Hints on the cultivation of British and exotic ferns and lycopodiums : with descriptions of one hundred and fifty species and varieties / by Benjamin Samuel Williams.

FERNS AND LYCOPODIUMS

B. S. WILLIAMS

HINTS ON THE CULTIVATION

OF

BRITISH AND EXOTIC

FERNS AND LYCOPODIUMS.

WITH DESCRIPTIONS

OF

ONE HUNDRED AND FIFTY SPECIES AND VARIETIES.

BY

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TO

CHARLES BORHAM WARNER, Esq.

FELLOW OF THE HORTICULTURAL SOCIETY OF LONDON,

The following Pages

ARE

RESPECTFULLY INSCRIBED

BY

HIS OBEDIENT SERVANT,

B. S. WILLIAMS.

PREFACE.

I HOPE my readers will not be disappointed in this little work, which the numerous applications I have received for some account of my mode of cultivating Ferns in pots, and in the open Fernery, have induced me to write. My experience in the culture of this interesting tribe of plants has been, I presume, inferred from the specimens I have taken to the Chiswick and Regent's Park exhibitions, where I have been successful. I have endeavoured to render the hints and suggestions here offered exceedingly plain, in order to render them acceptable and servicable to those who may have given but slight attention

to the habits of Ferns, and be but partially acquainted with the treatment they require; and I shall rejoice if this little work prove the means of promoting the more extensive growth of Ferns, both British and exotic, than which I know of no class of plants more easy to manage, more varied and beautiful in their forms, or more suited to afford interest and pleasure to those engaged in their cultivation.

B. S. W.

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HINTS ON THE CULTIVATION

OF

BRITISH FERNS.

INTRODUCTORY REMARKS.

As Ferns affect shady places, ladies and gentlemen who take an interest in gardening can scarcely spend a little time more pleasantly, on a summer's day, than in visiting these beautiful plants in their cool retreats, more particularly when they grow near the margins of a stream, whose banks are furnished with rustic seats, on which the visitors may sit and admire the noble outline and elegant fronds of some of the larger species, with their exquisite verdure half-covering the rocks or bending gracefully over the water. Ferns may be grown in three different ways—in pots, in glass-cases, and planted out in the fernery. They are very useful for bouquets, as some of them will last a long time in water, and intermixed with cut flowers, they produce a charming effect. Such plants as *Adiantum capillus Veneris* (true Maidenhair), *Polypodium dryopteris*, *P. calcareum*, *P. phegopteris*, *Asplenium trichomanes*, *A. marinum*, and many

others, are suitable for that purpose. I have had fronds of Ferns, cut off and put into water, keep their form and colour unchanged for three weeks, by giving them fresh water once a-week.

British Ferns are found growing in hedge-rows, on old walls, and on mountains; some are found on trees, others near waterfalls, and also in caves, woods, and heaths. The roots of all our native Ferns are perennial and fibrous; some of them are deciduous, losing their fronds in winter, which is their season of rest, and throwing up fresh fronds in the spring: some are evergreen, retaining their beautiful foliage throughout the winter as well as the summer, the new fronds appearing before the old ones die off.

In the following pages I have divided the instructions and information which I have to offer under the six following heads:

I. Growing Ferns in Pots, under glass; including summer and winter treatment, time of shifting, proper soil, watering, and the best way of destroying injurious insects.

II. Growing Ferns in Glass-cases.

III. Propagation of Ferns.

IV. The Construction of a Fernery, the most suitable place, the proper soil, and the time of planting.

V. Drying Ferns.

VI. A description of fifty-one species, all natives of Britain.

CULTIVATION IN POTS.

Ferns produce a highly-pleasing effect in pots, more especially if they are placed under glass; as, for instance, in a grape-house, where there is a little heat and shade. I have had them succeed admirably well in such a situation, making much finer plants than out of doors if they are put under cover early in spring. Some of them are supposed to be difficult to grow, but I flatter myself that if my instructions are followed little difficulty will be experienced in their cultivation. Ferns, like other plants, require care and attention to grow them well; but what plant can be grown in a pot successfully without these requisitions? It is as easy to cultivate plants well as it is to grow them ill; the chief things they require are to be properly potted, to be placed in a favourable situation, and to receive attention afterwards in reference to moisture at the roots.

Different kinds of Ferns must receive different modes of treatment; some are quite hardy, while others require protection all the year. No family of plants are more peculiarly suited to persons with limited means, especially in relation to space, than Ferns, for a collection of British Ferns in pots need not occupy much room. A shady place suits them best; some of them require to be grown under bell-glasses, such as *Trichomanes radicans*, *Hymenophyllum Tunbridgense*, and *H. Wilsonii*; these require

a warm, shady place, to grow them to perfection, for they are generally found in wet places, near waterfalls and on damp rocks. I always grow them under bell-glasses in a warm house, with the temperature ranging from 40° to 45° in winter, but they may be grown in a cooler place, and will succeed in a cool frame, provided frost is kept from them : they will take no harm in a temperature about three or four degrees above the freezing-point.

I have grown them in two or three different materials, but I find the following to be the best, viz. silver sand, sphagnum moss, *i. e.* white moss found in water and in damp, boggy places, with some broken sandstone. I have also used broken pots when I have not been able to get sandstone, but I have found the latter suit them best. I cultivate them in pans with good drainage ; the pans are nearly filled with broken pots or sandstone. I then put on a good layer of sphagnum, about one or two inches thick, and press this firmly on the top of the drainage, in order to prevent the sand from sifting through ; then I place about one inch and a half of silver-sand on the moss, and afterwards place the plant on the top of the sand, so that it is about three inches above the rim of the pan. I finish by giving a gentle watering with a rosed waterpot, then I select a bell-glass to fit the pan, and putting the glass over the plants, keep them constantly close. The glasses should be kept perfectly clean inside and out ; if they are allowed to get dirty, the fronds will become weak and dwindling. These plants should never be allowed to get too dry ; they require abundance of water in the summer season, which should be applied by means of a fine-rosed waterpot, or syringe, over the fronds. They delight in this treatment, for they are found growing in damp places where the spray of water falls

upon them. They do not require so much water in winter as in summer. During the dull season, I give only just enough to keep the roots and fronds damp. They should always be kept in the shade; I never allow the sun to shine on them, for if that occurs they will not thrive. I grow all the other species of British Ferns in pots; they require different treatment from those just mentioned; they like plenty of air, but not much sun, with a good supply of moisture, as many of them are found in damp places. For these last five years I have grown a collection of British Ferns in pots, for the purpose of exhibiting them at the London shows, at which, as I have already stated, I have been very successful in obtaining first prizes, both at Chiswick and Regent's Park. I grow them in a late vinery, where there is a little heat to bring them on in time for the May show. I put them in the vinery in the beginning of March, with not much heat at first. I always treat the house for the vines and not for the Ferns; but the latter seem to enjoy the warm, moist atmosphere, and I think their presence is beneficial rather than otherwise to the vines when the house is first shut up and after the vines have broken, more especially if the house lay dry, for the vines require a good degree of moisture at the time they are breaking, and that is also what the Ferns delight in. I give them a good syringing twice a-day in fine weather, viz. early in the morning, and again when the house is shut up in the afternoon. This creates a moist atmosphere, in which the Ferns increase in size very fast. I keep them in the vinery till June, when I move them out into a shady part of the garden where no sun can get at them. If the rays of the sun are allowed to reach them after coming out of the vinery, they will be sure to scorch them, making their fronds turn

