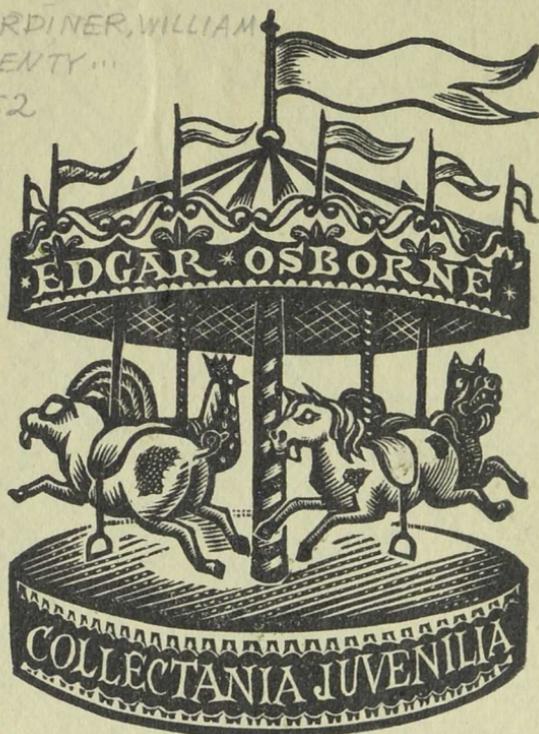


TWENTY LESSONS
ON
BRITISH MOSSES

FOURTH EDITION

3/6

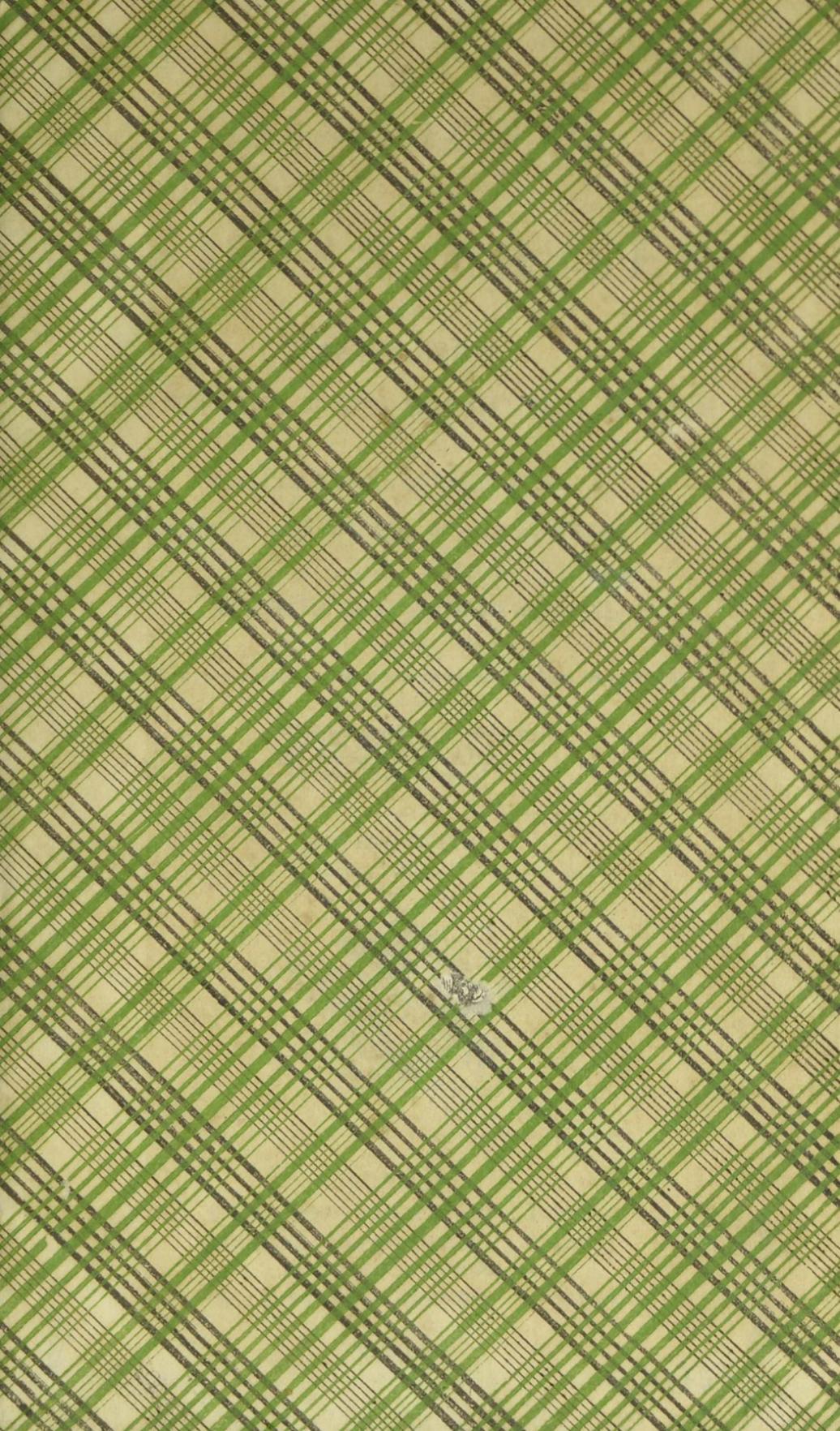
N^s
GARDINER, WILLIAM
TWENTY ...
1852



3713/009563 198

I, 200

This book forms part of
The Osborne Collection of Children's Books
presented to the Toronto Public Libraries by
Edgar Osborne
in memory of his wife
MABEL OSBORNE



TWENTY LESSONS
ON
BRITISH MOSSES;

OR
FIRST STEPS
TO A KNOWLEDGE OF THAT BEAUTIFUL TRIBE OF PLANTS.

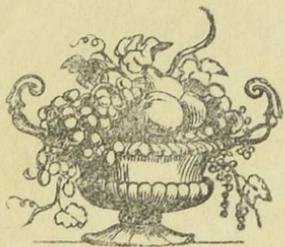
BY
WILLIAM GARDINER, A.L.S., A.B.S.E., &c.,
AUTHOR OF THE "FLORA OF FORFARSHIRE," &c.

ILLUSTRATED WITH TWENTY-FIVE SPECIMENS.

"O, Lord! how manifold are Thy works! in wisdom hast Thou made them all."

"Thou who hast given me eyes to see
And love this sight so fair,
Give me a heart to find out Thee,
And read Thee everywhere."

