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*Muscologia Itineris Assamici; or; a Description of Mosses, collected during the Journey of the Assam Deputation, in the years 1835 and 1836. By WILLIAM GRIFFITH, Esq. Assistant Surgeon, Madras Establishment. Read before the Linnæan Society of London, March 6th, 1838.**

The accompanying collection forms part of the large collections made during the journey of the late Deputation from Calcutta into Upper Assam. By far the greater portion was collected on the Khasiya Hills, an elevated

* This paper, which was written in 1836, was read before the Linnæan Society in March, 1838. I fear that it may not appear to be altogether in good taste to publish in India, what was not published in England, for I have implicit confidence in the soundness of the judgment which suggested that the paper should stand over.

Still I wish to place on record the only connected botanical examinations which have resulted from the Assam Deputation, the more particularly because most of the species are undescribed, and almost all the specimens, from which the descriptions were drawn up, have been destroyed.

With the feelings of an author, those of a botanist are mingled. Priority is the bone of contention for which the great majority of botanists are always wrangling. It appears to me evident that if a botanist were to come to India, visit the places I have, and publish his materials,

tract of country, forming portion of the Eastern frontier of British India. The extreme distance from Terya Ghat, at

I should be exposed to the loss of so many undescribed species. And it is well known that most botanists, even many who are considered great, cannot put up with the loss of a single species, even though their claims to its botanical authorship may be founded on any thing but justice. The loss therefore to me would be insupportable.

The publication of MSS. which I knew from the disadvantages attendant on their preparation would contain an unusual number of mistakes, and which I know to do so, does not admit of such easy explanation: it is however not very far from being in accordance with modern practice. I myself would rather have reserved the MSS. until I could have worked out to the best of my ability the very extensive materials in Muscology now in my possession. But the daily increasing extent of my Indian Herbarium, the duty I have to perform with regard to the Affghan Collections, the probability of my residing for several years in an unexplored and highly botanical country, all induce me to suspect that any adjournment would become a postponement sine die.

For those who take an interest in Indian Muscology, it may not be amiss to add, that in vol xi. of Sir Wm. J. Hooker's *Journal of Botany*, the Mosses in the Herbarium distributed by Dr. Wallich, and those collected by Dr. Royle, are enumerated; the former by the Hon'ble W. Harvey, the latter by Dr. Hooker, botanist to the Antarctic expedition. And of these, many I believe are figured in Hooker's *Icones*, tab. XVII to XXIV.

This paper, like most others, is written for the European Muscologist, in as much as it gives only the means of determining the previously undescribed species.

This deficiency is shared by my paper.

Those, who consider it indispensable to understand structure before they venture to describe form, I would refer to the works of Hedwig, to a paper by Mr. Robert Brown, in the 12th vol. of the *Linnæan Transactions*, and to a paper by Mr. Valentine in the xvii. vol. of the same excellent collection. Mr. Valentine's paper is accurate and original, and with the exception perhaps of the physiological conclusions, worthy of being studied. The article on Mosses in Dr. Lindley's *Introduction to Botany*, 2nd Ed. is certainly inaccurate with regard to one of the most peculiar points of structure, and presumptively so in all the points regarding function.

the foot of the Hills on the southern side, to Raneegaon on the northern side, does not exceed 60 miles; and that between Churra Punjee and Nunklow, both of which may be said to be on the edge of the higher portion of the plateau, 35 miles.

The heights of the places situated on the route between the above places, are as follows; they are taken from Capt. Pemberton's "Report on the Eastern Frontier of British India :"

					<i>feet.</i>
Churra Punjee,	...	...	...	...	4,349
Surureem,	...	...	...	...	5,600
Moflong,	...	...	...	...	5,942
Myrung,	...	...	...	...	5,940
Nunklow,	...	...	...	...	4,553

In addition to these places, I must mention Moosmai and Maamloo, near Churra Punjee; and at about the same elevation, Mumbree between Moflong and Myrung, one of the highest parts on the route; and the Bogapanee, a mountain stream rushing through a valley perhaps 1,500 feet below Moflong. The mean annual heat of these Hills, although it probably varies much relatively to the distance from the commencement of the descent on either side, may be estimated at 65° Fahrenheit, calculating the average height to be 5,100 feet, and adopting Baron Humboldt's ratio of a decrease of one degree for every 396 feet of vertical ascent. Very little is known about the climate of the central portions; but towards either descent, it becomes one of excessive dampness throughout the rains. The southern side receives the whole force of the S. W. monsoon, and the fall of rain at Churra Punjee, the only place where it has been estimated, is, if the accounts be correct, prodigious. Mr. Cracroft states, that the total rain that fell in four months, from June to September inclusive, and in two days of October, when

15,790 fell, was inches 225,789. But if we consider that this so far exceeds the maximum amount observed in other places, exposed more directly to the influence of the S. W. monsoon, we may reasonably question the correctness of Mr. Cracroft's observations.

So little attention has been hitherto paid to Indian Muscology, that no parallel can be drawn between the Muscology of the Khasiya Hills, and of other mountainous tracts of India. The present collection forms about one-eighth of the whole number, taking Bridel's total amount (1,324 species) to be nearly correct. And some idea may be formed of the probable great number of species that remain to be found, when I mention, that the whole of the Hill collection was formed between the 8th of October, and the 20th of November: and that the most interesting portions of the hills to the Eastward of the route mentioned were not visited.

I know no arrangements of the genera, except the artificial one employed by Dr. Hooker, and the artificial and natural ones of Bridel, as given in his *Bryologia Universalis*. Mr. Brown begins his account of the Melville Island Mosses with *Polytrichum*. No very satisfactory ordination of all the genera has, I believe, as yet been given; nor will it be, until additional characters have been discovered. At the same time, I think, that several types of organization exist, and that in the larger groups of these, every gradation of development, at least so far as the peristome is concerned, may be observed.

Sphagnum approaches, in some points, to *Hepaticæ*, but I doubt the correctness of its being stated to be evaginulate. I have not been able to examine its fruits at different periods, but it appears to me that the only difference between it and the usual form, exists in the cohesion of the true apex of the seta, with the interior of the vaginula.

Polytrichum, in the structure and origin of its peristome,

has nothing in common with the usual form of mosses, in which both peristomes originate from the inner membrane. In the genus alluded to, and in one or two allied genera, it is an extension of the outer wall of the capsule, shews usually no indications of composition, and is probably analogous to the annulus of the more developed genera of the order. Its processes too are liable to vary in number, and they are in some species much increased beyond the number 32, which is the maximum number of a single peristome of the usual structure, in which likewise no instance occurs of less than 16; for although *Tetraphis* has only four, and one or two genera only eight teeth, the composition, as indicated by longitudinal lines, is in all such 32. The smallest number, 16, exists in some *Weissia* and *Didymodons*. I believe that Mr. Brown was the first to direct attention to the composition of the teeth of the peristome in the above instances. One of the most curious peculiarities in *Polytrichum* exists in the inflection of the inner membrane, forming, as it were, a ring opposite the *neck* of the capsule. This is quite distinct from the inflection that occurs in some other genera, in which the inflected portion is the termination of the membrane.

The outer peristome of *Buxbaumia* is obviously of analogous origin with the peristome of *Polytrichum*; neither do I see any reason for not adopting the opinion of Bridel, that the inner peristome of *Buxbaumia* and *Diphyscium* is analogous to the epiphragma of *Polytrichum*. Bridel in his generic characters of *Catharinea*, *Pogonatum* and *Polytrichum*, describes the teeth of the peristome as seizing, by their apices, the epiphragma. This is incorrect; the teeth are seized by the epiphragma, which, in the dry state alone by contraction, leaves the interstices open: in the wet state it expands, covering the whole of the teeth as well as their interstices.

I have referred a species, which, with almost every charac-

ter of *Dicranum*, has the peristome of *Didymodon*, to the former genus. Schwaegrichen however refers a nearly allied species with a similarly anomalous peristome to *Didymodon*: this however appears to me to be sacrificing a number of characters to a solitary one. But if such views are correct, my *Fissidens neckeroides* must be incorporated with *Didymodon*.

Fissidens has, I think, without doubt, terminal setæ, for in those cases in which they are axillary, they frequently become elongated, which, so far as I know, is never the case with those which have truly lateral setæ. Judging from the first developed leaves both of the stem and perichætium, it would seem that the "duplicatura" of Hedwig is the true lamina, and that they differ only from highly carinate leaves in the excurrent vein being as it were alate, the dorsal ala being prolonged down the carina to its base. The only objection to this view is the frequent inequality of the two lamellæ.

In *Trematodon longicollis*, I had opportunities of ascertaining the correctness of the observations of Mr. Valentine on the development of the setæ. With these observations I am only however partially acquainted. The old and incorrect ideas appear nevertheless to still prevail, and are admitted into the second edition of Mr. Lindley's Introduction to Botany. The explanations too adopted in this excellent book as to the difference between a mitriform and dimidiate calyptra, and an outer and inner peristome, are likewise particularly erroneous.

With regard to the development of the setæ of Musci, I know of no analogous instances, excepting *Jungermannia*, which is undoubtedly vaginulate. The changes subsequent to fecundation are, in these, much more complicated than in Phænogamous plants, in which they are limited almost universally to the maturation of a pre-existing ovule; whereas in these, they are extended not only to the development of

the sporula, but to the generally highly complex apparatus in which these are contained.

I am not aware whether any one has explained the opposition of the teeth of the peristomes in *Funaria*. But looking at the situation of the carinæ or plicæ that exist in the membrane of the inner peristome, which are invariably alternate with the teeth of the outer peristome, and at the allied genus *Bartramia*, it is evident that the anomaly arises from the cohesion of the component parts of different processes, each of which thus becomes strictly compound.

I have approximated *Pterogonium* to *Neckera*, on account of its habit, and the laterality of its setæ: in its capsule and peristome it approaches nearly to some *Weissia*.

Daltonia I have adopted in the sense of Bridel. *Neckera heteromalla*, which Dr. Hooker refers to *Daltonia*, agrees entirely with *Neckera* in its inner peristome, and must, if attention be paid to its mitriform calyptræ, be referred to *Pilotrichum* of Bridel, or *Daltonia* of Mr. Arnott? I have no opportunity of examining *Anomodon*, which can only differ in the degree of development of the membrane of the inner peristome, and its adhesion to the base of the outer. As the authors of the *Muscologia Britannica* state that their *Daltonia* agrees well in the inner peristome with *Anomodon*, there is some reason to doubt the accuracy of the generic characters of both these genera, as given in the book alluded to.

In *Neckera* I have included *Pilotrichum* and *Cryphæa* of Bridel, and *Daltonia* of Arnott. It is certainly a heterogeneous assemblage, particularly as regards habit. I have been guided in this by the existence of every gradation between the truly dimidiate calyptræ of the true *Neckera* and its mitriform state in *Pilotrichum*. The existence of the appendiculæ, which appear to have first excited attention in *Drepanophyllum*, is now, I believe, for the first time, pointed out as occurring in *Neckera*. Neither are they limited

to one section, although three out of the four species in which they occur agree tolerably well in habit, and all are characterised by a great tendency to elongation in their branches, to the lower part of which elongation the appendiculæ are usually confined. Their structure is that of Paraphyses; their contents similar apparently to the contents of the ordinary form of anthers. As *Paraphyses* are perhaps, in all cases, abortive anthers, these appendages may be considered as anthers at the maximum of development. The objections to this exist in their having no especial protecting organs, and in their never appearing to dehisce. The question will be best set at rest, by examining whether they ever co-exist with male flowers of the ordinary form. If such is not the case, such species cannot remain grouped with those which have male flowers of the ordinary form. *Neckera Hookeriana* and *Adiantum* have leaves of two distinct forms, the lateral and distichous ones being alone oblique. This they possess, in common with some *Hookeriæ*, *Leskiæ* and *Hypna*. In all, this is only an instance of excess, as it were, of the difference perceptible in the obliquity of the lateral leaves, and the equilaterality of the anticous and posticus ones of many other mosses, and especially of the falcate section of *Hypnum*. With *Stipulæ* they have nothing in common, for independently of their being single organs,—even when they *may* be considered referable to, or as belonging to the lateral leaves, it is only to one series of these, and only to one point of these (the lower point of insertion), that they correspond.