brown. Something should be laid down for them to stand on; pieces of slate or other material will do: they must not stand on the earth; if they do, worms will enter the pots and stop up the drainage, which will be injurious to the plants, and cause the soil in the pot to become soddened—an occurrence which will most likely kill the plants, for they require an abundance of water during their growing season; and good drainage, which is essential to the growth of all plants, whether they are in a pot or planted out in the open ground, allows the water to pass off quickly. I keep the Ferns in the garden till October, when I remove them to a cold pit, where I keep them till March. This is their season of rest. During the time they are in the cold pit I water them very sparingly, giving only just enough to keep the soil damp; they must never be allowed to get dry, for if so, they will most likely perish. I lost a fine plant of *Woodsia ilvensis* three years ago, in a house in winter, by letting it get dry; that taught me a lesson I shall not soon forget. It was the only plant I ever lost in winter, and that was caused by too kind treatment. I thought I would give it the best place in the ship, as I have often heard people say, but in this case it proved to be the worst. I had another small plant of the same kind under different treatment, which was saved, and glad enough I was to find it alive. I soon potted it, and put it into a warm damp house, where it made a good plant by the first show, and now it is in as fine condition as the one that was lost. I find that a cool, damp pit, is the best place to keep them in during winter. It should have glass on the top, air given every day, and the lights covered up when it is likely to be a frosty night. I never allow the frost to get to the tender species, but in the case of the more hardy kinds a

little frost will not hurt them, provided the pots are kept from it; if the pots become frozen the roots will be injured: the pots are best plunged up to the rim, which will preserve the roots from frost. This is of great importance to all plants when grown in pots, whether they be hardy or not. Where Ferns in their wild state are found growing in exposed situations there is generally some protection to keep off sharp frosts from their roots—such as trees, brushwood, fallen leaves, and rough grass, and the old fronds of the Ferns themselves afford some protection. In pots, however, more protection is required; and as I have already said, a cold, damp pit, is best suited for them in the winter season. Where there are not the means of growing them in a glass-house, or if they are not wanted for exhibition early, they should be kept in the pit till June, and then removed to some shady part of the garden.

On Potting and Soil.

I find that the best time of the year for potting British Ferns is the beginning of March, after their resting season. My practice is to pot all Ferns once a-year, except *Hymenophyllum Tunbridgense*, *H. Wilsonii*, and *Trichomanes radicans;* these I pot once in two years, and turn the plants out of the pots, shake off some of the soil, and if they require larger pots I give them, if not, I put them into the same size again, with fresh drainage and soil. Some of the small-growing species should never be put into larger pots than the size of the plants requires, but the strong growers require large pots to have them in perfection.

The soil I find best for pot Ferns is turfy loam, peat,

and leaf-mould, in equal parts, mixed with a portion of drift-sand, all being chopped well together. I always give the stronger-growing Ferns their soil in a rough state, but the more delicate species require it made much finer, with a good quantity of silver-sand mixed in it. This makes them root more freely. In potting give good drainage, and have your pots perfectly clean. If your plants are ready for potting, turn them out of their pots and shake off some of the old soil, but be careful not to injure the roots and young fronds; then place in the bottom of the pot about two inches of drainage, then a layer of sphagnum, or rough peat—(this is of great importance to their successful growth, as it keeps the soil from stopping up the drainage)—then fill up with soil, placing the plant in the pot so that the crown is about level with the rim. Press the soil firmly round the plant, and finish by giving a gentle watering with a rosed waterpot, to settle the soil.

Water.

This is an important item in Fern culture; Ferns require an abundance of water during the growing season, both at their roots and over their fronds. They should never be permitted to get dry. Some of the species like more than others; as, for instance, the *Osmunda regalis*. I generally water them once a-day in summer, but that must be according to the weather. If dry, they will require it; but in damp, dull weather, they will not need it so often. Rain or pond water is the best for all plants, but where this cannot be obtained, and pump water is used, it should never be applied when fresh pumped up from the well, but be allowed to remain for some time exposed to the air.

Insects.

British Ferns are not subject to many kinds of insects. Their greatest plague is the brown scale, which appears on the fronds when they are growing under glass. The way in which I get rid of scale is by placing the plants in autumn and winter so that the frost can get at the fronds, but not the roots. This will soon kill the scale. The green fly will sometimes make its appearance in spring and summer on the young fronds. They may be got rid of by means of tobacco-smoke; but do not give it too strong, or it may injure the fronds. It is best to give them a little two or three times, till the insects are destroyed. The evening, when the house is shut up, is the best time for this operation.

GROWING FERNS IN GLASS-CASES.

In the country, where there are unenclosed wastes or commons, where rocky caves and woody dells, shady lanes and running streams, are found, those with whom Ferns are favourites may find continual recreation and enjoyment in searching out the places where they grow most freely, and observing their habits in their natural state. Notwithstanding this, in the country, and also in houses, connected with which there are greenhouses and frames, and other glass structures, now becoming so common on account of their cheapness, Ferns are frequently cultivated in glass cases on account of the facilities which these simple and often elegant little structures afford for observing the developement and changes in the graceful form and delicate foliage of the species for which they are specially adapted. But in a city or a town-house few objects of ornament look more attractive, whether placed in the window or elsewhere, and few objects also are capable of becoming greater sources of instruction and pleasure, than the miniature wildernesses often seen in a Wardian case of well-grown Ferns.

Many Ferns will grow well in glass-cases, even in a warm room, where they can have plenty of light but not much sun. Some of them will grow even in the dense

atmosphere of London. I have heard of *Trichomanes radicans* being grown beautifully in a case in close parts of the City, and I have no doubt that the *Hymenophyllums* would thrive in such circumstances. I have had *Tunbridgense* growing in a very small glass case, viz. in a bottle, for these last two years, in a little silver-sand at the bottom, and the bottle corked up tightly, so that no air can get at it except when I take the cork out to give it a little moisture. This is always kept in a room where it has plenty of light. *Wilsonii* can also be grown in the same way, but they look best planted in a glass-case of moderate size. If the case is large they will not do so well, because they require a close damp place. There ought to be room at the bottom of the case for plenty of drainage. After the drainage is put in, place a layer of sphagnum upon it; then build up in the centre a little heap of sandstone, on the top of which place some silver-sand for the Ferns to be planted on; then plant the three sorts together in the same case, viz. *Trichomanes radicans*, *Hymenophyllum Tunbridgense*, and *H. Wilsonii*. These cases must always be close, and the Ferns kept damp. The three species should not be moved after they begin to root.

The other species of Ferns must not be kept close in cases. The small-growing sorts are best adapted for such places, and they should be of the evergreen kinds, such as *Adiantum capillus Veneris;* and some of the *Aspleniums*, such as *Trichomanes*, *A. fontanum*, *A. marinum*, *A. adiantum-nigrum*, *A. viride*, &c.: many others will also do. Fern-cases are made of different shapes and sizes. The best glass-case I ever saw belonged to Messrs. Cogan of Leicester Square; it was made by them, and shown at the Chiswick and Regent's Park exhibitions. This case

was filled with Ferns in beautiful condition. A stock of these cases is, I believe, kept ready made for sale, some with Ferns in them, by this firm; also a stock of bell-glasses for growing Ferns under. In planting the last-named Ferns there must be plenty of drainage, with some rock-work in different parts of the case for planting the small-growing species upon; then put a layer of moss, and the same kind of soil that is recommended for pot Ferns. These cases ought not to be kept close. Do not keep the Ferns too wet; only just keep the soil moist. To grow Ferns in perfection in glass-cases they ought to have fresh soil every year, and the best time to effect this operation is March or April. The Ferns should be taken up very carefully, so as not to injure the roots and young fronds, for that is the time the latter begin to grow, and if they are injured the growth of the plants is checked until fresh ones are produced.

PROPAGATION OF FERNS.

Ferns are propagated in different ways; viz. by dividing the plants, and by seeds: many of them may be very easily increased. The best time of the year for dividing the plants is March or April. Some of the species have a creeping caudex, and are increased by cutting them into pieces, each piece having a part of the root attached, and some of the fronds. Other species are not so easy to propagate; their caudex is not creeping, but erect: the crown must be cut through with a sharp knife, and some of the roots, with a portion of the fronds, should be attached to each piece. After these are cut through, pull them to pieces with the hand and pot them in small pots, in the material recommended for the small species of Ferns. After they are potted place them in a close frame till they are rooted, and give them a little water to settle the mould; keep them shaded from the sun till they begin to root, when they may be moved into some cool, shady place.