FOURTH EDITION.



LONDON :
LONGMAN, BROWN, GREEN, AND LONGMANS ; ACKERMANN & CO.
EDINBURGH : DAVID MATHERS ; J. MENZIES ;
EDMONSTON AND DOUGLAS.
DUNDEE : F. SHAW ; W. MIDDLETON ; J. CHALMERS.

MDCCCLII.

Dedicated,

WITH THE MOST PROFOUND FEELINGS
OF GRATITUDE AND RESPECT,
TO ALL THE KIND AND GENEROUS FRIENDS
WHO HAVE AIDED THE AUTHOR IN HIS LATE ILLNESS,
AND NOW ENABLED HIM
AGAIN TO ENTER INTO THEIR SERVICE.

PREFACE

TO THE FOURTH EDITION.



IN preparing this little book, the author's object has been, to convey to the young, in a simple and attractive manner, some knowledge of a minute, though very beautiful and interesting portion of Nature's works, calculated to open up to them an ample source of innocent and rational amusement, as well as to awaken in their minds feelings of true piety, and a thirst for that kind of knowledge which enlarges and purifies the heart.

Were the youthful mind more generally directed to natural objects, and to the wonderful operations continually going on around us, and taught to seek for entertainment and instruction in them, rather than in matters of a frivolous or vicious tendency, it is impossible to say to what extent this might be conducive to the future advancement and well-being of human society.

This love of the beautiful has a refining influence, and has no doubt been implanted in us by the wise Creator for an important end. Its growth should therefore be encouraged, especially in the youthful mind, where it may have the tendency to check the progress of those noxious weeds that are

too apt to spring up and flourish in a soil where their absence would be a blessing.

The idea of illustrating the subject with real specimens, instead of engravings, is not a new one ; but it must be allowed to be more effective ; for the works of Nature are always superior to the imitations of art, and the eye can more readily recognize a plant in the growing state by this means, than by the most careful delineations of the pencil.

Should this small unpretending volume be the means of exciting and encouraging in the minds of those who may become its readers, a love for the delightful works of the Creator, and afford them that true pleasure which such love naturally produces, its aim will be fully accomplished.

Three editions have already met with a cordial reception, and the fourth one has long been called for ; but, in consequence of circumstances over which the author had no control, its publication has been delayed till now. He hopes, however, that it will meet with as hearty a welcome as its predecessors.

TWENTY LESSONS
ON
BRITISH MOSSES.

LESSON I.

INTRODUCTION.

MY DEAR YOUNG READERS,

You have doubtless, in some of your rural walks, noticed the little mosses, that, in the beautiful woods, cover the ground with a fresh green carpet, and adorn the tops of old walls with their lovely verdure. But, perhaps, you have not examined them attentively, nor are aware that there are so many kinds of them, all differing from one another in the structure of their various parts. It shall be my object in these lessons to lead you to a better acquaintance with them.

Possibly you may have often passed them by with little more than a headless glance,—thinking, that, because there were plenty of bright-coloured flowers and stately trees around to delight your eye, the humble moss was scarcely worth your attention. Because things are small or humble, however, they should not be treated with contempt nor carelessness. God made the little moss as well as the glowing flower and lofty tree, and he has made nothing in vain. We may not know all the uses for which such tiny things were created, but we know some of them. We love what is beautiful, for God has implanted in our minds that love; and in the structure of the mosses, as well as in that of many others of his smallest works, there is a very great deal of beauty. We

love them, therefore, because it is natural for us to love what is beautiful. This love yields us true pleasure, which constitutes our earthly happiness, and ought to awaken our gratitude to the benevolent Creator, who hath so kindly provided for our purer gratifications ?

Mosses are found in all parts of the world ; and in Britain alone, there are about 400 different kinds. Their places of growth are as varied as their forms. Some are found in the deepest valleys, by the sides of lonely streams, or within the spray-clouds of roaring waterfalls ; others brave the tempests of lofty mountain-summits, or seek shelter among their shelving rocks ; many court the shade of the forest, or nestle about the roots of the hedge-rows ; whilst various species seek the open fields or the sunny wall-tops, or have their homes in the deep morass, or dwell on the sandy shores of the mighty ocean.

O ! let us love the silken moss
 That clothes the time-worn wall ;
 For great its Mighty Author is,
 Although the plant be small.
 The God that made the glorious sun
 That shines so clear and bright,
 And silver moon and sparkling stars,
 That gem the brow of night—
 Did also give the sweet green moss
 Its little form so fair ;
 And, though so tiny all its parts,
 Is not beneath His care.
 When wandering in the fragrant wood,
 Where pale primroses spring,
 To hear the tender ring-dove coo,
 And happy small birds sing,
 We tread a fresh and downy floor,
 By soft green mosses made ;
 And, when we rest by woodland stream,
 Our couch with them is spread.
 In valley deep—on mountain high—
 The mosses still are there ?
 The dear delightful little things—
 We meet them everywhere !
 And, when we mark them in our walks,
 So beautiful, though small,
 Our grateful hearts should glow with love
 To Him who made them all.

LESSON II.

THE STRUCTURE OF MOSSES.

A moss, like plants of a large growth, is furnished with a root, stem, and leaves, and, in place of a flower, has a little vessel usually supported on a stalk, and containing the seeds. The stems vary from the twelfth part of an inch to a foot in height, but not many of them exceed three or four inches. The leaves are in some kinds nearly round; in others, *ovate*, or egg-shaped; *oblong*, or longer than broad; *lanceolate*, or lance-shaped; *subulate*, or awl-shaped; *setaceous*, or bristle-shaped, and of various other forms. Some of them are beautifully reticulated or netted, which is best seen under a microscope. They are often furnished with a nerve or midrib, which varies in length,—in some shorter than the leaf, in others longer. In colour, they are found from the palest tint of green to the darkest, and even brown, purple, or nearly black. Their edges are frequently *denticulated* or toothed, or *serrated* or notched like a saw, and their direction straight or curved.

The little vessel containing the seeds is called the *capsule* or fruit, and the stalk which supports it the *seta* or fruit-stalk.

CAPSULE.

SETA.



The capsule is covered by a hood called the *calyptra* or veil ; and when this is pulled off, or falls off, we see an *operculum* or lid covering the mouth of the capsule.

CALYPTRA. 

OPERCULUM. 

When the lid is removed, we find the mouth of the capsule either surrounded with a number of little teeth, or naked. The teeth are named the *peristome* or fringe, and are in number 4, 8, 16, 32, or 64.