I do not know whether the nature of the compound hairs existing on the vaginula or calyptræ of many mosses has been hinted at. In *Neckera crinita* they are obviously reduced perichæatial leaves. Such is probably their nature in all cases. They are not to be confounded with the simple hairs existing in similar situations, such being referrible to *Paraphyses*.

Anhymenium I have ventured to propose as a new genus, remarkable for the proportionally very small teeth of the outer peristome, and for the great development of the processes of the inner peristome, considered relatively to the almost total absence of a basilar membrane. In this instance, the disparity between the membrane and the processes, in favour of the latter, is greater even than in *Climacium*.

Pleuropus, the second genus, which appears to me new, has the same relation to *Leskia*, etc. that *Brachymenium* has to *Bryum*. From the former genus it is alone distinguishable by the laterality of its setæ, and the accompanying difference in habit.

Almost the whole of the above descriptions were made from dried specimens. I trust that considerable indulgence will be shewn to the numerous errors that must exist, especially as regards the fabrication of new species. Advice in Muscology is not to be obtained in India; and my means of consultation are limited to Bridel's *Bryologia Universalis*, the *Musci Exotici* of Dr. Hooker, and the *Muscologia Britannica* of Dr. Hooker and Taylor. In means of comparison with authentically named specimens, I am altogether deficient: owing to this, I have not ventured to meddle with either *Leskia* or *Hypnum*, under any circumstances a business of some difficulty, but one to me almost insuperable on account of the unnatural arrangement of *Hypnum* by Bridel.

Sequence of the genera of the *Muscologia Itineris Assamici*.

	No. of species.		No. of species.
1. Sphagnum,	1	10. Grimmia,	3
2. Polytrichum,	6	11. Trematodon,	2
3. Diphyscium,	1	12. Dicranum,	13
4. Gymnostomum,	7	13. Fissidens,	10
5. Orthodon,	1	14. Didymodon,	4
6. Orthotrichum,	5	15. Funaria,	2
7. Schlotheimia,	1	16. Bartramia,	3
8. Weissia,	3	17. Brachymenium,	3
9. Barbula,	3	18. Bryum,	7

	No. of species.		No. of species.
19. Pterogonium,	4	24. Hookeria,	4
20. Neckera,	20	25. Leskia,	7
21. Daltonia,	1	26. Hypnum,	28
22. Pleuropus,	3		
23. Anhymentium,	1	Total,	143

SPHAGNUM.

Sphagnum obtusifolium.

Hab: In humidis, circa Surureem et Moflong.

Var: *a.* *S. cymbifolium* Brid. Bryol. Univ. 1. p. 2?

Hab: In humidis ad margines rivulorum Moosmai.

Fructiferum nunquam reperimus.

POLYTRICHUM.

1. *Polytrichum (Catharinea) angustatum*, Hook. Musc. Exot. p. 5. t. 50. Brid. Bryol. Univ. 2. 105.

Hab: In collium Khasiyensium regionibus altioribus, vix inveniendum infra altitudinem 5,000 pedum.

Aggregatum: Caules simplices, semunciales, e basi foliosi. Folia siccatione marginibus involuta, valide crispata tortiliaque, celluloso-membranacea, ascendenti-incurvata, subcarinata, lanceolato-lineararia, acuta vel obtusiuscula, undulata, a medio supra denticulata, dorso apicem versus aspera papillis in lineis oblique transversis dispositis; vena crassiuscula completa dorso apicem versus denticulata; lamellis rectiusculis subquinis basin folii fere attingentibus; marginibus subincrassulis sub lentem modice augmentem fibrosis. Perichaetia con-similia, interiora minora.

Var: *a.* *Atrovirens*: Caules longissimi, setas excedentes, simplices vel subramosi, inferne foliorum venis persistentibus obsiti; folia longiora, magis repanda et incurva.

Hab: Sururreem in rupibus madidis.

Var: *b.* *Majus*: folia longissima, 4—linealia, magis incurvata.

2. *Polytrichum falcifolium*, Gr.

Caule simplici, foliis e basi lanceolata subulatis falcatim incurvis integris, capsula rotundato-ovata exapophysata inclinata.

Hab : In arenosis Boga Panee, Collium Khasiyensium.

Aggregatum : Caules breves vix lineas tres longitudine excedentes.

Folia siccatione tortilia et incurva, madore falcatim incurva, e basi lanceolata cauli adpressa longe subulatim acuminata, concava, obtusa, integra marginibus subinvolutis, percursa vena crassa completa, lamellis conspicuis subseptem instructa.

Perichætalia basi largiora magisque membranacea.

Seta stricta, longitudine unciam paullo excedens, rubrotincta, siccitate tortilis.

Vaginula mediocris, anguste cylindracea. Paraphyses subnullæ, pistilla pauca, styli longi apicibus solito dilatatiores. Capsula inclinata nutansve, siccatione interdum erecta, sæpius rotundato-ovata et inæqualis, interdum suburniformis, ore vix coarctato nunc obliquo, fuscobrunnea, inconspicue areolata; membrana interna libera, apicem versus capsulæ in anulum inflexa.

Peristomium e dentibus 27—33, sed sæpius ut videtur 32, basi connexis, brevibus, acutis, leviter inflexis, sublentem materie grumosa hinc illinc opaciusculis, inæqualibus, latioribus (ob cohesionem) pluribus apice submarginatis medioque sulcatis.

Epiphragma demum liberum.

Columella inclusa, 4 angularis, fere 4-alata, apice planiusculo anulum membranæ interioris subattingens.

Cætera non visa.

3. *Polytrichum proliferum*, Gr.

Caule indiviso hinc apice innovatione prolifero, foliis falcato-incurvatis siccitate tortilibus e basi lanceolata longe linearibus argute dentatis carinatis carina medium supra denticulata, capsula erecta oblongo-ovata basi sub-apophysata, operculo conico breviter apiculato, calyptra villosissima.

Hab : Legi primum in umbrosis circa Churra Punjee sed absque fructificatione; serius fructiferum invenit D. Wallichius infra rupes in umbrosissimis prope Sururreem.

Cæspitosum, atrovirens: caules spithamæi, basi denudati. Folia siccitate marginibus involuta incurvata et tortilia, longissima fere semuncialia, angustia, acuta, vena completa ab initio partis linearis angustissime lamellata, infima innovationum oblongo-lanceolata, vena elamellosa. F. perichætalia conformia longiora.

Seta terminalis vel pseudolateralis, solitaria vel geminata, crassiuscula, basi rubra cæterum pallida, siccitate tortilis et flexuosa. Vaginula angusta. Paraphyses filiformes hyalinæ, inæqualiter septatæ, tenuissimæ. Pistilla subnulla.

Capsula æquilateralis, oblongo-ovata, interdum anguste urniformis, fuscoviridis, collo constricto.

Membrana interna libera ad collum capsulæ in anulum inflexa, annulo, operculo persistente, apice columellæ obturato.

Peristomium e dentibus 32 linearibus, æqualibus, æquidistantibus, inflexis, basi unitis, acutiusculis, pulchre coccineo-rubris, marginibus hyalinis.

Epiphragma tenue, hyalinum, centro opaciusculum.

Columella cylindracea, irregulariter alata, apice imo plana, longitudine fere capsulæ.

Sporula in acervulo sordide viridia, minuta, rotundata, lævia, inæqualia.

Operculum conicum breviter recteque subulatum. Calyptra dimidiata, fusea villis arcte implexis pallide ferrugineis.

4. *Polytrichum urnigerum?* Menz? Hook et Tayl. *Musc. Pritt.* 49. t. 11.

Var: Simplicicaule.

Hab: In ripis in Pinetis circa Moflong.

Habitus fere *P. juniperini*. Medium videtur inter *P. urnigerum* et *aloides*, illi statura majore, colore, foliisque accedens, huic caule simplici. Dentes peristomii pallidi, inæquales, sub—32. Calyptræ villi fulvi.

5. *Polytrichum aloides*. Hedwig.

Hab: In collibus Khasiyensibus vulgatim; in ripis arenosis rivuli Deboro apud Kujoodoo et Rangagurrah, regionis Assamicæ altæ. Nuperius vidi allatum e collibus Aborensibus.

Variat magnopere statura, capsula læviuscula vel papulosa, operculique longitudine.

6. *Polytrichum?*

Hab: In collibus Aborensibus in solo arenoso.

Efructiferum tantum vidi. Caules elongati simplices basi nudiusculi. Folia undique imbricata, e basi latiuscula membranacea longissime lineari-subulata, concavo-canaliculata, apices versus tenuiter denticulata, percursa vena crassa anguste lamellosa, dorso apicem versus denticulata, madore incurva summa subsecunda, siccitate tortilia marginibus involutis.

P. prolifero valde affine. Habitu et foliatione *Lyelliae* crispæ proximum, differt tantum foliis magis incurvis, tenuiter et apices versus tantum denticulatis.

DIPHYSCIUM. WEB: ET MOHR.

1. *Diphyscium longifolium*, Gr.

Caulescens, foliis (maximis) ligulatis acutis integris vel crenulatis, perichætialibus vena excurrenti longe aristatis laciniis sæpidus dentiformibus, capsula semi-exserta, calyptra dimidiata.

Hab: In saxis rupibusque rorantibus ad Moosmai et Surureem, etiam in rupibus in sylvis umbrosis Myrung.

Dense cæspitosum, sæpe pulvinatum: e locis madidis proveniens atrovirens. Caules longitudine variantes a lineis duabus usque ad semunciam, inferne denudati. Folia siccatione incurvata crispataque marginibus involutis, madore subrosaceim patentia, repanda, sæpius irregulariter crenata, prædita vena crassiuscula completa inferiora minora, reliqua bilinealia: areolæ minimæ.

Perichætialia plurima, erecta; exteriora foliis caulinis similia sed vena excurrente longe aristata, reliqua intus gradatim magis magisque membranacea, apice bifida sinu longe aristigero, laciniis integris vel breviter laciniatis, intima minima fere omnino membranacea.

Seta subnulla. Vaginula brevis conica, albida. Paraphyses paucae vel subnullæ. Pistilla 3—5 breviter stipitata stylis longissimis.

Capsula alba, magna, oris margine irregulari. Membrana interna discreta, insidens stipite brevi conico, capsulæ ope filamentorum cellulorum adhærens, ore constricto irregulariter lacero. Peristomium sub-16-plicatum, niveum. Columella inclusa, plana, latissima. Sporula globosa, lævia, valde irregularia, in acervulo læte viridia.

Operculum conicum, obtusum, vel acute rostratum, cum columellæ apice secedens.

Calyptra subulata ad apicem usque fere fissa, operculi longitudine.

D. folioso proximum.

GYMNOSTOMUM. HEDW. BRIDEL EX PARTIM.

SECT. I.—GYMNOSTOMA VERA.

1. *Gymnostomum repandum*, Gr.

Caule simplici, foliis congestis ascendenti-patentibus spathulato-lanceolatis acuminatis repandis apices versus serratis vena intra apicem evanida, capsula turbinato-hæmisphærica, operculo convexiusculo mammillato.

Hab: In terram circa Suddya vulgatim occurrit. Per menses frigidos fructificat.

Pusillum, semunciam vix metiens. Folia marginibus simplicia; areolis magnis irregulariter parallelogrammicis: vena crassiuscula fere completa. Perichætialia magis ovata.

Seta brunnea, vix bilinealis.

Vaginula subcylindræa; paraphyses pistillaque subnulla.

Capsula brunnea hæmisphærica, sed ob apophysin spuriam basilarem turbinato-hæmisphærica. Sporula brunnescentia spherica, sub lentem modice augentem echinata. Calyptra basi ventricosa 3-4-fissa.

Species forsan vix distincta, intermedium videtur inter *G. sphericum* et *G. pyriforme*.

2. *Gymnostomum pulchellum*, Gr.

Caule simplici, foliis congestis ascendenti-patentibus spathulato-lanceolatis apiculatis repandis marginatis subintegris vena in

apiculum excurrente, capsula turbinato-pyriformi, operculo planiusculo umbonato.