Ferns may be raised from seeds collected from the under-side of the fronds, which should be gathered when the seeds are ripe. The way I gather the seeds is to cut the fronds from the plant when I think they are ripe. Then I get a large piece of white paper, and

shake the fronds over the paper till I get the seed out. If the seed be ripe, it is easily displaced ; but this must be done where the wind cannot blow away the seed, which is as fine as dust. After the latter is gathered, I fill some pots or pans three parts full of drainage, then a layer of moss, then fill up with fine earth ; press all a little with the hand, then sow the seed on the top: but before I sow I give the mould a gentle watering. After sowing, I place a bell-glass over the seeds and keep them close till they begin to vegetate. A little air may then be given, by tilting the glass. When the seedlings get large enough to handle, they should be potted off into small pots and placed in a close frame, shaded from the rays of the sun ; as they begin to root they require air : they must, however, always be kept damp. I forgot to mention that the soil should be baked before the seed is sown, as this destroys small worms, which are very troublesome when the seed begins to vegetate. This process will also destroy such seeds as may be in the mould, that would smother the young Ferns as they come up, so that by baking the soil before using it you will get rid of this pest. When the plants are grown in a warm, damp house, the seeds will vegetate in different parts, and soon make good plants. After they are rooted, take them up and pot them, if they are wanted. I have seen the front walls of a vinery covered with seedling Ferns : the fronds which hang down look very beautiful, especially *Adiantum capillus Veneris*, the true Maiden-hair, and the *Scolopendrium vulgare.*

Ferns are propagated and cultivated for sale by many of our nurserymen. In the grounds of Messrs. Rollisson of Tooting, whose extensive and well-grown collection of Orchids and other rare and valuable plants renders their

establishment one of the best of the kind in the country, there is the finest collection of British Ferns that I have seen. Messrs. Rollisson have also introduced many of our most valuable exotic species, which they have received from their collectors abroad. At Mr. Sims' nursery, Footscray, Kent, there is an extensive and valuable collection of Ferns.

ON THE CONSTRUCTION OF A FERNERY, AND THE MATERIAL MOST PROPER FOR THAT PURPOSE.

The most suitable place for forming a fernery is in some secluded spot, away from the flower-garden, in some shady part where trees overhang a stream of water; shade and water are both very essential to the growth of Ferns. Some of our native kinds are found in damp situations. The Royal Fern inhabits boggy places, and many others are found in similar situations, and, of course, under artificial treatment, require a damp place. A gentleman informed me that he saw the *Osmunda regalis* growing in a boggy place, to the height of five or six feet. This is one of the noblest of all British Ferns, and one that blooms from the top of the frond: by planting it near water you may have it in full perfection, and when such is the case it is a truly beautiful object. Every fernery ought to be made at some distance from the dwelling-house if possible, with a shady walk through a shrubbery, or an avenue of trees, which will make it very pleasant on a hot summer's day. It ought to be in the middle of a plantation, or in some spot where there are sloping banks, and old stumps of trees placed in different parts; also some rockwork, which should be made with burnt bricks, commonly called burs: these are bricks run together, which may be had from the brickfields in large masses in some parts of the country; but where stone can be pro-

cured it forms better rockwork than bricks, and its appearance is more natural. Bricks, however, require to be tastefully put together. Mr. James Pulham, of Broxbourn, Herts, is the best hand at building rockwork that I have seen, and he has been employed by many gentlemen in different parts of the country in executing works of that kind. All the rockwork at Hoddesdon is formed with burs and common cement; these burs are put together with the cement, and built according to the size and shape required. After that is done, mix up some common cement with drift-sand; when it is mixed, spread it over the burs, covering every part: when the cement is set it looks like stone. We have some done in this way which has been built twelve years or more: it stands well, and is a good imitation of stone. We have rockwork which is put together with cement, without covering the burs; this is not so expensive as the former, but it ought to be made carelessly and rough in imitation of rocks: some of the pieces should be so placed as to appear to have been broken off others, which will make them appear as if in their natural state: some crevices should be left for the small species to be planted in; also hollows or caves in different parts, for the purpose of sheltering or otherwise favouring the growth of the more tender varieties, as several of our native Ferns are found in similar situations. *Adiantum capillus Veneris*; also *Asplenium marinum*, Sea Spleenwort; and *Trichomanes radicans*, Swartz Bristle Fern; are species which are all found in damp caves and attached to moist rocks on the seashore. I have seen *Adiantum capillus Veneris* growing in a similar situation where it had been planted in one of these caves in a fernery, and it was growing beautifully

on a piece of rock, with a little earth placed on the top, which was always kept damp. Some rockwork ought to be made in large masses, and places left large enough in different parts of the rocks for placing some earth for large-growing Ferns to be planted in. In forming these, rocks should be imitated as near as possible, but they must not be made too formal; the rougher they are, the more natural they look, and the more readily some Ferns flourish among them. These rocks ought to be placed in shady parts of the fernery for the different kinds of mosses to grow upon, as well as for the Ferns: a collection of mosses will be very interesting, and by these growing over the rocks, the latter are kept damp and green. There ought to be a number of old pollard trees placed in different parts of the fernery, some of them ought to be eight or ten feet high, for the purpose of planting Ferns upon them; there must be room on the top of the trees for some earth for the Ferns to be planted in. Some of our native sorts are found growing on trees, such as *Polypodium vulgare*. I have seen trees covered with this charming plant, with fronds as much as a foot and a half long; this Fern has a creeping caudex, so that by planting them on the top of the tree they will soon cover it, and form a beautiful and attractive object. Stumps often look well laid down in different parts of the fernery with common ivy overrunning them, and the *Polypody* planted on the top. The ivy should be the small-growing kind, that is found in hedgerows and woods; the trees should be the roughest you can get. I have used hornbeam, which is well suited for this purpose; but it does not matter what kind of tree it is so that it is a pollard, and looks rustic. Those trees that are to be fixed

upright must be cut long enough to allow them to be planted in the ground to make them stand firmly; they ought to be placed in different parts of the fernery, so as to appear as if they had been growing there for years, with some ivy planted at the bottom for the purpose of covering the stems of the tree. A few rustic arches look very well in different parts, made with rough burs, and put together with cement; some of the different kinds of climbing plants look very well running over these arches, such as *Clematis vitalba*, common Travellers' Joy, the *Lonicera periclymenum*, the common Honeysuckle, or Woodbine: the flowers of this plant are very sweet. There should also be one or two summer-houses in the fernery, made with rough wood on burs, with climbers running over them. If a stream of water runs through it, there ought to be some pieces of rock overhanging the stream, for the purpose of planting some of the Ferns on, such as *Scolopendrium vulgare*, common Hart's Tongue: this plant delights in such situations, and being of a dropping habit, and evergreen, it creates a fine effect all the year round. I have seen this plant growing on the banks of a stream of water with fronds two feet long. A waterfall would be a great improvement in a fernery; this can be easily formed if there is a stream near, by heading the water back to the height that is requisite for the fall: for this purpose a strong wall should be built with bricks and cement, for the purpose of heading the water back after the wall is finished; then build some rockwork up to it with burs and cement: on the whole, it will look best if it is made in imitation of stone. The rocks ought to be so placed that the water may flow over them, and a few pieces of rock thrown carelessly in the bed of the stream

help to increase its natural appearance. A bridge made with rough wood with the bark on, would also look well near the waterfall; but burs and cement will be the most durable, as the wood does not last long.

On Planting, and the Soil most proper for that purpose.