PERISTOME. 

They are variable in length and form in the different kinds of mosses, and either in a single or a double row. Their use is to protect the seeds in moist weather, which you will see by merely breathing upon a capsule, when its fringe is expanded in the sunshine,—the slight moisture of your breath making the little teeth instantly close over its mouth. The seeds are very small and simple, having no lobes nor germ like the pea and bean. In dry sunny weather, the fringe opens, and the ripe seeds are scattered abroad by the gentle winds, and wafted to places fitted for their abode, where in time they put forth their delicate stems and leaves. These mosses, when fully grown, produce, like their parents, little capsules filled with seeds, and these seeds again in due season spring up into other mosses of the same kind, and thus continue to perpetuate their species and adorn their chosen homes.

LESSON III.

ANDRÆA REPUSTRIS.

ROCK ANDRÆA.



This curious little moss grows in wide-spreading tufts on rocks, particularly on those that are moist, near the summits of hills and mountains, in various parts of Britain.

It may be as well to mention here, that it is necessary to give every natural object a name, to distinguish it from others; and that plants and animals generally have *two* names,—the *generic*, and the *specific*. The *generic* name *Andræa* (in honour of André, a German botanist), is given to four mosses that grow in Britain,—all agreeing in having a capsule that splits into four parts or valves, the points of which are kept together by the lid, which never falls off, the seeds escaping at the openings. The *specific* names of the four are *alpina*, *rupestris*, *Rothii*, and *nivalis*. These four mosses have the same kind of capsule, and form a *genus*; but they differ in their leaves and other particulars, and these differences constitute *species*. Thus, *Andræa rupestris* is a small plant, with dark brown leaves that are nerveless, and the upper ones somewhat sickle-shaped. *A. alpina* is a larger plant, with glossy and darker-coloured leaves that are all straight: *A. Rothii* has the leaves almost black, *falcate* or sickle-shaped, nerved, and *secund* or turned to one side: And *A. nivalis* is taller than any of the others, with fewer and pale-coloured leaves, strongly nerved.

You will thus easily perceive the difference between a *genus* and the *species* which it includes.

On the Sidlaw Hills, this species is of frequent occurrence ; and its dark tufts are often conspicuous, from growing on rocks that are encrusted with the white thallus *Isidium paradoxum* or *Variolaria lactea*, affording an interesting example of the first stages of vegetation. Darwin says,

“Retiring *lichen* climbs the topmost stone,
And drinks the aerial solitude alone.”

It is not long doomed to this solitude, however ; for having laid the foundation of a soil, mosses soon seek its society, and as the soil increases, there follow in succession flowers, shrubs, and trees. It is by this process that the sterile spots of our globe are in course of time converted into the abodes of the richest fertility.

“ Among these rocks and stones, methinks, I see
More than the heedless impress that belongs
To lovely Nature’s casual work : They bear
A semblance strange of power intelligent,
And of design not wholly worn away.”

“ These are thy glorious works, Parent of good,
Almighty ! Thine this universal frame,
Thus wondrous fair : Thyself how wondrous, then,
Unspeakable ! who sits above these heavens
To us invisible, or dimly seen
In these thy lowest works ; yet these declare
Thy goodness beyond thought, and power divine.”

LESSON IV.

SPHAGNUM SQUARROSUM.

SPREADING-LEAVED BOG-MOSS.



This and the other species of bog-moss, grow, as the name imports, in bogs or marshes. Their leaves are of a remarkably pale colour, almost white when dry, and their network structure is exceedingly beautiful. They are in shape, in the

spreading-leafed bog-moss, *ovato-accuminata*,—that is, egg-shaped, with the points narrowed upwards. The capsules are deep brown, almost globular, and have lids that fall off very soon from the naked mouths.

In marshes, there are many plants besides mosses to delight the lovers of Nature, and lead them to adore that wise and good Being who hath clothed even the very morass with things of beauty. Here the marsh marigold unfolds its large golden flowers ; the lovely forget-me-not displays its brilliant blue stars,

“ Whose silent eloquence, more rich than words,
Tells of the giver's faith and truth in absence ;”

the marsh trefoil opens its curiously-fringed blossoms ; the bog-myrtle fills the air with its rich perfume ; and the little sundew spreads out its tiny leaves, with their diamond-tipt scarlet hairs, to allure the passing insect. In the pools also, the water-efts and water-beetles are seen swimming and diving about, and the sparkling dragon-fly rustles past in the warm sunny ray, or reposes its graceful form on the culms of the tall grasses. A marsh, indeed, is a perfect treasury to the naturalist ; but, in venturing into one, great caution must be used in picking your steps to avoid danger ; for it would be much easier to get into a quagmire or marshy pool than to get out again.

LESSON V.

GYMNOSTOMUM HEIMII.

LONG-STALKED BEARDLESS-MOSS.



This genus is called beardless-moss, because the mouth of the capsule has no fringe. The lid, which is *rostrate* or curved, like the beak of a bird, adheres, however, till the seeds are ripe ; and, as the mouth is large, this is a wise provision, as otherwise the seeds might be blown away before becoming mature. The leaves in this species are lance-shaped, and *serrated*, or notched like a saw at the points. There are nearly twenty species of this genus that grow in Britain, some of which are very minute. One, the *G. fasciculare*, is supposed to be the “hyssop” of Solomon, as it is found growing upon the walls of Jerusalem, and possibly the smallest plant there : For Solomon, we are told in the holy records, was well skilled in Nature’s works, and “knew all plants from the cedar of Lebanon even to the hyssop that groweth on the wall.” However that may be, it is certain, that these humble mosses were as worthy of Solomon’s attention as the giant cedar, both being alike the handiwork of God.

The moss here given, and named in honour of the botanist Heim, grows in moist sandy places near the sea on the coast of Forfarshire, within hearing of the noisy waves. From

this spot is seen, on the one hand, a little sandy desert, beyond which are green fields, woods, and villages, and swelling hills; and on the other, the broad expanse of the German Ocean, bounded by the blue sky, and dotted with many a vessel, whose white sails glance in the sunbeams, like the sea-bird's wing.

“O ! wonderful thou art, great element,
 And fearful in thy spleeny humours bent,
 And lovely in repose : Thy summer form
 Is beautiful ; and when thy silver waves
 Make music in earth's dark and winding caves,
 I love to wander on thy pebbled beach,
 Marking the sunlight at the evening hour,
 And hearken to the thoughts thy waters teach—
 ‘Eternity ! Eternity ! and Power !’ ”

“ How sweet to muse upon the skill display'd
 (Infinite skill !), in all that he has made !
 To trace, in Nature's most minute design,
 The signature and stamp of power divine ! ”

LESSON VI.

