of the second description (f. 12) are likewise slightly concave whilst those that are ovate and acute are fully plane (f. 14) or concave or have their sides incurred (f. 33)
Ovate-oblong leaves are sometimes found throughout the whole length of an individual, but it more frequently happens that those at the base of the stem alone are of this shape, and that they are more acute at the extremity at the extremity. Three or four leaves (before their expansion) often embrace each other so closely as to form an oblong acute mass, which may, without examination, be readily mistaken for a calyx. It is to be observed that the upper leaves in green, or greenish, plants are often jagged at the point, as cut into two, three or even into more obtuse teeth. The collars are throughout remarkable in large proportion to the size of the leaf, and are conspicuous to the naked eye, when the plant is in a dry state, by a punctuated appearance. They are of a roundish form, except at the border, where they approach some near the juncture and toward the edge, and in the ovate leaves the collars are of a more obtuse figure. The color is generally a rich but rather pale yellow-brown, the spaces of the leaves often slightly tinged with purple.

Stipules small, subulate, one to each pair of leaves.

The Perigynous Leaves differ in no other respect from the rest, than in having at the insertion of the calyx a small, spherical, reticulated footstalk, or filament, while situated transversely.

British Jungermanniæ.

One, Amanita, is found on this species throughout the greater part of the year but most plentifully in the autumn. They form two or three rather compact spherical clusters, of a pale yellowish-green color at the apex of the terminal leaves, which soon below them also bear them, either as small globules or loosely scattered. Each particle is semispherical, pustulate, and roundish but angular. It may be well to remark that the leaves, which support them seem to be injured, and that their spores as it were exuded and spewed after the dispersion of the Genus.

J. annua was first discovered by the Rev. B.F. Francis, who has for many years remarked it in its immediate neighborhood. I have also received it from other parts of England as well as from Scotland and Ireland, but always without any of its parts of fructification except the Amanita, which have once been found by Mr Lyell. Dr Swartz has sent it to me from Sweden, gathered along with J. Spargii.

The most striking features of this plant are the uncertain form of the leaves, varying even on the same individual, from ovate to ovate-oblong, and the large size of the collars in proportion to that of the leaf. In the former particular it has a affinity with many species with which I am acquainted; and in the latter it bears a resemblance only to J. Typhleri, which also has stipules growing very nearly in figure with those of the present species. In both they are
British Jungermanniae (J anomala)

not discoverable without considerable difficulty, and in J. anomala they altogether escaped my notice till within these few days. They are most readily seen towards the extremity of the plant, all the rest of the under side of the stems being so much covered by the roots, though they then exist also.

The principal difference therefore, between J. anomala and J. Taylori consists in the presence of the ovate and acute leaves of the former which are wholly wanting in the latter; other marks, though much less to be depended upon, may be found in the densely-crowded patches in which I have always seen J. Taylori grow so that the individuals are forced into a nearly erect position, and in its color, which, in all the specimens that have fallen under my observation, has been for deeper and generally with a purple hue throughout. The fructification of this plant, which alone could remove all doubt respecting the specific difference of these individuals, has, unfortunately, not yet been discovered.

References to the Plate

N°.

1. J. anomala gemmiferous plant natural size.
2. The same, magnified
3. Perm. plant, natural size
4. Portion of the same, magnified
5. J. anomala with entire leaves throughout, and innovations, natural size.
6. The same, magnified
7 and 8. The same with the leaves erect, natural size and magnified
8. A more common appearance of the plant, natural size.
10. The same, magnified
11, 12, and 13. Various leaves, magnified
BRITISH JUNGERMANNIAE

JUNGERMANNIA LAEVIGATA

(TAB. XXXV)


HAB. Upon the earth in a wood on the north side of the banks of Lochnean.—Mr. Brodie has given the specimen found at or near the same place.—Communicated to me likewise by Mr. J. Y. Cockeburn, whose brother the late Mr. Maclay of Edinburgh gathered it in Scotland.—Near Bantry, in a mountainous situation Miss Hutchins.—Upon a rock, on the Castle-Hill, Kinrossshire, Barrle-Main Mr. Lyell.

PLANT growing in loose patches which lie over each other in an irregularly imbricated manner. Root consisting of a few very small, simple stems descending at distant intervals, from the lower side of the plant.

STEMS procumbent, close, from two to three and even four inches long, beset with many distichous, nearly horizontal, scattered scales, which vary from half an inch to two inches in length, long and short being interspersed without order; the smaller ones simple, the larger again pinnated by a few short and simple leaves, equally irregular in point of size, number, and position. The whole of the branches are singularly attenuated at their origin, but then linear, and blunt at their points; their texture is firm; their color a dark brown.

LEAVES (1 1 9 4) in general about half or three-quarters of an inch long, those at the base and extremity of the stems and branches smallest; it very unfrequently happens that the even outline of the shoots, which is in general remarkable, is here and there interrupted.
by smaller leaves or much as are divided, as may be seen in fig 1 and 2. They are very
where bifidious closely imbricated near the upper side of the stem, and placed
alternately with great regularity and exactness, divided into two very unequal con-
duplicate lobes, of which the upper one is much the largest convex on the upper
surface, more or less smooth and even glossy of an oval figure approaching to round,
with the margin sometimes entire but more frequently spinose-dentate, the teeth
being of very unequal sizes placed at distant but uncertain intervals, and generally
incurred, the inferior division or lobe is scarcely one third as large as the superior
to the under side of which it is closely opposed in a direction oblique with regard to
the stem, its form is oblong or subulate six margins every where dentato-spinose with
the teeth uncommonly recurved. The petals are very small, roundish; the color a dark
olive-green, sometimes inclining to a yellow-brown.

There is one Stripsus (15) to each pair of leaves oblongo-ovate and equally with the
lesser lobes of the leaf on which it exactly resembles in size and shape spinose-dentate
at the margin, having its teeth in the manner now and then recurved.

Dr Schroeder appears to be the first botanist who detected this species, and published it as
distinct from J. platyphylla, to which I must confess to be as close in affinity (and especially
to the see Thapsa) in every thing but the spinose-dentate margins of the lesser lobes of the
leaves and of the stipules that I cannot help offering it as my opinion that future discoveries
may prove it to be a variety, though a very strikingly marked one. At the same time I must
observe that in all the specimens I have examined of J. platyphylla I have never found the
stipules and smaller lobes of the leaves to be otherwise than quite entire in the margins. The
differences in size and in the smoothness of surface mentioned by Schroeder will not hold good,
the same being found to exist in an equal degree in J. platyphylla.

Dr Roth has done no more than copy the description of Schroeder and add synonyms from
Michaux and Dillenius which appear to me rather to belong to the J. Thyja of Dicker; so that
no new light is thrown on the matter in his work. Lassauz also describes a plant under the
name J. lericisis, in his Flora Francisco and cites Schroeder's name as a synonym; but his words are
at variance with his reference as that though I have thought it best to quote him above I
have done it with doubt, and I fear it must be admitted from his description, that his J. lericisis
is in reality a totally different species. Les feuilles sont en boutons, mericés, ovato-ovales, larges, courtes, tres obtuses, presque trapeces, demesnees d'une petite
pointe acerate, adnates aux beaux bordes dépoussus de nuances et des stipules dépoussus sur deux
ranges d'une manière peu prononcée.

The fructificatus, which I have never yet seen was also unknown to Schroeder and Roth.
**REFERENCES TO THE PLATE.**

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JUNGERMANNIA TOMENTELLA

(TAB XXXVI)

JUNGERMANNIA TOMENTELLA

British Jungermannia, Saxifraga folio hispinum, lamellata bilaebia labia inferiorem minorum; superos orbiculata bipartita; utricaque spicis marginalibus capitulis multiformibus; stipulae oblongae, basim ad margines cylindricos, bivalvis; acris aperto.


Jungermannia saxatilis, folio crepis capillaris multiformi. Hall. Muc. 1. 1831.

Jungermannia saxatilis, folio crepis capillaris multiformi. Hall. Muc. 1. 1831.

HABIT
Plentiful in moist places in various parts of the south, west, and north of England, as well as in Scotland and Ireland. So abundant is it at Allan a Ford near Durham that Mr. Thorold informs me he could in a very short space of time, have loaded a cart with it. — (Mr. Lyell finds it with northern in Ordnance, and Diffenbach observes that the capsules are produced in the month of March.)

PLANT
Growing in densely crowded patches, often covering a space of ground of several feet in diameter, and producing very conspicuous at a distance, from its extremely pale-green color.

Root nearly any except a few pollen. Short, and simple fleshy which may now and then be seen towards the base of the plant.
BRITISH JUNGERMANNIAE

Stems from two to three and even four ½ inches in length, and about the half of a line in breadth, nearly erect. Among the primary division which takes place near the base is generally dichotomous, the rest of the plant is pinacoid with patent alternate and somewhat distant branches, from three to five lines in length, which are in like manner often again rachis with still shorter pinacoids. The extreme ones are very slender and alga somewhat resembling the rachis of an ear of barley. The texture is everywhere firm and compact, closely cellular, particularly in the lower part where it is of a brownish hue; the rest is of a yellow-green color.

Leaves (⅓) about half a line long, but what is remarkable, nearly larger on the main part of the stem than on the secondary branches; then appearing as if these stems had outgrown the leaves which are in that part also distinctly placed. In the rest of the plant they are more or less closely imbricated over the upper part of the marcell and at this extremity they form a thick head or tuft. Each is patent on horizontal with regard to the stem divided into two unequal lobes of which the lower one is the smallest place conduplicate with the upper one and appressed to its under surface. The superior lobe is plane or very slightly convex, acute or obtuse, nearly to the base into two linear or linear-lanceolate segments, whose apex is minute as well as those of the lower lobe (though not in so great a degree) are divided and subcuneate into many capillary segments of various lengths and in variously curved, which give a somewhat appearance to the whole plant and render the true figure of the leaf very difficult to be observed. The cells on the lower side are oblong rather large in proportion to the size of the segment, occupy the whole diameter. In the narrowest part of the divided segments they occupy the whole diameter. This is composed of minute capillary and slightly branched processes which under a high power of the microscope, are seen to resemble the rachis of the lines placed upon the leaves, and by these have the pointed appearance of a Conifer.

Stipulae one to every pair of leaves, subcuneate, generally about the width of the stem, to the apex is a number of very narrow and, frequently branched segments.

Flowers 

Anther situated in the upper surface of the stem, in the middle of the leaves, spherical, radiated, of a gramineous hue, and placed at the extremity of a short white filament.

When the plant is dry, the distinctly placed stipulae on the larger part of the stem, become white, and give the appearance of being papillate.

Haller describes these as occurring in the length of half a line, in the neighborhood of Berne, in Switzerland.
BRITISH JUNGERMANIAE.

**FEMALE FRUITATION.** In the axils of the primary divisions of the stem.

Calyx (fig. 1, &c.) nearly a line and a half long, oblong-cylindrical, a little increasing in size towards the mouth, which is expanded and cleft. Its whole substance firm and subcorneous; indeed, as much so as that of the stem, with the nature of which it seems to agree. It is of a yellowish-brown color and is, on its exterior surface, beset with those papilliform branching processes, which I have described above as the periblastic leaves sheath from the upper margin had all fringes.

Calyx none (see fig. b.) At least in the only specimen of the only that I had an opportunity of dissecting I was not able to find any. It was however twice seen in England, and one time acquainting with two foreign species of this genus that have less present the periblastic leaves arising from the calyx, in which I have universally found that the calyx was wanting; a circumstance that tends to confirm my belief that the genus so homo is otherwise destitute of that part.

Podii cuneiformis or ovoid, two inches in length, ovate and slightly twisted, fixed into the receptacle by means of a small anobical bulb and terminated by the capsule of an oval shape and deep purplish brown color, dividing at maturity into four equal valves.

The seeds and spiral placentae (fig. b) which have only seen from an imperfect capsule, are of a fulvous color; the former spherical, the latter composed of a double helix.

---

*J. tomentella* is readily enough distinguished in its place of growth, from every other species, on less by its very pale color than by the extent of ground occupied by its shoots. It bears considerable affinity with the *J. reticulata* of Linn. but besides the great difference in color (*J. reticulata* being always more or less of a rich yellow-brown) our present plant is much less coarsed in the upper surface of its leaves, which are divided into narrow segments and the latter are considerably longer and more numerous, as well as greatly more branched than is the case with that species in which, moreover the stems are almost always procumbent. In the Bankian Herbaceous as well as in Smith's and M. Turner's, are preserved specimens of a Jungermannia from New Zealand and the Sandwich Islands closely allied to this, that I cannot do otherwise than mention it in a variety and, indeed, I am unable to point out any difference except in the ramifications which in the exotic specimens is simply planate and in that respect approaches in its mode of branching to *Hypnum Cristatellum* infinitely more so than *J. tomentella* does as observed by Weis.

Dilleniis justly says, when speaking of the figure of this species by Villaret, "*nec enim cum foliis et ramos villulentis beatus repentem*" indeed, it bears a much nearer resemblance to *J. fasciculata* of whom his Ficus India Parvifolia than to our species. It was reserved for the author of the *Hetera Microcarpa* in respect with great correctness the interesting plant and his description is scarcely less accurate. "*Ramos flabellata* he observes "*necorum tabulæ tabulatæ* et foliis frequentissimis vestallarius, pseudern vebe, proceniis, pro paucis ramos carnium sunt.
BRITISH JUNGERMANNIEL.

Follic non squah arboris sicta superbat et per margines, inferius autem gomphato eau sunt, foliis latiusculis villosis quibus lanceolatis finguere rectis. Auctore Dillenius considerat stipule ut a kind of leaf, but I can by no means agree with him in supposing that by help of that part the plant is affixed to the ground, though it is probable that roots are produced immediately from its base by which the plant may be attached to the soil or to other individuals of its own species.

Kehrert in his Beiträge first applied to this species the appropriate name of *somentilla*; and described it with his usual perspicuity. Wlez, on the contrary, Wlez, Hudson, Wutherige, and even Lamarck, in his Encyclopædia have confounded it with the true *J. cilium*.

The older Botanists called this plant *Maccan Abela&thi fidei*, but a more striking comparison would have been with the leaves of the *Ceratophyllum*, Tournouer add, *lipsipes*, while Dillenius remarks, "Lipsipes can est hic Maccus, sed abelae non tancon amnias." To me, however, it appears to be tasteless, or at least to have only a flavor which it might possibly from the earth.

The fructification represented on the plate was drawn from the specimen in the Linnean Herbarium.

REFERENCES TO THE PLATE.

1. *J. somentilla* natural size.
2. A female plant of the same natural size.
3. Portion of the stem and branches seen from beneath, magnified.
4. A leaf and stipule.
5. Capsule and corolla.
6. Ovary longitudinally dissected, with the young capsule, fruit stalk, and its bud.
7. Pericarpial lumen.
8. Seeds and spiral filaments.
JUNGERMANNIA GRENUMATATA.

(TAB. XXXVII)

JUNGERMANNIA, caulis procumbente ramoso, foliis rotundatis, margine fructu terminali ovatis, compressis longitudinallis quadrangulatis. (a) contractis, setato.

Jungermannia crenulata. Engl. Bot 1 1493

Sub JUNGERMANNIA graminifolia, folius minutis distantiis.

Jungermannia gracilissima. Engl. Bot 1 2358

Habitat Stepney, London, Miss E. J. E. Young, Mr. W. D. H. Fens. — On the boggy parts of Holt Heath, Norfolk; among Coniferous Trees. Rev. R. B. Wallis, Esq. — Near Bury St. Edmunds, Miss Hatfield. — On the moors of the New Forest, Hants, and at Kempsley, near Truro, Cornwall. Mr. Lyall. — At Place Forest, Mr. E. Forster. — At Mont pleasant, near Blandford. Mr. George Don. — At Richmond, Mr. Skene. — On sandy loam in the New Forest, near Windermere, and at the roadside in the vicinity of the latter. — (Young fructification is tolerably plentiful in the months of October and November.)

This Plant grows in rather dense, thicket-like patches of various but generally considerable extent. Roots simple, whitish, fibrous, which descend here and there from nearly the whole length of the under surface of the plant. Stems from an inch to nearly three-quarters of an inch in length, all from somewhat. Sexes rarely separate, mostly twice as twigs irregularly divided, with rather slender and simple branches, which gradually lessen towards the extremity; flowers, which resemble those that still more slender are frequently produced. The flowers of all of

Fresh specimens seen to be the most crowded in their mode of growth, and I present, from Mr. Lyall, 5265, which bears almost an entire rosette of calyces,
BRITISH JUNGERMANNIÆ

there is tender and composed of numerous cells, which are readily distinguishable with
the microscope. The color is a dull green at the apices frequently purple.

Leaves (1-5) by oc means closely placed in the harvest shoots but crowded and
obstructed in the fertile ones; in this form they are considerably smaller in the
former than in the latter the upper ones, which are the largest of all, are nearly half a line in
length in many instances erect gradually bowing as they recede from the calyx; the rest on the
contrary become smaller in proportion as they approach the extremity and are generally
petulant; all of them of a nearly circular form (the lower ones sometimes becoming to oval)
converse, with the margins usually entire. Their leaves are somewhat narrow: the
leaves are small: roundish - ovate at the margins, where they are situated larger more
regularly quadrate forming a curve and very conspicuous border which is often to
remarkable in a dry state when it becomes a little recurved and is distinguishable by
this circumstance, and by a somewhat paler color even with the naked eye. The extreme
edge of each of the marginal leaves is often swollen thus forming the segment of a
circle, of course gives the leaf a curled-up appearance; whereas the name
adopted by Dr. Smith. This is however by no means universal so nor have I ever
seen the leaf altogether so much curled ed as the figure in English Botany represents it
to be. The border itself is not frequently very obscure in the younger leaves and in
this no evident in those upon the fertile shoots. The color of the leaves is extremely
variable. I possess specimens gathered by Mr. Lycett, which are wholly green but the
most usual here is a dull olive with the extremities often, and the terminal leaves
generally altogether of a rather deep purple

The Perigonal leaves resemble the rest except that they are more crowded and those base is
swollen for the reception of the anthems. They are situated in various parts, but most
frequently about the middle of the stem.

Perichaetial leaves differ in no respect from the rest that are placed upon the fertile part
of the stem. When the calyx is young they form a sort of cup around its base and when
that part has reached its full size they are about half its length or more and are closely
appressed to each side of it. They sometimes appear to have their origin from the lower
part of the calyx itself but this is by no means constant. For the calyx and perichaetial
leaves will often be found to have one common point of insertion, at the extremity of
the stem.

Male Ferticulation situated in the axile of the perigonal leaves in shortlets, consisting of
two or three, or more, each of which is spherical and reticulated and supported upon
a short stem, robust and stalk.

FEMALE FERITICULATION terminal upon the main stem.

The Calyx (1-5) in three-quarters of a line or more in length of an obscure figure,
laterally compressed and furnished with four longitudinal angles which in the fully
grown calyx, are prominent and acute but in the younger state for has evident and
obscure; at which time also, the whole calyx is more spherical and may readily be

* Unless, indeed, as may happen with almost every species of the genus, the production of a shoot immediately
beneath should give the appearance of being hoarly. The seemingly hoarly situation may be eons readily
distinguished from a truly hoarly one as a consequence of the much larger subulate leaves, on the upper part of
the main stem
supposed, by them who have not the opportunity of tracing it in perfection, to belong to
a different species. The mouth is much contracted and never was seen prominent
always irregularly toothed. The color and texture correspond with those of the leaves.
Calyptra (1 6) thin delicate of a pale yellowish-brown color, elegantly reticulated, and
termimated by a short style.
Podarcs half an inch or more in length white, pallid, translucent.
Capsule (1 8) ovate approaching to spherical, of a deep, abiding brown color, longitudi-
nally and transversely furrowed.
Seeds and floral filaments (1 9) of a carmine color; the latter are form of a double hair,
and adhere after the discharge of the seeds, to the margin of the valves of the capsule,
the former are spherical.

The nor β J. granulatum of Engl. Not so similar in all its parts than α; the stamens, too, are more
lengthened and slender and are furnished with very minute, distinctly-placed, and more ovate
leaves, at least on the barren shoots. For the sterile now differ in no respect from those of α;
like them too, being very distinctly bordered with large quadrund cells, whilst in the rest
this appearance is not least observable.

The present species, which belongs to that division which may be called "Echinochaeta foliis
distichis integris", is at once to be distinguished from the rest of the same tribe by its qua-
drangular culms, and its curiously margined leaves. In room of these however as has been
already remarked, especially of the nor β, the border is obscure, and they then bear no small
affinity to those of J. angustifolium from which, at the same time, the small stipules will always keep
the plant distinct even should the fructification be wanting, which is totally different in the two
species in question. Leaves of the kind just mentioned have some resemblance in figures to those
of J. pumila and J. talus, but besides that these last are always of a more delicately texture
their far greater size in proportion to the diameter of the stem and their more crowded mode
of growth, will prevent them from being mistaken for those of J. cornutum. As I am not aware that
there is any other species that is at all likely to be confounded with the present, it will be
unnecessary for me to say more on its specific character. With regard to J. granulatum of English
History, the sterile plants have a very peculiar appearance, and this true mark of the species will
be found in the sterile shoots, and I am particularly happy to be able to add, that Mr Lyell, who
has been at great pains in examining and comparing the two, and long thought them distinct, now
perfectly coincides with me in considering them merely as varieties of each other; β may often
be found with α, as well the intermediate states of the two.

Beggar-ticks in various parts of the extent of kingdom produce this petty plant. Mr. Francis
has for many years remarked it in the neighborhood of his residence, but Mr Barron's specimen,
found in Sussex, are those that have been first published. These grew to a larger size than the
Norfolk plant. No author but Dr. Smith has noticed the species, and indeed does it appear to be
an inhabitant of the continent.

REFERENCES
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BRITISH JUNGERMANNIAE.  (J. inflata.)

JUNGERMANNIA INFLATA

(TAB. XXXVIII)

JUNGERMANNIA, caules praecipue simplices vel ramosa foliis suberectis, ovatis vel oblongis, segmentis rotundis obtusis (feminaterminali), calyptrae pyriformibus, seminibus cornucopiis, dorso.

Jungemanna biflora,  Summer. Jour. p. 940 t. 44. f 2  (tent syn. Dual.)
Jungemanna bigera, var. 1 Wiss. null. pl. 853.

HA: Moist and frequently boggy places in various parts of England, Scotland, and Ireland.
Lc. Shows it abounds on the chalky downs.—(Mr. Lyell finds the authors in July in the New Forest, Hants.—Calyptrae are found during the greater part of the year; but capsules have been met with only by Miss Hutchinson and Dr. Taylor in Ireland during the early spring months, and by Mr. Lyell in the New Forest in July and again on the ninth of January, 1816.)

PLANT growing in very densely nestled patches of considerable extent, conspicuous from their deep green or almost black color.

Root consisting of numerous minute short whitish and simple fibres, thrown out here and there from the greater part of the outer side of the plant.

Stem from a quarter to half an inch or rather more in length, pyriform, furrowed or grooved, simple or in two or three simple or compound ramosities, which are either like the parent stem—procumbent (f 4) or erect (f 8) when the plant grows among grass or meadow. The entire verses tend to pale green to an olive brown. The texture is rather firm, composed of oblong cells. I nasturions are new and then found mingling from various parts of the stem, which much resemble the smaller branches.
BRITISH JUNGERMANNIAE

Leaves (2 6) more or less closely placed* in a haphazard manner generally oval or oblong in the lower part of the plant; the upper ones somewhat elongated horizontal, patent or even recurved, frequently concave, occasionally markedly so (see Fig. 7); sometimes also pinnately compound, and divided for nearly one-third of the way down from the apex by an acute sinus into two obtuse and entire segments. The cymules are small, roundish. The calyx varies from a pale yellow-green (if the plant grows in a much sheltered spot) to an olive-green or a brownish-black.

Pseudostem leaves produced at the extremity of the plant, where they are closely imbricated and ventricose at the base. In other respects they exactly resemble the rest.

Pseudostem leaves remarkable in being smaller than the other leaves which they otherwise resemble. Two or three of them closely enclose the base of the calyx.

MALE FRUITIFICATION.** Anthers are found in the nodule of the perigynous leaves of a spherical form of a pale olive-green color, reticulated, supported upon a footstalk which is transversely striated and about equal in length to the anther.

FEMALE FRUITICATION terminal, though occasionally appearing lateral from the peculiar insertion of an ovary.

Calyx large in proportion to the size of the plant, half or three-quarters of a line long at first nearly spherical, at length pyriform, in abortive, with a lengthened and tapering base, above somewhat pleated, on sides much contracted and cut into a few obtuse and unequally-nosed teeth.

Pistil (7 10) eight or ten in each calyx short, lanceolate, obtuse of a greenish color, longitudinally and transversely striated.

Siliqua ovate, reticulated, sublinear, ligulate with a short style.

Pod批发 from two to three as even four in length, cylindrical, terminated by the brown, ovate.

Carpel which is externally slightly furrowed and opened into four equal, or (according to Schmidt) three variously jagged valves.

Seeds and spicul filaments of a brownish-brown color; the former spherical, the latter composed of a double fiber and continuing attached to the margins of the lobes in a peculiar manner as well as to the centre of the capsule in a peculiar shape.

As the haphazard nature of the leaves has alone been so fortunate as to discover genuine upon this plant: I shall offer no apology for transcribing his account of it to render any description of the more complicated.*

* Sunt tres alia feminis, quas November meret perfossam, dilectam amant, aut hostili, amant, sociam salutum publicum, quas semper solvunt ordinim imbriciatis monti. In haux semper sub viticoles plectantia folioscens

** Upon the innovations they appear to be always very distinctly placed, and smaller than the sun,

* Schmidt says they are sometimes mixed with white. "Vasculum caprae capsum, magnum ac pedum pedum conducentis in folia fusimissim spheroides, quae formant illa internuncio, superficierint, quae impetrant, nonnullis, superfluum, atque latentiae aliae. CONSEQUENTIALIA ENSALAT A.

† Cupul, 249

* Schultes, Eberm. p. 249. "Vasculum caprae capsum, magnus ac pedum pedum conducentis in folia fusimissim spheroides, quae formant illa internuncio, superficierint, quae impetrant, nonnullis, superfluum, atque latentiae aliae. CONSEQUENTIALIA ENSALAT A.

† Cupul, 249

* Schultes, Eberm. p. 249. "Vasculum caprae capsum, magnus ac pedum pedum conducentis in folia fusimissim spheroides, quae formant illa internuncio, superficierint, quae impetrant, nonnullis, superfluum, atque latentiae aliae. CONSEQUENTIALIA ENSALAT A.
To our countryman Mr Hudson is due the credit of first distinguishing the present plant, which has consequently been published. Though no other author since his time seems to have spoken of it of his own knowledge except Schiedeck, who in the place above quoted, gives a figure as admirable as is his description. From the former of these not being myself at the time the plate was in hand, acquainted with the perfect capsule, I have copied the representation given at I. Of the species in question being the loba of Hudson I can speak with certainty having had the opportunity of comparing it with his original specimens, and being also furnished with others, which Dr Swartz gathered in England when in company with its discoverer. In Germany according to Schiedeck the plant seems to be not uncommon and in Sweden it is not scanty abundant than it is in Britain. Dr Swartz informes me that it grows near the exhibitions arising from the copper-works at Falun. E ochius cause, he writes upon the cover of one of the numerous specimens that he has communicated to me, vasculi Johnsonianum adscantiam, vid Flora suecica ob submersus potius quam quo procellis aliquem super terrae emergit. In this situated J. inflexa occurs to flourish though it is destitute of fructification.

The singular form of the fully-grown calyx of this plant, and the obtuse segments of the leaves together with the deep alive or almost black color are marks by which J. inflexa may be known from every other and after the accurate character given of it by Hudson, and the elaborate description and figure by Schiedeck. It is not a little remarkable that both should suppose it could possibly be a variety of J. incongruus. His words are: Bulbs (J. incongrus) protractae nonnulli quidem sibi, J. bicolor, Schid. Habitant suaviter plantem nunc bi-nunc quaeque vilius inter se dantur quae in postea regions plantis nunc bi-nunc et pluralique filia observatur. E. Germ. nii, p. 390). Without this has fallen into an error no less striking since he has made it the rare J. of J. bicolor (see J. heterophyllum). To this mistake he was probably led by Schiedeck's quoting incorrectly (though he has done it doubtfully) the Oldenland species 1. 50. L. 12.

Schiedeck has restored more than can fortune graven within the calyx a peculiarity that is not confined to this species. I have remarked it in J. aromatica (see 1. xxi.) and J. reginae.

The fructification of J. inflexa is a perfect man's woman to be very rare, but the umbels are extremely abundant, and these the sterile calyces of J. neotropicus are broken off with the slightest touch.

* A variety of Jungermannia cavaea has lately been found by my friend Mr Francis, her frugum so like those that are here described by Schiedeck, that it not for the established economy of this author, I should almost be led to suppose that he may have confounded the two. The color of the foliage in both is very metallic.

REFERENCES
REFERENCES TO THE PLATE

1. 2. 3. J inflate natural size.
4. Fertile plant: magnified
5. Barren plant
6. 7. Leaves
8. Apex of a stem and a calyx
9. Section of the calyx
10. Barren pistilla
11. Capsule
BRITISH JUNGERMANNIAE

JUNGERMANNIA DONMANA.

(TAB. XXXIX.)

JUNGERMANNIA, ramos erecto subulatia: folia sexuato imbricata, subhastata filiforme, oblongo-ovata, convexa. Spica habentata, foliata-acuminata.

Har. Discovered by Mr. George Donn in 1795 upon the highest mountains of China, in August; and on Ben Lovers and Ben Nacagh again found in 1803, in Caledonia, and in September 1809, on Ben-na-hord and Ben-Mac-Dowie, two mountains North of the Dee.

Plant growing in rather small and loosely-entangled tufts intersected with other species of Jungermannia and Musci.

Of the roots I have not been able to find any traces and, indeed, the lower part of the plants (whence, probably, the roots originate) are so much united together and so brittle that it is scarcely possible to separate an entire individual from the root. Stems from one to two or even nearly three inches in length and about the thickness of horse-hair neat. Filament flexuose of a rigid and in a dry state fragile nature somewhat lignaceous-opaque, exhibiting no cellular texture of a purplish-brown color, often verging to a black either simply or occasionally interrupted by one or two scattered young shoots, which, except in size differ in no respect from the parent stem.

Leaves (f. 3 4, 5) closely imbricated in a bifurcate manner over the posterior surface of the stem, and with great regularity throughout its whole length about half a line long of an oblong-ovate figure, very concave having the sides not infrequently recurved at the base they are slightly decurrent at the apex divided by an acute angle, which is often encircled by the marginal margin of the extremity (see f. 5), into two small and rather obtuse teeth; with regard to position they are mostly horizontal, slightly falcate; sometimes distinctly (f. 3 4) but far more generally
BRITISH JUNGERMANNIAE.

J. Boscana.)

Subaequilobatus (f. 8). The texture of the leaf is rather firm, brittle when dry, and the cells are very compact, extremely small, round or oblong, and may often be observed to be arranged in longitudinal series. Many of the vessels are opaque, whilst others are semi-permeable, as is represented at f. d. Their color is rather a deep purplish brown, at the base of the plant, of a dirty hue.

Mr. George Down of Forfar communicated a specimen of this plant which he gathered in 1795, both on the Clun and the Breconshire mountains to Dr. Smith a few years since, marked as J. subaequilobatus of Dicksbn (the J. propinqua of Swartz and this work). On its being ascertained to be a new species, my kind friend Mr. Lyell applied to Mr. Down for other specimens which he had been so fortunate as to gather on another of the Scottish mountains. In 1802, and he has subsequently informed me of two new stations for this plant, detected in September 1813. It is a species the most distinct of any I am acquainted with, and among the British Jungermanniae, as perfectly "pari generi" thought in mode of growth, and in the disposition of the leaves; some kind of affinity may be observed with J. propinqua. In the shape of the leaves, as well as in their direction, it bears a nearer approach to a large and, I believe undescribed species found at St. Helena, but, besides the much smaller size of the former, the color of the two are totally different. Of our present plant, unfortunately no fructification has yet been met with. It appears to be confined to a few of the hilly parts of the highland mountains and even in those situations, has only been seen by its discoverer, whose name it bears, and who has contributed as much by his indefatigable industry in the Flora of the British Isles.
REFERENCES TO THE FIGURE

1. Plants of J. Donnellana, natural size.
2. An individual magnified.
3. Portion of the same, seen on the anterior surface.
4. The same, seen on its posterior surface.
5. A leaf.
6. Portion of ditto.
7. Smaller portion of ditto.
JUNGERMANNIA PLATYPHYLLA.

(TAB. XL.)

JUNGERMANNIA, succulenta procumbente, plurimis ramosis; foliis bilaterris, inaequaliter bilobatis; lobi superioribus et inferioribus rectiuscis ovatis, ad basim angustatis, integerrimis, frondes laterali; calyceis subovatis, complanatis, ore truncatis, incurvatis, late angustatis, linea longitudinalem semitubulosa.


Hepaticoides foliis subrotundatis, squamosis, inaequalibus majori Vailant. Nat. For. p. 100. a. 3. f. 19. f. 9.

Jungermannia folii subrotundati demasculi et indolentes displicata viridulace dense colorat. Rupr. in. p. 144. p. 304. (Col. Dall.)


Jungermannia folii imbricatis, frondes laterali; calyceis subovatis, complanatis, lineis longitundinalibus obtuse angustatis. Hall. Flora. iii. p. 81. n. 1872.

f (f. 4) major; succulenta (et in r) vagis inaequalibus ramosis; foliis inaequalibus, integerrimis, frons obtusae, lineis longitundinalibus.