After the fernery is constructed, the next thing to be considered is proper soil for the plants. They like good material to grow in, if perfection in their culture be desired. Some of the kinds require different treatment from others. Those that are found on old walls and rocks do not require so much earth to grow upon as others. Most all the small-growing Ferns are found in such places, and they require a lighter soil than the stronger-growing species. The best soil for small Ferns is leaf-mould, rotten turf of a loamy texture, and some peat in equal parts, together with a good quantity of drift-sand mixed with the material. Afterwards chop them well with a spade, so that the whole is rather fine, but do not sift it. The more robust-growing Ferns require a stronger soil. They are generally seen in their wild state on banks, and sometimes on level ground. I find them do best in a mixture of rotten turf, loam, and peat, in equal parts, mixing them well together, and chopping with a spade, but not too fine. These like the soil rather rough, because the water passes off more quickly, and they require an abundance of water during their growing season. When the soil is rough, the water does not stagnate about their roots, which is very injurious to them.

On Planting.

It requires great care to place the different sorts, so that they do not overgrow one another. The stronger kinds should be planted in such parts of the fernery as will allow them plenty of room to develope themselves and spread out their beautiful fronds. Some of them grow to a great size, and of course require plenty of room. I plant all the species separately. Some growers of Ferns plant them in masses of a dozen plants together, but they look much better separate; and the sorts should be mixed, which shows them off to more advantage. The larger-growing species require earth of about a foot and a half deep, for some of this class send their roots deep into the soil, such as the common brake, *Pteris aquilina*. If the small growers are planted on the rocks, they will require from four to six inches of earth, in order to grow them in perfection. Some of them are found on walls, without any earth to grow in, but only just the moisture and wall to cling to. I have seen walls covered with them, and on which they grew beautifully; but when you move them from those places they require some earth to get them established. They will root freely enough provided they are kept damp, and should never be allowed to get too dry. The best time of the year for planting Ferns out into the fernery is March, April, and May; the more hardy species are best put out in March and April, and the tender kinds in May. The latter should be placed in the more sheltered parts of the fernery, in places according to the situations in which they are found growing wild. The large growers should be planted at the back, and the small ones in front.

A Description of the Fernery at Broxbournbury, the Seat of G. J. Bosanquet, Esq.

Broxbourn Park is celebrated for the fine trees it contains, among which its oaks and Spanish chestnuts are exceedingly beautiful. A short and pleasant walk among these trees to the eastern side of the park, leads through a plantation to the fernery, which is situated in a sort of dell or hollow, excavated originally for the purpose of obtaining gravel. The spot lies low, and is well shaded and sheltered by the large and spreading trees that surround it. Through a rustic wooden gate you enter this secluded garden of Ferns, where all the plants seem to thrive so well, that you are led to think they are at home, growing luxuriantly in their native soil. A few trees of a shrubby kind, among which the common elder is conspicuous, have been planted in the centre, and around the sides of the hollow. These sides are about twenty feet high, and have been formed into sloping banks, on which the several kinds of Ferns have been planted. The soil consists of sandy loam, mixed with peat. The Ferns are planted in groups, the several varieties of the same kinds being placed together, and I never saw any growing in greater perfection. The *Osmunda regalis* seemed quite at home; a beautiful *Polypodium phegopteris* covered a space of six feet. Also a fine plant of *Woodsia ilvensis*, which stands the winter without any protection. Along with this was *Asplenium marinum*, which few Fern-growers can manage out in the open ground. Also *Adiantum capillus Veneris*. I was very much surprised to find the *Hymenophyllum Tunbridgense* and *Trichomanes radicans* there. These had

been out all the winter: they were planted in a small cave made of rough wood, having the two Ferns in the centre; the only protection was a bell-glass over them. *Lastrea cristata* is growing very strong; the fronds were as much as three or four feet high. Also *Lastrea oreopteris*, which few can grow. *Cystopteris alpina* was growing very beautifully, and *Polystichum lonchitis*, of which there were several fine plants, along with the British Ferns. There are many tender exotic species, which are usually grown in hot-houses, such as *Adiantum pubescens*, *Doodia aspera*, *D. rupestris*, *Allosorus sagittatus*, *Adiantum pedatum*, *Aspidium Shepherdii*, *Pteris rotundifolia*, all planted in sheltered parts of the fernery. Along with these was *Lycopodium denticulatum*, which had been out three years, and was growing very luxuriantly. Mr. Fuller, the gardener, informed me that they had endured the winter without any protection except the fronds and the fallen leaves that had collected round them. This place is very much sheltered from the cold winds on all sides. At the bottom of the fern-banks is an edging formed of rough wood, and a walk, which leads round the bottom of the bank to a summer-house, built with rough stones and cement. The walks through the centre of the fernery are planted on each side with Ferns, and different kinds of our native plants. I noticed some very pretty British Orchids, viz. *Orchis bifolia*, the Butterfly Orchis, *O. morio*, green-winged Meadow Orchis, and *O. maculata*, spotted palmate Orchis. Also *O. viridis*, Frog Orchis, and the common fox-glove, *Digitalis purpurea*, with many other British plants, which look well planted in different parts of the fernery. There is no rockwork in this place, except the summer-house, but

many old pollard trees lying in different directions are planted with ferns, and produce a good effect. The fernery is laid out with much taste, and does great credit to those by whom it has been designed and managed. There is also a fine collection of roses at Broxbournbury, probably one of the best private collections in this country. But for a notice of this I must refer my readers to a little work, written by Mr. W. Paul of the Cheshunt Nurseries, entitled the "Rose Gardens of Hertfordshire," where there is a full account of the garden at this place.

DIRECTIONS FOR DRYING FERNS.

A COLLECTION of dried Ferns is both useful and interesting at all times of the year, provided they are properly dried and correctly named; they serve to refresh the memory at any time: to young gardeners in particular they are very useful, and when dried they do not take up much room. I have for some years past kept collections of dried British Ferns. I have also a collection of exotic species, which I find very useful, for sometimes you forget their names; but if you have them dried, and properly named, you can always refer to them.

When they are kept on white paper they look extremely handsome. I have some Ferns that have been dried four years, and they look as well now as when first done. The way I dry my Ferns is very simple, but it answers the purpose well. I first get two pieces of board, about three feet long and a foot and a half wide, then some paper—old newspapers answer the purpose very well. The next thing is the Ferns, which should be gathered when dry, if possible; for if put in the papers while wet, they will most likely spoil. In gathering them, pick the best and most perfect fronds you can get, but be careful not to break them. Pick the stalk near the ground, so that you have all that belongs to the frond. The small-growing species ought to be taken up with the roots and

dried entire. Shake the soil off from the roots before you put them into paper. When the specimens are ready, place three or four sheets of paper on one of the boards, then one of the fronds on the top of the paper, then two more sheets and another Fern on the top. Keep on thus till you get all your specimens in, by placing two or three sheets of paper between every frond; if the latter are small, you can place two or three in one sheet. After they are all put together, then place the other board on the top of them: get something heavy—say about ten or fifteen pounds weight—and place it on the top of the boards; let them remain for three or four days, then give them fresh paper and place them as before, following the same plan until you get all dried; but be careful always to keep the specimens in a dry place, for if allowed to get damp they soon become useless. If more specimens are gathered, they must be put by themselves in the same way as the former; but be careful not to put too many under the process of drying at once, unless you put them in separate places. After they are all dried, get some white paper, and put each specimen by itself on a sheet; after that is done, then have a slip of paper for each specimen, for the purpose of writing its name on, and the station from which it was gathered. When they are all arranged, get two stiff pieces of paper, of the same size as that in which the Ferns are in, and put the whole collection of Ferns in between the two; tie them firmly together, and deposit them in some dry place where air cannot readily get at them.

DESCRIPTIVE LIST.

The following will, I trust, be found to contain all the most important Ferns required in the construction of a fernery out of doors.

Polypodium phegopteris. Linn.—Mountain Polypody, or Beech Fern. This is a beautiful deciduous species, with a creeping caudex, and fronds ten inches high; found growing in damp situations, near waterfalls, and in damp woods. It is well adapted for planting out in a fernery, either on rockwork or on the level ground. It is a free-growing plant, and quite hardy, requiring a good supply of water at the roots.

Polyp. vulgare. Linn.—Common Polypody. A pretty species, with fronds from six inches to a foot and a half high; this is generally found growing on old walls and rocks, dry banks, and trees. It is a free-growing species, and is well adapted for planting out on rockwork and old trees, in which positions it forms a beautiful object. It is a very hardy Fern, requiring a liberal supply of water at the roots; it is evergreen, with a creeping caudex.