SPLACHNUM VASCULOSUM.

LARGE-FRUITED SPLACHNUM.

This beautiful moss grows in marshy places about the sources of springs and rills on the Highland mountains, but is far from common. Its leaves are large and pale green, nearly round, and nerved to nearly the summit; and what appears to be the fruit very conspicuous and of a dark glossy



brown. The globular part is only, however, a swelling below the real capsule, and is named the *apophysis*. The mouth of the capsule is furnished with 16 teeth in pairs, bent back when dry.

There are various other native species, all of which are singularly elegant. The habitation of a plant like this is associated with much that is grand and interesting. When

gathering it, we look around upon majestic mountains, all purple in the sunlight with glowing heather-bells, and forests of dark green pines, where the red-deer love to roam, and foamy streams gushing from the wild rocks ; and we breathe the sweet perfume of mountain-flowers, hear the merry songs of mountain-birds, and enjoy the fresh and healthful breezes that fan with their joyous wings the mountain sky.

“ How beautiful this dome of sky !
 And the vast hills in fluctuation fix'd
 At Thy command, how awful ! Shall the soul,
 Human and rational, report of Thee
 Even less than these ? Be mute who will, who can,
 Yet I will praise Thee with impassion'd voice :
 My lips that may forget Thee in the crowd,
 Cannot forget Thee here ; where Thou hast built
 For Thy own glory, in the wilderness !”

“ The Lord of all, himself diffused through all,
 Sustains, and is, the life of all that lives ;
 Happy who walks with him !—whom what he finds
 Of flavour or of scent in fruit or flower,
 Or what he views of beautiful or grand
 In Nature, from the broad majestic oak
 To the green blade that twinkles in the sun,
 Prompts with remembrance of a present God.”

LESSON VII.

ENCALYPTA VULGARIS.

COMMON EXTINGUISHER-MOSS.



This genus is so named because the veil or calyptra covers the capsule in the same way as we cover the flame of a candle by what is called an extinguisher, to put it out. The fringe has 16 short teeth, and the veil is entire at the base,—the other four species, which are alpine, having the base of the veil toothed. This grows upon wall-tops, and early in spring is found along with the little *Draba verna*, almost the earliest of our spring flowers, and perhaps the smallest,—its white blossoms and diminutive seed-pods being often produced on stems a quarter of an inch high. About the time when these two plants are found in perfection, we listen with delight to the far-off lark filling the blue heavens with its cheerful melody, and the happy thrush pouring from the topmost branch of some yet leafless tree its sprightly song. There is thus, you will perceive, a great deal of pleasure connected with plants, besides what we derive from contemplating their own beauty. We associate them in our minds with the scenery amid which they grow, the season in which they are gathered, and other circumstances; which, for many a day or even year afterwards, afford us the most pleasant reflections.

"There is a rapturous beauty on the earth,
 And in the heavens a healthful purity !
 Through all the glens the breezes ramble on,
 Singing a wakening song to prison'd birds,
 And flowers in hidden slumbers. All around
 The carol of innumerable birds
 Hails the ascent of Spring to her high throne,
 Which coming months with glowing flowers shall wreath."

"Cold is the heart
 That, bending o'er the first seen flower of spring,
 Feels not the glow of joy and thankfulness
 Through all his senses gushing. Spring's first blossom !
 It seems a pledge of blessing manifold
 From Him who is all love and mercy."

"Now parting Spring,
 Parent of beauty and of song, has left
 Her mantle flower-embroider'd on the ground,
 While Summer laughing comes, and bids the months
 Crown her prime season with their choicest stores—
 Fresh roses opening to the solar ray,
 And fruits slow-swelling on the loaded bough."

LESSON VIII.

WEISSIA NIGRITA.

BLACK-FRUITED WEISSIA.

The genus *Weissia* is named in honour of a German botanist, Weiss, and includes about 20 native species. The fringe has 16 teeth, placed round the mouth of the capsule at equal distances, and are mostly short. The *Weissia nigrita* derives its specific name from the mature capsule being of a black colour. It is a very rare moss, being found only in a few places. It has been picked on the mountains near Blair



in Atholl, 40 miles inland; and the specimen here given is from the Sands of Barrie, on the coast of Forfarshire. This is a remarkable circumstance, and shows that the climate of the lofty mountain and that of the sea-shore are very similar.

Many mosses, as well as flowers, are so common that they are found all over the country; others are only met with here and there; while some are so rare, that they are found but in a few particular places. The place where a plant is found is called its *locality*. The Sands of Barrie is one locality for the black-fruited *Weissia*—the mountain Ben-y-Gloe is another.

Sir James E. Smith, the author of the *English Flora*, observes, that “a plant gathered in a celebrated or delightful

spot, is like the hair of a friend, more dear to memory than even a portrait, because it excites the imagination without presuming to fill it." When we look upon this little moss, neither its own simple beauty, nor that of the various species with which it has a family relation, alone engage the mind's attention; for before it flits glorious remembrances or imaginative anticipations of magnificent Highland mountains, and ocean shores,

Where the noisy waves on the sandy beach
 Or the wild rocks dash in foam,
 And the glossy shell, and the bright sea-weed,
 Have their appointed home.

On mountains old and hoar,
 Where the healthful breezes play,
 How pleasant it is o'er heathy wilds
 In summer time to stray!—
 When the heather-bell is blooming
 In its purple glory bright,
 And the lovely mountain violet
 Seems glad in the golden light!
 Or to sit by mossy fountain,
 Where a sweet stream has its birth,
 And look around with admiring eye
 On the lovely things of earth!
 The lichen, the moss, and the mountain-flower—
 And the wild-bee revelling there—
 And the bounding red-deer, swift of foot—
 And the bird that skims the air—
 The dark green woods, and the clear blue streams—
 And the cascade, foaming white—
 And the floating clouds in the sunny sky—
 All yield the heart delight:
 For they link our souls to Heaven,
 And we feel the boundless love,
 And the wondrous power, and the matchless skill
 Of our Father who dwells above.

LESSON IX.

GRIMMIA APOCARPA.

SESSILE-FRUITED GRIMMIA.