γ (f. 2. 3) Thaela; succulenta elongata, simpliciter plurimis ramosis; foliis inaequalibus, integerrimis.
BRITISH JUNGERMANNIAE.

Lichenostomum Arbisci Vale-factae, folia rotundatiss. Dill. Icon. p. 78 f. 33
Jungermannia folia imbricata, lanceolata, suprae.planta altissimae inferius concava quadrata. Hall. Nov. III. p. 31 a 1752. our β

Han.—a is extremely abundant upon old walls, rocks, and even on the trunks of trees in various parts of the kingdom; flourishing within the enclosure of the race of large towers. —β has hitherto been found only in Ireland, by Miss Hackett upon stones by the side of the Burren Waterfall, near the mountains near Dungarvan. —γ was first discovered in this country by Mr. Archibald Menzies, in August 1778, growing upon trees on the north side of Loch Nevis. In Scotland, it has since been gathered by Mr. Tempestum on rocky cliffs, by the side of a waterfall, near Carlavine, in Ireland. —Upon a the female fructification is produced in March and April. —Upon b the name of Mr. Menzies' plants of the P. vulgarem are perfect capsules, gathered in August. —Mr. Lyell has detected the male fructification in the month of March.

This Plant grows in considerable patches with every individual adhering to each other as is the case with J. Hacketti et al., in the woods of Dilliki. "Magnus superior supersetnum caudaeque receptum in versus subrotundae nec non concepha." The rottos are with difficulty discoverable in few rigid, extremely brittle, and somewhat lignaceous sheaves, may now and then be seen in sheaves from the lower part of the plant. Scent from one to two inches in length (in most five inches, in γ and δ), scarcely so thick as small wood, being very slender and planted with struggling branches, in some instances with much greater regularity than in others. Some places are not infrequently again divided with short and widely horizontal simple pinnules. Their texture is firm, opaque, and even woody below but, towards the extremity, the cellular texture is very visible. The color varies from a deep brown to a yellowish green.

Leaves closely imbricated in two rows, as to wholly conceal the upper side of the stem, they are unusually two-lobed, having the upper one considerably the largest, and nearly three quarters of a line (in γ more) in length, often longest at the extreme of the branches dilatation alternate horizontal ovate approaching to round elliptical base above and the margins, particularly at the apex recurved, entire or here and there very slightly toothed; the lower lobe is lobulatus in lobulato, diagonally oppressed to the inferior surface of the upper one, phase having the margins only recurved and entire. The color of the leaves is a deep, and sometimes blackish-green opaque from a four per cent the texture is rather compact; the inferior annulate reniform (C. 71)

"Hicks has been very happy in his description of this species as he has in the other."
BRITISH JUNGERMANNIAE (I. stricta)

Perigynial leaves (1 & 6) are strongly ensheathed upon short lateral stalks, and we to form an ovate compressed mass not much unlike the spadix of a Brizec (L. c.); each is smaller than one of the common leaves and divided into nearly equal very narrow and not appressed, lobes resembling those of J. recurvata and having their margins a little involute, and altogether free from decurrentation.

The perigynial leaves scarcely differ from those of the stem, except that they are smaller, and that the lobes is somewhat larger in proportion to the lobes. There are two in each only.

Svipula (L. c. 10. 12.) of these there is one to each pair of leaves, arising from the under side of the stem, and appressed to it. It is oblong-ovate or ligulate, much resembling the lobes, and in the manner recurved and entire.

Male fruitication (1 & 9) situated in the axil of the perigynial leaves. There is one small (1.) in each of them which is large in proportion to the size of the leaf and presents an exterior reticulated outline, but within is filled with a minute greyish granulated substance. The footstalk is scarcely more than half the length of the anther, while transversely striated.

Female fruitication lateral arising from the under side of the pinnae.

Calyx (1 & 14. 16) is long or narrow in length, ovate, narrowly and cylindrical at the base, but gradually becoming wider at first compressed and flat, at length for the entire of the capsule erect and nearly cylindrical. The mouth is truncate non-accrescent and cut with a deep notch on one side, which extends nearly half the length of the calyx.

Perianth eight or ten in number, ovate-lanceolate of a greyish color longitudinally and transversely marked with dark lines which become a little expanded at the base which forms a kind of footstalk; it is entire curvaceae but elegantly marked with a rounded reticulation and terminated by a short tubular style.

Pistil one scarcely equal in length to the calyx which envelopes tipped with the perfectly spherical capsule of a pale yellowish brown color (1 & 10. 18), on bursting which is done from the apex the four equal valves extend far more than half the length of the capsule and never appear to expand but even when old continue erect. The texture of this capsule is particularly delicate and, under a highly magnifying power exhibits a reticulated structure very much like that of the calyx, but having on the borders of the arrows a granulated appearance (1 & 19).

Seeds (20.) numerous, by no means perfectly spherical, of a pale olive-brown color.
J. phytosophus.

BRITISH JUNGERMANNIÆ.

Sorediæ foliati (r 31) fulvios apparently enveloped in a delicate, yellowish tube; but whether or not these are allied to the end of the valves or as I rather suspect in various parts of the interior of the capsule, I have been unable to determine.

The variety $\gamma$ major is remarkable for the size of its foliæ, which is twice as large as that of $\gamma$, and for its being throughout glossy; the stem is equally irregularly planate.

For $\gamma$ has the stems much elongated and regularly though distinctly punctuated with short and horizontal punctæ, that are mostly simple. The leaves gradually at least in many instances become less as they approach the extremity of the plant, and are glossy and in all the specimens that have come under my observation of a yellow brown color. The two varieties differ in no other particulars from $\eta$ and intermediate states, even of these, show that the marks here laid down are by no means strictly to be depended upon.

J. phytosophus which in Britain is extremely abundant and is said by Millenia to be a native of Virginia and Pennsylvania is subject to considerable variation in appearance as some some specimens have been led to form from it two species which seem, indeed in fact rather sufficiently distinct yet on a more minute investigation, it will be readily ascertained in how slight a degree a character taken from the general habit at to be depended upon. Perhaps even the $\gamma$ longipes of Schrader and of this work might to be considered as a fourth variety; but so I have already under that species expressed my doubts, as well as pointed out the only differences that I have been able to find between them it will be unnecessary for me here to repeat either the one or the other. There is no other Jungermanniæ that I am acquainted with which shows in the least chance of $J$. phytosophus being confounded. With regard to its affinity I am as a low to say to which of the families it naturally belongs in the division of "Stipulâtes fulvos inaquilidos bilobis ilicis inferiorem subdorsibus foliis" for while on the one hand it resembles $J$. tenuifolia and ciliaria in the structure of its foliæ on the other, it greatly differs from them in its fructification, and the spore valves of the capsule agree with a very natural facility consisting of $J$. crepulifolium $J$. humifolium $J$. ciliifolium $J$. humifolium and $J$. minutissimum which in other respects it is nevertheless extremely unlike.

I have named the above synonymæ, many references to the older botanists which are mentioned in Millenia and Micheli, because, from their short and imperfect characters it is not possible to quote them with the least chance of being verified. Micheli's figures are more to be trusted than his descriptions. His representation of the ramuli containing the male fructification, is very accurate, as is his description. The authors it is well known, he worked upon as the mesh, and of these he says that they are found "non in internis foliorum parte et essentiae in sunt apparaturum appendix fructum qui locostatum Graminae nonis Germani proprius forensus pro saxillos vel puo phytæ NON singularis inanis solæ. His figure of the var. Thaps is much larger than I have
BRITISH JUNGERMANNIA

ever seen the plant, and the representations of a seem to be intermediate between that and γ. By
for the most excellent account of this species is given by Hillman, though I cannot find that the
difference mentioned by this celebrated author in the leaves of his fig. 38 exists, even in his own
specimens. Hille's is by no means correct in his remark upon Michoel, where he says, "Spernum
ranae terminalis compressus gynem, Bice biforme sessile quasi pro fructibus Michelius habes
vena tuncis jactantes ramus cuneus as folie serratis complanatis foliis agnosens" nor is he less in
accurate when, in speaking of the calyx, he describes them as "tuberculatis et biplatis" is his
nor (our Thym) he falls into the same error as Dillenius, in attributing to it coriaceous leaves
in opposition to those of γ, which he says are craso-lanceolatae. Linnæus, in the Encyclopaedia
had united this species with his J. capreifolium, making our γ the β of that plant and our our Thym
the γ of it. In the Flora Franconia this excellent naturalist has restored the name platyphylla. The
our Thym, however, is unnoticed in that work, from which, probably, we may infer that it is not a
native of France.

REFERENCES TO THE PLATE

1. J. platyphylla natural size
2, 3. For γ natural size
4. Van β. natural size
5. Portion of the stem and male fructification, magnified
6. Male scales, seen from beneath
7. Peduncle leaf and stamen
8. 9, Authors
10. Portion of the stem and leaves, seen from beneath
11. Leaf
12. Scales
13. Perishable leaves
14. Female branch
15. Calyx and capsule
16. Stem
17. Pustula
18. Calyptra and capsule
19. Apex of a capsule
20. Seeds
21. Spiral filaments

* 3 cited no. and
BRITISH JUNGERMANNIAE  

JUNGERMANNIA STIPULACEA

(TAB. XII.)

JUNGERMANNIA, caulis prostratus, simplici foliis rotundatis, apice truncatis, RVONG- 
esquameisque acutis, petala stipulaque magno ovario, acuminatis prope basis margine striatum 
undulata; frondis basali; calycibus chartaceo spicis subplicatis, carminibus obtusis dentatis.

III. Sturdy rock in Lahore wood near Bantry Ireland. Miss Hutchins.—Found afterwards at Lough Erne by Dr. Taylor, and in Scotland by Mr. George Dunn.

Plant growing in dense, very compact tufts, or cushion-like patches, resembling those of

J. Linné.

Roots descending in small branches from the whole length of the under side of the stem, each branch originating immediately beneath the stipules most abundantly towards the base of the plant. Every and each radicle is simple which and parallel.

Stems procumbent or occasionally nearly erect, mostly extending a quarter of an inch in length and not more than the fifteenth of an inch in diameter, filiform, or slightly tapering from the base towards the extremity; almost always simple, though I have observed them in one or two instances, producing young shoots. Their color is a yellowish-green, inclining below to a brown. The articulate are tolerably conspicuous under the microscope.

Leaves (f. 8) bluish-green at the base, gradually becoming lighter towards the middle where they are three-fourths of an inch long, but those diminishing in the apex; they are rather closely placed, and slightly imbricate each other sometimes patent or horizontal, but by far more frequently erect, slightly convex on the upper surface and concave beneath, a little twisted of a common figure and at the apex into a rather deep and acute notch or sinus, of which the segments are likewise sharp and straight. The stem is thin and somewhat membranous; the cells small, roundish. The color is pale green, with more or less of a yellow tinge.

The stipules (f. 9) which are very large when compared with the size of the plant, are entire, acuminate, plane or but little waved; a little patent or standing out from the stem; the margin entire except near the base where it is furnished with a single tooth which is, however, occasionally nearly obsolete. They are of a more delicate texture than the leaves, but, in the cells, and color, exactly resemble them.
BRITISH JUNGERMANNIAE

Perichaetial leaves small, two or three of them surround the base of the calyx. Each is roundish, and cut into three unequal acute segments at the extremity
Male Fruiting Catkin unknown.
Female Fruiting (f. 5) lateral, at least, it is so in the only fertile specimen that has come under my notice.
The Calyx (f. 5 & 10) is obsolete of the same color and texture as the leaves, slightly pleated towards the extremity where it is a little attenuated. The mouth is constricted pleated obtusely toothed.
The Collydium (f. 10) appears to be equal in width, and even at the sides of the calyx, of which it is about three-fourths of the length; the upper part only is detached, and is somewhat, whitish and reticulated.
Peduncle two or three times longer white, calyculate.
Capsule ovate, deep brown, crenated longitudinally and transversely.
Seeds and spiral filaments (f. 11) reddish-brown, the former spherical, the latter formed of a double helix.

This little species has been detected both in Ireland and in Scotland. Its minute size may have caused it to be overlooked in other parts of the kingdom. Its peculiarities together with its large stipules and the prominent situation of these and their figure afford striking characters; though in the latter particular it very nearly corresponds with another new species (J. Octogona) which has lately been discovered by Miss Houtchens, and which has, like the present, crenate leaves, but it differs in its much greater dimensions; in the few crenae, obtusely and slightly crenate leaves in the small stipules, and in the situation of the calyx rising quite leisurely at the base from the upper side of the stem, as that of J. gentilis does. I must here mention another species, found in Scotland by Mr. Lloyd, which has considerable affinity with the present in the size of the stipules and still more so in its form; but besides that its leaves are twice as large as those of J. stipulacea. It also offers a more decided character in its obtuse segments. With the two plantae now mentioned J. stipulacea will undoubtedly range. They all differ from J. Octogona and J. heterophylla in having larger stipules, while those have them deeply divided.
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JUNGERMANNIA SERPYLLIFOLIA

(JAS. XLII.)

JUNGERMANNIA SERPYLLIFOLIA. (J. serpyllifolia.)

JUNGERMANNIA erucula var. erecta. Bifurcat. stems, rosette, many, thin, plane, venous. foliis lineatis, uniacinariis, 8 (one sub-bifidus; lobis uniparibus, superioribus magis platis, rotundatis, basi pubescentibus; inferiorebus acute, acuminatis acutis, frondens, fructu laterale subciliariis, ovatis sub ovatis, suboblongis, unius verticilli, sub-quadriangulis, pilis pubescentibus, dense.)

JUNGERMANNIA SERPYLLIFOLIA. (Dicks. Crypt Plant June 4, p. 19.)

JUNGERMANNIA MINIMA foliis sericeis ac rotundatis acuminatis punctatis ac velatis perforatis, fructibus closeolatis, vaginis cordiformibus. Dille. Musc. 2. Th. f. 30.

Species.

JUNGERMANNIA MINIMA. (J. serpyllifolia.)

S. ovata; foliis minoribus, ovatis, sub-acuminatis.

Hab. - In sybilo inter muscos. - D. Dickson.-Upon the trunks of trees, very abundant near Capgrasse, Yorkshire. - About Ranby, Mrs. Hatfield. - Not uncommon in mountain glens, near Dalhousie. Miss Temple.—Northbrook, Furry Lane, New Forest. and upon rocks at Lewdole and Reswick and on Castle-hill, Kinnevow, Scotland. Sir G. Lyell.-Powerstock waterfall, with Calypso May 23rd. Mr. Taylor.—Mam Turk Cannabera, and mountains near Killarney. Mr. Mackey, found about the latter place, also, by Sir Thomas Gage, Earl.—Rocks by the waterfall on the Dee, near Mar Lodge. Mrs. George Down.—(The male flower is produced in June; the female during the spring months.)—It is found upon rocks near Ranby, by Miss Hatfield.

Plant growing in rather large and dense patches; the different individuals, of which the patches are composed, intermingling each other in a very compact manner.

Scapes from half to three-quarters of an inch in length: bifurcat. stems, extremely slender, branched irregularly in a pinnaed manner: the various shoots which are

* I have called the leaf of this species a "flosculum acrurosum," from the same resemblance it bears to the shell "flosculum acrurosum."
as necessary as possible in number, length, and situation, being all on the same plane; these are mostly simple, but sometimes again beset with a few short, simple, ramified.

Lesser (1 1 3 4) rather closely imbricated (at least in a) over the whole upper side of the stem, bilobed, somewhat two-lobed, having the upper lobe by far the largest and the sixth or sometimes even the fourth of a lion long horizontal ovate very slightly curved where the base beneath ventricose; where the other lobe arises which, perhaps, might with more propriety be called a dilated and remarkably involuted portion of the nucellus taken altogether; the leaf very correctly resembles a specimen of the Helotium muscularum by which comparison to figure will be better understood than could be by means of words. The texture is delicate; the cells large roundish. The color a pale yellow-green.

Perigynial leaves (which I had not seen till it was too late for them to be represented on the plate) close imbricated upon short roundish forming ovate compact masses like those of J. pinnatifida. They are vestigial at the base but the lobate is less involuted than that of the cauline leaves.

Periheral leaves (F. 1 6 12 13) of quite a different figure from any of the rest, being much larger and divided deeply into two oblong-ovate obtuse and slightly curved lobes which closely embrace the calyx. The upper one is about twice the size of the lower.

Stipe (F 5) roundish, plane, cleft above a third of their length into two sharp and equal segments, whose rim is rather acute, exceeding about one-third of the length of the stipule.

Male Fruitlet: a single stamen is situated in the axils of each perigynial leaf. It is reticulated, spherical, and terminates a short, white, transversely striated stalklike.

Female Fruitlet: lateral and subterminal.

Calyx (1 3) about twice the length of the leaves, widely obclavate, at the apex cylin- drical, the lobes gradually becoming of a larger diameter towards the extremity. Serrate throughout its whole length with five longitudinal sharp angles. The mouth small and protruding into a short tube.

Calyx (F 1 7 8) externally thin and delicate on that the young capsule may be seen as thus. The reticulation is large and the crumose-oblance, the style with which it is terminated is long, oblong and slightly expanded at the mouth.

Peduncle about twice the length of the fruit, wholly composed of a number of parallel tubes of equal length which are placed in distinct bundles so that by the intimation of the several pararches are formed distinct transverse lines, dividing the fruitstalk into several joints. In a dry state these joints are bent with much regularity to the right and left alternately and give the peduncle a zigzag appearance.

Carpel (1 0) perfectly spherical, white, beautifully marked with large and roundish reticulations; so transparent that the green seeds may be seen through it and the extreme edge forms round these a white ring or limbus. It opens into four equal valves which, extend only half its length (1 9) and always preserve their vertical direction, never becoming reflexed or even patent.

The etched filaments (F 7 11) are composed of a double helix slightly twisted encased within a large semicircular tube much expanded at the mouth. The seeds (1 11) are few in number large, oblong somewhat angular of a dark green color.
BRITISH JUNGERMANNÆ

(J serpyllifolius)

The var. S. writa differs from it in its smaller size, and in having the leaves more convex on the upper surface and of a more uniform outline at the point which appears indeed, at first sight, more narrow than is really the case from the circumstance of the margins of the leaves being incurved.

It is not a little remarkable that a species which does not seem to be confined to a few parts of the kingdom, should, among British Botanists, have found only one author who has given a description of it; and even among foreigne plants it seems to have been unacknowledged with a. The excellent observer has displayed singular acuteness in the figure and description he has given us of this plant and its diminutive associate J. minutissimum. Dillenius, however, profoundly ignorant of the plants themselves, has copied both the representation and words of Mollis, not without expressing his doubts as to their accuracy, which he certainly would not have done had the specimen fallen under his own notice. "Sed verum," is his remark, "ut valde accuratissimi et ob suavitas marca capitulis videntis Ambrosor: dissimulandae capillatis: in quibus non capitulis quidem sed pilis inanimitate. Quam quamvis vegetabilis prospectus sed inanitas sed inanitas! These "capituli," or "Antherae" as Dillenius considered them, and the "pilis inanimitate" are very striking characters in the species, though they are not confined to it, since we are now acquainted with four species being thus distinguished: J. humilefolia, J. cephalophora, J. minutissimum, and the subject of the present description. To the former of these it is that J. serpyllifolius owes the nearest in its foliage, but the calyces will be found to differ materially as will also the leaves though there is certainly a considerable resemblance between them of the variety described above and of J. humilefolia; the latter are however much smaller, still more acuminate and serrated, and have the lobes or expanded and involuted margins occupying a much greater portion of the leaf. A difference will likewise be seen in the stipules. Both J. humilefolia and J. lyrata have often found the two species growing together, but they have never experienced any difficulty in distinguishing them.

Mr. Dickson has quoted as a synonym to J. serpyllifolius Dill. Musc. c 78 p 98, instead of L. 59, which appears to have been done through mistake, the former figure being also referred to as his J. humilefolia, a species which I am disposed to consider only as an injured state of J. alpinus.

Various degrees of temperature seem adapted to the present Jungermannæ, which is not only found in Italy and in the North and South of Great Britain but also in the still colder climate of Sweden, as I learn by the kind communications of Dr. Swartz.
REFERENCES TO THE PLATE

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JUNGERMANNIA CALYPTRIFOLIA

(TAB. XLIII.)

**BRITISH JUNGERMANNIA** (S J calyptrifolia.)

JUNGERMANNIA saccata repens, rammosa foliis filiformibus, lobis inaequalibus, superne calyptrae longitudine inferiores circunvolutae stipulis subpubescentibus fructibus internis cylindraceis ad antiquum epiphyllis atque declinatis, planis, fewornut.""

*Help* On the stems of the Ulex worm, near the ground. In healthy mountanous herbs in the neighborhood of Bletia, intermixed with *J. montifolia.* Miss Hutchinson.—Mr Lyell finds it growing intermixed with the same plant upon rocks at Jersey.

This singular Plant grows in little tufts, green stems scarcely half an inch in diameter.

The roots are distantly scattered about the under side of the stems, and are composed of extremely slender, whitish, deliquescent, and the fibres

Sprout from one to two and a half rarely two leaves in length, creeping, filiform; margins once or twice fringed with thin, procumbent patent branches. They are of a pale yellow color and have the typical very thin under a magnifying power.

The leaves (2 2 3 5) are rather thinly placed filiform lanceolate patent or erect, even on the same leaf, about at the base of the plant the leaves are gradually pointing towards the apex of the branches, unequally two-sided, having the upper or one the largest (although from the crowded mode of growth of the plant the leaf is not usually forced into such a position that it may appear to be the inferior one as may be seen in 2 3), about two-thirds of an inch in length, so precisely the shape of the kind of calyptra in common which Moth has called *mimicform.*

In other words, it may be described as *calliforms,* the base narrow—furnished with a narrow opening which is about one-half the length of the leaf, its open length and out incurved and united; the lower lobes (2 3 4) is subulate, bearing the angulus at the base; it is appressed to the larger one half embracing it and concealing the apex 2 3 4.

The color throughout is a pale yellow green; the texture deliquescent; the calyxes rather large roundish.

* * *

The word underlining has been applied to *plattens form.* I can, I shall be prepared for adopting a term by which I mean to express that I consider one section would represent a round figure as shown by 1 2 1 3 at one of the eggs.
BRITISH JUNGERMANNIÆ

Perichaetium leaves (1 8) varying in number from two to four, erect, closely appressed to the axis of the calyx, of which they are about one-fourth of the length, nearly quadrate, their apex incurved, their apex obtusely and widely emarginate.

Sporocarpi (1 6) small, oblong, plane appressed to the stem, or a little patent, divided for about one-third of their length from the extremity by an acute acute, into two equal, striae and acute segments.

 Braun Fructification unknown.

female Fructification lateral

Calyx (1 8) large in proportion to the size of the plant, oblong, appressed at the base widening towards the extremity where there are five projecting patent angles or teeth which are very uneven, extending sometimes one-third and sometimes even more of the length of the calyx; its extremity is depressed and even flattened; the mouth much contracted and a little ragged. In color and texture the calyx exactly resembles the leaves.

Cephalus (1 f 10 11) spherical, narrowed towards the base, strongly reticulate, tipped with a tectum style.

Pedicel about twice the length of the capsule, divided by transverse septa into a number of joints each of which is composed of many minute capillary tubes, thus giving the pedicel an appearance which is observable in those marine Confera which Mr. Dillwyn has called "longitudinately renose", and, in which, he says—"the filament in an aggregation as several smaller tubes".

Capsule nearly spherical white, membranous, pellucid reticulate, divided for half its length only, into four equal, erect, conical segments, which support at their extremities the

Spiral filaments in the form of a small tuft or pencil, they are few in number, each appears (for I have not been able in the dry specimens to satisfy myself on this point as well as I could wish) to be formed of a double helix and is enveloped in a thin pellucid membranous tube open and slightly expanded at the mouth. The seeds are large, of an oblong figure, bare and there abnormally angular of a dark green color.

Genus (1 7) appear to be not uncommon and are produced upon various parts of the stem, whenever they readily separate, and upon the table of the microscope are seen floating about in the water. Almost the instant the plant is immersed they are larger than the seeds above described, nearly orbicular depressed, composed of a few large cells, the color is pale green.

J. polytricha is one of the most curious species and the most unlike every other in the Genus, that have been discovered by the two often mentioned botanists Miss Hitchin and Mr. Lyell. He states it has always been found growing along with J. humilis (short or though so identical

of the same natural family, agreeing with it in the singular structure of the capsule, seeds, and filaments, still, the form of the leaves is so different, that no difficulty will be found in distinguishing the two plants.

Although I have called the little spherical bodies, observable upon the stigmas Genus I, I ought to remark, that they are quite of a different nature from those minute particles (to which I have given the same name) that are produced upon the extremities of the stamens or leaves of J. bicapitata. J. erecta J. contrafossa &c.; these having no apparent internal organisation, while the former are composed of cells 100 times as large as those of the leaf. Similar Genus (if such they may be called) are found on J. microphylla and J. hemysfylla, and, probably, also (though I have not yet been so fortunate as to meet with them) upon J. scygylifolia.

REFERENCES TO THE PLATE.

1 J. colpypylla about twice the natural size
2 A single plant magnified
3 Portion of a stem and a leaf
4 A leaf, with the stamens in their natural position
5 The same with the stamens expanded
6 Stipule
7 Genus
8 Calyx
9 Pericarpell leaves
10 Calyptra including the capsule
11 An old Calyptra
12 Capsule with its scales, which contain the spiral filaments
13 Seeds

* The figures here referred to are magnified larger than usual; because, so few of the plants, the extremities of the plant would have prevented the appearance otherwise than on a small piece, the plates mean.
BRITISH JUNGERMANNIA.  (J. minutæ.)

JUNGERMANNIA MINUTA.

(TAB. XIV.)

JUNGERMANNIA minutæ. ... (J. minutæ.)

JUNGERMANNIA minutæ ... (J. minutæ.)

Plant growing in rather small, loosely entangled patches of small radius, and in a brownish-green colour.

Please note: The text is not fully legible due to the quality of the image. However, it appears to discuss the botanical characteristics of Jungermannia minutæ, possibly including its growth habits, plant structure, and possibly some observations on its ecological niche or habitat. The text seems to be from a botanical or natural history publication.
BRITISH JUNGERMANNIA

The leaves are more distantly placed, very small and very unequally lobed. The texture is soft, especially in a dry state; the cellular small roundish. The color a yellow-green, much inclined to olive or brown.

Perigonal leaves more conic than the rest and even vestigial at the base; but in other respects like them. In general, they are only seen near the extremity of the leaf.

Phylloclad leaves (1-2) large roundish, divided into two, or not unfrequently three acute lobes or segments. When only two segments I have observed a small lobe towards the base; usually the radius of a larger one. Their color is paler than that of the malus leaves and they are of a more delicate texture.

Male Fruiting Plants. Anthers situated in the axil of the perigonal leaves, two in three in each spherical reticulated footstalks short, white, transversely straited.

Female Fruiting Plants terminal.

Culms at first glabrous (1-2), and wholly concealed by the perigonal leaves; at length becoming obsolete or even obsolete-oblung, three fourths of a line long, a little pilose above; the mouth contracted and fringed with very minute teeth.

Peduncle half an inch long, white, pilose.

Capsule oblong-ovate, of a reddish brown color, striated longitudinally and transversely and opening into four equal, heart-shaped valves.

Seeds and attached filaments fleshy brown, the former of a spherical form, smooth; the latter composed of two short, closely twisted filaments.

On the 21st of July M. Lyell discovered Gnamma upon this species, bearing a remarkable similarity to those of J. insignis (as represented by Schultes) and those of J. carnea; but far less compact than the latter and more confined to the terminal leaves than appears to be the case with the former. They are of a red color, minute angular peliard, resembling an internal organization, collected into small, though by no means compact balls, at the apex of each lobe of the leaf.

The Dilléan plants which come from Greenland are preserved in the Herbarium at Oxford, though exactly agreeing with the specimens here figured, as well as with others which have been given me by Mr. Dickson are nevertheless very unlike the figure and description in the Dilléan "Machepa" and, indeed so much so, that it seems scarcely possible that these latter could be a new made from those individuals. The distinction of J. marina was entirely unknown till detected by Mrs. Hutchinson and Dr. Taylor in Ireland, and subsequently in Scotland, by M. Lyell who, alone has found both anthers and capsules.

This is an elegant and extremely well defined species and has a peculiarly neat appearance from the arrangement of the leaves being most regularly disposed, all placed in a nearly horizontal direction, and as it were, in a planed manner. In color it nearly approaches some of the species of J. insignis; and some of the leaves have a considerable affinity with that species, but they have the sides always convoluted, and the points more acute. The lower leaves, being
BRITISH JUNGERMANNI.

 unequaly two-leaved, indicates an affinity with the family "foliis unequaliter bilobis," whilst the upper ones resemble those in the division, "foliis aequaliter bilobis." So that in fact it holds an intermediate rank though, perhaps, most nearly allied to the former by the perichotial leaves having a greater number of lobes than the rest, which is nearer the same with the latter. By means of an authentic specimen communicated by Dr. Swartz, I was able to add the synonym of Schleicher. The same friend has also sent me specimens which he gathered in Sweden.

REFERENCES TO THE PLATE

1. J. minutus, natural size.
2. An individual, magnified
3. Upper part of the stem and leaves
4. Lower leaves
5. A trifid leaf
6. Perichotial leaf
7. A young * calyx
8. The same dissected longitudinally

* I was not acquainted with the full-grown calyx, till it was sent here so late, it is inserted in the plate.

Nota.-In the description of J. minutus, second page p. 28, for J. minutus, read J. gurnale.
Fanum anum anum multedola
BRITISH JUNGERMANNIAE

JUNGERMANNIA MULTIFIDA

(TAB. XLV)

JUNGERMANNIA, fronds lanceolat, acut, curv, compres, planus, ramos, frrcto marginali
spinae brevissimae; ora dilatato, truncate, anguste ovatis, oblongo-cylindrace, tuberculat.

JUNGERMANNIA MULTIFIDA


Lind. Encycl. Bot. i. 46.

JUNGERMANNIA MULTIFIDA

S. simult. frondibus tenuebus; frondis, margine simillis.

JUNGERMANNIA SIMILIS


Linn. herb. p. 64. 10.


t. 4. f. 3

Lind. Encycl. Bot. i. 46.

Hart. Most often upon banks; also in marshes and on the sides of ditches; abundant in

various parts of Great Britain.—(The fructification is produced in the spring months,

sometimes under water.—Genus are found by Mr. Lyell, in November.)

JUNGERMANNIA SIMILIS

PLANT generally growing in thickly-crowded tufts of considerable extent.

Roots a few small, white, simple thores, descending principally from the lower parts of

the plants.

Roots from half an inch to an inch and half in length, and half or three-fourths of a

line, or more, in diameter; compressed erect in general, but sometimes especially in

the broadest varieties, decumbent and fructifying each other, always branched but

extremely various in their ramifications, often being twice or thrice divided in a most

irregular manner with narrow lacinia in every respect resembling the main part of the

frond (L. 7); while, at other times, which is indeed most common, they are seen to be

plants
BRITISH JUNGERMANNIAE

or lipomate (f. 1-3 6.6) in which case, the phases are distinctly phrased, alternate patent or horizontal, head with less remote pustules which are again not infrequently furnished with other still smaller ones; all these at the apex are obtuse and somewhat dilated, rarely constrictate. The substance of the plant is compact, succulent externally appearing reticulate, but within evidently composed of many cells, which, in the thicker individuals cause it to appear opaque when held against the light; the thinner ones are more pellucid. The color is a pale green more or less inclining to yellow and even brown after having been long dried.

Male Fructification (1 8) axile on prominent tubercles, arising from various parts of the stem. In each of these, there are four or five anthers (1 12) imbedded within the cellular substance, of a nearly spherical figure, sometimes inclining to ovate, reticulated externally, within having a greyish granulated pollen scurf which a pellucid border or limbus is often visible (1 10). The foetidules are white, and transversely striated.

Female Fructification (1-6 7 16-17) always arising from immediately beneath the margin, never terminal nor by any means confined to the base of the plant, as some authors have considered it to be.

Calyx (f. 17) very short, somewhat hemispherical, having however its base slightly concave. Its mouth expanded, and cut into numerous short, but unequal, sharp laciniae which give it a beautifully filiform appearance. In color it resembles the foliage, and in texture likewise except that it is thinner and the cells, at the extremity of the laciniae, form a simple series like the points of a Conifer.

Pistilla (f. 17) few or six in each axil of a pale greyish color, striated longitudinally and transversely their figure ovate-oblong with the mouth slightly expanded. After impregnation, one of these rises erect or at most with a little curve at its base, to the height of a line, or even more, then becoming the

Calyxpetal oblanceolate of a nearly cylindrical figure widening however a little but gradually towards the extremity on base allung the whole calyx which is closely appressed to it by open to often terminated by a very short and spherical style but more frequently nothing is there observable but the minute tubercles which cover every other part of the calyx, and form one of the most striking characters of the species. The whole is of a yellowish white color the texture thick, flabby cellular. At the apex, it bears with a small and jagged opening, for the ejection of the spores

Podomere namely so in length, while cellular and uncommonly treated

Capsule large, oblong, brown, striated longitudinally and transversely dividing, at length, into four equal lamellate or valves, and discharging the

Seeds which are spherical and pappose. The spiral filament are of the same color composed of a single cell (1 12) tapering at each extremity. Their are afloat to the successions of the valves and then the greater number of them continue to adhere in the form of tails or prorsus after the dispersion of the seeds and till the capsule itself is in a state of decay

Gemmae (f. 8 10. 19) produced in small loose clusters beneath an inscrutable extremity of the stem where they are only detached, and under a microscope appear to be composed of a nearly spherical pellucid, while and at times a thin cuticle which contains a mass of a green, undulating granulated substance, which is often adherent to them distinct bulbs. The individuals which I have hitherto observed to produce these Gemmae, are such as have neither male nor female fructification.
BRITISH JUNGERMANNIAE

In the see & the J. juncea of Engl. Botany I can perceive no difference, except that the frond is somewhat wider and the divisions on lateral segments are frequently lost by no means constantly so short that the margins appear to be borne and these borne rather than cut into segments.