Hab : In terram circa Suddiya.

Præcedente cum quo mixtum occurrit duplo triplove majus. Folia conspicue areolata, areolis parallelogrammicis angulatisve. Perichætialia majora magisque ovata. Seta 3-4 linealis erecta, pallida. Capsula erecta, brunnea, membrana interna inter os hujus in anulum brevem inflexa. Sporula rotundata, sub lentem acre augmentem minutissime scabrella. Calyptra basi ventricosa fissa.

Verisimiliter intermedium inter *G. pyriforme* et fasciculare. Præcedenti valde affine.

3. *Gymnostomum atro-viride*, Gr.

Caule fastigiatim ramoso, foliis lineari-lanceolatis acutis carinatis integris patentibus siccitate incurvis vena subcontinua inferioribus subtrifariis, perichætialibus convolutis longe aristato-acuminatis, capsula erecta ovata vel rotundato-ovata, operculo oblique rostrato capsulam æquante.

Hab : In saxis Maamloo, in rupibus madidis Moosmai.

Dense cæspitosum, siccatione fuscoviride. Caules dense conferti, fastigiatim ramosi, vel dichotomi vel hinc innovatione tantum præditi, vix semunciales. Foliorum carina scabrella (an semper?), areolæ parvæ sæpius rotundatæ, perichætialium vena infra apicem evanida.

Seta trilinealis sanguineo-brunnea. Vagina subfusiformis. Paraphyses paucissimæ. Pistilla subnulla.

Capsula rubro-brunnea ore paullo constricto, exannulata. Membrana interna libera, stipitata, paullo infra os capsulæ inflexa, marginibus laceris. Sporula in acervulo fusco-brunnescentia, rotundata, lævia, subuniformia. Columella clavata, apice truncata et membrana obsolete marginata. Operculum basi convexiusculum. Calyptra dimidiata parva.

Var. *a*. Foliis duplo angustioribus, perichætialibus acutissimis sed vix aristatis.

G. xanthocarpo propinquum. An satis distinctum a *G. curvirostro* ?

4. *Gymnostomum inconspicuum*, Gr.

Caule simplici vel apicem versus ramoso, foliis siccitate tortilibus carinatis madore planiusculis patenti-ascendentibus oblongo-lanceolatis rigidis acutis integris, perichætialibus conformibus, capsula erecta cum apophyse cylindræo obovata.

Hab: Inveni mixtum parcissime cum Dicranis quibusdam in rupibus madidis, Churra Punjee.

Dense cæspitosum. Caules unciales vel breviores, basi decumbentes, simplices vel apices versus innovationibus fastigiatis ramosi. Folia undique patentia raro recurvata, superiora conferta lanceolato-linearia, marginibus basin versus recurvis, inferiora oblongo-lanceolata subintegerrima, læte lutescenti-viridia, percursa vena intra apicem evanida, areolis densis opaciusculis punctiformibus. Perichætialia carinata, intima minora.

Vaginula brevis cylindræo-ovata. Paraphyses plures hyalinae subfiliformes, brevissimæ. Pistilla pauca.

Seta pallida lineas duas longitudine vix excedens.

Capsula sub-inæqui-lateralis, ovato-cylindræa, apophysin obconicam terminans, ore parum angustato. Membrana interna basi discreta, stipitata, ad collum capsulæ breviter introflexa. Columella subcylindræa apice paullo dilatata, planiuscula. Sporula globosa lævia, immersa diaphana.

G. longirostro, Gr. affine, diversum præcipue setis omnibus terminalibus, foliorum marginibus nullo modo involutis, formæque capsulæ.

SECT. II.—HYMENOSTYLIIUM.

Capsulæ os clausum columellæ apice dilatato et membrana interna introflexa. Opérculum cum columellæ apice secedens.

5. *Gymnostomum longirostrum*, Gr.

Caule innovationibus proliferis vel simplici, foliis lanceolato-linearibus acutis solidiveniis integerrimis marginibus involutis, capsula erecta oblongovata, operculo longe et recte rostrato capsulam excedente.

Hab : In collibus Khasiyensibus sed locus mihi incognitus.

Cæspitosum. Caules decumbentes sæpe unciales, radiculis brunneis villosi, proliferi, et sæpe parce ramosi. Folia siccitate insigniter involuta et incurvata, madore ascendenti-patentia, inferiora oblongo-lanceolata, superiora lineari-lanceolata, luride viridia, subcarinata, marginibus flexuosis involutis, areolis minutissimis, percursa vena fuscescente completa.

Perichætalia conformia, interiora minima.

Seta brevis vix bilinealis lutescens, terminalis si solitaria, si plures terminales lateralesque, siccitate tortilis.

Vaginula cylindracea. Paraphyses filiformes hyalinæ. Pistilla pauca. Capsula exannulata, oblongo-ovata vel cylindræo-oblonga, lutescens, parietibus tenuibus diaphanis collo contractiusculo, ore irregulariter denticulato rubro.

Columella clavata, inclusa, breviter stipitata basi reliquiis membranæ internæ cincta.

Sporula rotundata, lævia, immersa subdiaphana.

Operculum e basi conica rubra longe rostratum, capsulam paullo excedens, rostro lutescenti acuto, basi conica columellæ apice adhærenti obtrusa. Calyptram non vidi.

Affinis *G. xanthocarpo*. Hook. Musc. Exot p. 2 t. 153 præsertim capsulæ structura. Habitus, ut videtur, quodammodo *Calymperes Gardneri*.

Of this very distinct species, I have only seen one capsule before the fall of the operculum. The inner membrane is totally distinct from the capsule, and is connected only with the margin of the much dilated apex of the columella. It subsequently seems to become irregularly ruptured; the base alone remaining, and surrounding the lower portion of the columella.

SECT. III.—DIASTOMA.

Capsula annulata, collo insigniter constricto. Operculum cum columellæ apice secedens.

Huic sectioni primo *D. Hookero* propositæ pertinent *Gymnostomum julaceum* et involutum ejusdem auctoris. A *Gymnostomo* differt omnino habitu, et statione geographica, illo

nempe boreali, hoc tropicali. Locus naturalis Barbulam prope. ?
A *Gymnostomis* veris posterum certe segregandum.

6. *Gymnostomum denticulatum*, Gr.

Caule sub-simplici, foliis lingulato-oblongis acutis apices versus denticulatis vena sub-completa, perichætialibus intimis convolutis obtusissimis integris, capsula anguste cylindracea, operculo subulato.

Hab : In rupibus inter Syung et Myrung, et in terram circa Moflong. Nuperius legi in collibus Naga dictis altitudine circiter 1,000 pedum.

Cæspitosum. Caulis erectus, vix semuncialis. Folia siccatione incurvata marginibus insigniter involutis, madore patienti-recurvata, leviter repanda marginibus vix incurvis imo sæpa leviter recurvis, percursa vena crassa sursum valde attenuata et vix completa ; areolis minutis.

Perichætialia exteriora conformia, marginibus superne involutis, interiora minora integerrima vena infra apicem evanida. Seta ob innovationes interdum pseudo-lateralis, filiformis, rubescens, siccitate tortilis. Vaginula obclavata, basi paraphysibus pistillisque paucis obsi .

Capsula leviter inclinata, subinæquilateralis brunnea, sub lentem modice augmentem areolatim striata. Annulus insignis, initio horizontalis, operculo detruso erectus. Membrana interna libera, subsessilis.

Columella filiformis, longitudine fere thecæ.

Sporula minuta, rotundata, lævia, in acervulo fusco-viridia, immersa diaphana, subuniformia.

Operculum subulatum, capsula subquadruplo brevius, rostro sæpius declinato.

Calyptra dimidiata lævis, semel bisve torta.

Variat statura, foliis madore etiam margine involutis, et obsolete denticulatis. An ideo posterum cum *G. involuto*. Hook. *Musc. Exot.* p. 2 t 154, conjungendum ?

7. *Gymnostomum recurvum*, Gr.

Caule ramoso, foliis ascendentibus lanceolatis acuminatis integer-

rimis marginibus recurvis vena crassa in mucronem excurrente, capsula ovato-cylindræa, operculo subulato.

Hab: In arenosis Bogapanee.

Cæspitosum, totum rufescens. Caules sæpius pluries ramosi, ramis subfastigiatis, inferne nudiusculi.

Folia caulis primarii dense, ramorum laxiuscule imbricati, siccitate adpressa, rigida, marginibus subincrassatis, areolis distinctis subparallelogrammicis.

Flos fæmîncus terminalis, discoidius, cinctus foliis perichaetialibus ascendenti-patentibus, concavis, cæterum caulinis subsimilibus. Paraphysespaucissimæ. Pistilla plura sub-octena.

Vaginula cylindræa. Seta vix semuncialis, rubescens, ob innovationem pseudolateralis, sicca tortilis. Capsula erecta, utrinque attenuata, rubro-brunnea. Annulus ut in præcedente.

Membrana interna libera.

Sporula in acervulo fusco-viridescencia, inæqualia, rotundata, immersa diaphana.

Operculum subulatum, rectum vel obliquum, obtusum, capsula subtriplo brevius.

Calyptra subulata, dimidiata, ad medium fere fissa.

Variat statura et acumine imo foliorum sæpe diaphano.

ORTHODON. BORY.

1. *Orthodon subglaber*, Gr.

Caule erecto simplici, foliis oblongo lanceolatis acuminatis apice piliferis argute serratis, calyptra basi glabra apice papilloso scabra.

Hab: In arboribus vigentibus mortuisve in sylvis Mumbree, in arboribus et rupibus in sylvis Myrung; in utroque loco satis copiosus.

Habitus foliatioque fere omnino *O. serrati*, sed folia dorso lævia, apice in pilum integrum diaphanum breviusculum exeuntia.

Capsula erecta, oblongo-ovata, apophysin brevem obconicam terminans, siccitate subcylindræa, collum infra angustata.

Membrana interna arcte adnata.

Peristomii dentes madore incumbenti-conniventes, siccitate erectiusculi apicibus inflexis, distantes, latiusculi, crassi, coriacei,

lineis tribus, quarum centralis conspicuosior exarati, lineisque transversis plurimis; etrabeculati, sub lente acre augmentem minute punctulati.

Columella cylindracea, inclusa.

Sporula in acervulo sordide lutescentia, irregularia, lævia, sæpius extremitate una alterave attenuata.

Operculum ut in *O. serrato*, sæpius cum calyptra secedens.

Calyptra mitræformis, basi ventricosa, et profunde 4-partita, laciniis abrupte inflexis, fundum vel os calyptræ claudentibus, apice subulato sub lentem papillis scabra, cæterum glabra.

ORTHOTRICHUM, HEDW.

1. *Osthortichum concavifolium*, Gr.

Caule fastigiatim ramoso squarroso, foliis cordatis vel cordato-ovatis concavissimis breviter apiculatis evanidivenus perichæatialibus marginibus insigniter revolutis vena excurrenti cuspidatis, capsula oblongo-urceolata immersa, peristomio simplice, operculo conico.

Hab: Inveni specimen unicum fructiferum mixtum cum *Neckera aurea* e Mumbree.

Caulis erectus, sæpius fastigiatim ramosus, uncialis. Folia undique imbricata, siccitate arcte adpressa, madore patentissima, convuluto-concava, integerrima; marginibus leviter revolutis, vena medium ultra evanida prædita, areolis minutis oblongis vel rotundatis, summa minora, cordata, brevissime acuminata obtusa. Perichæatialia subconformia paullo majora a medio supra reflexo-patentia, valde acuminata, marginibus insigniter revolutis, vena sursum ampliata excurrenti ibidemque scabrella percursa.

Vaginula (saltem nuda) brevissima rubrobrunnea. Paraphyses Pistillaque pauca.

Seta brevissima, exserta et vaginula subnulla.

Capsula sublævis, ore valide constricto, fuscoviridescens. Membrana interna adnata.

Peristomium e dentibus 16, brevibus, erectis, fragilibus, albis, punctulato-opaciusculis, marginibus scabrellis, lineis transversis conspicuis, centrali longitudinali subobsoleta.