Polyp. dryopteris. Linn.—Tender three-branched Polypody. A very good species, with fronds from six to ten inches high. It grows in shady places, in moist woods,

on rocks, and near waterfalls. This has a creeping caudex, and is a free-growing species; it succeeds well, planted out in a fernery, either on the rocks or on the level ground. It is a hardy Fern, requiring a good supply of water over the fronds and roots. A deciduous species.

Polyp. calcareum. Smith. — Rigid three-branched Polypody. An elegant Fern, with fronds from six inches to a foot high. It is a hardy species. I have received fine specimens of this plant from Matlock, in Derbyshire, which were gathered by Septimus Warner, Esq.; they were growing in rocky places. It is well adapted for planting on rockwork, in a sheltered situation; it requires a good supply of water at the roots. A deciduous species, with creeping caudex.

Polyp. alpestre.—An elegant new Fern. I believe it is hardy, but I have not tried it; caudex creeping, and grows from six inches to a foot and a half high.

Polyp. Cambricum: var. of *vulgare.*—This is a handsome variety of *vulgare*, grows from ten inches to a foot high, with a creeping caudex. It will succeed well planted out, but it makes the finest plants when grown in a pot under glass, in a frame or greenhouse; but when planted out in a fernery, give it a sheltered position, with not too much water at the roots. This is an evergreen Fern.

Woodsia ilvensis.—Brown oblong-leaved *Woodsia.* A beautiful little Fern, with fronds from three to five inches high; a very rare species, found growing on rocks. It will do well planted out in the fernery in a sheltered part. I have seen a plant of it growing in a fernery for these last five years, but it was in a sheltered situation, and was not kept very wet. A deciduous species with a tufted caudex.

Wood. Alpina. Newman.—Round-leaved *Woodsia.* A

small-growing Fern, with fronds from three to four inches high. It is found on rocks and high mountains. I have a plant of it that was found on Snowdon, in Wales, procured three years ago by R. Backer, Esq., of Hertford. This Fern should be planted on rocks, in a sheltered part of the fernery, but it should not be kept too wet. A deciduous kind, and very rare, with a tufted caudex.

Allosorus crispus. Bernhard.—Rock, Brake, or Parsley Fern. An elegant Fern, with fronds from three to six inches high; the fronds are of two kinds, barren and fertile. This is a hardy species, which is generally found on old walls and on rocks. We have a fine specimen of it that was found on a wall, growing only in mortar and brick. It is well adapted for rockwork, or for planting on the level ground. It does not require much earth to grow in. It also makes a beautiful pot plant, requiring less water than some ferns. A deciduous species, with a tufted caudex.

Lastrea thelypteris.—Marsh Fern, has fronds from twelve to sixteen inches high. It grows in marshes and boggy places. It is a hardy species, which will do well in a fernery in a damp place, near water. A deciduous kind, with a creeping caudex.

Las. filix, mas. Presl.—Male Fern. A noble Fern, with fronds from two to four feet high; common in hedgerows and woods. It is very hardy, and should be planted at the back of the fernery, where there is plenty of room for it to grow. It requires a good depth of earth, and plenty of water at the roots in the summer season. A deciduous species, with a tufted caudex.

Las. oreopteris. Presl.—Heath Fern. A beautiful species, with fronds from a foot to two feet high. It grows on heaths, also in woods and commons. I found

some fine specimens of it last summer on Epping Forest, near High Beach; some of them were as much as I could lift into a cart. There are a great many specimens now growing on the forest. It will succeed in a fernery in a damp place, with not too much shade. A deciduous species, with tufted caudex, and quite hardy.

Las. cristata.—Crested Shield Fern. A beautiful Fern, with fronds two or three feet high, and very rare. It has a tufted caudex, and is found on boggy heaths. This will do well in a fernery. It requires a good depth of soil to grow it to perfection, with a liberal supply of water at the roots during the growing season. It is hardy, and loses its leaves in winter.

Las. rigida. Presl.—Rigid Fern; fronds from one to two feet high, with a tufted caudex. A very rare, hardy species, found in mountainous districts. It will do well planted out where there is plenty of earth to grow in. It does not require so much water as some of the species. Deciduous.

Las. spinulosa.—Prickly-toothed Shield Fern; fronds from one to two feet high: found in woods and heaths. A free-growing species, and quite hardy. It will succeed planted out in the fernery in an open part, so that it has plenty of light, with a liberal supply of water at the roots during the growing season. A deciduous species.

Las. dilatata. Presl.—Broad Sharp-toothed Shield Fern; fronds from two to three feet high: a noble Fern when well grown. It is found growing in woods and heaths, a hardy species, with a tufted caudex. It should be planted at the back of the fernery, where there is plenty of room for it to spread out its beautiful fronds. It is free-growing, and requires a liberal supply of water at the roots during the summer season. Deciduous.

Las. uliginosa.—A pretty Fern, with two or three sorts of fronds. This is a new Fern in the way of *cristata*, requires the same treatment, grows about two feet high, and is quite hardy. A deciduous species, with a tufted caudex.

Polystichum lonchitis. Roth.—Rough Alpine or holly Fern; a beautiful species, with fronds from six inches to a foot high, caudex tufted. Found on rocks and high mountains. A hardy species, which does well planted out on rockwork in a fernery, with not too much water at the roots. Evergreen.

Polys. lobatum.—Close-leaved prickly Shield Fern. An elegant Fern, with fronds from a foot to eighteen inches high, caudex tufted; a very hardy species, which grows in hedge-rows and shady banks. It is very suitable for planting out in a fernery, in which you cannot have too many. It will succeed on rocks or on the level ground, and it is well adapted for planting by the edge of water. An evergreen drooping species.

Polys. aculeatum. Roth. — Common or prickly Fern. Fronds a foot and a half high, caudex tufted; found on shady banks. A hardy species, resembling *lobatum*. It is well adapted for planting out, and requires a good supply of water at the roots. Evergreen.

Polys. angulare.—Angular-leaved Fern. A very elegant species, with fronds from a foot to two feet long, caudex tufted. This beautiful hardy Fern is very suitable for planting out. It requires a liberal supply of water at the roots; any part of the fernery will suit. It looks well planted on the banks of the stream. Is an evergreen.

Cystopteris fragilis. Bernhardi. — Brittle Bladder Fern. An elegant little species, with fronds from six to ten inches high, caudex tufted; found on rocks and walls

near waterfalls. A hardy species, which is well adapted for planting on rockwork or on the level ground, with not too much water at the roots. Deciduous.

Cyst. dentata.—A beautiful Fern, resembling *fragilis*, with fronds from six to ten inches high, caudex tufted; found in the clefts of rocks and on walls. A free-growing species, which will do well on the rockwork or on the level ground, with a good supply of water at the roots during the summer season. Deciduous.

Cyst. Alpina. Desvaux.—Alpine Bladder Fern. An elegant and rare species, with fronds from six to ten inches high, caudex tufted; found on old walls. It should be planted in a sheltered part of the fernery, and should not have too much water at the roots. Deciduous.

Cyst. montana. Linn.—Mountain Bladder Fern. A very rare kind, with a creeping caudex. It should be planted in a sheltered part of the fernery, on rocks; found on rocks and walls.

Asplenium trichomanes. Linn. — Common Spleenwort. A beautiful little Fern, with fronds from five to eight inches high, caudex tufted; grows on old walls, dry banks, and rocks. A hardy, free-growing species. I have seen walls covered with this drooping plant, which has a charming appearance. It will do in any part of the fernery, either on the rocks or on the level ground. You cannot have too much of this Fern. It is evergreen, and quite hardy.

Asp. viride.—Hudson's green Spleenwort. A beautiful little Fern, with fronds from four to seven inches high, caudex tufted; grows on rocks and walls. It should be planted in a sheltered part of the fernery, on the rockwork with not too much water at the roots. An evergreen species.