For most of fructified specimens of the J. palmata of Hoffmann a plant evidently been nearly allied to J. multifida, I am unable to point out from my own observation any other marks of distinction by which it may be known been the species been described than its smaller size its more cylindrical shoots and its disposition to be branched principally at the base of the frond. Other characters, however will be found in the fructification as detailed by Hedwig, whose remarks on the Anthus shall be here transcribed. "Manus a centra in diametris plantalis specimine planum et trapezium lanceolatum sensim oblongatum breviter acutum et albis striatum caulibus sppoose frondis integris breviter et prostratis attenuatis. Pedunculis brevem et corollis laevibus. Antherae brevissimae extensi externo deinde pleno et foliis transmissis reductae prostratas."

And besides the difference in the male fructification in the female the same author represents the calyptra as having a small brown covering like the calyptra of a moose which does not been in this plant. (see Thuret, tab. 10. l. 36.) J. pingue is the only other species with which J. multifida is likely to be confounded; and here it must be observed, that it is only allied to moose of the same section and most marked variations. The former however is always more thick and succulent, a plant on its upper surface, and more presents a flattened appearance; its leaf is much larger, and its calyptra, in every instance, more bossed tubercles.

The three Jungermanniae last enumerated, belong to that division of the genus, the individuals composing which have been called "decads," and differ from all the rest of that family in having on several of a moose, so perhaps, more correctly speaking in being altogether composed of series coexist and distinct of those lateral and more membranous expansions, which have united all the rest of the genus to be called. In contradistinction to these foliaceae and which, even in one species of this very section, have a considerable approach in the appearance of the leaves in other plants. In J. multifida the frond has this membranous expansion continued at the base to the extremity; in J. pingue the margin is here and there slightly lobed, whilst in J. Juncea (Blume: pustule of Authors) the lobes are so thick that they are round and regular that this species seems to hold an intermediate place between the Jungermannia foliacea and the Pseudana. That the more membranous part of these species is analogous to the leaves in the others will be still more apparent when it is observed that neither roots nor male nor female fructification are produced (as far as I can see) in any species when held up in the light will be seen to have an obscure though wide nerve whence originates on the upper surface both the male and female fructification, and on the lower surface the rows. In younger plants the nerve is very conspicuous on it as in the innovations. The situation of the spiral filaments, attached to the ends of the valves at the capsule is unfortunately not detailed in J. multifida. J. palmata and J. pingue for they are seen on J. juncea which, in other parts of its fructification, differs materially from those species.

Thuret, p. 67. t. 11. L. 94.
BRITISH JUNGERMANNIÆ

The true calyx does not appear to have been noticed by any author, and indeed, is not readily observable, except before the exertion of the calyx, when Schmidt [schmidt] has mistaken for it. Neither do the Genusses* figured by this author (his Authors are his Kettner, t. 65. f. 4.) appear in situation with those which have been communicated to me by Mr. Lyell, and which in all the specimens were collected together beneath an incurved curvature of the frond, whilst those of Schmidt are collected in a mass at the very apex. 'Vernae tempora', I s.n. Martus, Martis sut Apollinis interdum non autem nemesis, antiquan, alias aut illis simul etiam erexit, siste antiquam utique aperiendum in ruminae extremonum constituturum spectabilis plurimis adspersa solent vestigia miscentibus tecta religiosis substantiis pellucidiusque et in florum colorum vestigant. His accipit post aliquam momum facturum, et membra suis ensurcos reliquos videntur quae pellucidiarum aliarum formar apollinis magnis parallelos solent. Vere quidem non absimulat videtur in his vestigia surrexerat succedentibus elaborat et continuat calyces receptacles absconditae functions facessereant." Isaac p. 218

REFERENCES TO THE PLATE

1. J. multifida, natural size
2. var. B. simons, natural size
3. 4. J. multifida, with female fructification, natural size.
   5. Sterile plant, magnified
   6. Female plant
   7. Frond plant
   8. Portion of a male frond
10. Anther
11. Calyx
12. Capsule with its valves expanded
13. Calyx, longitudinally dissected to show the young capsule.
14. Seed and spiral filaments
15. The same
16. Calyx and young calyx
17. Calyx form open to exhibit the pistil
18. Extremity of a genunferous frond

* It is possible that these are intended for the Authors of J. polyantha, which Schmidt does not appear to have been acquainted with. In a subsequent species yet, an access an observer would briefly have perceived the specimen to have received his notice.—Hofmann in his Flora Gemmacea indeed, under J. polyantha says, "Hojum host ads parsi visibem spectante Jov, multifides, Schmidt, Isaac t. 65."
BRITISH JUNGERMANNIAE. (J. pinguis)

JUNGERMANNIA PINGUIS.

(TAB. XLVI)

JUNGERMANNIA, fronds oblongo, decumbente scarvi carnosae. vulgò phanicho, subita tenuidía laxe diversa margine sinuata; fructa ex inferior parte propa margine egradientes; calycibus brevissimis; ovo oblongo, seminibus; calyptris exsertis oblongo-cylindraceis, inaevi.


Jungermannia cephalo oblongo, juss. foliis oblongo sinuatis mucronatis. Dil. Rham. 21 p. 222. floribus f 89 (acc. fig. n. 23.)

Jungermannia media pluviosa, mound, ex latere fortis. Dil. Rham. 21 p. 83. 1851.

β. appendiculatus; fronds elongatus, subfusco, simplissim vel subplanum manu.

Hex. Extensively moist and generally alder-bogs, in marshes; sometimes also, though not frequently, growing under the water in shallow rivulets and stagnant pools—β is found plentifully at Herriaghe, by Mr Turner among tutorium and other aquatic plants, in pools of water.—(The fructification, both male and female, seems to be most uncommon during most of the summer months.)

Plant usually growing in loose and sprawling patches, sometimes however compact and clustered. Roots a few minute thorns, scattered about various parts of the under side of the plant. Some specimens I have observed to be quite destitute of them.

Fronds from one to two, and even three inches long in the scar β, procumbent and often imbriating each other, sometimes nearly erect, of an oblong figure, narrower at the

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Fronds from one to two, and even three inches long in the scar β, procumbent and often imbriating each other, sometimes nearly erect, of an oblong figure, narrower at the
BRITISH JUNGERMANNIAE

base where they are one or two lines in diameter; thence gradually widening to the extremity which is rounded and obtuse and three or four lines in width, they are either simple, or furnished with one or more large divisions or segments, which, in every respect resemble the principal part of the frond, and other lower ones which give the appearance of a flattened margin, the whole though plane or even a little convex above is below so shallow that many individuals are half a line or even a line in thickness, and are always destitute of any nerves. Distance between remarkably constant, opaque, small, numerous small, and not readily discernible color more or less of a yellow green.

MALE FRUCTIFICATION (1 ² 4, 5, 6) situated in the superior surface of small marginal processes or receptacles, eight to ten or more of which occupy the upper half of a frond, each of these is simple or two-larded ovate oroblast (6 8) plane above (7 ² 8 7). In the upper and plane surface, the substance seems to be of a paler color and more closely cellular than the rest of the plant, the latter are deeply imbomed in that unite above is level with the superfluous, and visible by means of a little opening. They are spherical, reticulated, grayish, allinated upon a very short footstalk by the shriveling up of the cuticle, after the discharge of the pollen from the Anther, the aperture which they previously filled, now now nearly empty. The receptacles themselves, in all probability after their office is performed, expand into segments of the frond.

FEMALE FRUCTIFICATION (6 ² 14, 10, 16) segregating in various parts of the under side of the plant first always near the margin.

Calyx (6 ² 10, 16) nearly hemispherical, much resembling that of J. manicata, and having an expanded mouth and flabellate margins; its diameter is similar to that of the frond.

Petals (6 ² 10, 16) green or white, in number six, nearly ovate, somewhat dilated, mouth, pellucid and a little heat back; they not of a grayish color, marked, longitudinally and transversely with darker lines.

Calyx (6 10) three or even four lines long, when armed at its full size, linear-oblong-cylindrical, nearly of the same thickness throughout, straight or a little waved and curved at the base, obtuse at the apex, somewhat or in a short style, its texture is abundant closely cellular, its color a very pale greenish yellow, approaching to white.

Pedicels from two to three inches long, white, subulate.

Capsule oblong, red-brown, marked with numerous streaks or nerves which are connected by transverse ones. It opens into four equal hemispherical valves which attach to the base of the capsule and rotate on their apices the Spinell folium in the form of tufts or prickles, these are formed of a simple closely-twisted hair terminated with a node of the same or each of the seeds which are, moreover, spherical and smooth ²

² Subsequent to the above described forms to be observed. See "Poterium sempergreenum, or, crested from alpine, formicaru sphereleum, aliquantum regale, superficiemque varie rostrata inclusione observans," Juss. p. 149.
I have already under *J. multiplex* noticed the characters by which that species may be known from the smaller varieties of *J. pungens* which, indeed, in the general outline of the frond bears a still closer resemblance to *J. ephedra*; the difficulty of differentiating these two will, however, vanish when the greater number and far less succulent nature of the larger species, more reticulated appearance and, above all, the nature of the latter are taken into consideration. The female fructifications of the two species is also totally different in its situation and affords most decisive and unequivocal marks of distinction. Dillenius, who was well acquainted with the tree in the state has never fallen into an error in his tab. *p. 54* & *58*. 2; and *v.* wherein he has represented the antheriferous fronds of *J. ephedra*, although he has, in the same plate and figure, at the letters *z* and *u* published a very satisfactory likeness of the true male fructifications of *J. pungens*.

In Schmidel's plan also of *J. pungens* *Flora of. 18. 22. 41 & 7* is figured a Jugueiramella which can only be in shape of the frond but also in the tubercula in which it bears on its upper surface has a close resemblance to the anther-bearing specimens of *J. ephedra*; but the aments of these tubercula on ammoniac they are called, are so different from the aments of *J. ephedra* that it is impossible they should be intended for them. these structure also, is most remarkable which tends to mislead Schmidel's elaborate description of them, which, at the same time, as little regret that it is neither is my power to confirm by my own observations an interesting account, or even to suggest an opinion, as in these probably was. Main et Janka, in description of J. procumbens in media diebus or maybe solent glomerato seco acervorum, ex basi rotundatis in circulus forman elevatum mode alternum modo conjugat. 

Venetian limestone a liquam incepisse procumbens, inde post qua sex superi posterius sequentes various cava minima plana regularis Lignumque decussatissimum non percussos sed herci umbros curios cepisse comprehen dulcis evocando in rotundis oblongis. In quo eorum crassior ad seculo quabajus, cujus ramosiusque per seca nature circinante.

Aequus morbus interdum sursum in, aut in malveolis formam dextra aut in globulis ovulis reticulatis formam fruticosas, maritatis magis, quin efferentem vel ad seculos laures, vel in frondem ignem. Non autem dixit rectius, sed una lineae, sed et irrigosit singularia praebentur. superiusque lares idem decreturum vel redi hunc, ut destructa vell occurreret differre et quos modus tantum lapsus. Quidam factum, nec venosa ligna alpinum rustice ut modernum cito accrescere decrepitabat.

Endemus temporum quas varis apices ramosae nuclei aut herbae occurrentes, saepe superficie frondis aut, aut superius transparente, quas in arenis venae instructis ramosis aequas et saepe saepe flavescentibus, in posterum sese ac evolvente, evolventem. Venetiana est forma, cuius postea secundum aequa aut in postereum abesse occurrit. En altera parte omni valorum superficiem ululans abesse sunt, tempore vix inveniri postea ad loca destructa, non obstante saepe flavescentibus, exaneo et frondes parvi tecti Venetia latissima reperita. Venetiana tamen aut in cava aut in posternum abesse occurrit. En altera parte omni superflua superflue superflua superflu
BRITISH JUNGERMANNIAE

per organa fructificationis parte uteri provent, Neque obscurum demonstratus eorum fructibus, quae
ullius utilius usi id quidem pientius testimonium involvunt, et plantas suam bibiscis velutcula successa
coriolum via quinquages officiis. Eliguer Vassula Anthonii pollinatorum perdit veluti occurrere
aut fructis creant sunt aut veli semilla substans est et quae dicti. Neque enim per plerumque hinc qui
nullum praexet schvastere neque per notasse corrum quo eis contabebant, plantas
propagationes alii experimentales omissis e pluribus supra evectis. The same author has remarked
that the corolla must be considered if the corolla, instead of opening at the anterior for
the adnation of the capsule is carried up upon it by the elongation of the peduncle. Chin etiam
ematura, ut vidimus malam in lit. idei interdum melissi, suberente velocissima homone aut in frondem
aut pollinorum aegresceum parsam, aut nihil frondis marginum aut velis arboris firmament ut corolla
en parte reddatur frondis substantia et non pedunculo, vigilans fovea utroborum; simile nuptem ob punctas
adpersas ut imperat ut eavm notabillere subrindicis innumeris horum poeite. Frons p. 139

Dillenia has quoted doubtfully the Hepaticas polsteris Colletii crass foliis Verrillam Bot
Per p. 100 1 18 f. 4 an synonym to the present species. The situation of the fructification
however in that plant and the figure of the capsule prove that it belongs rather to J. epiphyllae
Sebundel tastata and indeed that it can be considered only as a variety of it.

Upon the under side of the fronds of none of the plants which grew under water were
immeasurable granules; intermixed with many shining pollinated bodies, which are represented at
f. 9 and are, in all probability, some undescribed monocolus.

REFERENCES TO THE PLATE

1. J. pinguis with female fructification, natural size
2. Per B. natural size
3. Under side of J. pinguis natural size
4. Male plant, natural size
5. Under side of a male frond.
6. Antheraecum receptacle
7. The same
8. Anthers
9. A female monocolus which adheres on the plant when it grows in water
10. Calyptran capsule and longitudinally dissected
11. Young capsule taken from the calyptra
12. Full grown capsule
13. 14. Capsule, with the valves expanded
15. An old capsule, from which the filaments have fallen
16. Portion of the valve of a capsule
17. Seeds and spiral filaments
18. Frond, with young calyces
19. Portion of the same, with the calyx dissected, to show the situation of the pistilla
20. Pistilla.
BRITISH JUNGERMANNIÆ.  (S. epiphylla)

JUNGERMANNIA EPiphylla

(TAB XLVII)

Jungermannia, fronds oblongæ, submembranaceæ, hælic linteâ absque absoluta marginali integerrimæ vel subelevata similiquæ fructu e superiori parte frondinis prope epidermis egredientiæ, planis, sec pedem dilatato lanceo-dentato unipinnatis unacertis.


Lichenostreum capitulum rotundum, in foliorum modo enversatubus. RAII. Sp. p. 110. s. 2.

Marcula majus alvo-nivosus flores subheliciformes, in foliorum modo egredientissimæ. MICHAEL. nov. Gen. PI. ii. 4. f. 1.


Lichenostreum capitulum rotundum, in foliorum modo enversato. DILL. Mem. i. 74. f. 41.

Jungermannia similes solutis, utam locis, in modo floriferi. MAULT. Holz. iii. p. 63. n. 1852.

β Longipollicia frondibus elongatis simplicibus, vel in Ramis simplicibus ab linteâ divisi.


Hepaticoides paniculata DICH. Crypt. Fasc. iii. p. 19.

γ. hieracíllæ. frondibus oblongis, in Ramis simplicibus angustis, dichotomis divisi, cum ultima falcata.
BRITISH JUNGERMANNIAE.

Har. Mint bushes and slimy wet places in various parts of Great Britain are abundant.
—\(J. \) West ditches in Yorkshire.—In a field near the orchard Balvickery near Pantry
Miss Hutchison.—Bog between Castle Malwood Lodges and the Ringwood road, Hampshire.
Mr. Lept.—Not uncommon in the autumnal and early winter months, in various parts of
Suffolk, in the same at Cheddar Somersetshire and about Torquay and Dartmouth
Devonshire.—Miss Hutchison finds it in Ireland, and Mr. Lept in the New Forest, Hampshires.—(Both male and female fructification are produced in the spring and autumn.)

Flatt growing generally in very large patches of some feet in diameter; the indviduals interlacing
each other and matted together by means of their tendrils.

Roots issuing from nearly the whole length of the stem on the under side of the stem
composed of small dense simple fibres.

Plant from two to four inches in length in the set, \(J. \) and \(J. \) noobing, an oblong
oblong at the base, always narrow, simple or once or twice divided, without any
regularity by short lateral segments. Their margin waved, entire or at most only
separated into a few short and very unequal lobes, which are flat and curved at the extremity
of such plants as possess young female fructification a terminal lobe is generally bent
down, so as to conceal it (f. 14 b). Innovations are sometimes produced simple
and in \(J. \) and \(J. \) terminal and divided in a dichotomous manner twice or thrice
with the exception more or less forked. The whole plant has a wide, and (except
when held between the eye and the light) not a very conspicuous nerve. Thus, in the
younger plants, the net nerve is most evident and in the innovations on the new \(J. \) (f. 18)
is at all times very distinct. The stamens of the flower are large and stam. the color a deep green,
much darker about the nerve where a purple tinge is also not unfrequent.

Male fructification situated in the upper surface of the stem and always covered by the
crown in which the anthers are imbedded a single one beneath a small swelling or tubercle
(f. 11 & 12) such as of a roundish figure and a greyish color on an unscarred state
yellow, surrounded by a polished manner. As it is only in a dina leaf that I have yet had
the opportunity of examining the anthers I have been unable, satisfactorily to distinguish
the features which, in all probability, is extremely short like that of \(J. \) purpurea.

Female fructification upon the same plants with this only as well as upon different individuals
like it, not proceeding from the upper side of the stem, though a swelling may be observed
beneath in the young state of it (f. 11 b).

The calyx appears to be formed by the bending of the flower which takes place near the
extremity, as sometimes near the middle of the plant stem appears at first but an
irregular incohesion in the flower (f. 17) afterwards becomes a tubular and somewhat
pliable calyx (f. 11 & 12) varying in length from half a line to a line and a half, having
its mouth a little expanded and toothed in a very evident but irregular manner in its
edges, and in the form of the lobes. It particular, may be supposed of the nature of
those of the flower.

Calyx, when young and enveloping the capsule, of a round figure approaching to round
shape, with a long tubular style, and bearing on various parts of its surface abortive
petioles which like the style, are tubular a little expanded at the mouth, and irregularly
toothed throughout their whole length they are marked with reddish lines, and have also numerous intermediate series. When it has reached its full size, the calyx is of an
BRITISH JUNGERMANNIA. \( J \) epiphylla.)

Oblong shape and in length twice or thrice exceeds that of the calyx. Its texture is very thick, smooth, and closely nictitiate; its color a dirty white (t. f. 111 12). Peduncles from two to four inches long, whitish, roughness, tipped with the almost spherical Capitula (t. f. 15 16 18) which is of a pale greyish-brown color and opens into four equal white valves that soon become recurved and obscure the Spirals. Stamens, intermixed with the seeds attached to the inner base of the capsule in the form of a fleshy tuft or prickly (t. f. 15). The flowers are extremely long, much twisted, composed of a double layer and enclosed within a polynoid carpelle tube. Their color is a pale reddish-brown that of the seeds which are of an irregular knot more or less oblong figure is an olive-green, hinting to yellow.

The ver. \( J \) epiphylla has the shoot greatly lengthened out, or not infrequently extended itself or foot shoots, whilst its width is scarcely more than an inch long. So crowded is it in its mode of growth that it becomes most in some situations. It is more delicate in its texture than a, and has its margin more frequently formed into lobes in the manner in which Mr. Lycett has remarked dark marks, whereas have been produced lateral and undivided involucres, about half to three quarters of an inch in length, exactly resembling the parent shoot.

7. \( J \) epiphylla appears to be most abundant in the mounltainous counties, where the shoots of the leaves are produced in a very remarkable manner forming involucres, or perhaps, more properly speaking, branched elongations which are considerably more narrow and of a paler green than the rest of the shoot, and have the ultimate branches always more or less forked. As I have already observed, the margin is here at all times very conspicuous, disappearing only immediately below the extremities of the divisions. In the month of May, I have lately observed on leaves of this description that the branches become wider and of a deeper color and that they gradually partake more of the usual appearance of the plant roots descend from their under sides and the old shoots seem to be going into a state of decay, so that these curious processes are, in old probability determined by nature or a means of increasing the species, different forms may that has not yet been noticed in the other Jungermannia.

Of the present species, Vahlhart was induced to consider what I have almost described as the elongated variety a distinct plant, and our countryman Mr. Dicks has followed him in this particular as an opinion with which I would gladly have concurred, but that for my part I can neither find in the figure of the one nor in authentic specimens from the other any characters which will lead me to suppose them other than varieties, and I have consequently thought it best or Linnæus has already done in the appearance the \( J \) epiphylla. The origin habit is by no means peculiar to it, and seems only to arise from the situation in which it happened to grow for among small bush since I have observed one common \( J \) epiphylla is born an equally caked or woven fust in consequence of the uncertainness of the surface in which it was attached.

Whatever similarity may exist at first sight between the various species of Jungermannia which have been termed by botanists, "fusiform," it is certain, that no two of
BRITISH JUNGERMANNIÆ

them sound in the important parts of the fructification. With regard to the individual which is the subject of the present description, it is without difficulty distinguishable from J. platyca and J. multijuga; in having a nerve, which however, obscure in some of the old specimens, may be all be seen by holding the plant between the eye and the light, and may be traced on the under side of the plant by the insertion of the roots, since these are confined to the nerve itself. In this respect it resembles J. saraia J. Ellis, and the beautiful J. lyrata, but it is with the latter alone that it can be confounded, and with J. only in a barren state, as this is a far more delicata plant than symphylla, is furnished with a very distinct though narrow nerve and has the margins beset with a few scattered teeth.

In the situation of its anthers, J. symphylla differs from every known species; they being placed singly and immersed in small scattered tubercles upon the upper surface of the nerves as has been long known by the able descriptions and illustrations first of Schumel, and afterwards of Hedwig. The latter author in particular has been so fortunate, as not only to have observed in this species the expulsion of the spores from the anther but he have observed the seeds germinating, and has thus been able to bring forward the strongest arguments in favour of his own system. Speaking of the little bodies embedded in the tubercles, "Antheris his aestus," he says "dubius nonum patronum. Quae vero eorum conformatioem et structuram eo distintam extremae, eheuheram consorsin nulli meae, particulari sectione perpendiculari visumque assumendum longitudinalis, per aliquot horum punctationem ducit. Hanc aquam guttula in lemnis vitæ ut et alia insta digitorum alpiniae delenitae conservatam. Lactam scleroderio apparatuna, hab. anni e sig. in annis eque manibus foliis foliisque quibus lemnisque grandibus usus. Atque en angustis fortuna favor inter delminium ascendere de illa foliisque su, per supremum partiali veneculorum quae anteculi iniquum roves grandulose, sculpusque in figuras se dimissae habentur. Petalis: in eæ flores circum elucos minimorum intermissos posse nulla eæ posterior versus minusrin a. a ejusdem figuras iniquas iniquitas, brevi distinguendam particular membra visivit. Testiculo alboque denso, centra annexatis, quae evidenter fructus his denique ne frons ultra angusta erga."  

With regard to the germination of the scoria of J. symphylla, the same author remarks, "anno 1780, nomine Apollina, cum Jungermanniæ seminibus ovatis verticibus externi et interni amnibus et amnibus externis insertionem in numero positum aliquot illis detinere a distantiis extremis predictis radicibus amplector aliis pelluciduntia. Rerum praebent incrementem haberem eadem in perfectis plantulis utroque suspenderem. Sin et de haec certe constare pellucidum scoria semina esse vere factum antherarum visivint"
REFERENCES TO THE PLATE

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<td>Portion of a pod, with a young calyx and peltate</td>
<td>4</td>
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<td>18</td>
<td>Portion of the ear</td>
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Jungermannia Dicksoni

(I. L. B. 1847.)

Jungernannia $\text{moda} \text{convoluta, foliis bisectis, stipulis lineatis, involucris uniuslatao,}
\text{fruitibus globosis, seminibus oblongis, petalis albis.}$

Found many years since in Scotland by Mr. Dickson.—On the Castle-Hill, Kinnairdy.
Kerrie burn most abundant producing scotsman and required in August, Mr. Lyon.—
Descrribtum abhinc Dehnia. Dr. Taylor.

Plant growing in small and densely-seeded tufts.

Roots a few minutes white and simple stems, proceeding from near the base of the stems.
Stems from a quarter to about half an inch in length. Foliage slightly deeper at the base, mostly a little procumbent in the rest of the plant even undivided, or sometimes though rarely branching a simple branch or increscent; the color paler of that of the leaves the texture is in the upper part tender and //. below more compact, somewhat brittle when dry.

Leaves (1 4 6 8) more or less closely placed in a helicoid manner patent or horizontal, between the stem of the plant frequently several above a quarter of a line long, deeply divided into two unequal unisepalsate lobes or segments of which the anterior is about twice the size of the posterior; but both of the more figure narrowly ovals with acute apices; their margins are entire, or only slightly and principally in the upper laves regularly toothed. Their general color is a yellow-green approaching to white in some situations of a more uniform green; the lower leaves mosty uniform in a dirty brown. The collars are small, consistents of an equal way throughout.
BRITISH JUNGERMANNIA.

Perigonal leaves (f 10) more oblong placed than the rest, with which they are internervated, and are scarcely different in figure, except in having their base swollen for the reception of the anthers.

The Perigonal leaves (f 7) also much resemble the calyx in size, they are erect and embrace the lower part of the cyme with their segments.

Male Fructification annulate in the axil of the perigonal leaves; in each of which are placed two or three, nearly spherical, rounded anthers, each supported by a white transversely striated filament which is about equal to the anther in length.

Female Fructification terminal.

Calyx (f 3) half a line long, ovate longitudinally plicated, the mouth a little crenulated and covered. In texture it closely resembles that of the leaves; as does the color also, except that towards the mouth it becomes white and, as it were, scariosus.

Calyx (f 1 3 9) small, ovate, of a delicate membranous texture, reticulated, stipule short.

Peduncle two or three lines long; white, mucilaginous, cellular

Capsule ovoid, approaching to round both longitudinally and transversely flattened, and remarkable for being of a pale and rather bright red color. The four valves are ovate and of an equal size.

Seeds and filaments (f 9) filiform, approaching to oval; the former spherical, the latter short and composed of a double bicuspid.

There are few naturalists to whom Cryptogamie Botany is more indebted than to Mr Dickson. In the genus Jungermannia his numerous additions to the list of the British species are well known. The present is one of many collected since the publication of the fourth fasciculus of his Plantae Cryptogamiae in the Highland Mountains of Scotland, which he kindly communicated to me; and I have great pleasure in distinguishing it by his name. I have already noticed it under the descriptions of J. obliquus and J. obtusifolius, next to which it most naturally ranges, differing from both in the ovate and sharp segments of its leaves, which are quite destitute of any appearance of a nerve. The pale red color of the capsule affords a very obvious and striking mark, when the plant is in a forward state of fructification. The greatest part of the natural figure was drawn from Mr Dickson’s original specimen, but the male and female fructifications have been added from others lately gathered by Mr Lyell, who alone has found the plant in that state. I sought to remark that, in general, the individuals collected by the latter gentleman have their leaves more crowded than appears from the plate, though in other respects they exactly agree with Mr Dickson’s specimen, as do, in every particular, those gathered by Dr Taylor.
REFERENCES TO THE PLATE

1. J. Dickson, natural size.
2. The same, a barren and fertile plant, magnified
3. Male plant
4. Cbgy. longitudinally dissected
5. Portion of the stem with leaves
6. The same
7. A single leaf with the lobes expanded
8. Perichaetial leaf
9. Capsule
10. Seeds and spiral filaments
11. Anther
12. Anther after the pollen has been discharged
JUNGERMANNIA FRANCISCI

(TAB XLIX.)

Jungermannia francisci, Hook. f. 326. t. 29, pl. 84. (Jungermanniaceae) p. 286. t. 84. f. 227 (planta graminifera) 12

Jungermannia francisci, Hook. f. 326. pl. 84. f. 227 (planta graminifera)

Hab. Alces Hall and Edgesfield, Norfol., Rev. R. & Franch.—New Forest, Hants. Mr. Lyell.—Alces Hall y Tatonin together with J. Turner. Miss Netherfield.—In meadow places upon the ground near the Don y Herrington. Suffolk (11th of July. Calend., both male and female, in the spring and early summer months.)

Plant growing in small and rather disordered patches of a pale green colour, or a very frequently a tinge of purple

Rise consisting of a few rods or small shrubs which originate at various distances from the under side of the plant.

Surrounding ascending by an ax. stem in length, slender, filiform, or only a little incrassate apiculatus because the lower part simple usually bare of leaves, pellucid and of a whitish color, the rest either simple or once or twice divided with different branches which are generally erect, but occasionally procumbent, of a pale yellowish green color now and then tinged with purple at their extremities.

Leaves (1-1 of 1) small in proportion to the diameter of the stem, growing in a bilaminate manner, alternate, more or less nearly placed usually a little subterminal either erect or tecte-patent about the sixth of a mm in length, entire, serrate from the apex nearly cleft for about one fifth of their length, into two equal, and somewhat obtuse segments.

The plant is for so small a plant, subterranean: the cells are roundish, the color in pale green leaning to purple in those leaves which are most exposed to the light and air-

* Mr. Lyell examined a single specimen with a larger ordinary colliculus, resembling that of S. plaglata.
**BRITISH LUNGEMANNIAE.**

Perigonal leaves (f. 3) no otherwise different from the rest than in being more narrow and more closely appressed or imbricated one over another to that the extraneous of the branches where they are found, are imbricated which renders them the more readily discoverable.

Perianthial leaves (f. 1 3 9 10 11) seven or eight in number, numbering as many from the base of the fruit bearing cylinder, where they scarcely exceed the maximum radius leave in the insertion of the alytes, where they are twice or three times their length, imbricated on every side; their figure oblong, approaching to quadrate concave or perhaps, more correctly speaking, semicircular (f. 1 9 10); at the apex they have a deep and wide notch of which the segments are acute and not infrequently decribated, waved or even recurved.

Stipules (f. 1 7 8) small, nearly more than one third of the size of the leaf plane and either appressed or projecting a little from the stem: their form is ovate and they are divided at the extremity by an acute sinus into two rather sharp segments which in length are about equal to one third of that of the stipule.

Male Fruitification situated in the axil of the perigonal leaves. Anther (f. 10) generally found slightly transformed, sometimes together: nearly spherical of a pale greenish white color; in a young state often at an advanced period more evidently marked with redulations. The footstalk white semi-opalescent transversely striated.

Female Fruitification situated on the proper footstalk.

Calyx (f. 12) nearly half a line in length oblong; a little attenuated at the base and slightly narrowed upward where it is longitudinally displaced on either side and evidently toothed (in fact it resembles the leaves, so close in color though it is often of a paler tint).

Calyx (f. 13) ovate white, slightly ochraceous, furnished with a short style. It opens with a vertical feature for the reception of the capsule its base is surrounded by a few brown points.

Fiducaule about four lines long white cellulosa.

Capsule (f. 14) small, ovate, brown, splitting into four equal white valves.

Sperma and spiral filament (f. 15) fulvous; the former spherical, the latter serrated and more distinctly marked with a double helix rather closely twined.

Sperma (f. 14) are found at the same season of the year with the male and female fruitification the surcups, at the naked apex of which they are produced, have the leaves smaller and more distantly placed as well as more erect and appressed than in metal with the fruitilliferous individuals. They are collected in minute rather compact spherical masses so that in this respect as well as in their situation, they resemble those of J. bicarpellata and J. Treschmannia. Each particle is pellucid of a greenish color and angular (f. 17).
Until my description of *J. hyacina* (T. x. II) I had not noticed this plant which I had no reason to think would be the same as that which is figured by Schmidel in his *Icones*, f. 63, 64, f. 2. But these representations are too imperfect to enable me to decide with any degree of certainty and the important distinguishing character, the bluish stipules, seems to have no existence there. I have therefore considered it best to quote the Schmidelian plant with a mark of doubt and gladly take the opportunity of distinguishing the present by the name of its discoverer, my friend the Rev. R. B. Francis, who has so successfully investigated the vicinity of his own residence in search of the plants of this genus and has so kindly and liberally communicated to me numerous specimens, and much valuable information respecting them.

In habit *J. francisci* certainly approaches *J. hyacina* as well as small varieties of *J. humilis* but the upright growth of the stem and the more massive and less deeply notched leaves are of themselves sufficient marks of discrimination, and when the presence of the stipules in taken into consideration no difficulty in distinguishing these will be found to arise.

With regard to the stipulated species, among which it seems I am unable to mention any in which it bears such a similarity as to render it necessary for me here to notice the points in which they differ.

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BRITISH JUNGERMANNIAE. (J decipiens)

JUNGERMANNIA DECIPENS.

(TAB. L.)