Columella cylindræca, apiculata, inclusa. Sporula majuscula, uniformia, globosa, laevia, immersa opaciuscula. Operculum conicum breve, rubrum. Calyptra deerat.

Solum est inter *Orthotricha* Khasiyensia forma boreali gaudens.

2. *Orthotrichum Moorcroftii*, Hook et. Grev. in Edinb. Journal of Science, 1824, 1 p. 116 e. Bridelio. *Leiotheca Moorcroftii*, Brid. Bryol. Univ. vol. I. App. p. 727.

Hab : In rupibus arboribusque per totos colles Khasiyanos inter Churra Punjee et Nunklow.

Variat colore fuscescente foliisque madore minus patentibus. Folia siccitate incurvatim tortilia. Perichætialia exteriora conformia, interiora oblongo-lanceolata cuspidato-acuminata. Vaginula cylindræca angusta, ubique paraphysibus plurimis hyalinis, summis longissimis, basinque versus pistillis pluribus obsita. Capsulæ os incrassatum, lucidum, sulcatum. Dentès peristomii pallidi, albidi, vix per paria approximati, lineis compositionis inconspicuis.

Sporula magnitudine summopere varia, opaciuscula.

3. *Orthotrichum assamicum*, Gr.

Caule repente, foliis lanceolato-linearibus subcarinatis ascendentibus siccitate incurvatis contortisque, capsula anguste cylindræca, peristomio simplice, calyptra villosa.

Hab : In arboribus versus Negrogam et in agro "Muttack" dicto, regionis Assamicæ altæ; atitudine supra mare circiter 600 pedum.

Cæspitosum, ramosum, rami breves ascendentes. Folia rectiuscula, integerrima, marginibus leviter recurvis, prædita vena crassiuscula in apiculum brevem mucroniformem excurrente, inconspicue areolata.

Perichætialia interiora, fere membranacea, subconvoluta, cuspidato-acuminata, solidivenia.

Seta ob innovationes lateralis, vix semuncialis, brunnea, sicca spiraliter torta. Vaginula cylindræca. Paraphyses plurimæ, summæ longissimæ. Pistilla pauca longiuscule pedicellata.

Capsula erecta; juniorem tantum vidi.

Peristomium simplex, e dentibus 16 binatim compositis, obtusis, sæpius emarginatis, punctulato-opacis, notatis linea longitudinali semi-diaphana, lineis transversis ægre distinctis.

Sporula fuscescenti-viridia, irregularia. Operculum e basi convexa recte rostratum capsula triplo brevius.

Calyptra campanulata, pilis luteis compositis ascendenti-adpressis villosa, basi 3-5 fida, fissuris irregularibus, una alterave medium fereattingente.

Præcedenti proximum; capsulaque matura non observata an jure separavi ob folia breviora, ascendentia, siccitate contorta, capsula mente anguste cylindraceam?

4. *Orthotrichum squarrosum*. Hook et Grev. loc citat. p 128 (e Bridelio) *Schlotheimia squarrosa*. Brid. *Bryol. Univ.* 1. 324.

Hab: In terram in sylvis, Myrung.

Bridelio) *Schlotheimia Squarrosa*. Brid. *Bryol. Univ.* 1. 324.

Hab: In terram in sylvis, Myrung.

Planta Khasyana cum descriptione Brideliana bene convenit; differt tantum statura minore, ramis sæpe apice tantum ob innovationes ramosis et peristomio interiore?

Peristomii utriusque descriptionem subjungo.

Peristomium exterius madore connivens, siccitate semi-reflexile, e dentibus 16 binatim compositis, subulato-planis, obtusis, emarginatis, rigidis, opacis, solidis, rufobadiis, linea longitudinali subdiaphana transversisque crebris minus conspicuis notatis.

Interius e ciliis totidem alternantibus, ad basin usque fere bipartitis, rarius indivisis, (ciliolis inæqualibus) peristomium exterius longitudine æquantibus vel sæpius brevioribus, opaciusculis, sublentem centies augmentem conspicue sed irregulariter striatis, peristomio exteriori præcipue basin versus plus minus cohærentibus.

Structura peristomii interioris affine *O. perichætiali* Hook. et Grev.

5. *Orthotrichum? bryoides*, Gr.

Caule repente ramoso, ramis sterilibus repentibus fertilibus erectis,

foliis coriaceis obovatis-subulato apiculatis margine fibrosis, capsula erecta oblongo-elliptica ore coarctato, calyptra villosa.
Hab : In arboribus in locis humidis Surureem.

Cæspitosum. Rami fertiles unciales inferne dense radiculis ferrugineis vestiti.

Folia subconformia, siccatione crispata tortiliaque, madore oblique patenti-ascendentia, interdum recurva,* apices versus ramorum fertiliū conferta, obovata, vel obvato-oblonga, repanda, apicibus rotundata, subulato-apiculata, vena crassa subulata in apiculum excurrente vel sæpius infra apicem evanida donata; marginibus fibrosis, integerrimis; areolis pro genere maximis, angulatis, oblongis vel parallelogrammicis. Folia perichætialia pauca, subconformia, basi concava, exteriora majora, interiora multo minora.

Seta terminalis, viridescens, crassiuscula, sicca tortilis.

Vaginula ovato-oblonga, pistilla plurima præsertim basin versus gerens. Paraphyses plurimæ, summis longissimis, inferne e cellularum seriebus duabus conflatis, pilis paucis compositis immixtis ascendentibus circa setæ basin.

Capsula magna, longitudine fere bilinealis, latitudine semi-linealis, brunnea, sub lentem modice augmentem conspicue celluloso-areolata, ore lævi valde angustato.

Peristomium utrumque imperfectum tantum vidi. Exterius e dentibus 16? conniventibus, albidis, angustis, binatim compositis, obtusis, infra opacis, supra punctulatis subhyalinis, linea longitudinali indistincta, transversis pluribus distinctioribus notatis, fragilibus, leviter semet cohærentibus.

Interius membrana areolata brevissima p. exteriori 4-plo brevius, apice irregulariter dentata, alba, obsolete plicata.

Operculum (immaturum) conico subulatum obtusiusculum.

Calyptra (immatura) anguste companulata, basi subintegra, pilis compositis longis, ascendentibus patentibusque, flexuosis villosa.

Species perpulchra distinctissima, habitu omnino bryoideo, areolatione marginationeque foliorum in tribum insolita insignis.

* Maxima, longitudine $2\frac{1}{2}$ lineas, latitudine 1 lineam metientia.

Verisimiliter Schlotheimiæ, peristomio interiore perfecto investigato, in posterum adjungendum. Per. exterius p. exteriori Schlotheimiæ sulcatæ simillimum.

SCHLOTHEIMIA BRIDEL.

1. *S. sulcata*. Hook. Musc. Exot. 2. 14. t. 156.

Macromitrium sulcatum. Bird. Bryol. Unin. 1. 319.

Hab: In rupibus et arboribus Churra Punjee et Moosmai.

Rami hinc apice fere semper innovantes,

Capsula 8-sulcata. Membrana interna adnata. Peristomium exterius e dentibus 16 binatim compositis, minime evolutis, obtusis, fragilibus, fuscescentibus.

P. interius longitudine exterioris, e membrana cellulosa areolata, margine irregulariter denticulata, quamvis conspicere licet formatum esse videtur e dentibus ciliisve totidem alternantibus, binatim compositis et firme cohærentibus.

Columella inclusa apice truncata.

Sporula in acervulo viridia, lævia, magnitudine valde varia, minora immersa diaphana, majora opaca.

WEISSIA. HEDW. BRIDEL EXPARTE.

1. *Weissia Templetoni*. Hook.

Hab: In terram circa Moflong.

Flos masculus cinctus foliis perigonalibus rosaceis patentibus ovato-oblongis. Antheræ plurimæ, cum stipite longo clavatæ, constantes e sacculo simplici subrotundo oblongove, hyalino, transversim dehiscente, stipitem oblique terminante, immixtæ paraphysibus setaceis vel clavatis.

Vaginulæ superficies celluloso-areolata.

Variat statura, foliorum serrulatione et acuminatione, capsula interdum subglobosa et peristomii fugacitate et structura, varietate una peristomio multo magis evoluta minusque fugace gaudente, dentibus simplicibus vel binatim compositis.

Folia magis acuminata et operculum magis planum quam in figura, Hook. et Tayl Musc. Britt. t. 14.

Planta a *Weissia* proculdubio segreganda.

Habitus omnino Gymnostomi, a quo ob peristomii dentes operculo detruso fugacissimos caute distinguendum.

Vix *Eremodon longicollis*, Brid. Bryol. univ. 1. 234. ob venam evanidam.

2. *Weisia bartramioïdes*, Griff.

Caule fasciculatim? fastigiatim ramoso, foliis (siccitate rectis) adpressis lanceolatis acuminatissimis solidiveniis perichœtialibus aristatis, capsulæ erectæ globosæ vel ovato-globosæ ore valide constricto.

Heb: Rupes arenosæ ad Churra Punjee, Surureem, et Bogapanee. Cœspitosa. Caulis ascendens, apice fastigiatim ramosus, vix semuncialis.

Rami subclavati, extrorsum curvati.

Folia caulis subdistantia, ramorum densissime imbricata acuminatissima, fere pilifera, acuminibus denticulatis, interdum apice diaphanis, percursa vena crassa breviter excurrente, marginibus leviter revolutis, areolis oblongis parallelogrammicis.

Flos hermaphroditus, terminalis, gemmiformis, foliis perichœtialibus conformibus in cuspidem piliformem acuminatis, vena longe excurrente. Antheræ paucæ, pallide lutescentes, oblongæ, breviter stipitatæ, apice dehiscentes, cellulis irregularibus areolatæ. Paraphyses subnullæ. Pistilla antheris numerosiora, longiuscule stipitata.

Seta terminalis, subsemuncialis, fuscescens, sicca tortilis.

Vaginula mediocris.

Capsula siccatione sulcata, brunnea, ore lævi rubro-brunneo.

Membrana interna discreta.

Peristomium, quod imperfectum solum vidimus, fugacius, e dentibus 16 siccatione erectis, humore fere horizontaliter conniventibus, brevibus, latiusculis, binatim compositis (ciliolis interdum facile solubilibus) rarius simplicibus, solidis vel longitudinaliter perforatis, apice emarginatis, aliquand oper paria approximatis diaphanis, pallide fusco-lutescentibus.

Columella cylindræa, inclusa, apiculata.

Sporula fusco-ochroleuca, oblonga, lævia, immersa opaca,

Operculum non visum.

Calyptra dimidiata, per totam fere longitudinem fissa.
Affinis præsertim forma capsulæ, *W. pomiformi*, Hook. *Musc. exot.* p. 7 t. 131.

3. *Weisia Maclellandii*, Griff.

Caule simplice, foliis siccitate tortilibus e basi lanceolata longelinearibus carinatis sursum argute serrulatis carina apicem versus serrulata, capsula erecta anguste cylindræa.

Hab: In arbore lapsa prope Myrung parcissime invenit D. McClelland.

Caules erecti, vix unciales. Folia siccitate involuta et tortilia, humore oblique patentia, acuta vel obtusa. percursa vena solida, dorso inferne scabrella superne serrulata, marginibus leviter incrassatis, areolis inconspicuis.

F. Perichætialia conformia longiora.

Capsula fuscescens, ore rubro lucido.

Peristomium e dentibus 16, minutis simplicibus, infra os capsulæ exsertis, horizontaliter conniventibus, aurantiaceis.

Sporula majuscula, lævia, fusco-viridescens, immersa opaciuscula.

Columella inclusa, apice truncata.

Operculum, calyptra saltemquoad.

A *Calympera Gardneri*, saltemquoad iconem Hook. *Musc. exot.* t. 146. vix distinguenda, nisi carina foliorum serrulata et peristomio.

BARBULA, HEDW. TORTULA, HOOK. ET GREVILLE.

1. *Barbula indica*, Brid. *Bryol. univ.* 1. 544. *Tortula Indica*, Hook. *Musc. exot.* p. 7. 135.