Grimmia is also named in honour of a German botanist, Dr Grimm. Many plants are thus named after votaries of the science ; and such living monuments serve to perpetuate their memories among the lovers of Botany, and tend also to stimulate the enthusiasm of future inquirers. To have one's name thus associated with a plant, is perhaps more honourable than to possess the title of a baronet or lord.

The fringe has sixteen teeth like Weissia ; but the veil which is split on one side in Weissia, is entire in this genus. In Weissia, it is called *dimidiate* or halved—in Grimmia, *mitriform*, or shaped like a mitre, the head-dress worn by bishops and archbishops on particular occasions. There are upwards of a dozen species growing in Britain, most of which are alpine, and have leaves of a dark green colour. Grimmia apocarpa has the capsules *sessile* or sitting on the ends of the branches,—the lid and the fringe being elegantly coloured, their brilliant red hue contrasting finely with the deep green leaves. It grows in bushy tufts on the sides and

tops of old walls, as well as on rocks among the hills, and occasionally on trees. A state of it growing upon the mountains (*stricta*) has reddish brown leaves ; and another (*rivularis*), found immersed in the waters of mountain-streams, has almost black foliage. These are called *varieties*, because the leaves and capsules do not differ enough in their forms to constitute distinct species.

“ Happy is he who lives to understand
 Not human nature only, but explores
 All natures, to the end that he may find
 The law that governs each ; and where begins
 The union—the partition where—that makes
 Kind and degree, among all visible beings :
 The constitutions, powers, and faculties
 Which they inherit—cannot step beyond,
 And cannot fall beneath ; that do assign
 To every class its station and its office,
 Through all the mighty commonwealth of things,
 Up from the creeping plant to sovereign man.”

“ The desire which tends to know
 The works of God, thereby to glorify
 The great work-master, leads to no excess
 That reaches blame, but rather merits praise,
 The more it seems excess ;
 For wonderful indeed are all His works.”

LESSON X.

DIDYMODON CAPILLACEUS.

FINE-LEAVED DIDYMODON.

This genus, of which there are upwards of 15 native species, is named from the teeth of the fringe (32 in number) being placed round the mouth of the capsule in pairs. *Didymodon capillaceus* has the leaves singularly narrow, and of a fine green colour, with abundance of upright bright brown capsules.



It grows in dense tufts in the crevices of moist rocks in mountainous countries, and particularly loves the vicinity of waterfalls. It is pleasant to meet with this elegant moss in such places. The sound of rushing waters falls coolly and deliciously upon the ear, where the golden sunbeams, warm and sultry, are struggling through the green foliage of the mountain-ash: Little birds warble sweetly among the branching trees, and the wild-bee murmurs among the fresh flowers

that adorn the mossy rocks: Bunches of ferns rear their elegant fronds in these fairy nooks, and the bright plumaged kingfisher and amusing water-ousel are seen flitting about the sparkling waters—now sitting on a mossy stone, or hopping on a straggling bough—now lost among the green leaves, or darting through the wandering sun-rays on joyous wing.

In Highland dell, by lonely brook,
 Some sweet sequester'd fairy nook,
 Invites the wanderer to explore
 Its flowery wealth, a wondrous store!
 Trees, shrubs, and blossoms there display
 Their graceful forms and colours gay,
 And fling from leaf and chalice fair
 Their odours through the balmy air.

And there, to charm the curious eye,

A host of hidden treasures lie—

A microscope world, that tells,

That not alone in trees and flowers

The spirit bright of Beauty dwells—

That not alone in lofty bowers

The mighty hand of God is seen—

But more triumphant still in things men count as mean.

LESSON XI.

TRICHOSTOMUM LANUGINOSUM.

WOOLLY-FRIDGE MOSS.



The 32 teeth comprising the fringe of this family of mosses are very slender, and resemble hairs. There are in Britain about a dozen species of fringe-moss, all of which are peculiar to mountainous places. The woolly-fridge moss grows in wide-spreading patches upon hills and mountains, rarely on

the plains, and has a peculiarly woolly or hoary appearance, from the long white points to its leaves. If you place a leaf of this moss under the microscope, you will find it beautifully notched like a saw, towards the summit ; and, indeed, the leaves, as well as the capsules of every moss, should be microscopically examined, in order to see satisfactorily all the beauties and peculiarities of their structure ; and if you wish to find out the name of a moss yourself, from the description given in books, this is absolutely necessary. It is generally, however, an easy task, and affords a great deal of instructive entertainment.

The mosses are very hardy plants, and do not require much heat to bring them to maturity. The woolly-fringe moss is often found in winter or early in spring quite encrusted with snow, yet bearing its fruit profusely beneath this icy mantle.

They are also evergreen, and of course *perennial*,—that is, lasting for several years ; and their seeds or *sporules* retain the vital principle for a very long period. It has, indeed, been recorded, that some, taken from specimens kept in an herbarium for two hundred years, had been made, by the influence of moisture and a gentle heat, to germinate and produce mosses similar to those from which the seeds were taken.

LESSON XII.

FISSIDENS BRYOIDES.

SMALL FERN-LEAVED FORK-MOSS, OR MUNGO PARK'S MOSS.



This pretty little moss is found in various parts of the world. Even in the sandy deserts of Africa, it is met with ; and we are told by that intrepid traveller, Mungo Park, that the contemplation of its beauty was at one time the means of preserving his life. Plundered by banditti, worn out with fatigue, and surrounded with all the horrors of the desert, his courage almost failed him, and he sat down to rest his wearied limbs, and ponder on his destitute condition. "At this moment," he says, "painful as my reflections were, the extraordinary beauty of a small moss irresistibly caught my eye ; and though the whole plant was not larger than the tip of one of my fingers, I could not contemplate the delicate conformation of the roots, leaves, &c., without admiration. Can that Being (I thought) who planted, watered, and brought to perfection, in this obscure part of the world, a thing of so small importance, look with unconcern upon the situation and sufferings of creatures formed after his own image ?—Surely not ! Reflections such as these would not allow me to despair : I started up, and, disregarding both hunger and fatigue, travelled forwards, assured that relief was at hand, and I was not disappointed."

Fissidens is closely allied to Dieranum, and both are named from the 16 teeth of the fringe being *bifid*, or divided like a fork. There are several species, and the leaves of all are very curious in their structure, the upper half being double, or composed as it were of two plates or leaves.

This grows diffusedly spread over shady banks, particularly under the shade of hedges and woods, and is met with in fructification at various seasons. It is an exquisite little moss, and cannot fail to strike with admiration any one who will bestow upon it an attentive examination.