JUNGERMANNIA, succulenta, erecta, subapiceque foliolata, floribus minoribus, ovaris integerrimis; stipulis lineatam-ovatis non subquadratis; sementibus uno albo-ovatis, sparsis, spiniformibus.


PLANT growing in dense tufts of small size.

Roots large creeping of a ligneous texture and brown color, throwing out bases and there small opaque fibres.

Stems erect filiform, from half an inch to an inch and a half in height, and about the thickness of horse-hair, simple or rarely divided at the base sometimes, however; two or more arise from the creeping root; they are of a rigid and somewhat brittle texture; below of a dark brown color and opaque; above of an olive-green, and evidently cellular.

Leaves alternately and rather distinctly disposed in a bifurcated manner; those at the base smallest, most widely placed not more than a quarter of a line long ovate and concave, with entire margins, and either apiculated to the stem or entire-pointed; the rest are considerably larger; though they frequently again diminish in size as they approach the extremity and are of a roundish or even a subquadrate figure, patent and sometimes recurved, as in J spinulosa and J appendiculata; their base is decurrent; their margins furnished with one, or often two or three large and on their base broad, spiniform teeth, but these are placed in an irregular manner, and at such uncertain distances, that it is not possible to find two that precisely agree in that particular. A common appearance of the lower leaves is given at ¥ 10 ¥ 4 is a portion of the stem, of which one leaf has pairs, and the other three; at the apex ¥ 6 has an acute tooth at the extremity, and another lateral one ¥ 6 represents two leaves, the one having its margin entire; the other furnished with an obtuse lateral tooth; which is not of common occurrence ¥ 7 has two divergent or teeth at the apex ¥ 6 is not into two unequal limbs, (which may probably have been the effect of accident); the one having two terminal teeth; the other
BRITISH JUNGERMANNIA

one terminal, and a minute lateral one; whilst in J. spinosa the ovate leaf is tipped with a single tooth. The texture of the leaves is somewhat rigid, and, like the stem, when dry, of a brittle nature. The seedlings are of a rounded figure, except at the margin, where their longer and more quadrato shape forms an evident border to the leaf.

No fructification has hitherto been discovered upon the present specimen by the unskilful eye to whom we are solely indebted for our knowledge of it; a circumstance that is the less to be regretted, since there are sufficient characters in the foliage to distinguish it both from J. spinosa and J. spinulosa by nearest affinity. Nor does it, however unpalatable the shape of its leaves appear to the subject of any variety of a nature to cause it to be confounded with others, for Miss Huxley remarks, "I have watched it very attentively for three years past, and could not observe any alteration. I at first thought it might be a variety of J. spinulosa, but now I am pretty sure it is distinct."

REFERENCES TO THE PLATE

1  J. decipiens, natural size.
2  3. The same magnified ... 3
3  4. Portion of the stem ... 4
4-10. Various figures of leaves from the same individual 4 and 2
JUNGERMANNIA HAMATIFOLIA

(Tab. 31)

JUNGERMANNIA, semea egena, filiformis flexuosa, ramosa; folia oblonga, linearia, acuta, inaequilateralia, anguste obovata, atro-viridis, subcoriacea, pulcherrima, aristata, nitida. Calicis tubus parvus, subaequalis, cucullatus, illa crista basilica, glandula fructicula, reniformis, angustata, jugum auriculatum, sed obtruncatum, carinatum, obtusum, atro-viridum.

* Ichima*; folio elegans, angustatubuloso, orbata.

HAB. Rocks upon Eglosham, Westmorland; and in the Dean of Chetham near Manchester. Abundant upon the stones of Llanegryn near Bangor; and in other situations in that neighborhood, frequently intermixed with J. colppyfolia. Atlas Humblida. Mr. Light also finds it growing with the same species near Norwich, Cumberland. On level in the county of Kerry. De Tapir. It was discovered upon the rocks of trees at Torcop, Devon, by Mr. Light. Its fruitation, both male and female, is produced in the early spring months.

Plant growing in small crowded green patches, appearing to the naked eye like clusters of mossy granules.

Roots very small, whitish, threads, distantly scattered, in J. colppyfolia, along the under side of the stem, not infrequently bearing an little handle from near the base of the stipule.

Stems from four to three inches in length, extremely slender, of firm substance, procumbent, lying over each other in an imbricated manner, or creeping in a less-pressed form. Each individual is irregularly once or twice divided into a subequivocous number, the segments varying much in their length as well as in their direction; the latter is delicate, composed of oblong cells, the color a pale green.

Leaves (Fig. 1 & 2) rather closely placed on the stem, as in J. colppyfolia, but deeply divided into alternate bluish-green, alternate crests, plumose, very round, of which the upper one is the largest, yet scarcely equaling the third

BRITISH JUNGERMANNIA (J. hamatifolia.)

[Tab. 31]
BRITISH JUNGERMANNIAE.

of a line or length very convex on the superior surface of an ovate figure, acuminate at the extremity where it is often curved in various directions but usually downward. The margins are either entire (1 5) or serrated (1 1 4 3) a circumstance that varies much in different individuals and even on the same about through the former appearance of the most common; the lower lobe is about half the sum of the upper which it resembles in shape and is remarkably acuminate having six marginal nerves, though rarely very slightly serrated. The substance of the leaves is rather thick and suberosema for so small a plant; the cells are small, round, a little prominent. The color pale green.

Perigonal leaves generally to be found at the extremity of a stipe or scarcely differing from the rest except as being vestigial at their base and placed on a more crowded and somewhat interdigitated manner

Perichaetal leaves (F 2 5 4 9 10) almost twice the size of the midline ones 1 two attached on each calyx, the base of which they submerge. They are erect, approaching to round, nearly plano-convex for about one half of their length, into two, ovate but unequal upright acute segments or lobes of which the margins are sometimes entire but more frequently elegantly and very conspicuously serrated (F 2 10).

Scales (1 F 7 8) small ovate acute cleft for nearly half their length into two sharp, equal segments which appear to be always entire at their margins.

Not Palustris — a single spherical Antheria situated in the axilla of each perigonal leaf.

It is distinctly cuticularized, of a pale yellowish tawny color the footstalk is white pilose and transversely striated.

Female Fertile Collection lateral.

Calyx more than a quarter of a line long, ovate ovate-oblanceolate, often acuminate at the base, distinctly ribbed with five prominent and acute angles running from the extremity nearly to the base; there are either none (as in F 10) or strongly serrated (as at 1 3).

The mouth much contracted, and generally also elevated and tubular cut into many fine and sharp teeth

Corolla (1 11) ovate, contracted at the base; style rather long; tubular

Calyx (1 12) acute distinctly rounded

Peduncle scarcely exceeding the length of the calyx more than half a line, divided, by means of transverse suture into short joints which again appear articulated longitudinally in consequence of the numerous narrow and tubular cavities of which they are composed

Capsule exactly spherical white, pubescent membranous, reniform, opening into four equal segments or valves, which are only half as long as the capsule, and at their apices support the

Sporangia adhering to them by their bases each composed of a double hollow, slightly twisted, and enclosed in a yellowish tubular membrane. The spore though not quadrate is exactly spherical are more or less than those of J calyptrifolia and J serpyllifolia, and are of a green color including in size.

The leaves of our J. present under the microscope a highly-beautiful and singular appearance; for each cellulate upon their surface and margins which is the common state of the plant is at most, convex or slightly prominent there is so much so, and an acuminate so to appear altogether deltate a peculiarity that is not confined to the calyceous leaves but extends to the subjacent ones next to the only. The cells of the stem too are more than usually convex.
BRITISH JUNGERMANNIA

(J. hamatifolia)

(The same minute, nearly spherical, reticulated bodies (1 25) which under the description of J. alpina I have called ciname are also abundant upon the present species, but I am unable to discover how they are attached to it.)

In my remarks on J. alpina I have noticed the affinity which the present plant bears to the one β of that species and in addition to the observations I there offered, I have only to add that this is much smaller in all its parts; that the size of the lobule both in the calyx and perichaetial leaves bears a much greater proportion to that of the lobes; that the texture is thicker and more mucilaginous, the calyx narrower and the stipules more ovate.

J. hamatifolia is probably not a rare inhabitant of the subalpine parts of the British isles; but an experienced botanist, without the assistance of a microscope, would scarcely be able to distinguish it, in its native place of growth, from J. subalpina; although on a more minute examination the leaves will be found to possess a widely different character.

I have to regret that the Antheridium and a more perfect state of the capsule, as well as the car β more discovered too late to have them inserted in the annexed plate.

A minute reddish globular body (1 6) is not unfrequent in the axil of the leaves and may at first sight be readily mistaken for an Antheridium but it is probably always destitute of a footstalk and has rather the appearance of an uninal than a vegetative substance.

REFERENCES TO THE PLATE

1. J. hamatifolia, natural size
2. Portion of the same magnified
3. Prickled portion of the stem
4. The same with serrated leaves
5. Calyce leaves
6. Calyce leaf with an anomalous ? in its axil
7. Under side of a portion of the stem, showing the stipules
8. Stipule
9. Perichaetial leaves
10. Calyx and perichaetial leaves
11. Geranium
12. Calyce
13. Stem
14. Seeds
BRITISH JUNGERMANNIAE

JUNGERMANNIA MINUTISSIMA.

(TAB. LIX.)

JUNGERMANNIA MINUTISSIMA. Engi Bel. 1635
Jungermannia minutissima aut eom compacta Serpula aut Hemaria folia aurita; foliis et albo revolutis vaginae cordiformi. MICHELIS Nou Gen. p. 9. 6. f. 50.
Lichinastrum, quod Jungermannia minutissima est sub comparae Serpulae aut Hemariae foliis auritis foliis et albo revolutis vaginae cordiforme. MÜLL. Nova 7. 79. f. 50.

HAB. First discovered in this country by Mr. Loddiger, growing on the back of boulders and ash trees near the ground, in the Nun Forest. Bearing fruit in April and May, afterwards turned by the genus of Jungermannia more plentifully near Keswick Cumberland and upon the rocks at Mount Edgecombe Devonshire.—Upon trees at Henfield Sussex. Mr. William Burrell.—In the neighborhood of Banbury Ireland. Miss大桥.—It grows indifferently upon trees and rocks and is very common in various parts both of Devonshire and Cornwall.—About the lake of Killarney Ireland, upon the trunks of trees. Mr. Thomas Gage Bart.—Woodlands near Dublin.—Dr. Tapier

Planta growing in patches from one to two or three inches in diameter appearing at a little distance, like a green straw and, even on a nearer approach, it may readily be mistaken for Leporinia stricta.

The roots proceed from the under side of the stems and branches generally immediately at the base of the stipules, and in small, whitish bundles of fibres.

Sorus spreading over each other in an indistinct manner; each individual is from one to two or three hairs long, remarkably slender. Stipules numerous with the branches varying in length and direction simple or again divided. The texture is equally delicate with that of the leaves composed of distinct oblong cells.
BRITISH JUNGERMANNIE

Leaves about the twentieth of an inch in length, distinctly placed, bifid, alternate with regard to the stem, patent or erect-patent, of a roundish-ovate figure on the upper surface very convex or to be almost semicircular. the margin is frequently altogether entire, sometimes furnished in the lower part with a small, oblique and obtuse notch which can scarcely be said to constitute an unequally two-lobed leaf: the rest of the margin is wholly free from serration or serrate of any kind. The color is a pale green; the texture thin and roundish; the cells: small, roundish, and a little prominent.

Petiole leaves placed at the extremity of a branch, eight or ten in number more closely placed than the smaller leaves, but in no other respect do I perceive that they differ from them.

Perichaetial leaves (1 1 1 1 1 4) the tenth of a line long; one pair originate at the base of the calyx, to which they are appressed; their figure is widely ovate, concolor, divided by a very obtuse and oblique sinus into two small, unequal blunt lobes (1 4).

Stipules (1 1) small, ovate, approaching to round, furnished at the apex with a deep and sharp notch forming two equal acute segments.

The Male Fructification I have but lately seen, so in J. harryaei, a single, spherical, reticulated. Another is found in each perigynial leaf, the fruiting-hill is short, white, unossi-nervously serrated.

FEMALE FRUCTIFICATION INERIAL

Calyx (1 1) large in proportion to the size of the plant, and twice the size of the leaf lobes, inclining to round, its base slightly attenuated. The acute projecting angles extend from the apex to the base, and these are always entire the mouth is considerably contracted, and slightly toothed. In color and texture the calyx exactly resembles the leaves.

Cymaria (1 1 h) ovate green white rather long tubular. Cymbidium (1 1 1) ovate whitish membranous reticulated.

Podostele bladder exceeding the calyx in length, white, cellularly transversely striated, forming nearly quadrato-ovate points which are again divided longitudinally. Here too as in J. harryaei and its associates, the podostele, when dry, is bent at the points in a zigzag manner.

Calyx (1 1) precisely spherical, pallid, white, reticulated opening into four equal, acute valves which are only half of the length of the capsule (1 1 1).

The spirals filaments (7 1 9 1 1) are of a brownish color, formed of a double Helen, brownly twisted, enclosed within an extremely delicate tube and attached by their bases to the points of the valves in small parallel-shaped tubes.

The seeds are large, oblong, somewhat angular, of a dark green color.

Cymaria (1 1 1) spherical, green reticulated.
BRITISH JUNGERMANNIAE. (J. uncinifera)

Mitchell had the honor of first detecting and describing this most diminutive species of the genus; which Dr. Smith has very aptly named uncinifera. Italy and Great Britain are the only countries yet known to possess it; though, with me, I think it can hardly be reckoned among the "plantae ramosae."

In habit, as well as in the more important parts of fructification (which are such as to furnish characters for a distinct genus) J. uncinifera distinctly accords with J. serpyllifolia, J. calyptrifolia, and J. hawaiiensis; the leaves, nevertheless, will be found to differ essentially from those of the individual now mentioned, in being altogether entire; so at least having no obscure an inclination, that no one would consider the plant as belonging to the division Jothis ianqualiter silholis. Indeed, it seems to hold an intermediate place between that section and the one J. filicis integra.

The stipules, though, on account of their small size, they are with difficulty detected and have not been noticed by any preceding authors, will, if section is used be found to exist throughout the whole length of the lower part of the surculus.

Dillenius' figure and description of this species, as well as those of J. serpyllifolia, are, as noticed by that author, copied from Mitchell.

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BRITISH JUNGERMANNIAE.  

JUNGERMANNIA MACKAI.

(727. LIII.)

Jungermannia, membranacea, vague ramosa; lobia disjacula, subulata; lobis imparipinna; superanuim; majoribus rotundatis; inferioribus angustis, ovulis; stipulas magnas rotundatis, obcordatis, fructibus lateralis terminalibus; corymbus obcordatis depressis, triangulatis, apice subcuneato, elevato, dentato.

Here. Sent to me January 1840 by Mr. Mackay, who observed that he had known the plant to grow at the Dargle for several years, and that it is not unfrequency mixed with J. maculifrons. — On wood stumps, and stems at height about Bullylicky near Bantry. 

Miss Hatchine. — Low here. Mr. Lafl. — Upon rocks at Cheddar, Somersetshire, plentiful and on the rocky sides of the chasms and vallies in the neighbourhood of Torquay; and indeed, in another situation throughout the Lime-stone Country in that part of Devon.

It occurs more rarely upon a hill near the water-fall at the Devil's Bridge, Llaford.—Mr. Lafl finds it at Mount Edgecombe. — Sometimes it is attached to trees. (In February and March the fruit, both male and female, is produced in Devonshire.) In Ireland Miss Hatchins finds it growing in November.

Plants growing in dense, blackish-green patches of various dimensions, from one to two inches to as many feet in diameter.

Roots branching from the lower surface of the stem, and immediately below the stipules, in small bundles, which consist of short pellucid fibers.

Stems creeping over each other in successive layers, and closely applied to the surface upon which they grow, each individual is from half an inch to an inch and a half in length, slender,iform, because one or two branches in an elongate, though somewhat narrowed manner: the branches very variable in length: the substance is rather opaque: the cells suffusely apparent: the color a dirty green, approaching to brown.

Leaves rather closely interlaced in two rows over the whole upper surface of the stem, herringbone, divided into two very unequally-sized lobes of which the largest is about four tenths of a line in length, smaller as they approach the apex of the barren stem, though the reverse in the case of the fertile ones; of a roundish figure: slightly convex above; the lesser one is scarcely one tenth of its axis: involute and reniform (fig. 4) the texture somewhat firm: the costellations (as in the calyx, represented at fig. 3) formed by
BRITISH JUNGERMANNIA

...and regular in size so as to give the leaf an extremely broad full appearance under the microscope. When dry the whole surface appears to be elegantly punctured, in consequence of the sinking in of the centre of the lobes, and when immersed at once a dark spot may be seen in each leaflet where the coloring matter has been precipitated. The general color of the leaves is an olive-green, more or less dark, frequently approaching to black.

Perigonal leaves (f. b) more narrowed and closely imbricated than the rest and the latter

...is of a somewhat larger size in which particular alone they differ.

Periocalcal leaves (f. 5) also bear a close resemblance to the calyx none, but they are

...somewhat larger and are furnished with a lobule nearly equal to one half of the size of the lobes the latter is appearing in the superior on the former is in the inferior surface

...of the calyx.

Stipules large roundish acute, more often very slightly notched, when they may

...truly be called obsolete.

MALE FERTILISATION (f. 8)

Anthers (of which one or two are sometimes in the axils of each perigonal leaf) ovate

...in a younger state, spherical when advanced in their full size pale grey, minutely; footstalk about half of the length of the Anther white, transversely striated.

FEMALE FERTILISATION very generally terminal occasionally lateral

Colpus (f. 9) about three-fourths of a lim long oblong-acute much deformed especially towards the extremity besides the two angles on the edge a third and more obtuse one projects from the under surface and extends from the base to the apex (f. 3) The mouth in an early state appears to be enclosed to a narrow central tubular epistome, which may at length be distinctly seen to divide into four acute teeth and, after the emission of the capsule a long but narrow opening is to be observed reaching nearly the whole width of the calyx, (f. 9) In color and texture, I can perceive no difference between it and the leaves.

Germen (f. 7) ovocolu, pale green, having a long tubular style.

Cephalium of the same form with the Geranium of a very thin membranous texture dilatation rectangular. It opens with an irregular vertical fissure for the emission of the capsule.

Podium very little indented exceeding the length of the calyx, sometimes not at all, white sulphureous cylindrical a little thickened towards the extremity.

Cephalium (f. 9) small, nearly spherical of a delicate texture less so middle them that of J. serpyllifolia but more so than those of J. delphinia and Tamarcopsis which so pointed that a point into a greenish-brown color is imparted by the seeds within marked with reticulations. The four ovate valves are equal in size and the divisions extend to the thickened apex of the podule after the discharge of the seeds they become retruded.

Seeds of an irregular form but approaching to spherical smooth of a dark olive-green color. The spiral filaments are brown formed at a double bell enclosed within a peculiar tubular membrane which at the mouth is a little expanded, at the base adherent to the extremity of the inside of the valves, where they are persistent in small tubas, even after the discharge of the seeds.
BRITISH JUNGERMANNIAE. (J Machili.)

It is to my friend, Mr J T Macleay of the Botanic garden, Dublin, that we owe our first knowledge of this plant; and to him I am anxious to dedicate it. Since this discovery, indeed, it has been found elsewhere in Ireland as well as in England; and, in the south-western part of the island, appears to be an abundant species on shaded and moist limestone rocks. In the numerous clumps in the ground, especially near the sea, about Torquay and Babbacombe, in Devonshire, J. Machili grows in such profusion, as to form a striking feature in the coloring of the perpendicular faces of the rocks, though it is in more exposed situations only that the delicate capsules are to be found, and, even there, not without an enormous expenditure of time on the small one.

The present species, although abundantly distinct as well from J. delatata as from J. serpyllifolia, has nevertheless, many characters in common with each. The former at approaches in general habit (though neither it has a still greater affinity in external appearance with J. complanata) and in the figure of the calyx, but distant equally in the formation of the lobe of the leaf, in the white and Subcutaneous texture of the capsule, in the irregularly shaped greening seeds, and in the double spiral filaments:—in all these particulars, and in the shape of the sepals, it so nearly agrees with the latter (J. serpyllifolia) that a similarity in the shape of the calyx might not unusually be expected. But this is far from being the case; for in J. Machili, the calyx is depressed and has three angles, whilst in J. serpyllifolia, it is by no means flattened and is furnished with five angles. This affords a character the most decisive in enabling us to distinguish the two plants, which we may be further known, even upon a more casual inspection, by the much greater size, deeper almost blackish-green, as well as the closer texture of the stem (J. Machili) when contrasted with the minute foliage, more cellular structure, and very pale green of the other (J. serpyllifolia).

These peculiarities of the last mentioned plant are dwell upon by Dr Wahlenberg in his admirable Flora Lappica (a copy of which I have lately had the opportunity of seeing) under his J. campestris; and it is from his having noted them rather than from his figure (in which no fructification is represented) or from his specific character that I am induced to believe it to be the same as our J serpyllifolia; for both will accord equally well with J. Machili, as well as with that species "Coloris," he says, when speaking of J. campestris, "intempest et habitus J. complanatae L. continent, sed omnem trichum angustissimum spargunt succus in sexautem (J. trachemanus) speciem. Mollis est, et a venterco grandum facit."
REFERENCES TO THE PLATE.

1. Female plant, natural size.
2. Male plant.
3. Leaf and stipule, with a portion of the stem and roots.
5. Sori, extreme of a branch, showing the under side of the calyx and perichaetial leaves.
7. Gernra.
8. Calyptra.
9. Calyx with a capsule after the discharge of the seeds.
10. Sporophytes, enclosed within their pollen tube.
BRITISH JUNGERMANNIAE. (J. Hooker.)

JUNGERMANNIA HOOKERI

(TAB. LIV)

JUNGERMANNIA, caule erecto, robusto; foliis uniusque inaequali, ovatis vel oblongo-ovatis, basi incisis; pedicellis brevissimis; fructu terminali, calyci sulcis; calyptris magnis, oblongis, carneis latis.


Hum. Growing intermixed with J. multifida, by the side of a ditch near the private road from Calman to Poonaw, in the New Forest. Mr. Loddiges—Said found by the same gentlemen, in August, 1819; in the moor of Knooddy, Kerrintoon, Scotland. It produces fructification, both male and female, in the winter and spring months.

Plant growing in small and scattered patches, generally of a dull green color.

Roots from a descending stem branch (if I may so express myself), which appears or is altogether a continuation of the stem, and nearly equals it in thickness more several large underground fibres, which shoot out in a horizontal direction, they vary much in length, generally exceeding a quarter of an inch, and are either simple or branched, their color a dirty white, and the cellular structure is the same as that exhibited by the stem.

Stems varying from one inch to half an inch, rarely more, in length, erect slightly because, alliform, but not remarkably slender, for the most part simple, though a divided stem is now and then observable, and a young shoot or innovation occasionally arises from various parts of the plant. The color is greenish, the texture closely cellular.

The leaves in the smaller individuals are rather distantly placed, more crowded in the shorter ones; all of them are patent or erecto-patent, sometimes a little recurved. They are inserted without order on every side of the stem, and vary in regard to size in all parts of the plant and equally so in figure. A few are rounded in their shape, but the greater number are either ovate or oblongo-ovate or occasionally ligulate. Ligulate, plane, cut at the margin, though not deeply yet in a manner so irregular that they will be more easily understood by a reference to the annexed plate than by any description I can able to give.

I may observe, however, that none the more the maturity of a leaf two opposite lateral matche
are frequently seen which form a large terminal base, and that in other leaves, are formed smaller lobes in projections as well acute as obtuse which give to the margin a very jagged appearance. The substance is rather thin, and delicate yet of such a nature as to dry very badly, shrinking considerably and requiring a great length of time to recover after immersion in water; the cells are not moderately large, ovate; the color green varying from a pale to a deeper hue.

The perigeeal leaves are generally larger than the rest and equally variable in figure with them always situated at the extremity of the stems by no means equally directed nor having the base (as is usual in the genus), particularly ventricose, nor the apex incurved, but rather expanded so far that the Author are always exposed.

Perigeeal leaves six or seven in number, as far as I have yet had the opportunity of observing while enclosing the Geranium, closely placed and immersed, as in a cone (f. 10); in dimension, this figure is very nearly oblong-ovate, without any marginal incision as projection, measure. In a more advanced state of the fructification they are not to be distinguished except by their situation, from the main leaves, which they never more exactly resemble in size or texture.

Male fructification in the middle of the perigeeal leaves, where the seeds are placed in clusters of five or six together, each as nearly spherical, finely reticulated, on a yellowish color inclining to orange, when mature to its full size. The flower in short and cellular.

Female fructification terminal upon the stem as branches.

Calyx none.

Corolla (f. 9) several, green, with a tubular style and surrounded at the base by a few abortive pistils which are linear, only slightly revolute at the base and at the apex, under a high magnifying power are seen to have an expanded and hollow mouth.

Corolla quite exposed, so as to resemble at first sight, a cup, at the main branch of the stem, below as seen this at the base it appears to be a continuation of the stem (f. 7 9). It is of an oblong or linear-elongated figure, its extremity short and its base profuse, with a fine texture, as well in color only that it is nerveless pales. The style on the contrary at all times apparent, and just within the perigeeal leaves even during the state of the ripe capsule a flow of the pistils may be seen. At the apex, the calyptra opens with a vertical, but irregular fissure for the ejection of the capsule.

Petals about half an inch in length, white, filiform, elongated, terminated by the capsule, this is of a linear-elongated figure, pale brown color and reticulated structure rather delicate, subpellucid. It opens for the great part, into four equal linear valves, which often adhere at the extremity in consequence, as it appears to me of the arrangement of the elements. Sometimes five valves are seen and more than once Mr. Lyell has observed an appearance of only two valves and three were laid together at their apices, so as to form the exact figure of the periphery of an ellipse.

Seeds (f. 12) disposed within the capsule in three and enclosed in a transparent capsule, through which they are distinctly seen, in an immature state in be of a green color, when more advanced (f. 13) they become brown and the papery covering is not apparent though they very generally hang together (if I may so express myself) in three
BRITISH JUNGERMANNIAE

(J Hookeri.)

Like the seeds, the spiral filaments are in a young state green, and enclosed in a thin white membrane (L. 15.) which in their perfect state we lose. They are formed of a single hollow thread united at each extremity, and as in most of the fresh spore are attached to the extremity of the valves in pencil-shaped style.

Perhaps, there was not to be found, in the whole genus of Jungermannia, a species more distinctly marked both in its fructifications and its foliage than that represented on the annexed plate. It is one of the many interesting discoveries made by Mr. Lyell, who kindly proposed that it should bear the name under which it has been already described in English Botany.

The most remarkable feature in this plant (if I may be allowed such an expression, where every thing is so strange) in the absence of a calyx, and the prominent fleshy calyptra, which might be taken for a calyx. The horizontal thick and fleshy fibres of the root, seem rather to belong to some phanerogamous plant than to the genus Jungermannia, almost all the species of which are furnished with remarkably slender simple and dendritic radicles. The multiform fission of the leaves in of rare occurrence in the present tribe of plants. Indeed I am only acquainted with two species of British origin which have this peculiarity in common with J. acutum and trichophylla; but in every other respect these plants are widely different; the individuals new vegetation bearing numerous leaves while those of J. Hookeri are broad and subulate, or ligulate, varying most remarkably in size, and in the shape and situation of the lobes and auricles, with which the margin is generally furnished. Most of the Jungermannia are well known to possess the property of being easily restored to a fresh and vegetative appearance, after being dried for a considerable length of time; but the present species is a striking exception even to this rule, since after ever so long an immersion in water it very imperfectly recovers its original state.

In the color of the Anthus and in their exposed situation, a similarity may be traced between them and the Anthus of J. purpurea. But the female fructification is totally different, and in the form of the capsule and the situation of the spiral filaments there is a close analogy with J. pilosa and multiform between which, and the Jungermannia Hookeri J. Hookeri may be considered as holding the middle rank. The coloring of the apex of the valve of the capsule, which Mr. Lyell has remarked to be an equally common occurrence in the sporangium, confined at Rinkaby in as much as the New Forest, is not confined to this species. It also happens with the capsule of J. Lyelli. But in no other individual have I yet observed the seeds to be disposed in these, within a cellular covering; though it is not impossible that such a circumstance may have escaped my notice through neglect of examining the capsules in an immature state, when this appearance is most evident.
REFERENCES TO THE PLATE

1. J Hooker, male plant, natural size
2. Female plant, natural size.
3. Male plant, magnified.
4. Apex of a male plant with the anther.
5. Perigonial leaf.
6. Anther.
7. Female plant, calyx still entire.
8. Female plant, with capsule.
10. Interior view of the same.
11. Immature seeds and spiral filaments.
12. Perfect seeds.
13. Spiral filaments.
BRITISH JUNGERMANNIAE. (J furcata.)

JUNGERMANNIA FURCATA.

(TAB. LV LVI.)


Liches sterilis saxelle revolutum fasciculatum. Cat. 811. p. 313. (See Doll.)


ß ALLOMEN: brunniferum majoricenum, elongationibus strictioribusque.


γ ALLOMENA: brunniferum latioribus apicibus (in genere fuscus plantis exceptis) dilatati, oblongosimulata.


Ham. Abundant in every part of the kingdom: growing as well upon the trunks of trees and low bushes as upon stones, rocks, and even an heathy ground. (Producing fructification, according to Dr. Taylor, from October till March.)—ß. is not uncommon upon rocks, and
on the ground in subalpine countries.—γ has been found in various parts of Ireland by Miss Rutledge, Mr. Templeton, Mr. Turner, and Mr. Mackey.—At Kinross, Scotland, by Mr. Lyell and near Perth by Mr. George Don; but no fructification has hitherto been discovered upon this variety.

Plant growing in large dense patches closely pressed to the surface, which affords it nourishment.

The rosettes consist of simple white hairs, produced here and there from the lower surface of the stems of the fronds, and not easily distinguished from the hairs which are intermixed with them.

Folius: from half to three quarters of an inch in length, creeping, horizontal, lying very near each other, an undulated margin an inch, scarcely equaling half an inch throughout; linear, thin and subpellucid, slightly waved; the margin quite entire; never (except in a very young state) simple; always branched in a few low dichotomatic manner, with the small fronds for the most part at the extremity; where the same, the apex obtuse; the upper surface is destitute of hairs or covering of any kind; but the margin and the surface beneath are bent more or less thickly with rather stout, entire, and simple hairs, which upon the margin have very frequently a collateral appearance. The texture is delicate, the cells roundish, the color a pale and pleurant green. Throughout the whole length of the fronds and its ramifications a central, slender, but very distinct, nerve on which extends upon the lower surface a fine of which are seen a few hairs therefor it gives the impression, which are to be observed at almost every season of the year and at various stages of growth from the young ovate and almost unbranched shoot (L. s. L. 17) in the larger, broader, bearing and branched kinds, which in every respect resemble the parent, separating from it in a little time, throwing out roots, and becoming anew and distinct individuals.

Mass Fructification abundant on distinct individuals from the female (see next page), placed within a peculiar receptacle or perigoneum attached to the underside of the frond (L. 17, 18) and always upon the midrib. It has the appearance of being a young shoot or ovation (for in color and texture I have perceived no difference) rolled up into a spherical figure and generally bent, serrated, and bent on the lower surface with blunt-creped hairs (L. 28). It is insufficiently polished to admit of the seeds being distinctly seen within, and no cutting or tearing upon a perigoneum (L. 29) they may be distinctly seen to be fixed in clusters of three or four in each to the midrib. They are of an ovate or spherical form (L. 30, 31) finely matted in an early stage of growth and very noticeably so when arrived at their full size. The fructification is very short, white, obliquely twisted.

Female flowers: (see next page) arising from various parts of the lower surface of the midrib.

The calyx at first resembles a scale (L. 3, 4) opposed to the stem of a roundish form, convex on the external surface at the extremity, and indeed not infrequently elongated along the whole margin, very beautifully fringed with long white culms or hairs; at a more advanced period (L. 8) it may be seen in the two-labeled, and when the calyptra is exerted the calyx is cut into two very deep, subacuminate lobes, which are usually a very acute, embracing the base of the calyptra (L. 1, 2, 6 and 9). These I have great reason to believe shot out into incassatus, after the decay of the fructification for their two-labeled figure gradually if appear, and the calyptra are converted into shoots, like that represented at L. 13 of Tab. 15.
BRITISH JUNGERMANNIACE.

Fistula (F. L. 8: 7) rarely more than three or four in each calyx, large, broadly ovate, the mouth a little expanded and crenate. They are thinly marked longitudinally and transversely with dusky lines.

Calyces oblong-corneate, curved at the base, which as has been already remarked, originates in the undersides of the frond or stem, as the extremity of a whitish color, base on every side with many white, rigid hairs or bristles which stand out for the most part in a horizontal direction, and give the calyx a remarkably branched or almost exserted appearance. As irregularly turn but vertical fissures is formed for the emission of the capsule—I have not been able to discover any style.

Leaflets these three as long as the calyx, rather wide in proportion to its length, white, cells lined with the ovate, or rotundate-ovate.

Capsule which is of a deep brown color (F. 16) strongly constricted opening into four equal ovate valves, that soon fall back and become twisted.

Seeds spherical (F. 18) brown or olive; the spiral elements are of the same color;

composed each of a single half of considerable length, and much attenuated at each extremity. Many of them continue to adhere at the apices of the valves of the capsule as in J. Hookeri, J. pinguis, &c.

For $\beta$ (F. 7) scarcely differs from that in its larger size, and more elongated as well as straier habit. It is also of a more yellow color than the usual appearance of the plant.