Asp. fontanum.— Brown's smooth rock Spleenwort. An elegant little kind, with fronds four inches high, caudex tufted. A very rare species, which grows on rocks and old walls. It should be placed in a sheltered part of the rockwork, and should not have too much water at the roots. An evergreen species. We have had this Fern growing in the fernery in a sheltered part, and it stands the winter well, although it is supposed to be tender. We have a fine specimen of this growing in a pot about ten inches across.

Asp. lanceolatum.—Hudson's Spleenwort. An elegant Fern, with fronds from five to eight inches high; grows on rocks and walls. This has a tufted caudex. A very rare species, requiring to be planted in a sheltered part of the rockwork, with not too much water at the roots. Evergreen.

Asp. marinum.—Sea Spleenwort. A beautiful Fern, with fronds from six inches to a foot high; very rare, caudex tufted. This is a tender species, requiring to be planted in a sheltered part; as, for instance, in a cave. I have never tried this Fern in the fernery, but I have seen it stand the winter with a little protection. It is best grown in a pot in a little heat, in which it soon makes a fine plant. It is found growing in caves and on rocks on the side of the sea. An evergreen species.

Asp. Adiantum nigrum. Linn.—Black Spleenwort. An elegant Fern, with fronds from six inches to a foot high, caudex tufted. A hardy species, found on dry banks and old walls and rocks. A very common Fern, which is well adapted for planting on rockwork or on the level ground, with a liberal supply of water at the roots. You cannot have too much of this sort, for it will do in any part of the fernery. It will also do well on some of the

old pollard trees planted with the *Polypodium vulgare*. An evergreen species.

Asp. ruta muraria. Linn.—Wall-rue Spleenwort. A very small Fern, with fronds two or three inches high, hardy, and having a tufted caudex. It is found on old walls, some of which I have seen covered with it where it had nothing to grow on except mortar. It should be planted in the crevices of rockwork. An evergreen species.

Asp. Germanicum.—Alternate-leaved Spleenwort. A very rare Fern, with fronds from three to four inches high, caudex tufted; found on rocks and walls. I have never tried this in a fernery. I imagine that it will succeed, provided it is planted in a sheltered part of the rocks. It makes a beautiful pot-plant when grown in a little heat, but take care never to have it too wet at the roots. An evergreen species.

Asp. septentrionale. Hull.—Forked Spleenwort. A small-growing Fern, with fronds three inches high, very rare, and having a tufted caudex: found on rocks and walls. It should be planted in a sheltered part of the rocks, and should not have too much water at the roots. An evergreen species.

Athyrium filix fœmina.—Female Shield Fern. An elegant species, with fronds from a foot to three feet high, hardy, and having a tufted caudex. Found in woods and on banks, in damp places. I have found some fine specimens of this Fern on Epping Forest, near High Beach, growing in a damp place, on the side of a stream of water. It will do well planted in the fernery where there is plenty of room for the fronds, which grow very large when the plant gets well established. It requires

a liberal supply of water during the summer season. A deciduous species.

Ath. filix fœmina crispum.—A very distinct variety, grows about ten inches high, with a tufted caudex, and quite hardy; will do in any part of the fernery, with not too much water. A deciduous Fern.

Ath. filix fœmina multifidum.—This is a very curious variety of *femina*, grows from six to ten inches high, caudex tufted; a deciduous Fern, and quite hardy, and will do in any part of the fernery, with a good supply of water at the roots during the growing season.

Ceterach officinarum. Willdenow.—Scaly Hart's Tongue. A beautiful Fern, with fronds from three to six inches high, caudex tufted, quite hardy. It is well adapted for planting out on the rock-work or on the level ground in general. It is found on old walls and rocks. I have seen walls covered with it, growing in nothing but the mortar. It was drooping down the wall, and looked very beautiful. An evergreen species. This does not require so much water as some of the others.

Scolopendrium vulgare.—Common Hart's Tongue. An elegant species, with fronds from a foot to two feet high, hardy, and having a tufted caudex; grows on old walls and banks, and on the sides of streams. One of the best for a fernery, as it will do in any part of it, either on the rocks or on the level ground, and it also looks beautifully on the sides of a stream, where the fronds can slope over the water. It requires an abundance of water at the roots in the summer season. You cannot have too many of this Fern, which is an evergreen.

Sco. crispum.—A variety of *vulgare*, and a beautiful Fern, with fronds a foot high, caudex tufted. It is quite hardy, and does well planted in anv part of the fernery.

It likes a good supply of water during the summer season. A very rare Fern, and evergreen.

Sco. multifidum.—A variety of *vulgare*, with fronds four to six inches high, caudex tufted, hardy, and will do well in the fernery, with not too much water at the roots. Evergreen.

Sco. polyschides.—A variety of *vulgare*, with fronds eight inches high, caudex tufted. It is quite hardy, and will succeed in the fernery either on the rocks or on the level ground. We have all these varieties planted out in the fernery. An evergreen Fern.

Blechnum boreale.—Withering hard Fern. A beautiful species, with fronds a foot high, caudex tufted, a hardy species, found in damp boggy places on heaths. I found a specimen of this plant three years ago, which was as much as I could lift into a cart. I gathered it near High Beach, in Essex, in a damp boggy place, surrounded by water, and where it seemed to thrive well. It is a beautiful species for a fernery, in which it should be planted in a damp part, near water. The fronds are of two kinds, fertile and barren. It is an evergreen species, which requires an abundance of water during the growing season.

Adiantum capillus Veneris.—The true Maiden Hair. The most elegant of all the British Ferns; it has fronds from six to ten inches high, with a creeping caudex; a rare species, found growing in moist caves and on damp rocks on the sides of the sea. It is rather tender, and should be planted in a sheltered part of the fernery, similar to the stations in which it is found wild. We have a plant of this Fern planted out on a piece of rock underneath a Gothic arch, from which place there is a constant run of water from a spring. It is always kept damp, and stands the winter well. I mean to try the *Asplenium*

marinum, also the *Hymenophyllum* and *Trichomanes radicans* in the same situation, and I expect that they will do well, if they are kept damp. The *Adiantum* makes a fine pot-plant, when grown in a little heat; it requires a good supply of water at the roots. This is an evergreen species.

Pteris aquilina.—The common Brake. A large-growing Fern, with fronds from three to six feet high, and sometimes more; hardy, with a creeping caudex, and very common. I have seen as many as thirty or forty acres of this Fern; the proprietor cuts it down every year, builds it up into stacks, and uses it for his cattle to lie upon, and it is very handy for packing plants with. Messrs. Paul, of the Cheshunt Nursery, pack all their roses in this Fern, in which they send many thousand plants away every season. It should be planted at the back of the fernery, and should have a liberal supply of water at the roots. A deciduous species.

Osmunda regalis.—The Royal Fern. The noblest of all British kinds, and one that flowers from the top of the fronds, which are from three to eight feet high, caudex tufted. A hardy species, found in damp boggy places, in which it delights. It should be planted in a damp part of the fernery, near water, of which it requires an abundant supply during the summer season. A deciduous species.

Trichomanes radicans.—Swartz Bristle Fern. An elegant sort when grown under glass, with fronds from four to six inches high, caudex creeping; found near waterfalls and in damp caves. This is a tender evergreen species. I have already referred to its cultivation.

Hymenophyllum Tunbridgense.—The Tunbridge filmy Fern. A small-growing species, with fronds three inches

high, caudex creeping, found on damp rocks and near waterfalls. This is rather a tender Fern, and I always grow it under a bell-glass. I have never tried it in the fernery, but I intend to plant one out to try if it will withstand the winter; I shall put it in a place resembling the situation in which these plants are found in a wild state, and I have no doubt that I shall be able to grow both the species of the *Hymenophyllum;* I shall set them on a piece of rock with some silver-sand and sphagnum moss, in a damp, sheltered situation. This is an evergreen species.