Hab: Ripæ prope Jumalpoore, Bengalie inferioris.

Caules simplices. Folia siccitate valde involuta et incurvata vix crispata, marginibus superiorum et præsertim perichaetialium involutis. Peristomii capsulam fere æquantis dentium articuli opacitate obscurati.

2. *Barbula longifolia*, Griff.

Caule simplice brevissimo, foliis erecto-patentibus linearibus concavo-carinatis acutiusculis muticis siccitate incurvtis mar-

ginibus valde involutis, capsula cylindraciuscula, operculo subulato obliquo capsula duplo brevior.

Hab: Ad Moflong parce legit D. McClelland.

Caulis vix lineas quatuor metiens.

Folia siccitate etiam subtortilia, humore patentia, inferiora sæpe recurva, integra vel apicem versus minute denticulata, percurta vena subulata in mucronem brevem excurrente.

Perichætalia conformia, majora.

Seta terminalis, subuncialis, gracilis, fere capillacea, flexuosa, rubro tinctoria, siccitate tortilis.

Vaginula cylindracea, angusta, paraphyses pistillaque pauca gerens.

Capsula æquilateralis, subfusiformis, os versus gradatim angustata, brunnea, ore incrassato rubro, annulo completo siccitate inflexo eincto.

Membrana interna basi libera, breviter stipitata.

Peristomium capsula triplo-brevius; dentes 32, an semper? basi per paria approximati, capillacei, obliquiusculi, vel ut in var: A semel tortiles, rubri, scabrelli, opaci, apicibus pallidi.

Columella filiformis, apice truncata, inclusa.

Sporula uniformia, lutescentia, lævia, immersa diaphana.

Operculum conico-subulatum. Calyptra dimidiata, apice longe stylifera.

Affinis videtur *Barbulæ recurvatæ*, Hook. Musc. exot 7. t. 130.

Var. A. Peristomio semel torto.

Hab. Ad Bogapanee.

3. *Barbula arcuata*, Griff.

Caule simplice longiusculo, foliis lanceolato-acuminatis carinatis vena excurrente breviter apiculatis margine recurvis perichætialibus longissimis canaliculatis, capsula cylindracea arcuata.

Hab: Legimus specimina 2-3 fructifera in arenosis "Bogapanee."

Caulis erectus, basi denudatus, subsemuncialis. Folia siccatione adpressa, obsolete falcatis secunda, summa apice flexuosa patentia, humore ascendente, rigida, integra, e basi lanceolata valde acuminata, perichætalia margine involuta, acuminibus limbum æquantibus, sursum denticulatis.

Seta terminalis, vix uncialis, capillacea. Vaginula angusta, cylindracea. Paraphyses pistillaque pauca.

Capsula erecta, angusta, brunnea. Peristomii dentes sub-32, obliqui, rigidi, opaci, scabrelli. Columella truncata, inclusa. Cætera desunt. Peristomium ex parte destructum solum vidimus. Ex caractere videtur proxima *B. domesticæ*, Brid. Bryol. univ. 1. 536. An vere differt?

GRIMMIA, HEDW.—HOOKER. BRIDEL ex parte.

1. *Grimmia flexuosa*, Griff.

Caule simplice elongato flexuoso, foliis adpressis lanceolatis acuminatis carinatis vena excurrente cuspidatis perichætialibus longe aristatis, capsula immersa oblongo-ovata, operculo breviter et recte rostrato.

Hab. Ripæ arenosæ fluminis Soorma prope Chattuc agri Sylhetensis. Ripæ Maamloo collium Khasiyanorum; rivulique Deboro prope Rangagurrah. Nuperius vidimus e collibus Aborensibus allatam.

Caules sæpius simplicissimi, filiformi-clavati, unciam vix excedentes. Folia sursum gradatim majora, integra, e base lanceolata valde acuminata. Perichætialia majora vena longius excurrente cuspidato-aristata.

Seta terminalis, brevissima.

Capsula brunnea, complete annulata. Peristomii dentes erecti, vel subconniventes, rigidi, plano-subutati, basi diaphani lineisque transversis conspicue notati, cæterum opaco-punctulati, sæpe varie perforati, lutescentes.

Sporula in acervulo ochroleuca, rotundata, lævia, immersa opaca.

Columella brevis, inclusa.

Operculum e base conica subulatum, rostro recto acuto.

Calyptra mitriformis, integra vel fissa.

2. *Grimmia ovata*, Mohr. Hook et Taylor Musc. Brit. 71. t. 13. *Drypodon ovatus*, Bridel Bryol univ. 1. 202.

Hab: Rupes et monumenta circa Moflong, ubi abundat.

Foliorum margo unus tantum recurvus.

EFRUCTIFERÆ.

3. *Grimmia*.—

Hab : Rupes rotatæ ad cataractam Moosmai, ubi dense cæspitosa.

Prostrato-dependens. Caules ramosi ; rami subsimplices, clavati. Folia siccitate adpressa, subsecunda, madida ascendentia, lanceolato-acuminata, carinata, minute denticulata, vena in mucronem brevem excurrente prædita, marginibus subincrassatis opacis, areolis oblongis laxiusculis.

Var a. Caules filiformes, foliaque minora.

Hab : Ibidem.

TREMATODON, RICH.

1. *Trematodon sabulosus*, Griff.

Caule simplice brevissimo, foliis conniventibus ovato-lanceolatis acuminatis, capsula subovata nutante apophyse clavata ecerviculata duplo brevior, operculi conico-subulati rostro curvato.

Hab : Ripæ arenosæ fluminis Burrumpootur, tractusque sabulosi huic vicini. Humida cujusque regionis Assamorum editæ, ubi frequentissimus Fructus Aprili Majoque maturi.

Caulis lineam, vix excedens.

Folia tenera, imbricata, obtusiuscula, concava, prædita vena completa crassa, integerrima, areolis conspicuis, acuminum marginibus basin versus revolutis.

Perichætialia sub 3-plo majora, conformia. Seta sicca flexuosa subtortilisque, gracilis, stramineo-nitens, linealis.

Vaginula arcta, rubra ; paraphyses pistillaque pauca.

Capsula conspicue annulata, matura sulcata, sub lente modice augente areolata. Apophysis antice struma minuta instructa.

Membrana interna adnata, sed facile solubilis.

Peristomium connivens, e dentibus 16 binatim compositis, (ciliolis irregularibus) rigidis, medio perforatis, trabeculatis, striatis rubris, apicibus pallide aurantiaceis punctulato-scabrellis.

Columella inclusa.

Sporula in acervulo lutescentia, rotundata, lævia.

Operculum e basi conica curvato-rostratum, capsula paullo brevius. Calyptra dimidiata, lævis.

Quoad characterem affinis *T. brevicolli*, Hornsch. Brid. Bryol. univ. 1. 385. a quo vix differt nisi statura minore, vena excurrente longitudine que apophysis.

2. *Trematodom longicollis*, Rich. Bridel Bryol. Univ, 1. 388.

Hab : Ripæ arenosæ fluminum Noa Dehing et Deboro regionis editæ Assamicæ. Fructus Aprili Maioque maturi.

Caulis simplex. brevis, lineas duas longitudine vix excedens.

Folia sicca flexuosa, etiam tortilia, madida subsecunda, inferiora multo breviora rectiuscula, superiora flexuosa, interdum subcrispata incurvataque, e basi lata longe subulato-acuminata, convoluto-canaliculata, integra, lutescentia, prædita vena completa ? plerumque indistincta.

F. Perichætialia maxima, convoluta, acumine limbum vix superante recto vel flexuoso, prædita vena distinctiore ; intima minora. Vaginula rubro-aurantiacea, cylindræa. Paraphyses paucæ, breves. Pistilla subnulla.

Seta longissima, sesquiunciam excedens, capillacea, straminea, sicca flexuosa apiceque parce tortilis.

Capsula immatura cylindræo-ovata, sicca sulcata, nutans. Apophysis longissima, capsulam 3-plo superans, clavata, apice subcerviculata, basi antice strumosa, arcuata. Peristomium (immaturum solum visum) præcedentis.

Operculum conico-subulatum, rostro obliquo, capsula dimidio brevius.

Calyptra dimidiata, lævis, pallide straminea.

DICRANUM, HEDW.

1 *Dicranum glaucum*, HEDW.

Hab : Sylvæ Churra Punjee et Maamloo collium Khasiyanorum. Regiones Assamorum editæ, ubi ad basin arborum frequens. Fructiferum non vidimus.

Var. A. Foliis magis deciduis.—Negrogam.

B. Foliis longioribus, magis acuminatis.

Rupes humidæ, Churra Punjee, ubi Hypni specie mixtum.

—Hypno subbasilari, Hook. proximum.

C. Foliis brevioribus et latioribus.

Negrogam versus.

D. Macrophyllum; vix non distinctum.

Churra Punjee, versusque Negrogam.

E. Marginatum; foliis siccatione ascendenti-subsecundis, dorso transverse undulatis, humore falcatis subsecundis, spiraliter dispositis, marginibus hyalinis, latis.

Negrogam versus.

Verisimiliter species distincta.

Dispositio foliorum spiralis in facie ramorum aversa valde conspicua.

2 *Dicranum cuspidatum*, Griff.

Caule mediocri simplice parceve ramoso, foliis undique patentibus e basi lanceolata acuminatissimis carinatis marginibus acuminis carinaque argute denticulatis baseos incurvis, perichætalibus basi convolutis, capsula erecta clavato-cylindræa basi strumosa.

Hab. Pineta Moflong. Duo solum specimina fructifera vidimus.

Cæspitosum; caules sæpius ramosi radiculoso villosi, ramis ascendentibus, simplicibus.

Folia siccitate falcatis subsecunda, flexuosa, humore undique patentia; inferiora fere horizontata, fragilia, seniora sæpius rupta, dense imbricata, amæne viridia.

F. Perichætalia conformia, interiora longissima, convoluta circa setam, abrupte acuminata.

Seta terminalis vel ob innovationes lateralis, crassiuscula, 3-4-linealis, viridescens, siccatione flexuosa.

Vaginula cylindræa, longa, brunnea, ore membranaceo. Paraphyses pistillaque pauca.

Capsula erecta, basi strumosa, sub-cylindræa, e basi sursum gradatim ampliata, (ore incrassato) pallide brunnea.

Membrana interna, discreta, subsessilis.

Peristomium siccum madidumve connivens; dentes rubri, profunde bipartiti, diaphani, raro irregulares, laciniis pallidis, sæpe basin versus materie mucilaginosa coalitis.

Columella filiformis, capsula paullo brevior, apice truncata.

Sporula lævia, fusco-viridia, difformia.

Operculum calyptra que non visa.

Valde affinis *D. fragili*, Hook. Musc. exot. 2 p. 10. t. 134.

3 *Dicranum scoparium*, HEDW.?

Hab. Arenosa torrentis Bogapanee.

Folia innovationum sæpius undique patentia; folia basi planiuscula sursum carinata carinis denticulatis, perichætialia intima mutica, exteriora longe cuspidato-acuminata, acumine canaliculato, apice denticulato, refracto; capsula erecta.

An ita distinctum mediumve inter *D. scoparium*, Hedw. and *undulatum*, Solrad?

4 *Dicranum subulatum*, HEDW.

Hab. Ripæ circa Moflong ubi sequente sæpius mixtum.

Folia sæpe vix falcatis secunda, sub-integerrima, siccitate flexuosa.

Capsula inclinata, subobliqua, oblongo-ovata, vacua demum fere cylindræa erecta et sulcata, annulo completo prædita.

Peristomii dentes mediocres, infra medium bipartiti, rubri, laciniis pallidis. Operculum e basi conicâ longe et oblique rostratum, capsulam æquans. Calyptra non visa.

Sporula immersa opaciuscula, globosa, sublævia, in acervulo fusco-ochroleuca.

Sequenti proximum; vix discrepans seta erecta capsulaque demum cylindræa. Affine videtur *D. longisetæ*, Hook. Musc. exot. 2. 11. t. 139.

5 *Dicranum khasiyanum*, Griff.