For $\gamma$ (L. ex F. 8: 26, 28) is most remarkable for its color which is of a fine verdigris green, especially towards the apices of the frond which are moreover considerably dilated and the whole plant is of a mass delicate texture than the mass in $\alpha$. A further difference may be observed in the middle which in $\gamma$ is frequently forked within the frond and immediately below the apex. I am aware that this peculiarity is occasionally seen in $\alpha$, but it is much more common in this araucanum variety as was to anticle it as observation. With regard to the color of $\gamma$ I ought to remark that it is sometimes but not always visible in a fresh state. Mr Turner and Mr. MacKay having been directed to the habit their by this circumstance whereas Mr. Lyell and Mr. Templeton both observe that it becomes araucanum after having been kept for a length of time in a dried state. In all other respects they also resemble $\beta$ and like it produces abundant innovations. By these it increases, but not by these alone for several terminal divisions of segments have been found upon this variety, first by Mr. Lyell and afterwards by Mr. Den and Mr. MacKay. In a perfect stage of the present individual has a new and very striking character for the forked segment (F. 1: 26, 29) have their margins so much recurved as to make them appear almost cylindrical and at their apices the segments are formed and adhered, though slightly in clusters. These segments (F. 20) vary much in size and not a little in form, but they all agree in being of the same cellular structure as the plant and in this respect resembling the segments of $\Omega$ filiformes. At first they are rounded or ovate afterwards more oblong and when they fall from the frond they may be seen to have marginal hairs. Although I have not the opportunity of tracing them in a more progressive state, I think there cannot be a doubt that they are destined every one to form perfect plants. Their color is of the same araucanum green as the frond.
BRITISH JUNGERMANNIA

Jungermannia furcata is one of the most common species of the genus, and, as such, is familiar to every student of Cryptogamic Botany. The form of its various parts, however, is deserving of the most minute investigation, for I have scarcely met with any species which offers at the same time so much beauty and singularity of structure united. Without the curious calyx, the perigynium, and the genuina have escaped the notice of writers upon the subject, or, been but very imperfectly and incorrectly described. Even the illustrious Hedwig has been far from happy in his account of the antheridium receptacle, the calyptra, and the seeds, all of which differ considerably from what I have myself had the opportunity of examining. In another part of this Monograph I shall have occasion to speak more fully on this subject. Both is surely incorrect, when he says: Calyx in avena frondis pagum propinquae, subseptus conicus ovatus hexagonalis, viridis. Corolla calycis brevior (drovatum) et arrecta

and further, ah one has larger placenta in so genitit hae planta in calyx ex advena frondis pagum subseptum subconico, ovate, ovato-lanceolato. Sperma cernuum in rebus calyceiforme c female substans per integumentum membris dilatamentum protrahit. The corolla is surely the part that is protruded and in this particular accord with all the rest of the Jungermannia frondosa. In its delicate texture, and in the strongly marked though slender midrib, J. furcata resembles J. Lycell’s from which, and from every other species in the genus, it is nevertheless abundantly distinct.

There is no reason whatever for considering the var. as a species. The Riccia fruticosa of Hau Raisel I fully agree with Mr. Smith in thinking quite a different plant, and probably (if I may be allowed to judge from the figure) the Jungermannia palmata of Hufnann.
REFERENCES TO THE PLATES. (TAB. LV. AND LVI.)

(TAB. LV.)

14. J. ferrata, with male fructification, natural size.
15. The same, magnified.
16. A portion of the stem and infructescence with male fructification.
17. Portion of a gynoecious plant, seen from the under side.
18. Perigonium with the Anthers included.
19. Perigonium torn open.
20. Anther in a young state.
22. Petal, natural size.
23. The same, magnified.
25. The same, magnified.
27. Gynoecious plant, showing the under surface, natural size.
28. and 29. The same magnified.

(TAB. LVI.)

1. J. ferrata, female plant, natural size.
2. Petal, natural size.
3. Under side of a female plant, with the fructification in various stages of development, magnified.
4. Pericarp, upper side.
5. Calyx in a young state, and pistil.
6. A calyx more advanced.
7. Pistil.
8. Calyx expanded.
9. Calyx and stamen.
10. Calyx and capsule in a young state.
11. Volute of the capsule.
13. Calyx lengthening into a shoot.
BRITISH JUNGERMANNIAE  

JUNGERMANNIA TAYLORI  

② TAV. LVII ③  

Jungermannia tendens erecta, stellata lancea, reniformis. Petiolus patellariformisinternae stipulae lineata, subulata. Fructa terminalia, ovata, apicibus compressis, truncatis bilabiatis.

Max. Tonlague, a lofty mountain in the county of Wicklow Ireland. Dr Taylor—Found also in the vicinity of Bantry by Mr. Huxley.—Two miles from Ambleside to the north of the Pennine range and on the rock behind the hill at Potterdale near Ullswater Cumberland region planty and in the highest beauty together with J. racemosa and J. harrisi. Mr Lodd.—Upon Learney-gallows and other mountains of the Highlands of Scotland.—Mr. Hall finds it upon the Clare mountains.

Plant growing in rather large patches, as stems as those of Sphagnum atropurpureum.

Roots running in small tufts of ample, which share from near the base of the stipules. 

Stems erect, from two or three to four and a quarter inches in length. Stems, thread-like, simple, or near and thin producing one or two small ramifications, which are more generally found about the extremity of the stems, and especially in the bract of the plant, or in its barren state. The substance is rather firm at the base even in the dry and brownish towards the apex, more succulent, having the cells distinctly visible with a lens, and of a green or purplish tinge.

Leaves about three quarters of a line in length at least near the middle of the sterile individuals, for as they arise from that part they gradually become smaller (f. 5). In the female plants, on the contrary the largest leaves are those which reach the nympha (f. 4). They are everywhere rather close and here and there placed slightly overlapping each other, alternate or polygonal or in the stern or not unfrequently away and several as in most species, represented at the base of fig. 4, their form is round or suborbicular, and very slightly coniform; at the margin entire or somewhat a little waved, and at the extremity a small point is generally recurved, as in most distinctly seen on the underside of the leaves (f. 5). Their base is decurrent and obliquely semi-
BRITISH JUNGERMANNIA

amplexical. The stems are, in a striking degree, thick and subterranean the calyx large of a roundish figure but by no means regularly or closely placed (f. 6), when dry from the circumference of the shrinking of the calyx a curiously punctated appearance observable even with the naked eye. The color is of a dingy but yellowish green at the base of the plant gradually assuming a purple that as the leaves approach the extremity of the plant where they are entirely of that color.

Stipules (f. 7) though minute, always present, widely subulate, and, like the leaf, compound of a line of roundish forms and large in proportion to the size of the stipules. Their color is generally pale green.

Perigynial leaves more entire and for the most part more crowded than the rest; at the base they are a little swollen, and the margin is there recurved (f. 8).

Of the Perichaetial leaves there is no very great pinnity in the base of each only, in which they are in a slight degree appressed; their margins are frequently a little waved.

Male Fructifications (f. 9) generally near the center, but sometimes at the extremity of the stem; two or three spherical, pedunculated.

Anthers (f. 10) are situated in the axils of each perigynial leaf.

Female Fructification terminal.

Calyx (f. 10) ovate subtriangle, by an annular plate cylindrical except at the apex, where it is compressed truncate very obliquely toothed, and divided into two short lips. In color and texture it closely resembles the leaves, but the calyx are of a more oblong shape.

Colpus ovate (f. 10) which somewhat membranaceous, reduplicate, tipped with a short columnar style. A few small hairs publish surround its base.

Pedicel short, being three to five times the length of the calyx while colluminal.

Corpus ovate, dark brown furrowed longitudinally and transversely splitting into four equal valves (f. 10).

Spathe spherical, fulvous. Spiral filaments composed of a double beard short, rather closely twisted (f. 11).

Obs. Upon the leaves of this species, a very minute, nearly subulate, blackish, bifurcated genus is frequently to be seen—and I have figured it in the annexed plate (see f. 3, 4, 10, 13). Internally along with a bluish mucilage it contains a number of oblong itellous bodies each with from two to four minute brownish seeds. A very similar parallel, if not the same, is found also on the leaves of J. cambarus but I am not aware that they have ever been under the notice of any writer upon the subject.

I have already mentioned, under my description of J. cambarus the distinguishing marks between that species and the present and I have little more to add but that my own subsequent observations, as well as those of Mr. Lyell, who has lately had the best opportunity of examining the two plants in their native places of growth, have more and more strengthened the opinion that
BRITISH JUNGERMANNIA. (J. Taylor.)

they are truly different. Notwithstanding the warmest encomiums of the able Botanist just mentioned, the fruitation of J. juncosa has hitherto eluded his research; but whatever be the fate of that plant, the one here described, and named after my friend Dr. Tayler of Dublin, will I trust, be permitted to hold its place in the list of species as a memorial of the great assistance which I have derived from one of the most acute and active Cryptogamists of the present day.

Mr. Lyall observes that J. Tayleri has an agreeable using which resembles that arising from the flowers of the Heath.

REFERENCES TO THE PLATE

238.

1. J. Tayleri, male and female plants, natural size.
2. Sterile plant, natural size.
3. Male plant, magnified.
4. Female individual.
5. Portion of the stem seen from beneath.
6. Leaf.
7. Stipule.
8. Perigonous leaf.
10. Calyx, Collyrium, and Capsule.
12. Parasitic Fungus detached from the leaf.
13. Seeds of the same enclosed in a papilous covering.
BRITISH JUNGERMANNIAE. (3 compressa.)

JUNGERMANNIA COMPRESSA

(TAB. LVIII)

JUNGERMANNIA, annual erecta, divisa folia biseriata articulatis, (cymulae subumbelliformes,) plantum aestival, suppleta atque instar innovationum jungermanni aculeatae, foliis integris et in ramis multis fructa terminali, umbellosa pericarpiis inammatis, oblongis coriaceis, serpen, quadriventialis.

Hab. Mountain rivulæ, near Dunbar Miss Hitchens.—Lough Derry Mr. Taylo.—(It produces fruit in the month of June.)

Flary growing in dense purplish tufts, of some several mm diameter.

Roots axially ring; a few simple stems may here and there be seen near the base of the plant.

Stems varying from two to six inches or more, in length, erect or only growing in a horizontal direction when carried down by the force of a mountain streamlet, bifidum, ramifrons, brachialis: at least appearing so, in consequence of the innovations which are rather frequent and produced, and are often of such a close or slenderly to be distinguished from the stem itself, all of a brown or purplish color, and a cellular texture, though, in the older parts of the plant, the cuticles are obscure and almost obliterated.

Leaves often three-hitch at a line in length, varying in size in different parts of the plant; but in general largest at the extremity of the stem, both in the fertile and in the sterile individuals; they are closely but alternately placed, undulating each other in a very regular and beautiful manner, erect, appressed and from their pellicular nature, softer the stems to be seen through them, dividing each of them, as it were, into two nearly equal leaves (2 f). In figure they are for the erect part oblividate, except those on the extremity, which are nearly uniform, all plane, decurrent at the base margin, and every where entire. In these individuals, which have been subject to the action of a current of water, the leaves are at intervals obliquely placed and often divided (4 f) and, as the young innovations, they are much less closely arranged, somewhat conceave, and have not unfrequently an oblong or rectangular (f d). The texture of the leaves is semi-pellucid, peculiarly thin and delicate, as to be almost membranaceous, but, when dry somewhat rigide; the cuticles are unknown, those at the margin of a regularly subquadrate form; the color is in the lower leaves, a pale yellowish green, while those above are of a fine deep purple.
Jungermannia lacophila
JUNGERMANNIA LAXIFOLIA

(Tab. LIX.)

JUNGERMANNIA cana erecta simplicicula, foliis foliis distansibus, quadrato oblongis, obovatis, ovatis, oblanceolatis; frutice terminali; olychana oblonga, apiculata; seminibus ovatis, obtusis.

Hab. Mountain rivulet near Bantry Maen Hartbein.—In a stream upon Castle-Kelly mountain county of Wicklow De Taylor.—(The capsules are perfected in April. Colours are found during most of the summer months.)

Plant growing in small but very dense green tufts in cushion-like patches.

Roots (as in J compressus) scarcely any; the few that do exist are confined to the lower part of the stem.

Stems erect, diffuse, branches about half an inch long, extremely slender simple or branched with one or two branches uncertain as to their place and length, but always more slender than the main stem and undivided. The branches are tender and flaccid, composed of large, compressed, oblong cells, the upper pale green, approaching in some instances to olive.

Leaves (f. 3) distantly and alternately placed arising from four sides of large disc-like stem, when compared with the diameter of the stem, becoming gradually smaller as they recede from the apex; the smallest are seen upon the branches; they are all peltate or crested-peltate leaves, generally slightly carinated and cleft for about one-third of their length by an acute sinus into two equal or unequal sharp, but altogether entire segments. Their texture: peculiarly soft (if I may be allowed the expression) and divided the indentation very large and formed by oblong cells (f. 4).

Pericarpel leaves larger than the rest and what is remarkable even more distantly placed than the smaller ones, not infrequently leaving the whole only exposed (f. 2).

MALE FERTILIZATION SCHEMATIC

FEMALE FRUIT terminal, if apparently lateral, only rendered so by the circumstance of an innovation being produced immediately beneath it.
BRITISH JUNGERMANNIA.

-Colpus (f 4) large, oblanceolate or oblongate, or it generally becomes in size upward very slightly pedate; the mouth incurved and toothed. It is of the same color and texture as the leaves.

-Capsule (f 5) ovate, membranaceous, whitish, reticulated; style short. Barren pistil small, united at the base of the calyptra.

-Peduncle scarcely more than twice the length of the calyx white, cylindrical, succulent, silky.

-Capsule nearly spherical, opening into four equal, oval valves, which are longitudinally and transversely furrowed.

-Seeds (f 7) spherical, and together with the spiral filaments of a fulvous brown; these latter furnished with a doubly-foveolate halo.

J. laxifolia belongs to that division of Jungermannia, which have their leaves placed in a quadrifoliar manner, and of which a few species have hitherto been detected. With J. junceum it will be seen to have many points in common, but will be found to differ materially, not only in the greater size and larger collibles of the leaves, but also in the form and disposition of the perichaetial leaves, in the texture of the foliage, and in the color in these last particulars approaching J. bicapitata, a species from which it otherwise is abundantly distinct.

Hitherto this elegant little species has been found only in Ireland, a country no less fertile in rare and singular plants, than fortunate in Botanists both able and willing to detect and investigate them.

REFERENCES TO THE PLATE.

1. J. laxifolia natural size.
2. Fertile plants, magnified.
3. Portion of the stem and leaves.
4. Capsule and perichaetial leaves.
5. Calyptra.
7. Seeds and spiral filaments.
JUNGERMANNIA VITICULOSA

(TAB. LXX.)

**JUNGERMANNIA**, erecta, praeeminentia, ramosa, folia hirsuta, subhirsuta, folio horizontalibus, platis ovatis, integro stipulce lato ovatis, dentata incisa; fructu laterali, calycibus subtomentosis, oblongis, carneis; ovum quum foliis seminibus seminatis.


_Habit_ In subalpine countries, far from mountains: in various parts of England, Scotland, and Ireland, growing as well on the ground, as upon stones and other *Jungernmannia*. (It bears fruitation in the spring months.)

**Plant** growing in loosely-spatulated patches of various sizes, rendered conspicuous by their yellowish brown color.

_ROOT_ in few whitish, simple fibers, proceeding in small clusters the whole length of the stem from beneath the stipules.

_STIPULES_ varying in length from one to several inches in length, slightly flexible, simple, as an generally happens, divided by incisions of various lengths, that are patent, and resemble the parent stem in every thing excepting size. All are prolonged their texture firm, rather rigid when dry. The foliis very compact, the color a dirty reddish brown.

_LEAVES_ about half a skin long, smaller towards the extremity and at the base alternately, but rather closely and very regularly, arranged in a bifarious manner horizontal, plane, or
BRITISH JUNGERMANNIAE

slightly curved on the upper surface, of an exactly ovate figure, widest at the base, where they are a little decurrent: the margins always destitute of every kind of margin and serration: the substance is somewhat firm: the cellular tracts and somewhat: the color is yellow-brown at only green: a few growing in a very shaded situation.

Sepals (1 1 3 5) small, oblong ovate, approaching to round: the margins are on less toothed and indistinct: the apex usually furnished with a long point.

Pericarpel forces more: at least there are none that differ in the slightest degree neither in shape or direction from the rest.

Male Fructification imperfect: flowers unknown.

Female Fructification originating from the under side of the stem and beneath the sepals.

Calyx: this in a young state (E. G. T. B) is cup-shaped, and situated upon a short curved stalk: its margin ovate or slightly falcate: its base very thick and caruncle: within are the pistillae (l 2): in proportion as it advances to its full size, the thick base descends, and at length forms a hollow oblong pouch at each, nearly a line long (I 10): the point of attachment of which with the stem is seen to be at the margin: the mouth is a little expanded: and the seeds there situated are, before the exertion of the peduncle incurved: this calyx is imbedded in the earth among the mosses and Jungermannia to which the plant may happen to be attached: it is smooth: or presents many short minute, and irregular striae on its outer surface: its color is a dirty white.

Pistillae (l 1 7 9) seven or eight in number: includes: the mouth a little expanded.

Carpellae (l 11) white: more or less acuminate, recurved: when it has reached its full size, about three-fourths of the length of the calyx: the inside of which is closely appressed: if not attached: for I cannot separate the one from the other without injury: the apex is crowned with a short style.

Peduncle about an inch or an inch and a half long: white: cylindrical, válvate, tipped with the brown oblong valves.

Capsule which opens into four narrow strict valves: divided by a number of transverse and longitudinal furrows: and the integuments again marked by dark line running in similar direction (l 12).


Almost all the above synonyms I have quoted: in compliance with the opinion of preceding Botanical authors: rather than from any conviction of the propriety of so doing: as vulgar and unsatisfactory are the descriptions with which they are accompanied: Two forms can be depended upon: with any degree of certainty: the Michigan figures and that of English Botany: from the circumstance of Linnaeus having referred to the really excellent figure of Nichols: there is reason to believe that he intended the same plant: yet how arrange it is: that he should have described it in the Speciei Plantarum: "juliosis mesobéolis:" This, we are informed: the illustrious author had
BRITISH JUNGERMANNIÆ  

( J. viticeus )

enamed in his own copy, but in the Systema Naturae he has fallen into an error equally great, in describing the species "Habana planta nulla speciosa." In the character given by Becker there is nothing to distinguish J. mielbrana from many other species, and Pohl twenty authors rather than to have had some slight variety of J. mielbrana in view when he says, "Habana extra orbiculata, marginis complexa, satisque pellucida, satisque rotundata, semina semina longa, semina levita, semina denticulata apparent." Wettl. too describes the leaves "marginis alatae" whilst Weber says that they are to be distinguished from those of J. mielbrana by their being entire.

No author whatever appears to have been acquainted with the distribution of this singular species, the honour of discovering it reserved for Miss Hutchinson and Mr. Lyell, the former of whom has alone detected perfect capsules. The stipules too, which are so long being inapparent have escaped the notice of every writer upon the subject, but Dr. Smith.

The curious structure and situation of the calyx are peculiarities which J. viticeus has in common with a species in other respects widely different, brought by Mr. Meehle from New Zealand as well as with one of our own country J. Trichometis, in which indeed it is in other respects likewise closely allied. The differences to be observed are, the pale color the very cellular texture the convex leaves, the closely margined stipules and the linear-cylindrical figuration of the capsule of J. Trichometis which species moreover has the valves of the capsule treated in a very remarkable manner. All of these characters as may be seen by the above description are applicable to our J. viticeus.

Bullen as was ignorant of this species. His figure quoted for it as Hatia Maxt in J. polyanthus, which he has represented veris.

REFERENCES TO THE PLATE

1 J. viticeus natural size.
2. The same, magnified 8
3. Portion of the stem with leaves and stipules seen on the under side 6
4. Leaf 4
5. Stipules 3
6. Under side of a fertile shoot with the young calyxes 6
7. Calyx with a portion cut away to exhibit the pistil 3
8. A young calyx, solitary 3
9. Pistil 4
10. Perfectly formed calyx 3
11. The same longitudinally dissected to show the calyx and the peduncle 3
12. Portion of the calyx, exhibiting its inner structure. 1
13. Portion of the valves of a capsule, 1
14. Seeds and spiral filaments 1
Jungermannia secalans
JUNGERMANNIA SCALARIS.

(TAB. XXI.)

JUNGERMANNIA, caulc simplex alatpice folia rotundata concava integra margineae; stipula late oblonga, fructu terminali, soleae perianthii inamarae.


HAB. Abundant, upon a loamy soil in woods, barren wastes, and hedgebanks.

Plant growing in patches, covering a considerable surface of ground; the individuals generally densely crowded.

Root consisting of small white tubes of fibres, originating from the lower surface of the stem, and near the base of the stipules.

Stem from a quarter to half an inch or sometimes more in length, simple or rarely producing innovations filiform, rather wider in proportion to their length, straw-like, distinctly cellular of a pale green color.

Leaves more or less closely placed in a distichous manner patent and horizontal (f. 5, 4, 10) on erect (f. 7) they vary in length from a quarter to half a line, the smaller ones being found in general near the base, and at the extremity they are of a roundish figure concave above at the base semi-amplexicaul, for the most part having the margin entire but, in some individuals the whole (f. 6) in others, a few only placed here and there, without any kind of regularity are amoeboid at their apices. Their color accords with that of the stem; the cells are small roundish sometimes oblong at the margin but not strikingly larger than in the disk of the leaf.

Stipules (f. 3, 19) small, of a wholly obtuse shape, agreeing in color and texture with the leaves.

Perigynia less (f. 5) serice-villous differing from the rest, except in having a swollen base, and the lower margin a little incurved on the upper side of the stem.
BRITISH JUNGERMANNIE

Perishable leaves longer than the calyx, crenate and wavy, united together the calyx is toothed, of a spherical shape, reticulated, pedunculate; two or three are placed in the axils of each perigonal leaf.

Male flowers never have a terminal flower.

Calyx (f. 14) ovate, clearly attached, by an unattached surface, to the exterior surface of the tube or hollowed receptacle, formed by the pedunculated leaves, the extremity alone or smooth being free; this is cut into four large and equal-sized teeth or wide segments, which scarcely rise above the perianthium. The texture is some deliquescent than the leaves: the color pale and dirty brown.

Germen ovate (f. 15), dark green surmounted by a short, tubular style.

Carpels ovate, semicircular, reticulated.

Peduncle from a quarter to half an inch or upwards, in length, white, glabrous, obtained both transversely and longitudinally.

Capsule between roundish and ovate, dark brown, deeply furrowed longitudinally from the base to the base and those furrows connected by transverse ones. It opens into four equal orifice valves.

Seeds and spore filaments (f. 16) of a dark brown or chocolate color, the former spherical; the latter composed of a double helix.

One No flower that I am aware of have yet been found on this species; but six leaves, like those of J. euphytae, produce a minute, black, angular, nearly spherical fungus attached usually to the upper surface of the leaf and sometimes to the margins. This when broken gains a semi-transparent pulpy substance among which I can discover no traces whatever of seeds or granules. (See f. 4, 10, 17, 18, 19.)

The present species, although among the most common that this country affords, appears nevertheless to be little known and in no place, that I can find described with the accuracy which the culture structure of the calyces richly deserves. It has indeed, a considerable affinity in the form of its leaves in general to J. euphytae, as well as to J. penniis J. sphacelosa, J. aquatica, and J. centrolepis. From the first of these it may be known by its much smaller size and more compactly cellular texture, from the rest, by the presence of the stipitate and from the whole, by the biseriate calyx, from which particular it appears J. marianus, J. marianens, and a few more which are, in other respects, abundantly distinct.

Schulze appears to be the earliest author who has described a Jungermannia under the name of scalaria; but I have little hesitation in pronouncing his plant as well as from the figure as from his own account of it to be no more than the gemmiferous state of J. Fruticulosa; as he indeed, the case with the J. marianus of most other authors. Specimens, however, from Schrader himself,
preserved in Mr. Turner's Herbarium prove the J scalaris of his Spec. Succul., to be the same as the one here represented, but still I dare not venture to quote Hoffmann and Both's plants without considerable doubt. It seems possible that the former may be our J. Trachyantha, but there is no occasion made of the fructification, and the calyx of J scalaris as described by Dr. Roth, appears rather to accord with J crassulae, which that writer probably confounded with it. No author whatever, has remarked the stipples.

J scalaris is represented in English Botany under the name of lanceolata, but the unmagazed red figures are taken from unusually luxuriant specimens, and are much larger than any individuals that have fallen under my own observation.

REFERENCES TO THE PLATE

1. J scalaris, male plant, natural size.
2. Female plant, natural size.
4. Male plant, magnified.
5. Fungoid leaf and Anthae.
6. Anthae.
7. Barren shoot, with shoot known.
8. Pear with conelike leaves.
9. View of the under side of the stem, showing the stipules.
10. Female plant.
11. Calyx and pericarpium.
12. Stipulae.
13. Calyx and pericarpium longitudinally opened.
14. Calyx and pericarpium longitudinally opened.
15. Capsule after the discharge of the seeds.
17. Leaf with its parietal fungus.
18. The fungus detached from the leaf.
19. The same, burst.
Jungermannia polymorpha
BRITISH JUNGERMANNIA

(J polyanthos.)

JUNGERMANNIA

(TAB. LXII)

Jungermannia polyanthos

Jungermannia, minute procumbente, arctophylo, foliis latis, subumbellatis, horizontalibus, planis, rotundato-quadratis integro margineaturae; stipulis oblongis basibus 2 fructa in ramo proprie in parte inferioris ambo aggregatissimis latitudine; calyceus cylindricus denticulato brevioribus, bilabiato laciniatis.

Jungermannia polyanthos

Linn. Sp. Pl. p. 1537

Syst. Nat. 11 p. 706

Schrader, Bavar. ii p. 439

Pullich, Fl. Pol. iii p. 179

Watt, Pl. Cypri p. 115

Linn. Herb. p. 209

Villari iii. p. 438

Hooker, Phys. Pl. p. 85

Eichler, Gen. ii p. 271

Hasse, Entw. 2. ed. 11 p. 318

Wett, Bot. 2 ed. ii p. 277

Lamarck, Encycl. Bot. iii p. 279

Lamarck, H. Fr. ed. 3 211 p. 431

Lamarck, Fl. Gall. p. 32

Engl. Bot. 4 2470


Jungermannia ciliolata

B. Werner, Spie. Fl. Cest. p. 133

Jungermannia aequiloba

Schrader, Bavar. ii p. 436


Jungermannia fragilis

Roth, Germ. iii p. 370

Entw. Crypt. Excip. n. 48

Jungermannia pallascens

Schrader, Syst. Som. ii. p. 7

Huetmann, Gen. ii p. 87

Roth, Germ. iii p. 374

Lichanostemma trichocaulon aquatica aquariae fonte. W. Winckler

Blatt Syst. p. 112

Nepeta trichocaulon folia rotundatum, pallides, aqua

mattis incorporatis sili botanophila

Vallely, Bot Fil. xii. n. 37

Jungermannia aquea folio humem, al oblongo, luteo, dentibus

Minh, Nov. Gen. p. 3

f. 9

Lichanostemma Trichosoriae foliis, polyanthemum, brevis et repens.

Dill. Max. t. 190, f 0

Lichanostemma trichosoriae, 1 basi et media floribus

Dill. Max. t. 190, f 7

Lichanostemma trichocaulon aquaticum fonte. W. Winckler.

Dill. Max. t. 190, f 8

Junguermannia folia pinnata, caudae, ex caulibus

Vallely, Bot Fil. x. n. 90

His Moót and very wet places in various parts of Great Britain. (It is particularly abundant upon rocks and stones in clear and rapid streams, producing fructification both male and female, in April and May.)
(F. polyantha.)

**BRITISH JUNGERMANNIÆ.**

PLANT generally growing in rather sober and struggling patches, easily detached from its native soil.

Roots more or less abundant upon different individuals, issuing in small tufts from the under side of the

Stems which are either wholly procumbent or at the apex only inclined to be so, assume, from one to two tufts, an魔术 at length simple—some even twice irregularly branched; frequently also producing innovations which, at an advanced period, are seldom to be distinguished from the branches themselves.

Leaves rather closely, but still alternately placed in two rows, somewhat individualizing each other with their margins horizontal in their direction, about half a line in length, but decreasing in size from the middle towards the base, as well as towards the extremity of a nearly quadrate figure with the angles obtuse; their surface is plane, or but slightly convex; the base decurrent at the lower margin, the extremity entire in color ferrugineous, though often emarginate especially upon the innovations the notch varying from obtuse to acute. Once or twice I have observed a leaf to have two of these notches, thus forming a trifid leaf which indeed may have colors from an accident. The texture is dense; the cells of a roundish form; the color for the most part pale green, varying in intensity in shaded and exposed situations.

Stipules (f. 1) of a narrow lanceolate form, divided nearly down to the base into two or three, unbranched semi-stalked segments. Under a microscope they exhibit the common reticulated appearance of the leaves, which they further resemble in color.

Perichaetial leaves colorless situated at the extremity of the plant right as far as more, in number, resembling the cauline ones in every thing except in having their base swollen for the reception of the Anthus (F. 8)

Perichaetial leaves (f. 8 3 10) very small, ovate, obtuse, unequally accrescent at their margins, a few of these rather resembling scales than leaves, surrounding the base of the calyx, and are only seen upon the proper calyptra half.

MALE PRODUCTION in the middle of the perichaetial leaves.

The Anthus are spherical, reticulated, of a pale greenish or olive color, situated upon those whitish footstalks.

FEMALES FERTILE on two short proper footstalks, resembling small ramiets, which originate from the under side of the plant, and from a bent or curved base become erect.

Calyx very short, scarcely half so long as the calyptra, at the base cylindrical, compressed towards the extremity widely ovate-truncate, split into two lips, each of which is variously cut and incisulate at the margin, the lips divided it may be observed are unequal, but on one side extending to about three-fourths of the length of the calyx, while the opposite one is nearly half so deep (f. 8 3 10)

Calyptra (f. 8 3) covered, twice the length of the calyx, subglabrous-obovate, white membranaceous near the base, rounded, rounded, tipped with the narrowest style.

Pedicels nearly as much in length white, cylindrical

Capsule ovate; approaching to orbicular, of a brown color marked with longitudinal and transverse furrows.

Seeds (f. 11) spherical, both they and the spiral filament, which are composed of a double helix are of a fulvous color.
BRITISH JUNGERMANNIAE

When found in a state of fructification, there are, perhaps, few individuals of the genus that may be so readily distinguished as in the present specie. Its erect erect stems, and its truncate and bilobate calyx, affording characters no less decisive than remarkable. The leaves also, seem very constantly to retain their subquadrate form; and, though they may in some instances be as much elongated as those of J. heterophylla yet still their general figure, and that being so much more frequently entire, furnish sufficient marks of discrimination. In addition to this, it may be further remarked, that the stipules, which in J. heterophylla are much inclosed, are in J. polygonata always entire.

The Michelian figure above referred to is a tolerably accurate representation of our plant, indeed much more so as it appears to me than that cited by Dillenius (1. 5 t. 5), which I have consequently omitted. The author has mentioned, if I may be allowed to judge from his own experiments, has described that species no less than three separate times as his Species Massoniana. Owing to this I have been unable to learn to which name the species belongs, though it has been generally regarded as J. polygonata. The figure of Vaillant, however, does not appear to have been drawn by the plant in question, but to J. capillacea, under which species it has been classified. In my collection of Cryptogamata, I have a plant, which we have called Polygonum strictum, and which I believe to be the same species as J. polygonata; but it seems to be in no respect different from J. polygonata.

REFERENCES TO THE PLATE

1. J. polygonata, male and female, natural size.
2. The same, magnified.

3. Portion of the stem with its leaves, seen from beneath, in order to show its stipules.
4. Leaf.
5. Stigma.
6. Perigonal leaf, with its calyx.
7. Calyx.
8. Calyx, with its calyx.
9. Calyx, with the calyx.
10. Seed and spiral filament.
11. Seed and spiral filament.

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BRITISH JUNGERMANNIA

JUNGERMANNIA HYALINA

(TAB LXIII)

Jungemanniæ, caulibus secundatis, ternatis, dichotomis; foliis evocto-patentibus, subtomentosis; fructibus terminalibus, cylindricis ovatis, angulatis; ascis contractis, quadriloculatis.

Jungemanniæ hyalina

LYELL. 341

HAB. Boggy places in the New Forest, Hants, and among the rocks immediately above Stock gill Force, a waterfall near Ambleside. Mr. Lycett.—Sailing mountain, near Dublin.

Dr. Taylor.—(It bears fruit in the early spring months.)

Plant forming broad tufts of a deep green.—It is uncommon. It might be easily passed by a Botanist in a dwarf state, though its shining and glossy appearance is likely to attract the eye of the Botanist, who is at all concentric with the growth.

Roots slender simple, polystemous, proceeding generally from the whole length of the stem, which latter as well as the roots is of a deep purple.

Stems either wholly panunculate or so in much more frequent, ascendant in the greater part of its length simple or much branched with innovations, so as to look dichotomous.

Leaves (f. 3) bifolious; pinnate; distantly placed, erect or eretto-patent; loosely imbricated; round embracing the stem, and in places often consisting of their texture extremely thin, membranaceous, shining and subflaccidous; the cellular round the marginal row being larger, colored a deep bright green.