Hymenophyllum Wilsonii.—The Scottish filmy Fern. A beautiful little kind, with fronds two inches high, caudex creeping, found on damp rocks growing among moss. This, like *Tunbridgense,* is rather tender. It is evergreen, and requiring the same treatment as the former two.

Ophioglossum vulgatum.—Adder's Tongue. This is a curious Fern, with the tongue proceeding from the centre of the fronds, which are from six to eight inches high; it is found in moist pastures and woods: it is hardy, and will do planted out in the fernery in a damp place: it requires a good depth of earth, with a liberal supply of water at the roots. I have grown this in a pot these last five years: it had six fronds when first planted, but this year it has increased to twenty. A deciduous species.

Botrychium lunaria.—Swartz Moonwort. Fronds four to six inches; a hardy species, found on heaths and dry pastures: it will succeed planted out in the fernery, where it requires a good depth of soil, for the roots run deep. It should not be kept too damp. A deciduous species.

HINTS ON THE CULTIVATION

OF

EXOTIC FERNS.

GENERAL REMARKS.

Many of these are hardy, and will thrive well out of doors throughout the year; the greater number of them, however, are rather tender, and require both shelter and heat, in order to vigorous growth or health. Some of them are large and robust, but those most generally cultivated are smaller in size and more graceful in form, as well as more delicate in habit of growth, than our native species. In favourable situations, several kinds of tropical Ferns may be intermingled with the British species in a fernery in the open air, where they will do well during the summer, and only require to be taken up in the autumn, and removed to a place of shelter for the winter. Many of them may be cultivated in a grape-house, under the vines, or even in a green-house during the summer, while some of the most elegant and beautiful

among them flourish luxuriantly, and appear to great advantage in a Wardian or glass-case. The same kind of soil seems equally suitable for both British and foreign Ferns when grown in glass-cases, but the latter require to be kept much more close, and to be placed in a warmer position. I have been informed by a gentleman, who is a great admirer of Ferns, that he has in his drawing-room several glass-cases filled with exotic species: the plants have plenty of light, but are carefully sheltered from the direct rays of the sun, and thrive well in the atmosphere produced by keeping the cases constantly and perfectly closed.

In general, exotic Ferns are propagated in the same way as those found in England, but in a number of the species young plants are produced from the fronds; and to propagate these, the fronds should be taken off, laid on mould in a pot covered with a bell-glass until they have made roots, when they should be removed, placed singly in small pots, and kept moist in a shady part of the house. Many tropical Ferns seed freely, and as the seed is easily dispersed if the house in which they are grown be damp, multitudes of young plants will spring up in all directions.

Those who find pleasure in contemplating the delicate structure and graceful forms which distinguish this beautiful tribe of plants, may easily provide themselves with a collection of exotic species by drying the fronds, as already recommended in reference to British Ferns.

CULTIVATION IN POTS.

The most suitable place for growing the several kinds of tropical Ferns and Lycopodiums is a stove, orchid-house, or similar structure, in which the atmosphere is kept very generally moist, and the temperature ranging from 50° to 60° in winter, and where in summer the heat is between 70° and 80°, or where by the addition of sun-heat it may rise to 85° or 90°. This degree of heat will not injure the plants, provided they are shaded from the direct rays of the sun. The exotic Ferns and Lycopodiums under my own care are all grown in an orchid-house, being placed in different parts of the house among the orchids, or beneath those which are suspended in baskets from the roofs. In this latter position all kinds thrive remarkably well; their growth is rapid, and the fronds are all finely formed and beautifully coloured. They will even grow when placed on the floor of the house, and are but rarely injured by the water that falls from the tables or baskets above them. I am of opinion that the practice of growing Ferns underneath the orchids is, besides proving a means of concealing to a great extent the unsightly appearance of the pots, and adding to the amount of verdure and consequent beauty of the house, a benefit to both kinds of plants. The drip from the Orchids above, and the damp or steam arising from the Ferns

beneath, keep up the moisture longer than when they are watered separately. My practice is to syringe the plants twice a-day, viz. early in the morning, and again in the afternoon, during the months of May, June, July, and August, and once a-day throughout the remaining months of the year. Watering at all seasons will require to be regulated in some measure by the state of the weather. When this is dull or wet, less water will be needed than when it is hot or dry. I shut up the house in the spring of the year about three o'clock, but in May, June, July, August, and September, an hour later, and I then give the plants a good syringing with water of about the same temperature as the house.

Ferns require, especially during their growing season, a good supply of water at their roots, which should never be allowed to get dry, as this would most likely kill the plant; or, if not, cause the fronds to shrivel, and destroy its vigour and beauty. Though the mould in which Ferns are grown should always be kept damp, great attention should be given to the state of the drainage, that there be no lodgment of any stagnant moisture about the roots or crown of the plant; and the house should be dried up once a-day, if possible, by means of ventilation. But in doing this, care must be taken to prevent currents of cold sharp air coming directly upon any plants which are growing in a warm, moist atmosphere, as their young and peculiarly tender fronds would thereby be greatly injured, if not destroyed. Ventilators should, if practicable, be made near or below the hot-water pipes, that the air may be warmed to some degree as it enters the house.

Soil and Mode of Potting.

Although the treatment of all kinds of Ferns in respect to soil, &c., is to some extent similar, it must be occasionally varied. The more delicate species thrive best in fine soil, intermixed with a good quantity of silver-sand. The larger growers will do best in a coarser soil, one resembling that recommended for the British species. The exotic species require to be potted in the same way as our native Ferns, only earlier in the season; about the beginning of February has appeared to me to be the best time. I give all the specimen plants a fresh potting once every year. Young growing plants I pot twice or thrice during the same time, giving them a size larger pot each time, which greatly favours their growth. When they attain the size required, they are only shifted once a-year. In doing this, I take out the plant, shake off most of the old soil, cut away some of the roots, and place the plant in a clean pot. This plan is pursued till the plants have been grown in a pot five or six years. After which I find it best to replace them in the collection by younger plants. Previous to potting, I let the plants get nearly dry at the roots, in order that the mould may be the more easily shaken away; at the same time, I cut away all the decayed or injured fronds, and clean the plant from all insects. After potting, I do not give much water at first, but wait till the plant begins to make root, and then increase the supply.

INSECTS.

Ferns are liable to injury from several kinds of insects, chiefly, however, thrip, brown scale, and green fly.

The scale generally appears on the fronds, and is very difficult to remove. The best method of accomplishing this is careful washing with a sponge and clean water. In doing this, great caution must be used to avoid bruising or injuring the fronds. Cleaning the fronds of ferns in this manner is very tedious work, but it is the only way of getting rid of this pest. When the fronds infested with scale are old, the best way is to cut them off; but the whole, or even the greater part of the fronds, must never be cut away at once, however full of insects they may be. I once destroyed a beautiful specimen plant of *Chelanthus lendigera* by cutting away all the fronds at once, because they were completely covered with scale.

The most effectual mode of destroying thrip or green fly is by smoking the house with tobacco. The best time to do this is after the house is shut up in the evening. It is better to smoke the house moderately, and repeat the operation in two or three days, than to attempt to destroy them at once: too much tobacco-smoke may injure the plants, and a less quantity repeated two or three times will secure the same object more effectually.

A FERNERY UNDER GLASS.

The cheapness of glass having rendered structures of glass for gardening purposes much more common than formerly, many kinds of plants, that have always had many admirers, have been more extensively cultivated. This has been very much the case with exotic Ferns. They already occupy a place in many of our vineries, stoves, and orchid-houses, and in some of them fill up a considerable part of the space. A collection of tropical Ferns, under glass, is seen quite as frequently as one of those which are natives is met with in an out-door fernery. In some of our nurseries there are houses, or distinct compartments, filled with Ferns only. Mr. Burney, of Stratford Nurseries, has a house devoted to the growth of exotic Ferns, of which he possesses a very good collection. Messrs. Henderson of Pine-apple Place, Edgware Road, Messrs. Jackson of Kingston, and others, also cultivate these increasingly favourite plants. Among private growers, Mr. Edward W. Cooke of Victoria Road, Kensington, Mr. Anderson of Regent's Park, and Mr. H. Bellenden Ker of Cheshunt, already possess valuable collections, including some of the best kinds known amongst us. One end of the large orchid-house here is devoted chiefly to the growth of Ferns, with evident advantage to the effect of the whole, and it is scarcely

possible to imagine any building for plants more attractive than one appropriated chiefly to the growth of exotic Ferns might be rendered. A span-roofed house, of good dimensions, the sides facing east and west, would be the most suitable; rockwork of different kinds, having in it crevices and hollows for the mould, might be constructed in various parts of the house, in which arrangements should be made for a piece of water proportioned to the size of the whole. Here the *Nymphæas*, *Caladiums*, and other water-plants, would thrive well.