Caule simplice brevi, foliis falcatis subsecundis e basi lata longissime subulato-acuminatis acuminibus infra medium obsolete canaliculatis vena crassiuscula, seta flexuosa, capsula inclinata cernuave ovato-elliptica siccatione sulcata, operculo conico subulato, calyptra ventricosa lævi.

Hab: Ripæ Moflong.

Cæspitosum; folia interdum undique patentia, e basi quadrata vel oblongo-quadrata concava axi adpressa subulato-acuminatissima, integra, luteo-viridia, acumine concolori, vena solida latiuscula percursa.

F. Perichæthalia conformia.

Seta terminalis, sæpius solitaria, sicca vix tortilis, seduti madida valde flexuosa, pallida. Paraphyses paucissimæ. Pistilla 2-3.

Capsula directione varia, suberecta, inclinata, cernua vel interdum pendula, æqualis siccitate sulcata, brunnea, annulata; membrana interior adhæsens.

Peristómii dentes 16 (vidimus etiam 18,) per paria approximati (an semper?) breves, rigidi, fragiles, profunde bipartiti, basi sub lente centies augente striati, laciniis punctulato-opaciusculis; lineis transversis conspicuis.

Columella inclusa, filiformi-clavata. Sporula in acervulo ochracea. Operculum conico-subulatum capsula brevius, rostro obliquo acuto.

Sequenti affine; discrepans præsertim seta madida immutata calyptraque lævi.

Var A. majus; foliis saturatius coloratis, seta flexuosa vel suberecta.

Hab. Rupes madidiæ Churra Punjee—Dicrauum Khasiyanum subulato forsân jungeus.

6. *Dicranum (Campylopus) pinetorum*, Griff.

Caule brevissimo simplice, foliis falcatis subsecundis e basi lanceolata longissime subulato-acuminatis canaliculatis acuminum apicibus concoloribus scabrellis, seta flexuosa, capsula ovata pendula siccitate sulcata, operculo oblique rostrato, calyptra fimbriata.

Hab: Pineta prope Moflong, truncis pinorum adhærens.

Dense cæspitosum, pallide lutescenti-viride. Caules sub-3-lineales, simplices vel ob innovationes parce ramosi. Folia inferiora et præcipue caulium sterilia, (qui magis elongati) falcatis subsecunda; superiora et perichæthalia ascendentia, e basi lanceolata longissime subulato-acuminata, canaliculata, veli involuto-concava, flexuosula, apicibus minute denticulatis subtriquetris, vena latissima completa.

Perichæthalia conformia, majora, convoluta.

Seta vix bilinealis, sicca erecta flexuosa, madida decurva, pallida.

Vaginula mediocris. Paraphyses paucissimæ. Pistilla 2-3.

Capsula humore pendula, siccitate erecta, ovata, basi solida, annulata, sicca sub-8-sulcata, pallida, parietibus tenuibus. Membrana interna libera, subsessilis.

Peris tomium madore erectiusculum, siccatione inflexile, cum membrana interna facillime separabile, e dentibus 16 æqualiter approximatis ad medium circiter bipartitis, basi rubro-aurantiaceis et sub lente fortiter augente conspicue striatis, laciniis pallidis punctulatis.

Columella inclusa.

Sporula minuta, lævia, uniformia, in acervulo fusco-ochroleuca.

Operculum e basi conica oblique subulatum, thecâ paullo brevius, sæpe cum calyptra secedens, sed huic netiquam adhærens.

Calyptra dimidiata, per totam fere longitudinem fissa, basi hinc illinc breviter fissa, subinflexa et pilis simplicibus, colore calyptræ, brevibus fimbriata.*

Var. A. Villis calyptræ magis evolutis hyalinis.

Hab. Myrung, in arborum truncis.

A. D. flexuoso, cui proximum videtur, discrepat præcipue capsulis estriatis, operculoque oblique rostrato.

7. *Dicranum Didymodon*, Griff.

Caule simplice, foliis persistentibus longissimis subulato-setaceis falcatis secundis apicibus scabris, seta flexuosa, capsula cylindracea pendula, peristomii dentibus 32 per paria approximatis, operculo conico subulato obliquo, calyptra glabra.

Hab. Pineta Moflong, truncis arborum adhærens.

Dense cæspitosum, amœne virens.

Caules vix trilineales, erectiusculi, radiculis villosi, basi nudiusculi.

* NOTE. —Bridel makes no mention of an annulus in his *Campylopus flexuosus*, but in his character of the genus, he says, "theca exannulata." C. concolor, *Dicranum concolor* of Dr. Hooker, he however describes as being annulate.

Folia infima minora, ascendentia, reliqua falcatis secunda, e basi lanceolata subulato-acuminatissima, concavo-canaliculata integra, percursa vena lata excurrente? acuminum apicibus subtriquetis obsolete denticulatis.

Perichætialia conformia. Seta ob innovationes lateralis, pallida, sicca tortilis et flexuosa, raro geniculatim deflexa.

Vaginula cylindracea. Paraphyses pistillaque paucissima.

Capsula paullulum obliqua, utrinque attenuata, exannulata, sicca sæpius erecta.

Peristomii dentes 32, setacei, per paria approximati et infra medium trabeculis conspicue juncti, ibidem striati, cæterum punctulato-scabrelli, rubri apicibus pallidis, (omnino fere ut *Didymodon* purpureo.)

Sporula lutescens, globosa, lævia, minuta, immersa hyalina.

Columella inclusa, truncata.

Operculum capsula duplo brevius. Calyptra dimidiata.

Omnia *Dicrani*, dentibus peristomii exceptis. Proximum *D. pinctorum*, a quo facile distinguitur calyptra glabra peristomioque.

Proximum videtur *Didymodonti longirostri*, Schwägr.—*Brid.* *Bryol. univ.* 1.512, a quo differt foliis persistentibus conspicue secundis non fragilibus, operculoque capsula duplo brevior.

Var? A. Caules elongati, hinc illinc ramosi, ramique apicem versus nudi incrassati, apicibus imis foliosis, partibus nudatis cicatricibus foliorum lapsis semi-annularibus notatis.

Invenimus efructiferum in sylvis Myrung.

8. *Dicranum (Campylopus) ericoïdes*, Griff.

Caule subsimplice apice prolifero, foliis rigidiusculis strictis ascendentibus e basi anguste lanceolata subulato-canaliculatis acuminatissimis perichætialibus longe aristatis apicem versus scabris semi-diaphanis, setis aggregatis flexuosis, capsula pendula subobovata basi obsolete strumosa siccitate profunde sulcata, operculi rostro obliquo, calyptra fimbriata.

Hab. Sylvæ Myrung.

Terrestre, cæspitosum, amæne-viridescens.

Caulis primarius terra sepultus, brevis simplex, foliis rigidis atroviridibus undique patentissimis, summis patienti-ascendentibus obsitus, apice prolifer. Caulis novellus fructifer conformis lineas tres vix excedens.

Folia siccatione adpressa, humore patienti-ascendentia, integra, acuminibus flexuosis, apice denticulato-scabris, subdiaphanis.

F. Perichætialia basi ampliata, membranacea concava, longius acuminata, et quasi aristata, arista subdiaphana apicem versus scabra.

Setæ aggregatæ, 1-3 sæpius 2, pallidæ vix semunciales, siccæ fere semper geniculatim deflexæ, calyptræ apice nempe foliis perichætialibus ope filamentorum confervoideorum firme adhærente, demum eruptæ erectæ flexuosæ, humore decurvæ.*

Vaginula cylindræa, angusta. Pistilla pauca, stylis longis Paraphyses subnullæ.

Capsula siccitate erecta, inclinata, subæqualis, dorso nempe convexior, lutescens ore rubro, humore lævis, annulata. Membrana interna discreta.

Sporula immersa hyalina, globosa, lævia, in acervulo sordide ochroleuca.

Peristomii dentes 16, ad medium vix bipartiti, pulchre rubri, laciniis albidis.

Operculum fere prioris, cum calyptræ apice arcte cohærens semperque hoc pileatum.

Calyptra profunde dimidiata, basi villis hyalinis pulchre fimbriata, apice semper lacera.

Præcedenti proximum, sed ob foliorum directionem, setas aggregatas, capsulam sub-obliquam que operculum cum calyptra cohærens sat distinctum.

A D. introflexo distinguitur præsertim foliorum apicibus nunquam hyalinis.

* NOTE.—Although the Setæ are aggregate, yet in this as well as in *D. ericoides* no more than the usual number of pistilla can be said to be fecundated, as from each seta being surrounded by a perichætium, it is obvious that each belongs to a distinct female flower. The case is different in some other instances of aggregation of setæ, in which, as in some *Brya*, it arises from the development of more than one pistillum of one flower.

9. *Dicranum (Campylopus) exasperatum*, Griff. *Campylopus exasperatus*. Brid. Bryol. Univ. 1, p. 473.

Hab : Rupes apricæ Churra Punjee.

Descriptio Bridelii loc. cit. plantæ nostræ apte fere convenit ; hujus vers folia perichætialia pilo albo non termina a seta que apicem versus solum tantum scabrella.

Capsula annulata. Membrana interna discreta, breviter stipitata.

Peristomium pallide rubrum, e dentibus 16, vel per paria longitudine tota approximatis peristomium que 8-dentatum mentientibus, setaceis, opaciosirius, vel ad medium usque bipartitis, vel, ciliolis plus minus cohærentibus, solidis obsolete ve per foratis,—obliquuscule in spiram dispositis.

Columella inclusa, clavata, apice truncata.

Sporula in acervulo fusco-lutescentia, minuta, uniformia, lævia.

Operculum conico-subulatum, capsula vix triplo brevius, rubro-aurantiacum, rostro obliquo acuto cum apice calyptræ arctissime cohærente semperque hoc pileato.

Calyptra dimidiata, basi fimbriata, sæpe (villis deciduis ?) subglabra.

Flores fæminei aggregati, terminales, peripherici axillares ? cincti foliis perichætialibus arcte convolutis, apicibus patulis.

Paraphyses subnullæ. Pistilla 2-5, stylis longissimis in sinu folii perichætialis intimi convoluti obtecta.*

DICRANA ? EFRUCTIFERA.

10. *Dicranum?* Hab : Pini truncus, Nunklow. Proximum *D. exasperato*, discrepans statura majore, foliis distantibus, summis solum arcte imbricatis, magis convolutis, acuminum apicibus denticulato-scabris.

Muscus pulcher, dense cæspitosus, læte luteo-nitens.

11. *Dicranum?* Hab : Rupes husridæ, Churra Punjee, ubi rarum sæpius que aliorum muscorum comes.

* NOTE.—In the Musc. Britt. of Drs. Hooker and Taylor, page 92, it is said, that *Dicranum glaucum* has the nerveless reticulated leaves of a *Sphagnum*. This is not the case in the Indian specimens, so far at least as regards the reticulation, which is, I believe confined to *Sphagnum*.

Caules elongati, simplices, vel innovationibus parce ramosi. Folia inferiora secunda; brunnea summa vel novella patenti-ascendentia, luteo-nitens, e basi anguste lanceolata subulato-acuminatissima, convoluto-canaliculata, integra, rigida, stricta, demum fragilia, acuminum opacorum apicibus diaphanis denticulatis vel scabrellis, rectiusculis, vel semel abrupte geniculatis, vena latiuscula indistincta.

An *D. introflexum*, Hedw? sed folia seniora certe secunda, Habitu propinquum *D. exasperato* sed præ aliis *D. scopario* et *ericoïdi*.

12. *Dicranum?* Hab: Rupes humidæ, Surureem.

Cæspitosum, luteo-nitens. Caules elongati, apice interdum proli-feri, simplices parceve ramosi, unciales vel biunciales, per totam longitudinem radiculoso-villosi.

Folia distantia, sicca madidave falcatis secunda, e basi-lanceolata longissime subulato-acuminata, convoluto-canaliculata, integra, acuminibus sursum quasi aristatis, aristâ minute scabrella concolore laminam subæquante, vena angusta indistincta.

An *D. concolor*. Hook. Musc. exot. 2 p. 10 t. 138? sed vena angusta, foliaque valde convoluto-concava.