Perigonal leaves (f. 3) situated near the extremity of the stem, unilocular like the real and differing in no respect, but in having a swollen or reniform base.

The Peresipterid leaves (f. 3) which sometimes extend far below the apex of the stem, enlarge upwards from their base as so as in breadth ovate, and are also unilocular.

Main Peresipterum (f. 3) in the axil of the perigonal leaves.

Antheae spherical, of a pale, olive-brown color, reticulated, placed upon a short white stalks.

Peresipterum (f. 3, 6, 7) hexagonal, terminal upon the stem.

Calyx (f. 3) acute, broad at the base, bluntly angular, the mouth contracted, cut into four teeth.
BRITISH JUNGERMANNII

Calyptra (L. 10) ovata, membranacea, reticulata, utt with a short hollow style.
Envelopes a quarter or half an inch long, white, striate.
Capsule (L. 8 to 11) ovata, brevissima, approaching to round, of a deep brown color, narrowed both longitudinally and transversely.
Seeds and spiral filaments (L. 12) chocolate colored; the former spherical, the latter composed of a double helix.

Con. The texture of the leaves in J. hyalina is exactly similar to that in J. cordifolia, and their position and habit often bear great resemblance to those of that plant; but these figures never approach to coincide. In general shape and position, they are by far more like the leaves of J. aestivalis, as well as in their plane as waved states; but as their texture nothing can be more different. The leaf is, strictly speaking, terminal, as in J. polysta, a near though diminutive relation of our plant, as the bend in the stem, whenever the fruit appears lateral, indicates that it is seated between an older and a younger shoot; but calyptrae so placed, and also terminal ones, are observable nearly of the same age on the same plant. Lycalpia M. 6

To the above excellent character and description of J. hyalina for both of which I am indebted to my friend Mr. Lyell by whom they were made from fresh specimens; it is needless for me to add any thing, except my hearty concurrence in his opinion, that the plant is decidedly distinct from the species just mentioned, as well as from every other in the genus.

REFERENCES TO THE PLATE

Fig.
1. Main plant, natural size.
5. Main plant—magnified.
4. Scale.
6. & 7. Female plant—magnified.
8. Leave.
9. Calyx with perianth and leaf.
3. 10. Calyptra.
11. Capsule not yet open.
10. Seeds and spiral filaments.
JUNGERMANNIA CUNEIFOLIA

(Tab. LXIV)

Jungermannia, same repenta simplicie, folis subdistantibus, cuneiformibus integratis, vel apicibus obtusis et emergentibus, stipulis minulis, ovatis, ovatis, bidentis.

Hab. Found growing parasitically upon Jungermannia Tomentosa near Burney, by Miss Hutchins.

Plant so minute as to resemble the filaments of a Conifer, rather than the stems of a Jungermannia; growing loosely clustered.

Roots consisting of a few small fibers, which proceed in tufts from the under side of the stem, and always at the base of a stipule.

Stems extremely slender, filiform, rarely exceeding half an inch in length; generally much smaller and, in fact, have lost the opportunity of observing, undivided, of a brownish color, when dry exceedingly fragile, colules small and oblong.

Leaves (fig. 8 of 5.4) throughout the whole length of the plant rather distantly placed, scarcely the eighth of an inch long, patent or erect, of an exactly linear form; the base decurrent, the apex acute, or cut into a wide, but very shallow notch; the margin every where destitute of teeth or serrations. The collars are rounded, the texture when dry brittle, the color in all the specimens that I have seen, a dull reddish olive or brown.

Stipules (fig. 5.7) one to each pair of leaves, rather closely appressed to the under side of the stem, small, of an ovate form, divided for more than half its length, by an acute sinus, into two sharp segments. Its color and texture the same as in the leaves.
(J masifolia.)

BRITISH JUNGERMANNIA.

Of the present curious little plant no fructification has as yet been found; nor indeed is it at all necessary for the distinguishing of the species: the leaves and stipules allowing abundant characters by which it may be known from every other in the genus. Neither is it an easy task to determine to which it is most naturally allied. In the narrowed base of the leaves it has an affinity with J. spinulosa, in size, color, and texture, with J. hygrometrica, but the stipules require that it should be arranged in quite a different family, where there is most for which it can be mistaken.

REFERENCES TO THE PLATE.

No.
1. J. masifolia, natural size, growing upon J. Tamarisci.
2. Detached individuals, natural size.
3. Stem, magnified.
4. Portion of a stem and leaves.
5. The base showing the under side, with the stipules and root.
7. Stipules.

* * *
JUNGERMANNIA CILIARIS

(TAB. LXV.)

Jungermannia, ecaule praecumbente plane dilatato, foliis bifurcatis, lobis ovatis, inaequalibus, lobis inaequalibus, habitu bipartito, longa, teretes, aequilatere subquadrate, inaequaliter lobata, longissime ciliata, frutice latissimi, ovalibus obovatis, orbis contracto, destituta.


Jungermannia lauris. BATH. Gen. iii p. 431.

Lachnanthes socialis, pallescens, silvorum. DILL. Mon. i. 60. f. 3.

HAB. Among rocks and in shady places, especially in subalpine countries, abundant.

PLANT growing in densely-matted, purplish-brown patches, of considerable size.

STEMS varying from one to two to three inches in length, prostrate or merely (and only I believe when growing among tall mosses) adnate, flexuose-filiform about as thick as horse-hair; furnished, at rather distant intervals, with short, obtuse, patent, alternate leaves, which are frequently simple but at other times biserate with one or two small papillose. The color is a yellow-brown, varying to green in the younger shoots; the substance fragile when dry.

LEAVES (2.4) more or less densely-epilobated, interwoven together in a bifurcated manner over the upper surface of the stems about half a line long; and not sensibly smaller towards the apexes of the stems and plane than in the other parts of the plant. They are of a roundish,
or subquadratc figure, distinctlv divided into two, unequally-klone, conduplicate lobes; of which the upper one is the largest, very obtuse, at its upper surface, and cleft for about half its length into two, rather acute segments; the lower lobe which is nearly plane, and not more than one third of the size of the other, is in like manner divided into two lanceolate and acute segments. The whole are elegantly bordered with long, apically, flaccid cilia, which I have, in two or three instances, observed to be forked, and which are, throughout their whole length (f. 3), inserted in the same manner as the filaments of Conoae. The cilia of the leaves are roundish and closely placed. The color is in sheltered places only a browneish-green; in exposed situations a purplish-brown, generally deeper towards the extremities.

Semperviva (f. 6) of a widely quadrata figure, broader than the stem, to which they are oppressed; at the end unequally lobed, and there as well as along the whole margin, bordered with closely placed long-cilia, narrower than those of the leaves to which in other respects, they are similar.

Pervallia lanata (f. 7 and 8) of these two or three or four are placed at the base of each stalk, and closely approximated to it. They are widely ovate, cut into two to three unequal segments, and ciliate along their borders.

MALE FERTILISATION AT PRESENT UNKNOWN

FEMALE FERTILISATION lateral upon the petals, near the middle of which they are usually situated.

Coils of a more thin and delicate texture than the leaves, of an ovate form, having the mouth small, nearly constricted, and bent with small unequal teeth (f. 9). 

Germs (f. 10) ovate, style long.

Planta (f. 10) numerous, surrounding the base of the germs, linear-lanceolate, expanded at the mouth, of a pale greyish color, streaked longitudinally and transversely with darker lines, and having also a few reddish streaks.

The ripe and spiral filaments I have not had the opportunity of seeing myself, and therefore have copied the description of them from Hoffmeister, who describes the former as being acute, approaching to round, of a deep brown color and the latter, as well as the seeds of a subfuscous color.

The present very elegant species, which is not only common in this country, and upon the continent of Europe, but has even been brought from Greenland according to Dilanius, is likewise found at Raritaink by Dr. Teilenius; and has been by him communicated, with some other well-known European species of Jungermannia, from that country to Mr. Dawson Turner. Yet abundant and general as it is, it was unknown to the botanical world till Dilanius figured and described it in his Institutiones Botanica. The name of species was adopted by Lehmann also, from giving a wrong reference to Vallisner and Dilanius; has led subsequent authors into error, and has been the means, if not of causing Weber, Wesk, Hudson, Launack, and Withering, to mistake J. sementalis for J. crinita; at least of leading them to confound the two species; for the descriptions of many of the above authors will apply equally to either.
BRITISH JUNGERMANNIAE  

(J ciliata.)

The J pulcherrima of Weber is precisely the same as the Linnaean ciliata; and Mr Dickson, who published it as a distinct species in the first Edition of his Planter Cryptogamiae was afterwards aware of the mistake, and corrected it in the second part of the same work. Now is the J Lorraini of Roth to be considered otherwise than as a synonym to the present plant? For the jointed cilia, which the author describes as much upon are in less distinctly apparent in J ciliata, and even in J cannabifolia; and Hoffmann's figure of J ciliata, which is referred to m J Lorraini, in an admirable representation of the true ciliata.

I have already under my description of J cannabifolia pointed out the characters which distinguish that species from the present. The subject of the following plate, J cannabifolia, which at first sight bears a considerable resemblance to it, is remarkably different in having the margins of the leaves incised, not ciliated; its bluish stipules; and its large and distinctly placed collars of the leaves. Between the three species, there is a considerable natural affinity; and, in all of them, the upper lobe of the leaf is more or less bluish; but the true figure of the leaf and stipule of J ciliata is admirably described by Waldstein in the following passage, which I am rendering in quarto, hoping it may tend to remove future doubts on the subject: "Pulmonaria lobata superum se ramosa extrema mago et ut mago coloris; inferna longe longicaulis et Omni multipartita sagaces stipulis divaricantes. Stipula fera dimidiam longitudinem loborum sequent, oblonga, maliro-fimbriata; fibrinis longis articulatis."

REFERENCES TO THE PLATE

1. J ciliata, stellate shoots, natural size.
2. Portus of a stellate plant, magnified.
3. Portion of a portion of the stem, with its leaves and stipule.
4. Portion of a leaf, to show the collar and jointed appearance of the cilia.
5. Stipula.
8. Interior perithelial leaf.
9. Calyx, cut open.
BRITISH JUNGERMANNIA. (J. Woodii.)

JUNGERMANNIA WOODSII

(Tab. LXVI.)

JUNGERMANNIA, unae proeminentes, bi-triplinato folia bifidibus imbricatis, validi ovariis, inequalibus hyalinis lobis superioribus bipartitis spinuloso-c distributoris interiusque minute manubatis, ciliis nigro magnis, ovatis, bipartitis spinuloso-decussatis et minutis valvis.

Hab. On the ascent of Mangerton from Cwm an Cappal Ireland. Mr. Joseph Woods.—Some found at the Devil's Punch Bowl upon the same mountains; and in very great abundance at Brandon, by Dr. Taylor.

Plants growing in large and rather closely-crowded patches.

Stems procumbent from three to five and even six inches, in length, considerably stouter in the larger plants than borne-hairy. Leaves (uniform or bove dichotomous, heart throughout their whole length with rather distantly-placed, patent or recurved, acuminate points) which vary from an inch to an inch and a half or more, in length and are either simple, or again furnished with shorter pinnules. The color is a dirty brown; the texture compact, when dry very brittle.

Leaves (3, 4, 5) rather closely placed, from a quarter to half a foot in length; in the extreme pinnate on the largest are at the apex. In the rest they become gradually smaller towards the apex; where they are imbricated over the upper surface of the stem and branches and have a bifurcated form. They are divided into two nearly equal segments, each of these being divided into two or in some cases three by a line of minute teeth at their margins with variously-sized but generally large, spinulose teeth. The inferior lobe is exceedingly minute and oblong with its margin nearly entire. The remains of the leaf are of a familiar form, very distantly placed resembling those of J. Turneri. The color is a purplish brown, paller and of a more dirty hue in the lower leaves.
BRITISH JUNGERMANNII

Stipules very large, considerably broader than the stem, widely ovate, cleft into two spinulose-dentate segments, and, at the angles of the base, furnished with a reflexed tooth or spur (f. 6).

No Fuscipunctae in either Male or Females, has yet been discovered.

The truly magnificent species represented in the annexed plate, was detected in Ireland in the year 1809, by my friend, Mr. Joseph Woods, in whose name I am honour of dedicating it. It has since been found by Dr. Taylor in the same country, and may possibly have been overlooked by other naturalists, for a variety of J. ciliata, from which it differs in the size and ramifications, as well as in the border of the leaves and stipules, in the extremely minute tubercles of the former of these, and in the large size and very deep vowel of the latter. A further and equally important mark of distinction will be seen in the structure of the leaves, for the cells in J. ciliata are as closely situated, and the interstices consequently so narrow, that a beautifully reticulated appearance is afforded by them, whereas those of J. Woodsii are widely placed, and at very unequal intervals, in the same manner as those of J. justiciana, J. Taylori, J. Thomasii, and a few other.

REFERENCES TO THE PLATE

FIG.
1. J. Woodsii, natural size
2. Extremity of the stem, much magnified
3. Portion of a stem, with its branches seen on the upper side
4. Under side of a portion of the stem, with its branches and stipules
5. Portion of the leaf, to exhibit the cells
6. Stipule
JUNGERMANNIA, cana erecta, subsimplis; folia quadriradiata imbricatis, compacte-planta inferiorem majoretis, crassis; superioribus ovatis; cornibus elongatissimis dentato-ciliatis.

N. A. Upon Beinn Beord, and upon Ben Mac Davie a mountains to the north of the Ben Mt. George Duke, 1819. Summit of Brandon. Mt. Tisher, 1829

PLANT growing in rather closely-crowded patches of a remarkably dingy brown color; always intermixed with mosses and other Jungermannia.

Roots, a few short brownish Stems rising principally from the lowest part of the plant.

Stems erect, from two to three inches long, and about the thickness of leaden thread. (Exence, filiform) for the most part simple, but now and then forked; their color dark brown; their texture compact, rigid and brittle.

Leaves (f. 6) truly quadripartita in their insertion, and imbricated on both sides of the stem; those at the back of it the largest in length, plane, directed, vertical, of a widely ovate figure; the superior leaves narrowed half an inch at the root and obliquely opposed to them; their form nearly ovate, the whole are beautifully dentinate-ciliate at their margins, of a rather dark brown color sometimes inclining to purplish towards the summit. The scales (f. 6) are very minute, but somewhat distinctly placed and frequently of a paler color than the leaves; the texture thin, membranaceous, when dry brittle like the stem.

PRODUCTION totally unknown.
BRITISH JUNGERMANNIA.

The remarkable structure and direction of the leaves as well distinguish the present from every known British species of Jungermannia, that it would be superfluous to say any thing more upon the subject were it not for the great similarity which it bears at first sight to J. seminervis. My acute friend Dr. Taylor first pointed out to me the real structure of the leaves, and ascertained them to be totally different from those of the species that belong to the section of the genus J. seminervis. The apparent lobes and lobule being in reality distinct leaves as well as regard to their insertion, as to their figure; and in both respects bearing no inconsiderable resemblance to the Heschleria goodrichii of Mr. Smith.

Mr. Deane first discovered this species, interimized with J. Donatana.

REFERENCES TO THE PLATE.

1. J. planifolia, natural size.
2. Portion of the stem, magnified.
3. Posterior view of a portion of the stem and leaves.
4. Anterior view of a portion of the stem and leaves.
5. Portion of the leaf.
Jungermannia cochleariformis
BRITISH JUNGERMANNIA.  
(J. cochleariformis.)

JUNGERMANNIA COCHLEARIFORMIS

(TAB. LXVII.)

JUNGERMANNIA, corde proeminenti, abaxioploce, foliis arvibus instantes, convexis, ovato-rotundatis; apice hialina serratis; basi sublatis manubialibus; surculus magnis, oblongis, ovatis, indent.

JUNGERMANNIA COCHLEARIFORMIS.  
Wurmi Sp. in Ueat. p. 145  
Roth, Gen. iii. p. 250  

JUNGERMANNIA PRUVORTII.  
Scopoli, Carn. ii. p. 247  
Lessert, Sect. ii. p. 778.

HUNGRUM JUNGERMANNIA.  
Syst. Nat. ii. p. 731  
Howe, Angl. p. 472.  
Licheneum Tripolomata flos, prolioseum fœnus concave mactus partum spectabilis  

Licheneum alpinum propinquenti fœnus succus cochleariformis.  
Bell. Mass. i. 83.

f. 3. c. 13.

JUNGERMANNIA FOLOS SEMPLESTICULABUS ET Rotundatis.  

Not. Montanum bogis in Ireland, and the north of Scotland not uncommon.—It is particularly abundant about Cape Wrath, at the north-western extremity of the county of Sutherland, mixed with Arctium alpinum.

Plant growing in large, but loosely-entangled patches of many inches in diameter.

Stems, in their natural state, proeminent, but when the plants grow thickly crowded or intermixed, with tall stems and unbranched, they are often from four to six inches, and are about as thick as common buckthorn branches, simple or here and there beset with a small undivided internodes which, for the most part, occur towards the extremity. The color is a yellowish brown, the texture rigid, and brittle when dry.

Leaves very closely placed, and intermixed alternately, and with much regularity over the whole upper surface of the stem, so that they altogether conceal it; they are remarkably convex and obtuse, without the least indication of the figure of the leaf being round, or approaching to ovate, at the upper margin, near its insertion upon the
stem furnished with one or two rather large and spiniform processes or teeth, and at the extremity, divided by an acute stem into two serrated lobes. At the lower base of the leaf and on the under-side of the stem is the ventric, an ovate, inflated, Rusell-like appendage, about one fourth of the size of the leaf, which is exactly resembles in texture both having extremely minute, yet distinctly-pointed teeth (1 2). The color of the leaves is a fine purple towards the extremity of the plant, but becoming brown as it approaches the base that of the stalks a greenish brown.

The Fructification is altogether unknown to me.

The Linnean Mutum Jungermanni is, in all probability the same as the plant here represented, which has nevertheless no affinity with the plant referred to in Michelia's Nova Genera Pteridum, by the illustrious Swede under that species: that, as I have already had occasion to observe, being nothing more than a purple variety of J. nemorosa. Ray's plant is surely the same as ours, and Diffinum's figure is too accurate to be mistaken; although I did not observe the species in his herbarium at Oxford. The Hallerian synonym I can quote here doubtfully; but Weis, who first adopted the name of cocleaformis, has described the species with considerable accuracy. Northin this; however, nor any other author, seems to have been acquainted with the fructification: unless, indeed, Weis may be supposed to have been no, who still merely says of the plant, that "motit movet propter vagum teres, tenebras nitidissimae, cylindricas."

Dr Smith has made a remark upon J. cocleaformis, which I have not been able to verify by my own observation, that "the younger plants have flatter leaves, and are without the mutules. On the contrary, in all the specimens that have fallen under my observation, the leaves have been very ovate, and the mutules sufficiently conspicuous.

REFERENCES TO THE PLATE.

Fig.
1. J. cocleaformis, natural size
2. Portion magnified
3. Under side of portion of the stem and leaves
4. Leaf and caricle
5. Portion of a leaf
BRITISH JUNGERMANNIAE

JUNGERMANNIA FUSILLA

(TAB. LXIX.)


Lichenum Minutum, obtusae, triquetrae, acutae, nigro- ochraceo. BOLL., Fl. Germ. x. f. 23. c. 2. Lichenum angustatum, capsulis nigro-luteis et capsulis parvis, annulatis. BOLL. Mosa. I. f. 41.

Elon Mollis, thinly banked especially on a clayey soil where it is not at infrequent occurrence; bearing its fructification from October to the end of the spring.

The plant grows either in detached individuals or thickly united together as in some patches of many inches in diameter and firmly adhering to the ground by its

roots which are long, dense, simple issuing from the whole length of the under side of the stem and of a remarkably dark purple color.
BRITISH JUNGERMANNIACE

Stems wholly procumbent, lying flat upon the ground, varying from one to three or sometimes four to ten in length; the diameter thick in proportion to the size of the plant cylindrical, or somewhat compressed, waved simple (f. 5), bent with a single ramule (f. 2) or more rarely divided once or twice in a dichotomous manner.

Leaves varying in number according to the size of the individual: about half as long, closely placed, obliquely decurrent, horizontal, of a squarish figure much waved, but scarcely pointate: the extremity cut into two, three, or four irregular and obtuse lobules, forming segments, which are sometimes blunt and somewhat acute. Their color is a pale green, with more or less of a yellowish brown tinge as they approach the base of the stem; sometimes according to Schmidel, pustules of a reddish hue. The segments are more or less approaching in ovate (f. 4)

These are neither perigonal nor perichaetial leaves in the species,

The Male Flowering (f. 3 4) is mattering about the upper surface of the stem and quite exposed both upon stipes and upon epiphyllous plants. Each

Anther is of a spherical form, flattened of a yellow color, terminating a white pollinaria, footstalks, which scarcely exceed it in length (f. 5)

Female Fructification arising from the centre, or towards the extremity of the plant, but I have never observed it in an exactly terminal manner, although the Koch considers that it is its true situation, and in my opinion that when it is lateral it arises from an axillary bud.

Capsules produced singly or two or three together, large three-fourths of an inch in length, sometimes nearly equaling the whole size of the plant, encircling having a slight to the margin (f. 10) and the borders variously arninet and waved. At the base are five calyculate calyptrae in uppermost position, which have been hitherto unobserved by botanists, but which I find very constant in all the individuals I have examined. Sometimes the only is cut into three or five unequal segments and represented at figure 9. In the nocturnal it resembles the leaves, as well in its structure except that it is somewhat more delicate. Its color is, moreover, paler and not so frequently according to the acute Schmidel, of a reddish or pinkish cast.

Germs of an oblate form two or three are sometimes contained in the same calyx (f. 8 9 10 and 7)

Calyptra whitish, delicately, petiolate, terminated by a short style.

Podscrea scarcely twice the length of the calyx, of a silvery white, abundant, cellulosic, resonating a little to hand (f. 10)

Capsule exactly spherical, of a reddish brown color and of a thin, delicate membranous nature. Resplendent bearing deep brown dots along the margins of the loculiciols (f. 11) departing from the essential characters of the genus Jungermannia as it bursts in a most irregular manner; in order to permit the discharge of the seeds, as may be seen at figures 10, 6, and 7

Yet Koch says of the fructification that it is "actus basi foliis crescentibus."

† Schmidel, I might in justice to observe, express says "uterque non de septicuccum ubique ovatum et naturaliter, sin in unam basis tertiam nune rotundat, et in spinulosum ubique erat semeras in punctum diversas semi."

And his fig. 37 represents the four outer scales yet to the specimen which have come under my own observations, the copulate base, as shown in the plate, being irregularly
BRITISH JUNGERMANNIæ.

Spermatozoids, mucronate, of a rich brown color, smooth and with prominent points or tubercles. The spiral filaments are short, composed of a double helix. A few of these spermoids Schmedel says, after the dispersal of the anther, attached to the bottom of the capsule in the form of a tuft of setae.

What the  a spermoid may be "inaccurate disposita pen ramulorum longitudo facit" figured and described by 6 shell on this species I am at a loss to determine. The conjecture of Schmedel is probably just that they are some parasitic fungi and of Meste that they may be a species neither of Musilia nor Bertia. The curious bodies which Schmedel himself has taken for the male fructification of this species, have unhappily, altogether escaped my notice; but his description is worthy of attention and I shall offer no apology for the length of the following extract though I cannot help expressing my regret at being unable to throw any additional light upon the subject. "Tenuior spermatozoides anserinus homo  quaeque incommunicatae sex aliquot velutinae velutinae semen instructum est. Ex mediana columna nunc, mucrona, mucronata, veroncula et hodie minima angustiur lanarius, quoniam globulosum anserem comitum, secta angusti, at phragmata versus globulus ipso velutina semen accipit, non aliprum forte divisum exsto. Superficiles globulosum columnam  deserta numero decem et plurimum, aliquotindem pellucida lanceolata conicis et pseudoequis totius ex velutina columnarum rotundaria manifestandi, quae lena mucrona angusti dextrum deduct. Diversi globuli velutinae succumbi colorum sunt copiosae inclinantes parvulum legem sedulis quidem musculi jungerentur us genus musculi musculi geniturem us genus musculi musculi, quodcumque respectus into declamat quod organum musculifera at Amuranae  visus explicam." It is, however, at once to be seen that these supposed "Organum musculifera" are very different from the Anther in the median plate which, in every respect, resemble those in other species of the genus, and differ in nothing from what are represented by Hudsing except in color; and these, probably varies in different stages of their existence.

With regard to the affinities of this species, I know of none in which it is still naturally allied; and indeed its extremely distinct capsule and the manner in which it becomes, are almost sufficient to afford characters for its separation from the rest of the genus, not the habit of the plant forbid it. In the calyx, two remarkable peculiarities may be observed in the widely-expanded mouth and the impression produced or the bracts on which they might be called at the base. The situation, too, of the fructification is very curious, accompanied by perigonal or parahyal leaves; and the whole plant diffuses an agreeable odor not unlike that of the sweet vetch, Astragalus Colvenianus.

The small leaves of this plant suggested to Schmedel the idea that it resembled a leafy; for he says "regressum munia in propinqua inspecisse munitis insectorum membris utque spatium Michælius adimitur" and Bach considering that thus appearance was peculiar to the young plants, observes: Plantas musculi in juniores statu comprehendit: at mutatum, habundae, quippe pustulat ventrum muster Michælius lanceolata unguis membranum representat; praeventera musculi musculi exsurgentes flosculus et constrictus."
(J pusilla)

BRITISH JUNGERMANNIE.

In my Tour in Ireland ed 2, p. 281 I have mentioned having found this plant in a most flourishing state, although always exposed to the vapor of boiling water. Indeed, it was the only spot in that island where I recollect to have seen it; nor does it appear from Wahlenberg's Nova Lapponica, that it is at all a native of that country. In the warmer parts of France and Switzerland, and in the north of Italy, it is far more common than in England.

REFERENCES TO THE PLATE

1. Male and female plants, natural size.
2. Male plant, magnified.
5. Female plant, with one calyx.
6. Female plant, with two calyces.
7. Calyx.
8. Calyx, cut into segments.
9. Calyx, cut capsule bursting.
11. Seeds and spiral filaments.
JUNGERMANNIA BARRATA.

(TAB. LXX.)

JUNGERMANNIA. frutice prostratae, cimetiimae radicibus stratis reticulosato-quadratis, 3 vel 4-lata; stipula basalis, acutum bifurcatum margine laevis; fructus reniformis, cauliglobosum ovatum orto compostim, deorsum.


[V. 200] Not: C. MORRIS.

Jungermannia Flaccil—WÆRNER, Cord. ii. p. 57 et seq.

Jungemannia in gr. de G. Cord. ii p. 31 et seq.

Jungermannia Flaccil—SCHRÖTER, Cord. cord.

Jungermannia quinquedentata—WÆRNER, Cord. ii. p. 156.

Eichenstrum Trebbiana fuscis foliis multisextis capitis et pseudo ramulis instructis.

Horti Germ. ii p. 115.


Eichenstrum plurinervis basaliis instructis et simplex. WÆRNER, Muc. i 71 f. 29.

Eichenstrum multisextis majoribus, ed extremis instructum. WÆRNER, Muc. i 71 f. 29.

f multis, canaliculis elongato, ad Basalibus foliis inferioribus patellis superiores arctimis umbilicatis, geminiis.
BRITISH JUNGERMANNIAE

This Subalpine country is upon rocks in woods and rocky places, abundant. — Per 6 was discovered by the Rev. R. B. Peale, growing among Diocesan plants in Holt wood, and has since been found by Mr. Elliot, on the beach, near the mouth of the river. The plants appear Dr. T. B. R. L. A. and Mr. A. L. K. I. in the year the female, which is far less common, is produced in the spring months.

THE PLANT growing in loose, less densely-rounded patches, and on various dimensions.

Roots abundant and often nothing the whole underside of the stem, consisting of minute simple, brownish clumps.

Stems from one to two or three inches long, erect, I believe, really branched, but here and there producing spatulate innovations which have sometimes the appearance of divided stems; these may form culms or a green thistle including to brown in older specimen.

Leaves varying much in the thickness of their portion, sometimes they are densely imbricated at other times distantly placed; half a long leaflet drooping alternate, petiole of a subquadrate figure slightly decurrent at the base at the summit divided into generally three but sometimes only two, or often four large triangular toothed, and always placed on equal sides for the inferior one (which is nearest the base of the plant) usually smaller and frequently recurved on even quadrate scale, while the rest are expanded. They are entire mostly acute and subspatulate at the apex (1 5), sometimes acuminate or even acuminate, and sometimes serrate in the rest of the leaf; obtuse. Beneath these large teeth on segments, there is a very minute lamina situated at the base of the upper margin of the leaf near its insertion on the stem (1 5 10 11 12). The color, too, is remarkably variable, depending much on the more or less exposed place of growth of the individual. Most usually it is a pale sometimes a bluish green, in our 6 brownish.

The spathes (1 11) are somewhat of a roundish form.

Of the siphon stems as one or each part of leaves which varies considerably in size upon different specimen. It is always of a conical lamina shape, divided on the sides into three-fourths of the way into two narrow acuminate segments, which, on their margins are again in line variously-sized teeth of variable In number and color it resembles the leaves.

The perianth leaves (1 4 5) are crowded together at the extremity of a stem and missilely divided from the common calyx, except in being more convex, and in having a swollen or shining base.

Of the perianth leaves three or four surround the base of the calyx, their figure is subulate, recurved to the sides, at the apex quadrate with the segmenta very sharp near the base an one side, a small lamina tooth (1 12).

MALE REPRODUCTIVE TERMINAL TO THE AMOUNT OF THE PERIGONAL LEAVES.

Anthers in an ovate-spherical form of a greyish color, slightly papillose, stout, narrow, collous.

FEMALE REPRODUCTIVE TERMINAL, but frequently appearing lateral from the common calyx, just beyond it.

The calyx, before it has acquired the length of the perianth, leaves, is nearly spherical, then ovate or rather oblong (1 5), plicate, with the mouth contracted and sharply, but irregularly, toothed.
BRITISH JUNGERMANNIÆ. (*J. barbata*)

Calyctes are not developed, sessile, and tipped with a short tubular style.

Petioles numerous, lanceolate, a little swollen at the base, and slightly expanded at the summit.

Folia from three-fourths of an inch to one inch in length, wavy, succulent, ciliolate.

Caulis dark brown, constricting, opening into four or sometimes according to Schumel, three valves.

Seeds and spores from deep chestnut brown, the former spherical, the latter formed of a double helix.

Genus are produced both on the common appearance of the plant and more abundantly on the **ser p**. On the former, I have always observed them to be collected into small spherical (Fig. 16) on the latter in the loosey scattered at the apex of the leaves. In both, they are of a roundish figure, heart with sharp angles of a greenish brown color crumpled.

My species (Fig. 10) is considerably smaller than the rarely occurring so much as length, now th probably that the upper half is usually longer and succulent. This part is covered with leaves not closely set but not at all close to the stem, and appears to it as to conceal it altogether and make it have an inconsiderable resemblance to the stem of *J. alpina*, while the lower leaves are paired, as in the common plant of the plant. The leaves, however, throughout are glossy smooth and the color much darker. The uppermost leaves are orbicular, forming three and sometimes only two, small teeth (Fig. 19, 101). On them the Gemma are situated. The leaves below them are frequently antheridiophytes. So small are the stigmas that they are with difficulty discovered; and they will be found to be rather rare than abundant, whilst the male are nearly in the same. Unfortunately, no pollen has yet been collected, by which it might be ascertained how far I have been right in making the plant a variety of *J. barbata*. For it differs in many particulars, and I am not aware, that the common appearance of this species has been found in our flat parts of England; it being confined, as I have reason to think, to somewhat mountainous districts.

Notwithstanding that the figure 25 of Millenium has been generally quoted as the *J. acutifolia*, it is really intended, as well as figure 22 of the same plate for the plant here described; any dependence can be put in the specimen corresponding with those numbers in the Herbarium at Oxford. Mr. Berlincourt's representation of this species is particularly unsatisfactory that of Schumel, in his *J. alpina*, as well as his elaborate descriptions are truly from the hands of a master, although he has fallen from the same in common with the other botanists who have described this plant all of whom, with the exception of Millenium, have omitted to notice the stipules. I am much surprised that they should have escaped the notice of Weidner and Micht. These naturalists have, at least, described them on what I consider to be the same species the *J. barbata*, for nothing can better correspond with our present specimen than the description of it in the *Flora Cryptogamica Germaniæ*: "Pilum incrustatum truncatum extus incrassatis: unipilatis (sic stipulis) Ex-pilulis, inclusa subpilosa bracteis." Yet, although Weidner refers to Micht's description, he has represented the plant as having simple stipules,
and one in each leaf which is quite at variance with all we yet know respecting the stipules of Jungermannia. Mr. Smith also, has described the stipules in entire.

J. sarothrae is abundantly distinguished from every other species of the genus, by the shape of its leaves, its stipules, and its calyx when taken in conjunction with the other parts of the plant. Its nearest affinity is, perhaps, with J. stipulacea and J. Bauhinia as 1 has been have only two teeth on segments in the leaves, and the stipules are undivided. In regard to the name I have preferred that of Schreb. notwithstanding that J. quinquedentata is the oldest and has been sanctioned by the authority of Linnæus. This latter is extremely inapplicable, and can only tend to mislead the student; for I believe that, except by accident or injury, five segments are never seen to exist on the leaves of this species.