“ God is ever present, ever felt,
 In the void waste as in the city full :
 And where he vital breathes, there must be joy.”

“ I cannot go
 Where universal Love not smiles around.”

“ Though in the paths of death I tread,
 With gloomy horrors overspread,
 My steadfast heart shall fear no ill,
 For Thou, O, Lord ! art with me still ;
 Thy friendly crook shall give me aid,
 And guide me through the dreadful shade.”

LESSON XIII.

DICRANUM SCOPARIUM.

BROOM FORK-MOSS.



As in Fissidens, the mosses belonging to this genus have 16 forked teeth in the fringe. There are between 20 and

30 native species, the broom fork-moss being perhaps the most common. It grows in woods and upon hedge-banks, as well as upon wall-tops, and some of its varieties in bogs and upon the mountains. It is said to be met with in almost every quarter of the globe; and, though so widely diffused, and so common in our own country, is not less worthy of our regard than the rarer kinds. The name "broom fork-moss" has probably been bestowed upon it from its growing in long upright tufts, like broom. The leaves are long and narrow, somewhat curved like an awl, and *canaliculate* or deeply furrowed. The capsules are cylindrical and the lids very long.

How glorious are the summer woods,
 Where the bright broom fork-moss grows,
 With their gush of love-born melody,
 And their world of verdant boughs!

That heart is hard as the flinty rock
 That feels not the woodland's power,
 With all its magic influences
 Of green leaf, bird, and flower.

The flower and leaf with their honied breath,
 And the bird with its warbling voice,
 Are holy gifts of Heaven to men,
 To make their hearts rejoice.

LESSON XIV.

TORTULA SUBULATA.

AWL-SHAPED SCREW-MOSS.

This genus, including upwards of 20 British species and varieties, has been named "screw-moss," from the fringe being composed of 32 spirally-twisted teeth. The *Tortula subulata* has long cylindrical capsules, upright, and a little curved or bent, with awl-shaped lids, that cover the curious fringe. The fringe has its bright red teeth twisted into a spiral tube, and are only free at their extremities. The leaves, between oblong and lance-shaped, are *apiculated*,—



that is, having the nerve projecting a little beyond the point of the leaf,—thus somewhat resembling a bee's sting, the term being derived from *apis*, the scientific name of the bee. When the nerve is much produced beyond the points of the leaves, as is the case in many mosses, they are said to be *piliferous* or hair-pointed.

The species of screw-moss here introduced grows chiefly on walls and hedge-banks ; and in the " merry month of

May," you may often meet with it in perfection under the hedge-row, when you are breathing the hawthorn's balmy incense from its clustering snowy blossoms, or listening to the trilling song of the rose-linnet among the fragrant sweet-briars. Mosses, however, not being so dependent on temperature as flowering-plants, are not always confined to a particular season in perfecting their seeds, and some are often found in as good condition in the middle of winter as in summer. The present moss affords an example.

“How Nature through her ample reign displays
 The wisdom of her Maker! When I stray
 Beneath the gloom of her high-arching woods,
 Where Contemplation hears no other sound
 Than the low voice of the mysterious breeze—
 Or wander near her streams befringed with moss,
 The least of which proclaims, and loudly too,
 The forming finger of a God—or glance,
 With eye of rapture, o'er the lovely forms
 That everywhere obey the summer beam,
 And rise supreme in beauty— * * *
 I bow before the present Deity!”

LESSON XV.

POLYTRICHUM URNIGERUM.

URN-BEARING HAIR-MOSS.



The name of this genus is derived from two Greek words signifying *many* and *a hair*, and has been given to it in consequence of the veil being covered with an abundance of succulent fibres resembling hairs. The fringe consists of 32 or 64 short teeth, placed at equal distances, and *incurved* or bent inwards.

About a dozen of species inhabit this country,—some of them being common in woods and on ditch-banks in the lower grounds, and others growing only on the highest mountains. The Urn-bearing hair-moss is not a common species ; but it is met with occasionally both in England and Scotland, and grows on banks, quite covering them with its wide-spreading masses. The rigid lance-shaped leaves have their margins beautifully serrated, and present lovely minatures of those of the tropical aloes. The cylindrical capsules, their fringe shielded by a white horizontal membrane, look like so many fairy urns rising above the little forest of leafy branches.

The common hair-moss, as found in moist woods, where it occurs in wide-spreading dense patches, is the tallest species of moss indigenous to this country, frequently attaining the height of a foot or more.

While the genus *Polytrichum* contains some of our tallest mosses, there is another family named *Phascum*, or earth-moss, some of the species of which are so small that they are little more than visible to the unassisted eye. There are about 15 species, and they grow chiefly on banks and in fields, and are not to be detected without a very minute and careful scrutiny.

The alpine hair-moss is the most common on mountains, but seldom grows under an elevation of 1000 feet ; and the Northern hair-moss has its home only about the summits of mountains that raise their lofty heads 4000 feet into the cold sky, and I have gathered it in the month of July beside fields of glittering snow.

LESSON XVI.

ORTHOTRICHUM AFFINE.

PALE STRAIGHT-LEAVED BRISTLE-MOSS.

The fringe of this species of bristle-moss is double,—the outer having 16 teeth in pairs, and the inner composed of 8 *cilia* or hair-like processes resembling those of the eyelash. The genus has acquired its name from the fibres on its veil being straight. The native species are about 16, most of which grow upon trees and walls. In some the fringe is single, but in most of them double ; and the capsule is either *sessile* or sitting among the leaves, or supported on a short fruit-stalk.



The present species has deeply-furrowed capsules, that are immersed among the leaves. It is abundant on trees and walls, and grows in little bushy tufts, as do all the other species of this genus. This is usually called the *habit* of a plant ; and the eye, by a little experience, may soon become enabled to distinguish one genus or species of plant from another by the habit or appearance alone. Some are quite

contented with this superficial mode of becoming acquainted with the beauties of Flora ; but a minute examination of the structure of the various parts of plants on which the generic and specific *characters* are founded, is the only sure way of acquiring a knowledge of them.

The great number of *seemingly hard words* used in books in describing and characterizing plants, may appear at first a formidable barrier to your progress ; but, as you advance, step by step, this difficulty will melt away like mist before the morning sun, and, with a little exertion, you will find the task both easy and agreeable.

“A well-directed attention to the works of Nature tends in an incalculable degree to elevate our conceptions of the omnipotence and unerring wisdom of the Almighty, and is congenial to every innocent and amiable propensity of the human mind.”