13. *Dicranum?* Hab: Rupes torrenti "Burtapanee" collium Khasiyanorum vicinæ.

Cæspitosum, amâne virens. Caules subunciales, simplices vel rarius apice innovationibus ramosi, basi decumbentes, denudati, apice decurvati.

Folia semper falcatis secunda, tenera, e basi latiuscule lanceolatâ acuminatissima, concavo-carinata, integra, marginibus leviter involutis, apicibus acuminum opacissimis teretibus scabrellis denticulatisve, prædita venâ angusta, inferne valde striata, infra apicem indistincta.

Aspectu præsertim siccoteneritate structuraque foliorum affine *D. cuspidato*. Species præsertim siceæ teneritate structuraque foliorum *D. cuspidato* affines.

FISSIDENS. HEDW.

1. *Fissidens bryoides*. Hedw.

Var. A. Lamellarum margines tantum hyalini.

Hab: In ripis prope Jumalpore, Bengalæ inferioris.

B. Folia dense imbricata, obtusiuscula, rubro-tincta, vena sæpius intra apicem evanida, lamellæ obsolete marginatæ, capsula inclinata.

Hab : In arbore lapsa ad ripas fluminis, Noa Dihing copiose.

C. *F. tamarindifolius*. Brid. Bryol. Univ. 2, 684 ?

Folia læte viridia elongata, lamellarum margines sæpius conspicue fibrosis.

Specimina 2, 3, inveni mixta cum muscis aliis e Mumbree.

D. *arboreus*.

Hab : In arboribus Moflong : parcissime.

Habitus D. bryoidis, minimus. Caules sæpius ramosis. Foliorum margines simplices : seta lateralis terminalisve, brevis, folia perichætialia caulinis similia paullo excedens.

Capsula erecta urceolato-ovata.

Verisimiliter species distincta. seb ob materies mancas huic adjeci.*

2. *Fissidens longisetus*, Griff.

Caule simplici elongato, foliis lineari-scalpelliformibus integerimis marginatis perichætialibus subsimilibus, seta laterali caulem subæquante, capsula inclinata cernuave oblongo-ovata.

Hab : In ripis Mumbree, mixtum cum *F. tamarindifolio*.

Caules semunciales, cum foliis ambitu lineares. Folia valde acuta, amœne viridia, percursa vena medium supra flexuosa in mecronem excurrente.

Seta filiformis pallida, siccatione tortilis, caulem æquans vel excedens, in plantis novellis caule lineali præditis etiam longissima.

Capsula interdum urceolato-ovata, basi solida, pallida, ore brunneo. Peristomii dentes ultra medium bipartiti, crebre trabeculati, rubri, laciniis setaceis, pallidis, punctulatis.

Operculum e basi subhemisphærica breviter et oblique rostratum, capsula brevius.

Calyptra breviter fissa.

* NOTE.—In referring the above to *F. bryoides*, my European specimens of which have a very distinct margin to the leaves, I have been guided by a remark of Dr. Hooker, (see Hook et Tayl. *Musc. Britt.* p 89,) from which it appears that though a general, it is not a universal character.

Proximus *F. bryoide* a quo differt tantum (an satis?) setis lateralibus elongatis. *A. F. adiantoide* statura minore, foliis integerrimis, perichæcialibus caulinis subsimilibus, operculique rostro brevi discrepat.

3. *F. Jungermannioides*, Griff.

Caule repente ramosissimo, foliis insigniter falcatis—secundi scalpelliformibus marginibus incrassatis subintegerrimis perichæcialibus similibus, seta terminali leviter arcuata, capsuli cernua urceolato-ovata, calyptra conico-subulata.

Hab. In rupibus madidis Moosmai.

Dense cæspitosus, luride viridis. Rami semunciales, ascendentes.

Folia præsertim sicca falcatis secunda, acutiuscula, percursa vena crassa in apiculum mucroniformem excurrente, marginibus valde incrassatis, (lamellarum exceptis qui simplices!) areolis subconspicuis rotundatis quadratisve diaphanis.

Flos femineus gemmiformis, paraphysibus fere orbata. Pistilla plura.

Seta suberecta, vel siccitate arcuata, vix bilinealis, pallide fusca.

Vaginula mediocris. Capsula æqualis, pallide fusco-brunnea.

Membrana interna cohærens. Peristomium pulchre coccineo rubrum, dentes medium infra bipartiti, trabeculati, laciniis pallidis punctulato-opacis. Columella cylindræa, brevis, inclusa.

Operculum e basi conica sub-oblique rostratum, capsula paullo brevius. Calyptra conico subulata, hinc breviter fissa, basi denticulata, diu persistens.

Distinguitur a *F. bryoide* caule ramosissimo, foliorumque marginibus incrassatis opacis.

4. *Fissidens neckeroide*s, Griff.

Caule repente ramoso, ramis erectis, foliis lineari-scalpelliformibus subfalcatis marginibus subincrassatis apice denticulatis, perichæcialibus convolutis, setis (pluribus) lateralibus foliis brevioribus, capsula ovata erecta, peristomii dentibus per paria approximatis indivisis perforatis.

Hab : In arbore semidestructa inter Moleem et Surureem.

Dense cæspitosus. Caules radiculis villosi, rami ascendentes, sæpius simplices vix unciales, complanati, apicibus subdeclinati.

Folia leviter falcata, præsertim superiora secunda, obsolete repanda, marginibus irregulariter et præsertim apicem versus denticulatis, vena in mucronem excurrente prædita, inconspicue areolata. F. perichætalia convoluta, ensiformi-cuspidata, evanidivenia.

Setæ axillares, vix bilineales, curvatæ, pallidæ. Vaginula brevis subcylindræa. Paraphyses nullæ. Pistilla plura.

Capsula æqualis, ovata vel oblongo ovata, basi solida, fusco-viridis sub lentem areolis oblongis inconspicue notata.

Peristomium e dentibus 16, madore conniventibus perparia subapproximatis, conspicue trabeculatis, basi pulchre rubris cæterum albidis, ciliolis inæqualibus, sursum hyalinis, per totam longitudinem et præcipue apices versus mediantibus trabeculis cohærentilres, ideoque dentes indivisi et crebre perforati videntur.

Sporula magna, in acervulo fusco-viridia, aliis minutis immixta, ideoque difformia, immersa globosa, opaciuscula, sublævia.

Columella cylindræa, inclusa, apice subcyathiformis.

Operculum e basi convexâ oblique rostratum, capsula subduplo brevius.

Calyptra dimidiata lævis, apice fusca, basi irregulariter fissa, marginibus leviter inflexis.

Species distinctissima prope *D. adiantoidem* locanda, habitu *Neckeræ* peristomioque *didymodontis* gaudens.

5. *Fissidens nobilis*, Griff.

Caule simplici, foliis lineari-scalpelliformibus basi decurrentibus marginibus incrassatis serrulatis setis lateralibus, folia excedentibus, capsula ovato—oblonga nutante, operculo longe et oblique rostrato.

Hab: In rupibus arenosis sylvarum umbrosarum Mumbree; etiam in ripis Agri Muttock dicti.

Aggregatus. Caules ascendentes, longitudine a semuncia ad uncias duas vel ultra metientes, cum foliis ambitu lineari—spa-

thulatis. Folia maxima, longitudine $3\cdot3\frac{1}{2}$ linealia, latitudine sublineales, ensiformia, acuminata; marginibus conspicue incrassatis opacis denticulatis præsertim apices versus; vena crassa flexuosa in mucronem excurrente percursa; areolis inconspicuis.

Flores fæminei gemmiformes, numero indefiniti, sæpius plures cuique cauli, axillares, his apices caulium versus tantum evolutis (an semper?) in sinibus foliorum fulcientium reconditi, cinct foliis perichætialibus caulinis subsimilibus. Paraphyses nullæ vel paucissimæ; pistilla plura.

Seta pallida, apice paullo incrassata, subsemuncialis.

Capsula subinæqualis, dorso paullo convexior, ore obliquisculo dilatato, fusco-brunnea, sicca sæpe erecta. Membrana interna cohærens, stipite crasso insidens.

Peristomii dentes madore apicibus tantum inflexi, rubro-coccinei, pulchre trabeculati, ad medium circiter bipartiti, sub lentem centies augmentem leniter striati, ciliolis inæqualibus apicibus paullo pallidioribus.

Sporula inæqualia, immersa rotundata, lævia, diaphana.

Operculum e basi conico-hemisphærica longe et oblique rostratum, capsulam æquans vel paullo excedens, pallide rubro-brunneum.

Calyptra dimidiata, lævis, integra vel basi aliquoties fissa.

Species perpulchra sequenti valde affinis.

6. *Fissidens areolatus*, Griff.

Caule simplici, foliis ligulato-scalpelliformibus apice rotundatis marginibus simplicibus integerrimis perichætialibus conformibus, seta laterali curvata, capsula nutante ovato-oblonga, operculo subcampanulato rectiuscule rostrato.

Hab: In rupibus madidis umbrosis Mumbree.

Uncialis, vel sæpe digitalis; caules ascendentes. Folia longitudine sub-bilinealia, latitudine $\frac{1}{2}$ linealia, percursa vena infra mucronulum brevem evanida, diaphana, areolis pro genere maximis rotundatis vel angulatis. Seta plerumque singula cuique cauli. Capsula etc præcedentis sed minor.

Species formosa, præcedenti affinissima, discrepans præsertim

foliis apice rotundatis, marginibus simplicibus integerrimis et areolis conspicuis. Operculum etiam paululum forma differt.

7. *Fissidens sylvaticus*, Griff.

Caule simplici, foliis lineari-scalpelliformibus subintegerrimis marginibus simplicibus perichætalibus intimis subsimilibus, seta basilari caule duplo longiori, capsula cernua vel nutante ovato-oblonga, operculo longe recteque rostrato, calyptra subulata.

Hab. In ripis sylvarum Mumbree.

Caules ascendentes, bi-tri-lineales, basi interdum innovantes.

Folia sub-8-juga, acuta, integra, vena in mucronem excurrenti prædita, inconspicue areolata. F. perichætalia, uti in omnibus aliis setis lateralibus vel basilaribus gaudentibus, diversiformia, exteriora convoluta fere mutica, interiora basi convoluta, cuspidate ensiformi prædita, ideoque foliis caulinis subsimilia.

Seta erecta, solitaria necne, pallida, caulem duplo triplove superans, apice incrassata. Vaginula brevis. Paraphyses subnullæ. Pistilla plura.

Capsula paullo inæqualis, dorso convexior, ore lato, collo constrictiusculo. Membrana interna fere omnino libera, breviter stipitata.

Peristomium madore arcte inflexile, rubro-coccineum, dentes profunde bipartiti, ciliolis inæqualibus, asperulis.

Columella brevis inclusa, cylindræa, apice truncata.

Sporula fusco-brunnescentia, minuta, lævia.

Operculum e basi convexa longe recteque subulatum, capsulæ longitudine.

Calyptra subulata, rectiuscula, basi in unico exemplo maturato viso integerrima!

An satis distinctus a *D. taxifolio*?

8. *F. taxifolius*, Hedw.

Ad marginem sylvæ Mumbree.

Var: A. Calyptra longissime subulata, demum breviter subdimidiata, apice curvata, stylo apiculata.

Hab: In terram Mumbree.

EFRUCTIFERI.

9. *Fissidens.*

Hab : In rupibus rorantibus, Moflong.

Caules repentes ramosi. Rami subunciatis, ascendentes.

Folia leviter falcata, subsecunda, lineari scalpelliformia, obtusa, omnino mutica, inconspicue areolata, marginibus simplicibus integerrimis, vena intra apicem evanida.

Habitus F. areolati et nobilis, quibus ob ramificationem verisimiliter affinis. Prope F. jungermannioidem locandus. ?

10. *Fissidens.*

Hab : In arboribus prope speluncas Moosmai.

Caules longissimi, repentes, ramosi. Rami subascendentes, fusco-lutei.

Folia arctissime disticha, seniores brunnescentia plus minus disticha, scalpelliformia, acuta, percursa vena solida sursum flexuosa intra apicem evanida, marginibus simplicibus subintegris apicem versus minutissime serruatis, areolis inconspicuis.