REFERENCES TO THE PLATE

<table>
<thead>
<tr>
<th>no.</th>
<th>Name</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Male plant, natural size</td>
</tr>
<tr>
<td>2</td>
<td>Female plant, ditto.</td>
</tr>
<tr>
<td>3</td>
<td>Sterile plant, ditto.</td>
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<tr>
<td>4</td>
<td>Male plant, magnified</td>
</tr>
<tr>
<td>5</td>
<td>Female plant, ditto.</td>
</tr>
<tr>
<td>6</td>
<td>Perigynial leaf</td>
</tr>
<tr>
<td>7</td>
<td>Anther</td>
</tr>
<tr>
<td>8</td>
<td>Sterile plant, ditto.</td>
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<tr>
<td>9</td>
<td>Female plant, ditto.</td>
</tr>
<tr>
<td>10</td>
<td>Portion of a stem and leaves</td>
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<tr>
<td>11</td>
<td>The same area on the under side</td>
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<tr>
<td>12</td>
<td>Leaf</td>
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<tr>
<td>13</td>
<td>Sipula</td>
</tr>
<tr>
<td>14</td>
<td>Perichetal leaf</td>
</tr>
<tr>
<td>15</td>
<td>Section of a calyx with its pistilae</td>
</tr>
<tr>
<td>16</td>
<td>Seeds and spiral filaments</td>
</tr>
<tr>
<td>17</td>
<td>Gymnosperm apom of a stem</td>
</tr>
<tr>
<td>18</td>
<td>Gynoecium</td>
</tr>
<tr>
<td>19</td>
<td>Male flower, natural size</td>
</tr>
<tr>
<td>20</td>
<td>Individually of the same, magnified</td>
</tr>
<tr>
<td>21</td>
<td>Apex of the same</td>
</tr>
<tr>
<td>22</td>
<td>Sipula of the same</td>
</tr>
<tr>
<td>23</td>
<td>Its gynoecium</td>
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</table>
JUNGERMANNIA ORCADENSIS

(TAB. LXXI)

Jungermannia unica erecta, simplicis. Hollis much indica, ovata vel patellatia, ovoide-rata, apice emarginata, marginibus recurvatis.

Hair—Upon the West Hill, the highest mountain of Hoy in the Orkneys, I found near its summit in 1808.—Ambiaide in Cumberland, and at Callow, Kinross, Scotland. 
Mr Lyell—Summit of Brandon, Mr Taylor

Plant either growing in loosely-matted patches of a few inches in diameter, or, more frequently, scattered among mosses and other Jungermannia. 

Roots consisting of dense, but short, simple, semi-elliptical fibres, which clothe the under surface of the plant.

Stems from one to two inches in length, erect, filiform, sessile, simple, or only producing one or two innovations, and then generally towards the summit of the plant.

Leaves closely placed and subtruncate, nearly half a line long of a widely ovate figure, approaching to obovate or obovate and recurved; at the summit narrowly cuneate, rarely obtuse, their margins on each side of the leaf are recurved (l 7) throughout the whole plant. The leaves in compactly colling; the collars roundish. The color a brownish green.

No Fruiting—either Male or Female, has yet been discovered but 

Genus are found by Mr Lyell on his Kinross specimens situated at the points of the terminal lobes. They are collected into compact balls or spheres, and each granule of which they are composed, is polarized, of a yellowish green color, remarkably angular (g 2)
Specimens of this plant, which I have lately gathered in various parts of the mountains of Savoy and Switzerland, agree in every respect with those of our own country, so that although I have never yet had the good fortune to meet with its fructification, I venture to describe it as a new species, thinking myself fully justified in doing so by the authenticity of the characters here laid down. At first sight, J. orcadensis might be mistaken for a variety of \* J. barbata; but it will soon be seen that, in the present species, the stipules are wholly wanting, and that the leaves are never trifid. From J. ericetorum it differs in its larger size, in the small obtuse notch of the leaves, and in its more rapid mode of growth; and from that, and every species to which it is in other respects at all allied, by the curiously recurved margins of its leaves.

I have taken its name from the country in which it was first found.

REFERENCES TO THE PLATE

1. 2. J. orcadensis, natural size
3. Semisepalous plant, magneited
4. Stipal plant, with semenatum
5. Portion of the stem and leaves
6. Leaf
7. Leaf, with clusters of Gemma
8. Gemma
nugermanna albo-virg.
JUNGERMANNIA ALBESCENS

(TAB. LXXII.)

JUNGERMANNIA, caulic uterque, ranunculoides distichous alternas, caulis concavus, progumnosus hemisphericae, emergenti stipula alba-lanata obtusa.

Hab. Near the summit of Ben Nevis, Scotland.

Plant growing in large loosely-matted patches.

Stems half or three-quarters of an inch in length, creeping waved, diffuse branched twice or thrice in a dichotomous manner, and attached to the ground by radiipectate, simple, and subelliptical, which descend in tufts from the underside of the plant, and particularly near the stumps.

Leaves rather distantly and alternately placed in a nearly hemispherical figure, the base multilobulate and their upper furnished with one or more naked edges, having its segments somewhat undulate. The texture is remarkably slender, the cellules large and prominent, like those of J. montanum and its affinities. The color a pale green becoming almost white when dry, which has induced me to adopt the name albescens.

The stipples are distantly placed and between each pair of leaves. It is nearly of the width of the stem of an ovate-lanceolate figure, quite entire.

The only British specimens I possess of this plant are destitute of fructification, and, unfortunately those which I found in such perfection, bearing calyces and capsules upon some of the loftiest of the Swiss Alps, are not arrived in this country; so that, however unwillingly, I must defer my figures and description of the rest of the plant till the appearance of a supplementary number. Enough, however, is known of the species to enable me to say, that I consider it one of the most distinctly marked in the genus, and that it will rank near J. Franchetii, from which the much more concave leaves and slender stipule will always distinguish it.
<table>
<thead>
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<th>#</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>J allavenae natural size</td>
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<tr>
<td>2</td>
<td>The same; magnified</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Portion of the stem, upper side</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>The same, seen beneath</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Leaf</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Stipule</td>
<td>1</td>
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</tbody>
</table>
BRITISH JUNGERMANNIÆ

JUNGERMANNIA PUBESCENTES

(TAB. LXXIII.)

JUNGERMANNIA PUBESCENTES Linnéi dichotomie, numerosissimae, caulis anguste pubescens


JUNGERMANNIA LAMPSISI HOOK. Gen. II. p. 81.


Note: In Ireland and Scotland common on wet rocks in the upland parts of England, in similar situations; it is also not rare.

PLANT spreading rocks, sometimes to a considerable extent, with pale, glaucous green patches.

Roots an inch or an inch and a half in length, horizontally creeping and imbrazing each other very closely. Their width is scarcely more than half a mill. They are branched in a dichotomous manner twice or thrice. The stipes are always minute, the stipes armed with minute teeth. The leaflets furnished with a strong nerve ending, and the whole superficialis both above and below, covered with numerous short, white, pubescent, simple, jutinian burs which give the plant a pubescent appearance. The leaves in the axils of the leaflets small and compact but distinct on account of the pubescence.

The color of the pale green covered still palmer by the white hairs.

MALE FLORESCENCE most abundant on the inner side of the plant and always attached to the mid rib. The

stamens are two or three in number, inserted in a young, narrowwight, spathiform, of a pale brownish green color terminating a short white style. The anthers are divided into many perfect ones, which are always attached to the parent plant and become new ones.

No FEMALE FLORESCENCE has been discovered in this, nor as far as I can learn in any other country.
I am far from considering it so certain that the above characters are sufficient to distinguish this plant specifically from J. ferrata; since I can discover no difference but in the hairs, which in J. pubescens cover the whole plant, whilst in J. ferrata they are either confined to the margins, or, at most, to that and the under side. Yet this difference appears to be very constant, and I have followed Muehl and Schradt in keeping the two separate.

REFERENCES TO THE PLATE.

Fig.
1. J. pubescens natural size.
2. The same magnified
3. Portion even on the under side with the anther-bearing laminae
4. Section of an anther-bearing laminae
5. Anther
6. More
BRITISH JUNGERMANNIAE

(JUNGERMANNIA SPHÄROCARPA)

JUNGERMANNIA SPHÄROCARPA

(TAB LXXIV)

JUNGERMANNIA paludosa advenitente simplissima fallis orbiculatis; calyces obovato-obovatis,

cylindrici quadrati (capsulis sphaerica.)

Hab. Camnum bog. Mr. Levis.—In the neighborhood of Dublin. Mr. Taylor.—(It bears

fruit early in spring.)

Plants growing in rather dense tufts of a pale green color.

Stems scarcely exceeding half an inch in length, ascending, reflexed, round, as far as I

have yet seen altogether simple; here and there, from their under side, throwing out

small simple, whitish fibrous rootlets.

Leaves rather distinctly and bluishly placed 1 in the barren shoots smallest at the base,

and at the extremity; 2 in the fertile near largest towards the calyx 3 of an exactly

orbicular figure, a little conical and decurrent, mostly horizontally patent; but

accords towards the apex of the plant erect. Their color a pale green. Their texture

delicate, reticulate. Small roundish.

Pericarps leaves generally more ovate, and always larger than the rest; otherwise the same.

FRUITIFICATION: Male unknown.

FRUITIFICATION: Female always terminal.

Calyx obovato-obovatus, having no angles or at the extremity into four large

acuminate teeth or segments. Color and texture nearly the same as those of the leaves.

Gynoecium stigmat long tubular. Capsula ovata, reniform.

Peduncle twice or thrice the length of the calyx, white, pubescent, cellulose.

Capsula exactly spherical, brown, shining, splitting into four equal widely ovate segments.

Seeds and spines flavor in deep fulvous brown; the former spherical, the latter short, and

formed of a double angle.
BRITISH JUNGERMANNIÆ.

Much as this species is allied in general habit, and in the foliage, to J. scalaris and J. concinna, yet it may be at once distinguished when in fructification from the former by the exerted calyx, and from the latter by this part being entirely free from angles and by the four large teeth at its extremity. In the remarkably spherical shape of the capsule it differs from both; and equally from J. Junata, which is moreover a much smaller plant, and has the calyx not angulate, plane, and toothed, nor quadrifid.

We are indebted to Mr. Lyell for our first knowledge of this plant, which Dr. Taylor soon after discovered in Ireland.

REFERENCES TO THE PLATE.

2. Herbia plants, magnified.
3. A sterile plant.
4. A portion of the stem and leaves.
5. Calyx with the capsule unopened.
6. Section of the calyx showing the ovary.
7. Capsule bursting and discharging its seeds.
8. Seeds and spiral filaments.
Jungermannia reptans
BRITISH JUNGERMANNIAE.

JUNGERMANNIA REPTANS.

(TAB. LXXV)

Jungermannia reptans, small, repente, striae ciliatissimi variis, folio superbo inbriareto subquadrisulato, sursum aculeis quindecim, stipite brevissimo, quindecimacutae; fertu radicali; calyptrae oblongae plane et dentatae.


JUNGERMANNIA REPTANS.

A frequent in woods on banks and shady places, in various parts of the kingdom, and on the borders of Lough Neagh plentiful. Mr Turner.—Found near Dublin and in other parts of Ireland, by Miss Hutchinson Dr. Taylor and Mr. Steel.
BRITISH JUNGERMANNIA.

Plants covering the soil in dense tufts or as frequently happens, growing more loosely and struggling among mosses and other Jungermannia.

Roots most numerous at the base of the plant but also proceeding here and there from beneath the stipules on the under side of the shoot. In small tufts impressed at first, simple, pubescent fibres.

Stems creeping, horizontal, from half an inch to an inch and a half long, filiform, cylindric, of a greenish or in older specimens of a yellowish color, inserted, irregularly branched, growing in a sort of stellated manner as in J. bicapitata J. exb. In these the branches least with patent, in horizontal simple planes sometimes the extremities of the shoots are of the same width as the rest, and others; at other times, they are attenuated in a considerable length. From the under side of the stem at uncertain distances denticulate, resembling in a great measure, those of J. bicapitata, and, like them covered with foliaceous scales.

Leaves imbricated on the upper surface of the stems and branches, closely m for the most part, half on the intersections and attenuated at extremities of the branches distant and very small; the rest are larger, all of them patent or horizontal, yet pointing a little in the direction of the end of the branch of a nearly quadrate figure, convex and having the apices incurred, and divided into four, sometimes three and occasionally five, acute teeth. Their margin is a pale green; their reticulation small; the areoles distinctly placed in rows and at tolerably equal distances, as in J. Fernowii.

Perigonial leaves generally at the extremity of an "immuculate calyx," more convex than the rest, and more closely imbricated (f. 2 & 3)

Pericentral leaves six or eight at the base of each calyx; the exterior ones the smallest, all of them ovate convex and at the apex, cut into three or four small teeth, the concavity of them is somewhat membranaceous, the color nearly white (f. 2 & 10)

Spathe about twice the width of the stem (f. 7) of a somewhat quadrate figure, very convex, deeply cut into four acute segments. In texture they resemble the leaves.

Male Fertilities situated in the median of the perigonial leaves, one in two in each, spherical, reticulated, filiform, short, white cushions.

Female Fertilities terminal on the proper footstalks which originate at the base of the branches and from their under side.

Calyptra submembranaceous, nearly white, oblong, approaching to ovate, cylindrical at the base at the apex somewhat pleated a much conico-ovate.

Calyx subovate-wholly, reticulated, tipped with a short style.

Peduncle about three fourths of an inch long, white, rather fleshy, pubescent callobata.

Upper callo-ovate, deep brown, splitting into four equal, lanceolate valves.

Seed and spiral filaments subovate brown; the former spherical, the latter composed of a double helix.

The scar of the calyx being more regularly punctate, and of a much larger size than the leaves, though more closely imbricated, grows, as well as the stipules, in every essential particular with those of J.
BRITISH JUNGERMANNIA.  

The species here figured and described, which scarcely yields in beauty to any one of the genera, may be considered as one of the most universally dispersed throughout Europe. Its habit, it is closely allied to J. trabeculata having, like that plant, its leaves undulated on the upper surface, large dentate stipules, flaccid bract with leaf-like scales, and a whitish membranaceous calyx proceeding from the scales side of the stem. The corolla though differing at first sight so materially from a is distinguishable only by its great size and retinaculum stamina. The stamens of the uppermost perianth, indeed are almost always obtuse, those of the lower ones attenuated. This corolla is rarely found in fruitification Miss Hetherington alone having been so fortunate as to meet with it in that state.

REFERENCES TO THE PLATE.

10th.
1. Male plant, natural size.
2. Portion of the same magnified.
3. Perigonal leaf and anther.
5. Female plant, natural size.
6. The same magnified.
7. Portion of the stem with leaves and calyptra seen from below.
8. Calyx cut open, to show the calyptra.
10. Interior perianthial leaf.
12. Corolla natural size.
BRITISH JUNGERMANNIA

JUNGERMANNIA TRILOBATA.

(TAB. LXXVI)


Jungermannia trilobata sero in lemniscatibus, imbricatis, trilobatis. Hall. Not. 311 p. 50. a. 1836.

S. Strobila; quadrata proxima simplex lemniscata.

Jungermannia trilobata Schlecht. 311 l.c. 21.

γ. Strobila; foliis valde numerosis, imbricatis, distichatis, rectis bidentatis integrisque.


Jungermannia trilobata sero in lemniscata, distichata, distichata, recta, bidentata integra.

Pect. growing in large and generally dense patches, sometimes being more than a foot in diameter, throwing out few dense clusters which are often forked from the base or root of the stem (f. 12).

Stems from three to five inches in length creeping but usually upon the ground and branching each other, sometimes simple and hard but in the case of the young, at other times once or twice branched and distichous. These slender branches, of a brownish color. Juncus abundant about an inch long, tapering vertically from the under side of the stem, where they have their origin, each at the base of a
BRITISH JUNGERMANNIA

J. trilobata

stipules: they are bent with minute foliaceous scales jagged at the extremity which seem to be the remains of leaves and stipules: immediately at the base, however these are lubricated all round.

Entire leaves or less closely placed and lubricated on the upper side of the stem, horizontal discoloured, attenuated at an obtuse figure cut at the end into three obtuse teeth. They are of a firm texture composed of small roundish reticulations the surface is a little shining, of a light greenish tinge varying with more or less of a brown that in proportion as they are moist less exposed to the sun (f. 6 & 9).

Perigynous leaves situated upon short, proper branches, or internodes (1 6) closely embriated so as wholly to conceal the stem and stipules: their form is narrow and ovate with a remarkably truncate base: the peduncle on the under side of the leaf is usually unequal and unequally-toothed.

Perigynous leaves subtending the base of the calyx: composed of small ovate somewhat acuminate scales jagged at the extremity.

Stipules sunk in each pair of leaves, widely subquadrate notched.

MALE FRUCTIFICATION situated in the axils of the perigynous leaves (f. 6 & 11).

Anther spherical reticulated terminating a small whitish filament.

FEMALE FRUCTIFICATION standing on short, proper pedicellated, arising from within the stipules: from the under side of the plant: pedicellated upwards.

Calyx nearly two lines in length, oblong, narrower upward, the mouth with one side dentate of teeth its texture somewhat acuminate and reticulated under a highly magnifying power: its color nearly white.

Calyx oblong-rounded, tipped with a short style, splitting vertically for the stamens of its capsule (1 14).

Fructification from such and a half to two inches long, somewhat flattened: pellucidwhite, ocelliferous.

Capsule oblong, dark shining brown.

Seeds and spiral filaments brown: the latter composed of a double helix: the former spherical.

The two forms differ principally from one another in the staminal tube: the form which is intermediate and nearly half the normal size is as yet, in other respects, resembling it. Its fructification, as I have lately ascertained by a great professor of temperament gathered in Switzerland, is precisely the same. Its stem is soon distinctly-placed leaves and those so small that they are scarcely visible to the naked eye. Of the teeth: there are frequently only two, and sometimes none.

Jungermannia trilobata: although an uncommon inhabitant of various alpine countries in Europe still does not appear to have been described by any author to perfect fructifications. Both states of the plant are ill records with our own. I am not aware that even calyces have been found and I have been obliged myself to have recourse to German individuals for the whole of the drawing of the fructifications.
BRITISH JUNGERMANNIA.  

Dillenius has nowhere noticed this plant; nor does his Herbarium at Oxford possess a specimen. The Dilata is synonynm of most authors belongs to J. pringlei, Dillen. Meechel's figure is too accurate to be mistaken.

The affinities of this plant with J. regens I have already noticed under that species; but it is not of such a nature as to render it necessary for me to point out how they differ especially. Dillenius remark on his excellent Cryptogramme Flora of Germany, on this Jungermannia, is too excellent to be omitted. "Vitae eversum magis in horto sibi luxurians densitatis, levis iste, angustius" be added, that, "ea quae frut. globi terrarum regione proceres videtur."

REFERENCES TO THE PLATE

1. J. trilobata natural size female plant.
3. Sam 6 ditto.
4. Leaf ditto.
5. Female plant magnified.
6. Under portion of a male plant showing also the stipules.
7. Yar y.
8. Portion of a flagellum.
9. Leaf and stipe.
10. Stipe.
11. Perigynous leaf.
13. Calyx and perianthial lacinias.
15. Seeds and epical filaments.

References
JUNGERMANNIA LYEII

(TAB. LXXVII)

JUNGERMANNIA, fonsa scabrosa, submersa, tenera, contorta, marginae subintegratae, fructu e superiori parte bracteis calycis duplicibus, exteriori puberuli, margine lacinia-ovali, interiori lanoz caseata, cylindracea, subplacentosa, calyce subacum subpachycaul.

Hum Bogs in the New Forest, Hampshire, and at Bramsho Park, a waterfall on the Norn, Angushire. M. Lyell.—Bogs among Sphagnum subulatum and Hookeria lucens near Drury, Ireland. Miss Hutchison.—From some individual specimen gathered at Tunbridge High Rock. M. Forster's Habitat, in the Tunbridge List of Plants. It is, probably, the New Merchandiae mentioned in that work. — (Bears fruit in May.)

Plant growing in small loosely-matted patches.

Roots not very numerous, simple, pellucid, almost colorless, proceeding from the nerve on the underside of the plant.

Fruits generally about an inch long, sometimes twice as long, though very rarely three times that length, horizontally pressed to the earth, or to the substances on which it grows; all an oblong shape, being two or three times as diametrical and nearly similar throughout, simple, as throwing not out two lateral short branches (f 72) as forked at the extremity (f 1. 149), the margin narrowed, frequently entire, now and then with a few distant, mucronate, setose teeth, in the centre of the frond, and running the whole length of it, is seen a very distinct nerve, rather prominent at both ends; the interior substance of this is hard and rigid (f 49) and quite unlike that of the rest of the plant, of which the texture is remarkably thin and delicate, much more so than in J. ephedra and approaching more to that of J. furcata. The reticulation is small and the ovaries rounded, the color a pale but pleasant green.

Inrecessions (f 80) are not frequent on this plant, arising from the underside of the nerve, as in J. furcata. In these, at first nearly the whole breadth of the young shoot is occupied by the nerve, but they gradually bear some resemblance to the parent plant because furnished with roots, and are thenceforth from the old frond. Sometimes these interruptions are simple (f 81) sometimes forked as branched, as is represented at f 24.

Main Excurrentation (f. f. 1 to 8) situated upon the nerve on the upper side of the frond, generally near the middle or base, and always on distinct plates from those which produce the capsules.
BRITISH JULGERMANNIAE

Perigynial scale (f. 4) numerous crowded sometimes forming a beautiful fringe on each side of the nerve (f. 4) at other times altogether concealing it (f. 1 & 2); they are, each of these, of an acute or roundish figure (f. 5); much incised and toothed, convex on the outside. Among these scales
The Anthers are dispersed (f. 1 & 2 4); each of them (f. 5 9 6) roundish-ovate, yellow-brown, supported upon a very short white footstalk.

Female Fructification placed always on the nerve, on the upper surface of the frond, and generally near the center.

Colpus double; the exterior (f. 5 9 10) the shortest, and very much cut and incised at the margin; its texture nearly resembles that of the frond or if anything is rather more delicate the reticulation, too (f. 11) is composed of more oblong meshes. The interior (f. 9 10 12) is still more delicate (f. 14) of a pale color thrice as long as the length of the outer one embossed with a little pilose and toothed at the mouth, at length torn on one side by the bursting forth of the capsule (f. 13).

Germs at first ovoid (f. 15), tipped with a short, obtuse style; afterwards lengthened out, and to equal and often exceed the inner calyx.

Colpusa (f. 15) cylindrical; of a rather thick mucilaginous substance (f. 15) white, with very minute oblong reticulations. None instar are a few abortive pistillae.

Petiolar nearly an inch long white mucilaginous, a little fissurate.

Capsule oblong-cylindrical, splitting into four or sometimes only three valves and these are not infrequently united at their apices so in such cases with J. Holttum and many other species. Color rather a pale brown or chocolate.

Scales numerous, margin pinnate, feltrum. Sporangia of the more color very long, formed of a double axis closely twisted. Whether these are attached, as in J. epiglottis, to the base of the capsule, or at the extremity as in J. praegeri and J. furcata, I am unable to determine, for want of specimen in a sufficiently good state of preservation.

I have observed on Germs on any specimens that I have yet met with.

To none one this species be with more propriety dedicated than to its discoverer, Charles Lyell Esq. a gentleman in whose unwearied researches almost every page of this work bears conspicuous testimony and to whose I am happy in being able thus publicly to express my gratitude and esteem; while every one who is acquainted with him, will agree with me in saying:

Eum non esse novum

* Eum non esse novum
** Ten placit a corum a stolui, a nurse of Rama,
*** Content ancal, a needle doth a chain,
** Anche nos usus.

It was in the neighbourhood of his seat, Bartley Lodge, in the New Forest Hampshire, that my valued friend first met with this highly curious plant which he has since found in boggy places on his estate at Kinneary in Anglesea. It grows likewise in Ireland and I have the same species given me by Mr. Dickson who says it was gathered in the East Indies. The following,

J. Abercrombie, although on nearly allied so that, I believe to be perfectly distinct. It occurs in
BRITISH JUNGERMANNLE. (J. Lycop.)

General habit, in structure of the frond, in the double calyx, and in the male fructification arising from beneath the perigynial scales, but it is removed from it by the different substance of the nerve, by the more deeply-divided outer calyx, by the shortness of the corolla, and by the differently-shaped, and distinctly-placed perigynial scales. I have received several Jungermanniae, both from the East and West Indies, which agree in general habit with both these, and which will probably be found to have the same fructification.

REFERENCES TO THE PLATE

| No. | Description                                                                 |
|-----|                                                                            |
| 1   | J. Lycop., male fructification, natural size.                             |
| 2   | Portion of the same, magnified                                             |
| 3   | Smaller portion                                                           |
| 4   | Part of the frond with a portion of the internal substance of the nerve   |
| 5   | Perigynial scales and corolla                                             |
| 6   | Anther                                                                    |
| 7   | Young female frond, natural size.                                         |
| 8   | Young calyx, magnified                                                    |
| 9   | Calyx, more advanced                                                     |
| 10  | Externor calyx laid upon                                                  |
| 11  | Portion of stoma to show the revoluteation                                |
| 12  | Inner calyx laid open to show the corolla                                 |
| 13  | Tranverse section of the corolla                                          |
| 14  | Portion of the inner calyx                                                |
| 15  | Calyx, cut open to show the germinan                                     |
| 16  | Capsule barrenting                                                        |
| 17  | Scales and epural filament                                                |
| 18  | Cluster of female plants, magnified                                       |
| 19  | The same, natural size                                                    |
| 20  | Single frond, with innovations, natural size                              |
| 21  | Portion of frond, magnified                                               |
| 22  | Innovation                                                                |
BRITISH JUNGERMANNIAE.

(J. hibernica)

JUNGERMANNIA HIBERNICA

(TAB. LXXVIII.)

Jungermannia, fronds oblong, dichotom, stem nutate margina integratas fructus superiores parte frondium, calycum duplici, exterior petralia, laciniato, interior loquum, excreta, ovato cylindrace, subpetala, filipinni calyce interiore multo brunnea.

Han. Among Sphagnum cuspidatum et Jungermannia emarginata, in the shores of Lough Bray, a very elevated situation near Dublin Dr. Taylor.—Catlins, near Kilmurry, Anglesea. Mr. Lyell.—(It produces ripe spores about the middle of April.)

Plant growing intermixed with various Mosses and other Jungermannia in front, loosely entangled in brownish tufts.

Roots few and principally proceeding from the lower part of the frond, small, fibrous, pollex and ample.

Frond from two to four inches long profusely, oblong about two, or, towards the extremity where it always the broadest and often from liana, anemone, silver brown or even three branched. The fertile plants the most so and always in a dichotomous manner the branches sometimes very patent the whole plant is more or less waved or undulated but especially at the margins which are quite entire never producing teeth, as in J. Lyelli. Like that plant the substance is very delicate, pollex and calcareous; but the nerve scarcely divided from the rest of the frond, except in thickness, and in the most compact situations the cells never having the internal substance or hard. I might almost say, ligneous, as in the last-mentioned species. The color is a pale green, at the base yellowish brown.

I have seen no fructification on this species.

The Male Fructification (f. 1, 2 to 4) is produced upon the nerve on the upper side of the frond, so far as I am able to discover always on distinct individuals from the female.

Parietals scales few distantly placed arising from the top of the nerve, and closely appressed to it, but having an oblique direction alternately pointing to the right and left (f. 3) and extending nearly the whole length of the plant. Each of these is of an ovate figure convex on its upper surface, at the margins slightly and irregularly wavy (f. 4, 5, 6).
(J. hibernica.)

BRITISH JUNGERMANNIA.

One or two Anthers are situated upon the nerve, not are entirely surrounded by the perianthial scales. They are (1 9) nearly spherical, of an olive-green or brownish color, placed on a very short, pallidish footstalk.

Female Fructification arising from the upper side of the nerve of the frond, near the middle or upper searumely.

Calyx double; the exterior one short, and cut evenly down to the base into lancet-like divisions or lobes, which themselves are rounded or incised at their margins (1 8); the interior is altogether that of the frond: whilst the inner only is, on the contrary, more delicately of a paler color than the length of the outer obverse approaching to cylindrical at the mouth cut down on one side and slightly toothed. Such are the characters of the full-grown interior calyx, which are quite different from its young state this, even after the perfection of the German, is shorter than the exterior one, cup-shaped and slightly toothed or notched at the margin (f. 9)

German ovate dark green, tipped with a rather large, hollow style, and surrounded at its base by several linear-lanceolate abortive petals (f. 9)

Corolla white, between membranous and carnonus, ovate, never exceeding half the length of the inner calyx

Periantha as long as or longer than the length, white, succulent, filamentos, and cellular

Carpel oblong-ovate, opening into four or more tumescent only three valves, which are often united at their apices by the twisting together of the filaments

Seeds yellow brown; filaments of the tube color densely and spirally united to a double line and apparently attached to various parts of the inner valves of the capsule.

German more, that I have yet seen.

I exceedingly lament, that the perfect fructification of this species was not discovered till after the annexed plate was finished by the engraver. By means of it, I was the more confirmed in the distinct nature of the species though even from the less complete specimen, there appeared to be sufficient characters to enable a botanist to distinguish it from J. Egalii. It is altogether a larger and more branched plant, divided always into a definite number of segments, and furnished with a nerve, not essentially differing in substance from the rest of the frond. I have noticed under J. Egalii how the style and the corolla differ in the two species an equally remarkable difference, and so far as my observation has gone, an equally constant one which in this perianthial scales. In J. Egalii they are rounded, deeply cut at their margins, thickly clothing the sides, and frequently the top of the nerve, and not closely pressed to it. In J. bifrons on the contrary they are distinctly ranged and point obliquely and alternately to the different sides of the nerve. The latter appears also to be an alpine plant, having hitherto been found only in very elevated situations. To the supplement of this work will be given figures of the perfect capsule.
BRITISH JUNGERMANNIA

(S. aibernica.)

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<td>Male plant diluted.</td>
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<td>3</td>
<td>Male plant magnified.</td>
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<td>4</td>
<td>Portion of the male frond</td>
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<td>Perigynial scales, upper side</td>
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<td>Anthers</td>
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<td>8</td>
<td>Female plant with young fructification</td>
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</table>
| 9   | Calyces, interior and interior cut open to show the germen and burre plates.
JUNGERMANNIA TRICHOMANIS

(CAB, LXIX)


BRITISH JUNGERMANNIA (J. TRICHOMANIS)


JUNGERMANNIA subciliata also is more frequent in the spores of the genus. HALL. Fl. Nat. I p. 30.


In moist places on the ground, on banks, in woods, and in marshes in various parts of England, Scotland, and Ireland.—(It produces spores during some of the summer months if the weather be mild, and Gunner may be the spring.)

PLANT GROWING IN BOG, DUNE, IN SCATTERED PATCHES, FREQUENTLY COVERING A CONSIDERABLE SURFACE OF GROUND.
BRITISH JUNGERMANNIO

Roots (f 1) descending from the under part of the stem most abundantly near the base, in small fibrous bundles, then are placed close by the slipper.

Stem from one to two inches long, slender, procumbent, simple, or producing, here and there young shoots or innovations, which exactly resemble the parent plant; their texture is delicate, the cells large, oblong; the color a pale green.

Leaves rather closely arranged, and undifferentiated over the upper surface of the stem; as altogether to several if usually small at the base and at the extremity of the plant, longest in the middle, where they are not infrequently half a line long; their direction is horizontal, their figure widely ovate, above convex, many of them are entire, others are cleft with a wide and obtuse notch at the apex (f 18); the margins are entire where free from serratures. The cells are large and roundish, and gain the leaves a punctuated appearance when the plant is dry; the terraces dilate the cellular pale, and often wear a glaucous green.

Slipper (f 1 5 6). Of these one is placed between each pair of leaves. Their figure is roundish, and they are furnished with a deep and somewhat biconvex semicircular notch at the apex, resembling in more degree, that of J. nucleare. In color and texture the slipper resembles the leaves.

Male Fruitation unknown.

Female Fruitation lateral, and issuing from the under side of the stem.

Calyx (f 9) attached by a very short and nearly sessile, ovate, indented at the base, and deeply imbedded in the stem. It is a line or more in length, oblong-obovate, at the base, of a corolla substance, though, when viewed under a high-magnifying power, evidently cellular; its exterior is covered with short, but not thickly-placed hairs (f 3) pointing upwards.

Corolla (f 7) white, tipped with a yellow style, and bearing upon various parts of its surface several, rather slender, filaments, which are of an oblong form (f 8) transversely and longitudinally striated.

Carolla (f 10) when mature, at its full size, embracing the whole width of the ovary, and reaching in about half its length; its form is ovate, its texture delicate, and membranous.

Footstalk about an inch or an inch and half long, slender, whitish, cylindrical at its base inserted into its receptacle by means of a small bulb (f 11).

Capsule (f 19) linear-obovate, having the base linear, valves of which is composed, very curiously and spirally twisted (f 14). They unfold in some degree, but never become straight in expanding and, after the dishes go at the seeds, agule becomes twisted and reflexed. Their tunic in extremely beautiful. Under a high power and the microscope longitudinal hexagonal furrows are seen, having intermediate narrow ones (f 14) and these are connected by transverse lines.

Seeds small, numerous, of a roundish form, and of a brownish color. They are the spiral filaments of the corolla, more in number long, slender, and very closely twisted, formed of a double helix.

Genus (f 16) abundant upon those plants which bore their spores lengthened out into almost bimaculate portions of the stem at the points of which they are collected together in small spherical clusters, resembling those of J. bicorporata and Spagnum. Each particle is roundish, angular, pellucid, pale green.
BRITISH JUNGERMANNIA. (J Trichomanis.)