“The delight is inexpressible of being able to follow, as it were, with our eyes the marvellous works of the Great Architect of Nature—to trace the unbounded power and exquisite skill which are exhibited in the most minute, as well as in the mightiest parts of his system.”

LESSON XVII.

BRYUM TRICHODES.

CAPILLARY THREAD-MOSS.



There are upwards of 40 species of this interesting genus natives of the British isles, and the *Bryum trichodes* is perhaps among the rarest. The fringe in all of them is double,—the outer composed of 16 teeth, and the inner of 16 segments of a membrane that lines the capsule; and it is probable, that, in mostly all the double-fringed mosses, the inner fringe is only the termination of a membranous lining to the vessel that contains the delicate seeds.

The species here given is distinguished by the very long fruit-stalks, and the narrow pear-shaped capsules, that lean a little to one side, and have the teeth of their outer fringe

shorter than those of the inner. The leaves are *linear* or of equal breadth throughout, and *obtuse* or blunt, strongly nerved and netted, and their margins entire.

It grows on the Sands of Barrie, at the mouth of that beautiful Scottish river the Tay; and I have also found it on the majestic mountain Ben Lawers, which rises from the margin of the winding Loch Tay to the height of upwards of 4000 feet, and about 60 miles inland from the mouth of the noble river that takes its rise and name from this chieftain of Scottish lakes.

Lovely lake of azure hue !
 Looking o'er thy waters blue,
 From the lofty mountain-peak,
 Where the thunder-tempests speak,
 In thy half-seen charms I see
 Snatches of sublimity—
 Vastness that to mortal eye
 Whispers of Eternity !

“ Thou only, terrible Ocean, hast a power,
 A will, a voice, and in thy wrathful hour,
 When thou dost lift thy anger to the clouds,
 A fearful and magnificent beauty shrouds
 Thy broad green forehead. If thy waves be driven
 Backwards and forwards by the shifting wind,
 How quickly dost thou thy great strength unbind,
 And stretch thine arms, and war at once with heaven !”

This little moss, a thing of simple beauty, can, you see, awaken in the mind thoughts and feelings of the deepest importance; and we should not therefore look with an eye of indifference on any of the works of our Heavenly Father, seeing that all can in some way or other administer to our comfort, instruction, or pleasure.

LESSON XVIII.

BARTRAMIA POMIFORMIS.

COMMON APPLE-MOSS.

This genus is named in honour of John Bartram, an enthusiastic lover of the beauties of Flora, who many years ago travelled over a considerable portion of North America, in search of its botanical treasures; and how glowingly he described the scenery he explored, let the following little sketch of a morning scene in the American wilds show you. "What a beautiful display of vegetation is here before me, seemingly unlimited in extent and variety! How the dew-drops twinkle and play upon the sight—trembling on the tips



of the lucid green savanna—sparkling as the gems that flame on the turban of an eastern prince! See the pearly tears rolling off the buds of the expanding Granadilla! Behold the azure fields of cœrulean Ixia! What can equal the rich

golden flowers of the *Canna lutea*, which ornament the banks of yon serpentine rivulet, meandering over the meadows—the almost endless varieties of the gay Phlox that enamel the swelling green banks, associated with the purple *Verbena corymbosum*, *Viola*, pearly *Gnaphalium*, and silvery *Perdicium* ?”

Compared to these floral glories, the little mosses that bear Bartram’s name are humble indeed; but they possess an elegance of their own, which renders them equally as attractive to the real lover of Nature.

There are eight native species and varieties,—the capsule in all of them being of a globular shape, and having a double fringe, the outer of 16 teeth, and the inner of a membrane divided into 16 bifid segments. The common apple-moss has subulate, serrated, and strongly-nerved leaves, that become twisted when dry. The capsule is at first smooth and green, but in age becomes furrowed, and of a brown colour. It grows in bushy tufts, principally upon walls and rocks, loving those best that are somewhat shaded and moist.

LESSON XIX.

HYPNUM RUTABULUM.

COMMON ROUGH-STALKED FEATHER-MOSS.



The fringe of Hypnum is double,—the outer of 16 teeth, and the inner of 16 membranous segments. The fruit-stalks spring from the sides of the branches, in this extensive and beautiful family, which comprises nearly a hundred species and varieties that find their homes in Britain. The Hypnum rutabulum has capsules that are egg-shaped and *cernuous* or drooping, supported upon fruit-stalks that are rough, with little knobs scarcely discernible by the naked eye. It is a common but very pretty species, and loves to luxuriate on banks and walls, and about tree-roots.

Should you find a moss the name of which you do not know, but would like to ascertain by your own examination, the mode of doing so is this: Provide yourself with a good

microscope, and *Hooker's British Flora*, vol. 2d, part 1st; then observe whether your moss has its fruit produced from the ends of the branches or from their sides. This is the first step; as you will see by the *Flora*, that all our mosses are arranged under two *primary* or first groups,—the one having the fruit terminal, and the other lateral. If your moss has its capsules produced from the ends of the branches, you have next to notice whether the lid comes off: If not, it belongs either to *Andræa* or *Phascum*: If it does, you can, by the microscope, easily see whether the mouth is naked or fringed, and whether, if present, the fringe is single or double. Suppose, for example, you find the fringe single, and the teeth, 16 in number, divided like a fork, you at once refer your moss either to *Fissidens* or *Dicranum*. If the leaves are *bifarious*, or produced on two opposite sides of the stem, it belongs to *Fissidens*: If the leaves surround the stem on all sides, it is a *Dicranum*. If the leaf does not have any nerve, which you will learn by detaching some from the plant and placing on a piece of glass under the microscope then your moss is *D. glaucum*,—a curious species, with whitish green foliage, that grows on boggy heaths. If the leaves are nerved, and the nerve produced beyond the point, it is *D. latifolium*, a very rare species. If the nerves do not exceed in length the leaves, you must observe whether they are broad or narrow, and whether the capsule has or not a swelling at the base,—these characters being employed to divide the genus into sections, which is found very useful in large genera, materially lessening the labour of examination. Your last step in this investigation will be to compare the leaves, capsules, &c., of your specimen, with the descriptions of the different species contained in the section to which you have referred it; and thus, by moderate care and perseverance, you will soon become acquainted with the proper name of your plant.

HYPNUM RUSCIFOLIUM.

LONG-BEAKED WATER FEATHER-MOSS.