Habitus fere Neckeræ. An affinis F. adiantoidi. ?

DIDYMODON, HEDW. HOOK.—TRICHOSTOMUM, BRID. ;
expte.

1. *Didymodon pomiforme*, Griff.

Caule simplice, foliis lanceolato-acuminatis carinatis integris perichætalibus acuminatissimis, capsula erecta ovato-globosa, operculo oblique rostrato capsulam æquante.

Hab.: Ripæ. Myrung.

Caules erecti, filiformes, alteri simplices apice discoideo-gemmi-formes graciliores, alteri innovationibus ramosi setigeri.

Folia siccatione falcatis subsecunda, humore sæpius ascendunt, anguste lanceolata, prædita intra apicem vena crassa evanida, areolis fusiformi-angulatis majusculis.

Perichætalia majora, lineari-lanceolata, vena breviter excurrente, sæpe subsecunda.

Vaginula mediocris. Paraphyses paucae, breves. Pistilla pauca.

Seta terminalis vel ob innovationes lateralis, viridescens, sicca tortilis.

Capsula erecta, ovato-globosa, saturate brunnea, annulo completo praedita.

Peristomium e dentibus 16 ? brevibus plano-subulatis, setaceis, irregularibus, basin versus hinc illinc irregulariter nexis et varie perforatis, scabrellis, apicibus, opacis.

Sporula globosa, in acervulo ochroleuca.

Columella inclusa.

Operculum e basi convexiuscula longe et oblique rostratum, capsula saepe paullo longius.

Calyptra dimidiata, laevis.

Peristomium magis Trichostomi.

Adsunt in axillis foliorum superiorum caulium apice discolorum massae levissimo tactu separabiles, irregulares, ovatae vel ovato-fusiformes, celluloso-areolatae, continentes granulas mobiles difformes.

Var. A. Caules magis elongati; peristomium fugacius.

Hab : Rupes ripaeque Maamloo.

Var. B. Minimus, vix triinealis; capsula suburceolata, castaneo-brunnea, peristomii dentibus per paria approximatis, lutescentifuscis, apice hyalinis.

Hab : Myrung.

2. *Didymodon squarrosus*, Hook. *Musc. exot.* 10. t. 150.

Trichostomum squarrosum, Brid. *Bryol. Univ.* 1. 498.

Hab : Aërborea pinetorum Moflong, ubi rarus.

Caules interdum simplices. Foliorum margines a medio deorsum recurvi.

Capsula exannulata. Peristomii dentes breviusculi, e ciliolis setaceis, articulatis, vel arcte cohaerentibus, vel ope substantiae aspectu gelatinosae semiopacae annexis.

Operculum capsula duplo fere brevius.

Figura Hookeriana citata articulationes dentium non ostendit lineaque junctionis nimis regularis videtur.

3. *Didymodon longifolius*, Griff.

Caule simplice flexuoso, foliis patentissimis squarrosis lanceolato-linearibus carinatis subintegerrimis, capsula cylindracea, peristomii dentibus sedecim, operculo longe subulato.

Hab : Ripæ Suroreem.

Caulis vix semuncialis. Folia siccitate marginibus involuta, tortilia, humore patentissima vel patienti-recurva, superiora ascendenti-patientia, raro subsecunda, e basi anguste lanceolatâ linearia, longa, concavo-carinata, sub lente fortiter augente minutissime crenulata, percursa vena in apiculo diaphano brevi subexcurrente ; areolis minutis quadratis.

F. Perichætialia conformia, majora, ascendencia.

Seta terminalis, capillacea, siccitate spiraliter torta, vix 8 linealis.

Vaginula cylindracea, angusta. Paraphyses paucae. Pistilla plura, stylis longis.

Capsula anguste cylindracea, brunnea, sicca irregulariter sulcata ; os incrassatum, rubro-coccineum.

Peristomium siccum erectum, madidum, connivens, e dentibus 16, brevibus setaceis subinæqualibus, simplicibus perparia (sæpe obsolete) infra medium ope trabecularum irregulariter nexis, subdiaphanis, transversim, obsolete lineatis, irregulariter marginatis, aurantiaco-rufis compositum.

Sporula rotundata, lævia, in acervulo, fusco-lutescentia, immersa hyalina immixta corpusculis aliquoties majoribus rotundatis opacis.

Columella truncata, filiformis, inclusa. Operculum e basi brevi conica longe recteque subulatum, capsula dimidio brevius.

Calyptra dimidiata, parte fissa semel torta.

D. squarroso, Hook. propinquius, discrepans caule simplici, foliis angustioribus integris, dentiumque peristomii numero.

4. *Didymodon perichætialis*, Griff.

Cuale elongato ramoso, foliis patentissimis lanceolato-linearibus carinatis acutis marginibus incrassatis integerrimis, perichætialibus interioribus circa setam convolutis longissime subulato-

acuminatis, capsula inclinata subcylindræa, operculo longe et oblique rostrato.

Hab : Rupes arboresque Myrung et Nunklow.

Caulis repens. Rami ascendentes.

Folia siccitate tortilia, margine involuta, humore patentissima vel patienti-recurva, e basi lanceolata longe linearia, percursa venacra in mucronem brevem excurrente, areolis minutissimis opacis punctiformibus.

Perichætialia solidisena, exteriora caulinis consimilia, superiora longissime circa setam convoluta, intima setam sæpe superantia, acuminibus plano-subulatis cirrhosis, sæpe spiraliter tortis, reflexis vel patentibus.

Seta ob innovationes lateralis, vix uncialis, pallida, sicca torta.

Vaginula longissima, anguste cylindræa. Paraphyses plures breves. Pistilla pauca.

Capsula rarius erecta, inæquilateralis, cylindræo-ovata, utrinque attenuata, exannulata, fusco-brunnea, sicca sæparcuata.

Membrana interna libera.

Peristomii dentes per paria obsolete approximati, profunde bipartiti, (raro tripartiti), laciniis discretis vel hic illi, nexis, vel omnino cohærentibus, pallide rubri, apicibus albidis opacopunctulatis, lineis longitudinalibus indistinctis.

Sporula fusco-ochroleuca, subrotundata, lævia, majuscula, immersa hyalina.

Columella inclusa, miniata.

Operculum capsula $\frac{1}{3}$ bre vius.

Calyptra magna, capsula langior, dimidiata, caduca.

Habitus quodammodo Barbularum ramosarum.

Hæc species, cum *D. squarroso* et *longifolio*, *Trichostomo Bridelii* pertinet.

FUNARIA, HEDW.

1. *Funaria hygrometrica*, Hedw.

Hab : Colles Khasiyani, ad Maamloo et Moflong.

Statura magnopere variat.

2. *Funaria leptopoda*, Griff.

Caule simplice; foliis lineari oblongis carinatis incurvis flexuosis integris, vena completa seta, elongata recta, capsula sulcata elongato-pyriformi, operculo convexo.

Hab: Sylvæ, Myrung.

Omnia præcedentis, saltem quoad plantam Khasiyanam, sed folia humore siccitateve incurvata, flexuosa, carinata, longiora, seta longissima, 2-2½ uncialis, recta, peristomii interioris ciliis basi altius connatis, operculoque medio vix depresso.

An vere distincta species? an *F. calvescens*? sed folia nunquam plena?

BARTRAMIA, HEDW.

1. *Bartramia fontana*, Suz. var β *marchica*, Hooker et Taylor *Musc. Brit.* p. 147. t. 23. *Philonotis marchica*, Brid. *Bryol. Univ.* 2. p. 23.

Hab: Arenosa, Bogapanee.

2. *Bartramia sabulosa*, Griff.

Caule fasciculatim ramoso, ramis cylindraceis, foliis adpressis e basi lanceolata acuminatissimis minute serrulatis vena in subulam longam denticulatam excurrente, capsula subglobosa inclinata sulcata, operculo convexiusculo.

Hab: Ripæ arenosæ rivuli Maamloo agri singfoensis, et Deboro ad Kusoodoo et Rangagurrah.

Caules suberecti. Rami extrorsum curvati, interdum secundi.

Folia arcte adpressa, ramulorum novellorum siccitate sæpe ascendentipatentia, interdum subsecunda, perichætialia longius subulata, marginibus recurvis.

Seta subuncialis vel ultra.

Capsula inæquilateralis, maturata brunnea profunde sulcata, ore obliquo paullo constricto.

Peristomium exterius humore connivens; dentes plano-subulati, trabeculati, plerumque simplices, aliquando vestigia compositionis hic illic ostendentes, rufo-brunnei.

Interioris membrana lutescens, sedecies plicata, solida vel inter plicas minute perforata; cilia profunde bipartita, segmentis interdum apice cohærentibus, interdum divergentibus, sinubus (plicis alternantibus) nudis vel ciliola minuta gerentibus. Sporula sordide lutescentia, reniformia, vel oblonga, sublævia, immersa opaca.

Columella brevis inclusa.

Operculum convexiusculum centro depressum.

Var. æ. Statura multoties minor, folia patienti-ascendentia longiora, sæpe subsecunda.

Hab: In ripis Nunklow. Brid. B. ithyphylœ, fere omnino convenit.

Præcedenti nimis affinis; differt tantum foliis magis planis et adpressis, angustioribus, vena in subulam longe excurrente-operculo convexiusculo (nec conico) peristomiisque magis evolutis.

3. *Bartramia speciosa*, Griff.

Caule vage et fasciculatim ramoso, foliis patentibus lanceolato, acuminatis minutissime serrulatis vena agicem attingente, seta longiuscula, capsula inclinata ovato-rotundata sulcata.

Hab: In collibus Aborendibus in ripis arenosis.

Caules dense radiculoso-villosi, steriles sæpe simplices; rami inferiores vagi, superiores dense fasciculati et fastigiati. Folia laxiuscule imbricata, sicca patienti ascendente striata, madida patientia sublævia, interdum horizontalia, concaviuscula, sublente modice aut gente minutissime serrulata, vena tenui completa percursa, marginibus infra medium plus minus recurvis. Perichætalia subconformia, minora. Vaginula mediocris. Paraphyses paucae. Pistilla plura.

Seta subterminalis, vix uncialis, recta, crassa, rubra.

Capsula madida leviter sulcata, sicca crebre sulcato-striata, fere horizontalis, rubro-brunnea.

Membrana interna libera.

Perietonii exterioris dentes lati, brunneo rubri, lineis transversis hic illic lineolis singulis binis vel ternis longitudinaliter connexis crebre et conspicue notati, intus trabeculati.

Interioris membrana lutescens sedecies plicata, ciliis profundibipartitis, segmentis acuminatis sæpius convergentibus, ciliis irregularibus, sæpius binatim compositis liberis vel ciliis adhærentibus interjectis.

Sporula sordide lutescentia, subreniformia, sublente fortiter augente minutissime scabrella, immersa opaca.

Columella inclusa, magna, trigona.

Operculum et calyptra desiderata.

Proxima videtur, *B. tomentosæ*, Hook Musc. exot. p. 15. t. 19.

(To be continued.)

The wild Sheep of Afghanistan—“Koh-i-poombur” of the Afghauns.—Bearded Sheep of Pennant? by Capt. THOS. HUTTON, Bengal Army.

OVIS CYCLOCEROS, Nobis. Plate xix.

Among the many novel and beautiful forms which the late campaign in Afghanistan has presented to our notice in the Zoology of that country, by no means the least curious and worthy of attention is the wild Sheep, which forms the subject of the present paper.

It is now long since Pennant recorded the existence of an animal, which he but imperfectly described, and to which he applied the name of the “Bearded Sheep.”

Subsequent authors were unable to determine this species, until an animal was discovered at Cairo, by the eminent naturalists attached to the French expedition into Egypt, which was described by M. G. St. Hilaire under the title of the “Ruffled Mouflon,” (*Ovis ornata*).

This animal Messrs. Cuvier and Desmarest have considered identical with Pennant’s “Bearded Sheep,” and accordingly the two are now blended, and stand in our systems as the “Bearded Argali,” or “*Ovis tragelaphus*.”