Numerous as are the names synonymous I am very far from sure that I have brought together all that really belong to this species, one of the most distinctly marked in the whole genus, yet one which appears to have been less understood than almost any other. Wherever Dilthey has committed errors they have been copied and multiplied by succeeding writers, and we stand but little chance of having them corrected, without reference to the original specimens of the author which fortunately for science are still in existence. By an enumeration of these specimens it is clear that Dilthey figures P and S, of tab. 31, are slighter and by an cares above frequent variation of the same plant and those have been quoted under no less than six different names! It would be neither a pleasant nor a useful task, to point out the errors of the older authors in their accounts of this species. Our countryman Blackman first well established it under the name of J Trichomanis and has given a tolerably good figure of it. The magnificent representation of the leaf indeed is so accurate, but altogether it does not meet the appellation which Mehn has applied to it of "pectinata." The part of the Flora Cryptogamae Germaniae of the last-mentioned author containing the Jungermannia I knew but lately received and I am greatly disappointed in the assistance I had hoped to have derived from it. In his charmers of the species which forms the subject of the present description he has left unnoticed the thing that seems to the most interesting in his diagnosis. He has compared it with J pectinata (J pectinata, Linn. & with which it has little in common, he has referred to Dilthey (though doubtingly) sub. 31 L. (our J trichomanis) nuu variety, and he has brought in under a J pectinata to it as a synonym, than which nothing can be more unlike in all the essential characters.

Wahlenberg with great propriety observes in his valuable Flora Lapponea: "Atriplex monographia at et J trichomanis (our J pectinata) Schur. sed folis diversissimis, reuss onto et corum stipite majoris minus vsina et glumacei inter quos ita insignis alius has descriptionem. Delectes staminum foliosis obtusis vel acuminatibus characterem praebet. Capulis longissimi obtusam p. 39. He is equally correct when he says that the figure in English Botany" stipulae hemipsideae vel let.

I have already had occasion to notice, under J Hieracum the peculiar or which this species has in common with that and, at the same time, I pointed out the characters that distinguished them, which indeed are sufficiently apparent, even to those who are not very conversant with the Genus. The hairy calyx and vented capsule are very common, and circumstances which I believe are usual in the present plant. Authors are at present unknown. The leaves of Herbae are borne on elongated, nearly leafless portions of the stem, exactly in J Hieracum, and, like that plant, too, the texture of the leaves and stipulae is very delicate. 
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<td>Portion of the stem and leaves seen from the under side, showing the roots and stipules</td>
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<td>Calyx dissected, showing the germen and barren pistilla</td>
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<td>Calyx interior of</td>
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<td>The same dissected, to show the full-grown coryals occupying the whole width of the calyx and the receptacle of the peduncle</td>
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<td>Capsule about to burst</td>
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<td>Gemma</td>
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Jungermannia capitata
BRITISH JUNGERMANNIA.

JUNGERMANNIA CAPITATA

(TAB. LXXX.)

Jungermannia unica precedentem, supplemento, folia quadrata-quadratis, longitudine bilobis, undique tri-quadratis a fructu terminale calycibus oblongo-ovatis subdilatatis, ore contracto dentato.

Hab. Cadumnum Mag. Nova Fovix, Hants, et Lydiham Soc. aureo. In the same county, Mr. Lyell.—On a rock in a dry situation in the same county, near Poole, Dorsetshire.

Plant growing on very small pale-green cushions, on a dry soil, and having much the general appearance of small mounds of J. unica.

Roots rather numerous, proceeding from nearly the whole length of the midrib of the stem, pointed, ample fibrous.

Stems a quarter of an inch or rarely half an inch long, rather stout in proportion to their length, almost always simple (in one or two instances, only I have observed a single lateral shoot, I) with the leaf gradually narrowed, sometimes, but especially towards the base, slightly brown, the texture remarkably soft.

Leaves rather closely ranged in two rows, sometimes patent or nearly horizontal, at other times and generally (I) nearly erect of a roundish figure, approaching to quadrate; those at the base somewhat and simply bilobed, whilst the rest gradually increase in size as they approach the extremity, and are both to see and quadrilateral, the segments unequal, a little waved and acute. At the very apex, particularly of the median shoots, the leaves are collected into a tuft or cluster, the specific name. Their texture is dense and the cells large in proportion to the size of the plant, with a roundish shape, or often, as Mr. Lyell remarks, truly hexagonal. Their color is rather a pale yellow-green.

Perichaetial leaves large with four or five very unequal, incurved segments (I 1 7 8).

Main function unknown.

FEMALE FERTILIZATION terminal.

Colony large for so small a plant, oblong-ovate, greenish a little singular towards the extremity, and plicate; at the mouth somewhat contracto, and very unequally lobed.

Poisoned a quarter of a line long, white, undulate, a little waved.
BRITISH JUNGERMANNI"E

Capsules ovate, dark brown, splitting into four equal valves.
Scales and apical filaments fulvous, the latter composed of a double helix, attenuated at each extremity.

It is not easy, in a specific character, to decide the differences which will keep this plant separate from J. ericetorum. In the fructification, and in the form and size of many of the leaves, they seem perfectly to accord; but in all the specimens I have examined, both from Ireland and the New Forest, the upper leaves of J. capitata are collected into a tuft or head which gives the plant a very remarkable appearance; these terminal leaves, too, and most of these not inserted near the base of the plant, are either trifid or quadrifid, and the segments are very irregular, but, what is more striking, the texture of the leaves is delicate, fragile, and composed of cells more as those of J. ericetorum. In this particular it differs essentially from J. ericetorum which has similar tufts of leaves at the extremity of the shoots; but they are never, in our plant, toothed or jagged at the margins of the segments.

REFERENCES TO THE PLATE

210.
1. Sterile plant of J. capitata, natural size.
2. Female plant, natural size.
3. Sterile plant, magnified.
5. Culinaris leaf, showing the cells.
6. Terminal leaf.
7. Perichaetial leaf.
8. Perichaetial leaf with pistillar appearing before the formation of the valve.
Jungermannia complanata
BRITISH JUNGERMANNII.

(J complanata.)

JUNGERMANNIA COMPLANATA.

(TAB. LXXXII.)

JUNGERMANNIA orcinula sepanta vagi et ramosae, foliis dischlae, superbus imbricatis, linuumque lobatis; superiusibus majoribus, orbiculatis; inferioribus angustis appressis planis stipite nullis fructibus terminalibus; calycebus oblongis, compressis, transversis.

a. major; foliis planisnullis, pallide viridibus.


Hispaniculce foliis et incrustis Thagac inactor compressis major. Vahl. Linn. For. i. 1. 9. f. 9.

b. minor; foliis convolutis, flavescentibus.

II. Abundant on the trunks of trees, and thence rendered conspicuous by its pale-green color; bearing fructification all the year.—b was found in Ireland, near Ballybay, by Miss Hutchinson.
BRITISH JUNGERMANNIAE

Plants nearly indumented, no as to form wide but compressed tufts, or cushion-like patches.

Roots proceeding rarely from the base of the stems, more frequently from the leaves, always in small pebbly-like tufts consisting of peduncled simple filices (f. 2).

Stems, or filices, from 6 inch and a half to two inches in more in length, creeping, branches variously branched, the branches again divided in a planated manner and here and there producing innovations. Color green.

Leaves closely imbricated over the upper surface of the stems and in a bifurcated manner, unequally two-lobed, the superior lobe much the largest; articulated nearly upon the upper side (as 3 convex); the inferior lobe acute, appressed flat and often shooting forth roots. The color is a very pale yellow green; in 3 above yellow-brown. The receptacle is dentate and frayed; the calyces small and obscure (f. 15).

Perigynial leaves (f. 5) similar to the rest, but more compressed at the base, where the anthems are situated.

Periclinal leaves also but little differing from the middle ones, except in having the two lobes more equal in size (f. 1 6 9).

Stipules none.

Main fascicles erect, armed with the stamina of young lateral shoots (f. 1 2 4).

Anther two or three in the stamina of each leaf, globular, reticulated, yellowish, supported on cellular whitish short footstalks (f. 1 6 7).

Female Fructification terminal upon the branches, and on the lateral shoots (f. 5).

Calyx oblong, from a cylindrical base becoming wider compressed, and at the extremity quite flat incurved before the putting forth of the equule; the apex truncate, nearly entire; no in a little shrub on one side. (In a very young state (f. 9) the calyx is shorter and wider than that just described (f. 1 12 13) but still very much compressed.)

Persicaria desiccum in seven in each calyx, oblong, slightly swelling towards the base, at the mouth expanded and toothed or rounded (f. 12) of a pale and almost white color distinctly reticulated transversely and longitudinally.

Capsules pyriform or oblong, placenta reticulated, tipped with a short style.

Pedicels not more than twice the length of the calyx, white, subpubescent, ciliolate.

Capsule ovate, pale brown transversely and longitudinally; bursa (f. 13).

Seed rather large, spherical, brown, as well as the placenta (f. 14) which are formed of a double base.

Genome are attached to the margins of the leaves in the spring months (f. 2 6 18) and are of various sizes, of a reddish or purple figure (f. 16) compressed, evidently reticulated, so as to resemble in texture the leaves

Jungermannia complanata is a species but little subject to variation nor have I seen any appearance of it sufficiently unlike the common to be worth mentioning except the small brown one found on rocks in Ireland, by Miss Macbain and described above and represented at f. 17.

Although, in general habit, evidently allied to that beautiful family to which J. Tomentosa, J. atrocinina, J. prostrata, &c., belong the plant before us is, nevertheless abundantly distinguished from them by a total want of stipules; of which part Dr. Roth has notwithstanding, maintained
BRITISH JUNGERMANNIÆ. (J complanata)}

the presence, and has given a particular description of them. His words on the subject are,
Quamvis Pellitic, Scopoli et Web. stipulartem praenunciarn regnat tenuis rectae foliis, ut operumex
at mede test obverse sub leuto hinc anguste sine tunicis distinguendos. Ad interna collecteule
pervit later foliis demum imbricatis agranum in auctor paginæ folioque adjuntionem structuræ
et singularis histri cum concordi convenientia, last deplo hilarum— from all which, it appears that he has
taken the smaller lobe of the lenu for stipules.

The circumstance of roots proceeding from the leaves is highly curious, and Wahlenberg,
I believe, was the first to observe it. We know that the leaves of some mosses (Heterotram
incens for example) have the property of throwing out roots but in them it takes place at the
margin of the leaves; here from the surface of paginæ and generally from that part which forms
the fold between the organs and the larger lobe. I have reason to think that J. delatina and
J. fallax possess the same property, and that the small sphenoid I have figured on the stems
and leaves of the former of those species (no. 8) are the young roots, and the more so, since I
have seen the following remark of Wahlenberg. Alluding to the leaves of J. complanata he says,
"In eum paginæ minores vacuo vacuo inciderum papilla parva, primam hilarum, dat fungorum
at radicem."

Nor are the Gemmæ less worthy of observation. They have the most complete analogy with
the Gemmæ of the Marchantia, and with those of J. fallax; being like these evidently cellular,
and they are soon to become so even before they are detached from the plant. Totally different
are they in their nature from the Gemmæ of J. complanata J. complanata &c.

In point of colour J. complanata resembles J. fallax, which notwithstanding the different
mode of growth and habit, as it appears at first sight, ought perhaps to rank in the same family
with that species. There is this striking difference between them—that, in the family in question,
the lobules cover the upper or anterior surface of the stem, in J. complanata the lower. Such is
the manner in J. cochlearifolius, where the lobule is, however, formed into a kind of sack.
REFERENCES TO THE PLATE.

2. Portion of the same, magnified
3. Stem and lower part from base, to show the lobular and root
4. Anther segment eight
5. Perigonal leaf with its anther
6. Anther
7. The same
8. Perichaetial leaf
9. Perichaetial leaf with gametangia, and containing a young spore
10. Young spore, with pistilla
11. Calyx, showing its staminal columns
12. Pistillum
13. Segment of the capsule
14. Seeds and spiral filaments
15. Young female shoot, having gametangia on its leaves
16. Gametangia
JUNGERMANNIA BLASIA

(TAB. LXXXII LXXXIII LXXXIV)

JUNGERMANNIA, forma albaeque, ramosa costata indus aquilae ductatae sparse undulatim margine lobata, fructu a superficie parte costarum ingrediens, uncinis unipetiolaribus infracoriolis.


Hab. By ce means uncommon in the alpine and montaneous parts of England, Scotland, and Ireland; generally preferring moist heaths, or shady groves, which occasionally inundated.—(It bears capsules in the spring months. Species are found throughout the whole year.)

Flora growing in patches of various dimensions; the individuals separate, or so is frequently the case, embracing one another, like the fronds of J. pingua and J. hypoglaea. Basis more or less numerous, and crowded on different plants, and even on different parts of the same plant, yet frequently extending the whole length of the under side of the frond, from which they originate, they are simple, oblong, foliaceous, whitish. Frond lying horizontally upon the ground, yet with the spines often erect, from a quarter of an inch to an inch in length, varying remarkably in figure, for the most part obovate, sometimes ovate, or with a single lateral short branch (tab. 94 11 6. 7 and 89 11 8. 18); sometimes more detailed, and as in the foregoing species (tab. 89 E 2), at other times the ramifications seems to be almost palmate (tab. 94 E 1), having the ends forked: it is so
be observed, that the extremities of the plant and of the branch itself are always wider than their base; their width, in the first case, being two or even three times the width in the cases, seldom exceeding a millimetre in breadth. It is of more rare occurrence that the fronds, from a common principle base, are branched in a stellated sort of manner, such as appearances are represented in tab. 34 f 9, where the apex has a long slightly depressed to be farred. The structure of the fronds is between various and membranaceous, thinnest at the margins, where it is often slightly waved, and cut into deep and obtuse lobes of various sizes, but all of them large and at first sight giving the appearance of slenderly and fragrant leaves; but the division never reach so far down as the nerves. These lobes are, moreover, often incurved and particularly so towards the extremity of the plant (tab. 34 f 9). The whole is cellular, and the cells extremely large, presenting on the exterior surface a beautifully reticulated appearance with central spaces (tab. 34 f 15 34).

Throughout the centre of the fronds, and following the divisions of the branches to their very extremity, runs a very evident and broad nerve, most prominent on the underside, and marked on the upper side with numerous lines, as if the epidermis lay in plates or fields (tab. 34 f 1 2 3 5 6). Sometimes it happens that the nerve is found within the extremity of a simple branch, where probably the fronds is about to be extended in a dichotomous manner. as I have already noticed in J. furcata (tab. 34 f 11).

The color of the whole plant is a pale-green, but that of the nerve usually paler than the fronds, except when the plant is dry, in which it is often yellowish-brown, as if in a state of decay.

On the underside of the apices, always upon the nerve and closely appressed to it, are scattered, apparently at unequal distances, small, prominent scales of an oval form, fimbriated (tab. 34 f 5 10, 11), and deeply, though not equally, plicose-dentate. These scales must be carefully distinguished from the glandular buds or tubers found not only on the apices, but likewise on the underside of the plant but they are not confined to the nerve nor are they ever single or appressed to the frond.

Male Fructification, as far as I have yet observed, upon different individuals from the female.

(tab. 34 f. 35.

Athers two in three in the same frond, generally included in the nerves, covered however, only with a very thin cuticle, and always visible, not only by the different color but also by a slight swelling of the nerve where they are situated (tab. 34 f. 5). Their figure is elliptical or nearly ovate, their color pale greyish. I have not been able to perceive any point of attachment to the cell of the frond. In which they are embedded.

It requires a highly-magnifying power to discover the reticulated appearance of the athers (tab. 34 f. 9). Within them are filled with an extremely minute, granulated substance.

Female Fructification arising from the upper side of the frond, and towards the extremity.

The earliest state that I have observed of it is represented at tab. 34 f. 5 8, and tab. 34 f. 4.

In the first of these plates are figured young pistils quite exserted, scattered at various distances upon the nerve, each of which is nearly linear, but a little swelling at the base and slightly expanded at the apex of a greyish color, and striated longitudinally with paler end marked also with a few transverse lines. Another state of the early fructification is given at tab. 34 f 4 where the pistils are represented equally free from any stigmas or external covering collected into small clusters as they are within a perianthium in every other Jungermannia that we are acquainted with (J. Hooker's alone.
excepted). Those too, are upon the ovule. In the midst of one of these clusters, I found a single pistillate swollen into a germin (tab. 84 I b) of an ovate-bacillary form—end of a greyish-brown colour, and tipped with a rather large and perforated style.

It might be expected that, in a similar situation the germs would be seen in a somewhat advanced state; but this I could never observe to be the case; on the contrary the progress of the fruitification seems to be altogether internal. I have not been able to find an external germs more than as above described; but innumerable instances, as dissecting buds such as are figured at tab 85 f 12, having an oval infection on the bud, with a slight depression and scar on each side, in the centre I have never failed to see the germs in different states of advancement towards maturity and that will be better understood by a reference to tab 83 I f 3 d. The upper individual at 1 12 being dissected longitudinally, and exposed to the microscope, showed an oblong hollow beneath the umbilicus above mentioned (tab. 83 I 3), and within it was a only extending from the umbilical mark or extremity down to the lower extremity of the hollow or receptacle.

The only at an oblong-bacillary and acuminate figure, closed at the top, bladdery-like with the membranous, scarcely reticulated, semi-transparent, so that within is seen the Germin, already so much swollen as to be of a pyriform figure, tipped with a short, curved style, and of an olive-green colour; at the base it is inserted into the receptacle by means of a small bud. In its progress towards maturity, its increasing size causes the only to burst and peel off at it remains attached to the umbilicus (tab. 83 I 4) and at the bottom of the germs by the receptacle (tab. 83 I 7). The Germin is now become of an oblong-bacillary figure, and the reticulated appearance of the cuticle covering the epidermis is very striking. Advancing still more, the fruitification bursts upon the upper surface of the fruit in a very irregular manner; always above the inflation, and nearly at the apex of the fruit (tab. 82 I 2).

Capsule, even a her about to burst, scarcely exerted above the orifice of the fruit, sometimes not at all; on which more the opening is formed by the capsule.

Exocarp white, succulent, from half an inch to an inch long; with, but razor, straight, and somewhat twisted.

Exocarp globose, white at base, the rest pale olive-brown. It opens into four equal valved ovate valves, under the axis campose—beautifully reticulated, and the borders of the valves have a dotted appearance (tab. 82 I 10).

Seeds these, if removed from the fully formed germs or young capsules, some smallish, of no olivaceous colour; enveloped in a cellular membrane and lying together in streams; though sometimes only two, and rarely four are found in a cluster (tab. 83 I 1 3 e). In this state of the fruitification, etc., the filaments are most evidently likewise surrounded by a prismatic tube. The ripe seeds fall from the capsule singly (tab. 83 I f 11), but are still within a membranous and do not differ from the young ones, except in being of a darker color. I can perceive no tubular membrane about the fully formed spiraled filaments, which are rather long, closely twisted and formed of a double helix.

* And the same appearance is represented highly magnified, on the folds, at tab. 83, f 2; although the capsules are there exerted.

† Such is the case too in J. Rodartii.
The genus of this plant is one of two kinds and highly curious from their situation, which is perfectly different from that in every other species of the genus ever known, and deserving of very particular description.

I shall first notice those bodies which by most botanists are looked on as the seeds, whilst their receptacle has been considered the capsule upon the shape of which the principle character of the genus Blasia has been established. This receptacle is found plant fully in the spring and remains something like an empty two upon much segment of a frond; always towards the extremity, and always upon the nerve. This is an early sign of a swelling of an ovate figure, an open ventricle, at the upper extremity, furnished with a head at first short acuminate and closed (tab. 86 f. 4 19), at length becoming elongated and cylindrical and hollow throughout (tab. 83 f. 2 14). A section of this (tab. 83 f. 14) discloses numerous spherical on all bodies enveloped in a perfectly transparent gelatinous mass, and apparently floating on it. Each of these is cellular, and lies in the cells of very unequal sizes (tab. 82 f. 14) furnished with minute radicles, even before they are discharged from the receptacle. The discharge takes place through the tube, and seems as the mass readily in dry weather, when the fronds collapse, lie flat and the genus towards the mouth, when they are often collected into a capitation by rains at the gelatinous mass.

On the dissection of these Genus, they fall not only on the ground in great numbers, but on the fronds themselves, where they remain in the same state, developing themselves becoming tufts of small green scales, scattered over the surface of the frond, where they are retained by means of the indusium margins (tab. 84 f. 1 1 6). Their appearance is totally unlike the perfect plant, being of an ovate figure, denuding the frond with three or four collected together and resting on their base, which however, does not seem to have any point of attachment to the frond; or they are removed by the slightest touch. These it may be supposed, are expanded in an advanced state of their growth, the scales taking the frond form, and the tubercle becoming dilated into lobes. The similarity between these scales and those of the under side of the frond, is very considerable, but this difference has been already explained.

The second kind of genus is situated on the under side of the frond, but never on the nerve. These appear in the form of small, moist dark-green spots within the substance of the plant, but evidently nearer the lower spadix than the upper. Though visible on both sides, on account of their density, color as they grow older, they become prone to remain in the form of tubercles (tab. 86 f. 4 5 6, and tab. 84 f. 1 9) on the under side of the frond; yet always covered with a slight pubescence, out of which the swelling, when opined with the point of a knife, is readily fall, and are then seen to be spherical masses, of a substance between granular and pulpy, almost black, compacted but quite free from any membranous covering like the true spadix; nor are they at all cellular, like the genus just described.

Although, on want of a better term, I have applied the name of genus to these bodies, I suspect that these apparently unorganized granules have the same...
BRITISH JUNGERMANNIA. (J. Blatt.)

Having now devoted three entire plates and an equally unusual portion of letter-press, for the description and illustration of the present species; little remains for me to add to the diagnosis which now tends to a more complete knowledge of the plant than it is my wish simply to state facts as I have seen them, and to avoid every discussion respecting the offices of the respective parts of the fructification. I feel sensibly that the further I advance in my acquaintance with these curious little vegetables the greater are the difficulties which arise in the determination of the normal species, and I will for the present beg to declare myself satisfied with the partition of the Hedwigian system which, ingenious as it is, appears to be fraught with many difficulties, one of that of Richard, one of the most learned botanists of the present age, whose theory of Annexae in he calls the Cryptogamae, I am far from understanding, as I would wish to do; although I am sufficient to be convinced that it is highly worthy of attentive consideration. I shall content myself with remarking, what I think an one will deny that if what is now known to the language of Hedwig have been called species and others in J. epiphyte, on really much closer study they will be divided species are with equal propriety, worthy of that denunciation, since the closest analogy in structure and animal exist between them.

Declaring them as I do, bringing forward my arguments on the theory of the fructification in this species, it will be necessary to enter upon a critical examination of the labors of Hedwig and Schmiede, in their Dissectiones on the genus Blattai, which is profusely illustrated with a view to ascertain what is the male and what the female fructification of the plant in question. Their speculations indeed are now completely overturned, by the discovery of what they themselves would undoubtedly acknowledge to be the true capsules.

I must, however, omit adding a few words on the genus Blattai, which must in future be emended from the Flora. It was established by Micheli who says of it: "Eius speciem plantam jure quidem optimam Plantae denominandum: a Pat. D. B. S. vis xe Congregationae Vaticano-Umbrae Botanica non gregario, ac in Erucias et tertiae restricta ad Indagandam plantae arenae novis non elea." The character he has defined in the genus za plantarum, polypodiacearum, of pedunculate, elephantomum vibrando valvatum, and stelatal cuspis curvata. Fructus vertice nativus, secus foliorum marginis in quibus decrescit plenum minus extensa adhuc aliena samina. A figure in likewise added at tab. 7 but a very inferior one, compared with that given by Dillenia in his incomparable Historias Fluminenses. This latter admirably represents, though of the natural size, the tubular receptacle, the marginal gemmae and the

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* This figure though excellently good for the time in which it was published is yet far from conveying a correct idea of the plant. The lobes of the frond are not impressed; the marginal gemmae are imperfect, and the receptacle of the gemmae are not large, and the mouth too much expanded.
BRITISH JUNGERMANNIÆ.

In the extremity of the frond. The author, however, makes it a Monstera. * Mima Lachmannii fractured from the impression that the scales, at the extremity of the tubular receptacle, have their origin there; whereas it is only in a certain state of the plant that those gomphocarous receptacles put on the appearance of the granular heads of a Monstera. Now, in the description partly made by Dillenius himself, and partly by Mr. Wilkes Harness, who first found the plant in England near Manchester, as far as it goes, at all least worthy of praise than the figure.

Linnæus described not plant under the name of Mima palma in his Herb. Francic, it having been found in ditches near Fribourg; and Oeder has figured it in the Flora Danica; but neither of these authors has noticed into any satisfactory description of it. The former seems to consider the genus, within the tubular receptacles on seeds; since he says, * Sessio estára a uno cyatho ferre cylindrica dentata; semina ut eorum figura quae est occulti distincti respondet. yet in the Spätina Natura, his character of the genus is:

Male 1. Cal. cylindricum graniti repedatum.

So that Sir John Smith is not incorrect when he says that the black scales were scattered over the frond, are universally allowed to be male flowers. He has equally overlooked the passage in Micheli, * Fructus unuus capulis sessibus foliis marginibus.

It is to the admirable Dissertation of Schmidt—aborted quoted, that we must look for a complete description of that curious plant from its earliest stage of growth to its arrival at maturity together with its mode of increase by gemmae; for hitherto no one has ever discovered the nature any more than the capsule. Besides saying all that can be said concerning the two different kinds of gemmae, the author, in the harrower section, describes what he considers a third organ of propagation peculiar to this plant, but that, from all I can understand of the description, appears to be nothing more than a repetition of the mode of increase by the gemmas, which have fallen from the tubular receptacles and are dispersed alike upon the individuals, furnished with receptacles themselves, and upon such as have none at all. Now the figures he has given of those parts induce me to think otherwise upon the point; although I must confess that, with regard to most of the magnified figures on the plate, they do not cause me to desire that praise which has been so universally bestowed upon them, and which those at the natural size do not merit.

At the conclusion of his elaborate history Schmidt sums up his account of the genus in these words: * Mima in Antran genus pro flores principali notos, evanescentes atque annuales, pellicula, pro femineae Calyceae monopetalae, et ovario ovatis (extremum) tubularum notis albis hyalinae truncatis, aliisque Corda; et ax latro Caliica Semina unida, libera, pilace, unibracteata, compressissima confusa.

Heinrich comes next to be considered, who having us may be expected, added little that is new to what has been observed by the last-mentioned author among us, that what he has offered to the reader is done chiefly with a view to confirm and illustrate the doctrine of the incomparable Schiedel. He, therefore, likewise, bases upon the marginal gemmae as authors, and the receptacular upon those naming of the former, what I have not myself been able to verify that the foliolas of the author: * multum illustratum* not, evident in the communication complained to himself.

* Let me add, however, an acknowledgment of Hufeland's assistance, a communication made to me by Mr. Lyell. * In his specimen: the male scales are brown and unlobulated, as if they had been, and when I shew any of my-what shall I say of mutations on them, seemed colored (not thinned) with very short, white filaments.* Let. Dec. 1812.
Of the tubular receptacles of the genus (which, by the bye, are extremely ill done in the Th Wein, where they have the appearance of being of a different texture and color from the rest of the plant) Hedwig remarks, varum de trascollat extraneam, unidentibus, praecipue in America, que non posset recipaxum, quod nosterista, femina agnus. Yet neither does the figure allude to exhibit any appearance of the supposed style being of a different color from the rest of the receptacle, nor does it ever appear so in reality. The same author aptly compares this style-like body to a more advanced state of the eggs of Austrocarus, and with regard to Schumacher's third mode of classification I am happy to say, he states on the same opinion with myself. I must not omit to notice, that in Hedwig we own our first acquaintance with the roots or root-like appendages that are found on the receptacular genuses, although, in the Th Wein they are figured with these appendages too large and too much intermixed.

In the Species Medicinum (p. 542), the following character of the genus Rhina is given:

*Physalis mollis* (and cultulus, albae) Calix, a herb, integra, albo-rubræ, scapigro, subcallux, composita, albo-rubræ; calycinum albo-rubrum, calycis lignice in forma, quadratali, acutis.

These are entitled Schreber's, in his *Plantarum, fumilium, nun missed making of any mention in what preceding authors had done. Hedwig's description of Rhina zancula (Fl. Gen. v. ii) seems to be compiled wholly from Hedwig and Schleinitz. I think they may be said of Roth a new member of the genus. Yet do not desire that the excellent book give any new observations in his *Cryptogamie* Florae of Germany Schleinitz's character as a very important one. From unisexualia. *Genus zancula, multil.* Calycinum: a rugoso-fasciculato, dimidiatum.*

We must rely upon to doubt if the real seeds were known, and has, consequently, altered the generic character which stands thus in his admirable *Flora Lepadacea*:

Frons distinct;

*Main* et *Serrularia*, in substantia frondis seccatis, secciles albo-rubra, oblongo, et grana inconspicua cumulus.

Frons. 

And he adds to this a sentence so valuable that I cannot forbear quoting the whole of it. "Physalis 

As we cannot now list the entire list of the species in Jucquemart's book, nor gain an accurate notion of these genera of the genus, therefore we must rely upon the account of Mr. Lycull's observations. Mr. Lycull's observations are based upon the specimen of the plant which he gathered on the shores of the East River, in Jamaica, and supposed to be a new Jucquemartia. These observations, I should not perhaps have readily accepted to be the Rhina had I not received their specimens about the same time; but without specimens from Dr. Smirks, when I was instantly struck with the marginal genus in both. Mr. Lycull discovered the plant at Kinsey; and, with his accustomed zeal and industry,
BRITISH JUNGERMANNIA

watched its progress so unceasingly that I had at length the satisfaction of receiving from his specimens in the state represented at tab. 28 f 3, 4, 7-12, and had sent dear from Ambleside the 500 greater pleasure of having forwarded to me, by the means friend an individual with the capsule still from the frond. With equal ardor Dr. Taylor commenced his researches in the neighborhood of Dublin, where he had the good fortune to find capsules fully ripe and discharging their seed on the mountains at Lough Bray on the 31st of March, 1814. Those he soon collected to me, with the request that he believed the capsules to be of very great interest, for that it was not till after repeated visits to the same spot, and a most laborious search each time upon his hands and knees, that he was at length able to discover them. The weather was remarkably warm, succeeding a shower of rain.

I have myself seen the plant in the same habitat, and likewise in various parts of England and Scotland, though it is chiefly confined to hilly or mountainous districts. In Switzerland it is very abundant; yet it was only in the Grimsel, in the summer of 1814, that I ever saw the capsules exacted upon growing plants.

REFERENCES TO THE PLATE

(TAB. LXXXII)

1. Two fronds of Jungermannia Nielsae, the one producing marginal gemmae, and young tufts the other having the receptacular gemmae enlarged
2. Plant much branched, with receptacular and marginal gemmae
3. Portion of a frond bearing receptacles
4. Portion of a frond, with young receptacles for the gemmae, the mouth not being yet opened
5. Portion of a frond, bearing platilla scattered on the surface, and showing the marginal gemmae prominent beneath
6. Antler
7. Ditto
8. Portion of the cuticle
9. Portion of a frond, seen from beneath, showing the scales
10. Another portion of the same with a young tuft
11. Gemma removed from the substance of the frond
12. One of the same broken
13. Receptacle of gemma, dissected
14. Extremity of ditto with the gemma terminal
15. Ditto
16. Ditto
17. Stipulous capsule
REFERENCE TO THE PLATE.

(TAB. LXXXIII.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Jugermannia Bacea</em>, two specimens, with perfect capsule, natural size</td>
</tr>
<tr>
<td>2</td>
<td>The same, magnified</td>
</tr>
<tr>
<td>3</td>
<td>Section of a young female frond, showing the situation of the calyx and germen</td>
</tr>
<tr>
<td>4</td>
<td>The same, more adhered, the calyx being burst</td>
</tr>
<tr>
<td>5</td>
<td>Seeds and spiral filaments, removed from the germen, f &amp; g</td>
</tr>
<tr>
<td>6</td>
<td>The same</td>
</tr>
<tr>
<td>7</td>
<td>Germen, enclavus to the calyx, and having a portion of the calyx at the base</td>
</tr>
<tr>
<td>8</td>
<td>Capsule, unopened</td>
</tr>
<tr>
<td>9</td>
<td>The same, with the anther burst</td>
</tr>
<tr>
<td>10</td>
<td>Portion of the valve of the capsule</td>
</tr>
<tr>
<td>11</td>
<td>Seeds and spiral filaments, from a ripe capsule</td>
</tr>
<tr>
<td>12</td>
<td>Young female fronds, natural size</td>
</tr>
</tbody>
</table>

REFERENCE TO THE PLATE.

(TAB. LXXXIV.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Large bronchial specimen of <em>J. Bacea</em>, natural size</td>
</tr>
<tr>
<td>2</td>
<td>Portion of a frond, with tufa, magnified</td>
</tr>
<tr>
<td>3</td>
<td>Tufa, magnified</td>
</tr>
<tr>
<td>4</td>
<td>Portion of a frond, with inflorescence and clusters of pistilli</td>
</tr>
<tr>
<td>5</td>
<td>Young germen and pistilli</td>
</tr>
<tr>
<td>6</td>
<td>Sterile fronds, natural size</td>
</tr>
<tr>
<td>7</td>
<td>Fronds, bearing receptacular germen, natural size</td>
</tr>
<tr>
<td>8</td>
<td>Sterile fronds, natural size</td>
</tr>
</tbody>
</table>