Another species of this elegant genus of mosses is the Water Feather-Moss, so named from its growing under water, either in still streams or amid the turmoil of foaming water-

falls. I have met with it in several streams, but perhaps in no more interesting place than in a small cascade in the Den of Mains, where, under the constant rushing of the waters, its dark capsules are produced in abundance.

Where, through some meadow, soft and green,
 Gemm'd with the daisy's silver bloom,
 A gentle stream is wandering seen,
 Midst flowery banks of rare perfume :
 There you may look beneath the waters,
 Sweetly gliding on serene,
 For one of Beauty's lovely daughters—
 Lovely, though of humble mien :
 And where the stream in childish glee
 Leaps o'er the rocks with infant pride,
 This little moss, in eddying swirl
 Of foamy waves, its head doth hide.
 Yet, though so humble, ne'er deride
 This lowly dweller of the stream ;
 For from its watery home it sends
 To care-worn hearts a home-lit beam ;
 For may not those dark cares that shed
 Their gloom around the human heart,
 Be only meant as clouds that make
 Its joy more bright when they depart?

LESSON XX.

HYPNUM CHRISTA-CASTRENSIS.

OSTRICH-PLUME, OR PRINCE'S FEATHER-MOSS.

This most beautiful of the feather-mosses has its stems closely *pectinated*, or clothed with branches so regularly placed, that they resemble the teeth of a comb. From this



arrangement of the branches, and the elegant light-green leaves being sickle-shaped and turned to one side, the outline

has the appearance of a feather of the magnificent ostrich,—hence the specific name. Its ovate capsule is seldom produced with us. It is rather a rare moss in this country, though said to be common enough in the woods of Switzerland. I have met with it in a number of Scottish stations; the most interesting of which is perhaps Glen Dole, a solitary glen among the Clova mountains, where it is associated, as in Switzerland, with the exquisite *Linnæa borealis*, a little straggling shrubby plant, named in honour of the immortal Linnæus. This delicious plant has trailing stems, beautifully clothed with ovate opposite leaves, and bearing drooping bell-shaped flowers in pairs, snowy white, with a tinge of rose colour, and breathing the most delicate perfume.

This moss grows in the locality named, at the foot of a rocky mountain, on the banks of a solitary stream, among scattered stunted old birch trees; and there, as in the various Scottish woods where I have seen it, occurs in broad reclining patches.

“ Along this narrow valley you might see
 The wild deer sporting on the meadow ground,
 And, here and there, a solitary tree,
 Or mossy stone, or rock with ‘ wild flowers’ crown’d.
 Oft did the cliff reverberate the sound
 Of parted fragments tumbling from on high;
 And from the summit of that craggy mound,
 The perching eagle oft was heard to cry,
 Or on resounding wings to shout athwart the sky.”

CONCLUSION.

And now, my dear young readers, let me say a few words in conclusion. In the foregoing lessons, I have endeavoured, by selecting a species of moss from most of the larger and more widely-distributed genera, to give you some idea of their diversified forms, and supply examples to guide you in your further inquiries. It has been my care not to be too tedious, nor to overload and confuse your minds with too great a number of things at first: But, if you feel any portion of the pleasure which such a subject is calculated to impart, you will not rest contented with this first draught of knowledge, but return again and again to the delicious fountain. You will persevere in extending your acquaintance with these lovely little fairy plants—more beautiful than all the imaginary fairies you ever read of in tales; and every new acquisition will add something to the amount of your happiness.

You must expect to meet with difficulties in your way now and then, for the road to knowledge has its thorns as well as its roses: But this should not discourage you; for there is often more pleasure in overcoming a difficulty than in avoiding it; and where it cannot be avoided, and is not insurmountable, it would evince cowardice either to stand still or to turn back.

The difficulties are, however, only little clouds, that occasionally throw their shadows over this sunny path, and soon pass away, making the sunshine look all the brighter. And there is sunshine enough in it to warm our hearts, and fill

them to overflowing with pleasant thoughts and holy feelings ; for, when studying any of Nature's works, we tread as it were upon sacred ground—we are holding communion with the mighty Invisible God through his visible creation—are walking with our kind Heavenly Father in his own delightful fields of beauty.

“ Whom Nature's works can charm, with God himself
 Hold converse, grow familiar, day by day,
 With His conceptions, act upon His plan,
 And form to His the relish of their souls.”



TABULAR VIEW

OF THE

GENERA OF BRITISH MOSSES,

As arranged in *Hooker's British Flora*, vol. 2d, part 1st;

With the Number of Species and Varieties included in the Third

Edition of W. G.'s *Catalogue of British Mosses*.

FRUIT-STALK TERMINAL.

LID ADHERING TO THE MOUTH OF THE CAPSULE.

Andræa,	4
Phascum,	21
Archidium,	1

MOUTH OF THE CAPSULE NAKED.

Sphagnum,	6
Edopodium,	1
Glyphocarpa,	1
Gymnostomum,	21
Pottia,	21
Anictangium,	5
Schistostega,	1
Bog-Moss,	6
Club-Stalked Moss,	1
Beardless-Moss,	21
Branched-Beardless-Moss,	5

MOUTH OF THE CAPSULE FRINGED.

Fringe Single.

Diphyscium,	1
Tetraphis,	2
Splachnum,	9
Crytodon,	1
Conostomum,	1
Encalypta,	1
Weissia,	5
Grimmia,	19
Didymodon,	15
Trichostomum,	18
Glyphomitrium,	17
Fissidens,	1
Dicranum,	8
Tortula,	34
Cinclidotus,	32
Polytrichum,	1
Hair-Moss,	17
Extinguisher-Moss,	5
Fork-Moss,	8
Screw-Moss,	34
Lattice-Moss,	32

Fringe Double.

Entosthodon,	1
Funaria,	3
Zygodon,	3
Orthotrichum,	2
Orthodontium,	25
Bryum,	1
Cinclidium,	54
Timmia,	1
Bartramia,	2
Buxbaumia,	9
Apple-Moss,	1
Thread-Moss,	1
Cord-Moss,	1
Yoke-Moss,	3
Bristle-Moss,	2

FRUIT-STALK LATERAL.

MOUTH OF THE CAPSULE NAKED.

Hedwigia,	1
-----------------	---

MOUTH OF THE CAPSULE FRINGED.

Fringe Single.

Pterogonium,	3
Leucodon,	1

Fringe Double.

Neckera,	3
Anomodon,	2
Daltonia,	1
Fontinalis,	1
Water-Moss,	3
Hookeria,	3
Hypnum,	3
Feather-Moss,	99

45 Genera.

457 Species and Varieties.