Some of the exotic Ferns will grow in baskets, with moss to keep the mould in; others on old blocks of wood, to which they should be firmly tied with wire, and having a good bit of moss between the plant and the block. Those on blocks and baskets will require a good syringing twice a-day in summer; it is also well to take them down two or three times a-week, and soak them thoroughly by dipping them in tepid water, for when grown thus they need more water than in pots. Ferns grown in baskets or blocks suspended from the roof often look very beautiful, as the undersides of the fronds, often peculiarly interesting, are then more distinctly seen.

At the end of the orchid-house here, where the Ferns are planted, there is a wall fourteen feet high, covered with climbing Ferns, of which *Polypodium phymatoides* and *Acrosticum scandens* grow remarkably well. Others would probably do as well, but these are objects of great beauty. Under the climbing Ferns, and covering a piece of rockwork, are other kinds. There is a large Fern at one end, and a fan-palm at the other, and in the centre a noble plant of *Asplenium nidus;* in the intervening spaces, *Polypodium effusum*, *Adiantum trapeziforme*, *Didymochlæna pulcherrima*, and *Polypodium aureum*, are placed.

At the bottom of the rockwork is a piece of water, in which there are *Nymphæa cærulea*, *N. rubra*, and other plants; the water, which is supplied from a slate-cistern, flows over the rocks into the rustic sort of basin in which it is contained. The Ferns in the rockwork are planted in soil composed of leaf-mould, loam, and peat, well-mixed, but not chopped too fine,—a depth of from six inches to a foot is quite sufficient. I generally give the Ferns fresh soil once in two years, and find the month of February is the best time. Those that are climbing up are not disturbed, but receive a sort of top-dressing: the others I take up, shake off some of the old soil from their roots, and then replant them in fresh soil, giving them but little water till they begin to root, after which they are abundantly supplied. I water those on the rockwork with a pail-engine, having a spreader on the nose, which prevents the waters driving too heavily on the fronds.

DESCRIPTIVE LIST.

The following are among the best of this beautiful class of plants with which I am acquainted, and there is a number of others which I believe are well worth growing. In addition to the brief description given, I have occasionally added a remark, when such has appeared likely to be useful, on the peculiar mode of culture, or manner of propagation, which I have found most successful.

Acrosticum scandens.—A noble evergreen Fern, with fronds two or more feet long, and a creeping caudex. This may be grown as a pot-plant, but it will thrive best where it has larger space. Its habit is climbing, and planted against a wall, twining round a pillar, or running over rockwork, it forms a very attractive and beautiful object. We have a fine plant spreading over a wall which is fourteen feet high, and against which it has been planted about five years.

Adiantum assimle.—A desirable species of one of the most numerous and beautiful classes of Ferns. The whole class is characterised by the smooth, shining, dark colour of the stalk; and the general richness of colour and elegance in form of the whole frond, in some of the species, is very distinct, as well as beautiful. *A. assimle* is a very pretty species, not so tender as some, growing about a foot

high, having a creeping caudex, and well suited for growing in a basket.

Adiantum concinnum.—A most lovely evergreen species, caudex tufted; grows a foot high. Makes a beautiful pot-plant, and is a good one for bouquets. It requires plenty of heat and light.

Adi. cuneatum.—This is one of the prettiest of the Adiantums. Grows about ten inches high, caudex tufted. It is one of the best for bouquets; is also a good one for glass-cases, as it does not require so much heat as many others. It will do planted out in a light part of the house, or in a basket suspended from the roof.

Adi. curvatum.—An extremely handsome and rare evergreen species. Grows a foot or more high. Requires a good heat. Is a good sort for bouquets.

Adi. cristatum.—A pretty, dwarf, evergreen species. Grows six inches high, caudex tufted. A good kind for glass-cases, also for bouquets. It does not require so much heat as some of the sorts.

Adi. formosum.—This is another fine evergreen species. Grows two feet high, with a creeping caudex. A good plant for bouquets. It is not so tender as some, and will do in a cool place, and may be planted out in any part of the house. When grown in a pot, it requires a large-sized one to grow it to perfection.

Adi. Foveanum.—A graceful evergreen species; grows two feet high. The fronds are very suitable for bouquets. It requires a good degree of heat to grow it well. It will thrive well planted out in the house, where there is plenty of light; if planted in too much shade, the fronds are not robust or healthy.

Adi. hispidulum.—A pretty, dwarf, evergreen Fern, six inches high, caudex somewhat creeping. This is a

very good one for growing in a glass-case, as it does not take up much room, and a good one for small bouquets.

Adi. lucidum.—A beautiful, evergreen, dwarf-growing species, about eight inches high, caudex tufted. This will do for glass-cases, or planted in a basket suspended from the roof.

Adi. lunulatum.—A remarkably handsome species, with a tufted caudex. The graceful fronds are about a foot long. This species forms young plants on the end of the fronds, which should be laid on a pot of mould till they are rooted, and then be cut off and kept in the shade. I believe this is a deciduous Fern. Our plant lost all its fronds last winter, and produced fresh ones this spring. The fronds are drooping. The plant would look well grown in a basket suspended in a warm part of the house.

Adi. macrophyllum.—This is a beautiful evergreen species. Grows a foot or more high, caudex tufted. The young fronds, when they first appear, are of a reddish colour, which looks handsome. Afterwards they become green. This species requires a good heat to grow it to perfection, and will do well planted out on rockwork in any part of the house. It is also a good one for cutting for bouquets.

Adi. reniforme.—A rare and beautiful evergreen species, and is useful for bouquets.

Adi. pedatum.—Grows in the same way as *pubescens*, and I believe it is quite hardy, and will do planted out with the British Ferns.

Adi. pubescens.—A very good sort. Grows ten inches high, caudex tufted. This does not require so much heat as some, and is a good one for bouquets, and for planting in a glass-case. It will also grow well on

rockwork, or in a basket suspended from the roof, with a good supply of water at the roots.

Adi. serrulatum.—A dwarf evergreen-growing plant, and very pretty. The young fronds have a reddish cast; but as they get older they turn green. This is well adapted for glass-cases, and will do for bouquets; also in a basket.

Adi. trapeziforme.—This is one of the handsomest of the genus. Grows two feet or more high, caudex somewhat creeping. This fine evergreen species requires a warm place to grow it well. It will do either in a pot or planted out. The fronds are most beautiful intermixed with flowers.

Adi. vaŗium.—A very distinct and rare evergreen species. Grows a foot high, and is well adapted for glass-cases, also for bouquets, and will do well planted in a basket and suspended from the roof.

Anemidictyon longifolium.—A pretty species; grows a foot high. This will do out on rockwork in the house.

Ane. phyllitides.—A good and distinct evergreen species. Fronds a foot or more high, caudex tufted. This ought to be in every collection. It makes a fine pot-plant, and is well suited for a glass-case; also for bouquets. It has a very pretty effect among flowers.

Angiopteris erecta.—This is a noble evergreen Fern, six feet high, and will do well planted on rockwork in a warm house, and also makes a fine pot-plant.

Aspidium aurgesens.—This evergreen Fern grows two feet high, caudex creeping. A good one for bouquets, and will do planted out in the house. It does not require so much heat as some of the others.

Aspi. falcatum.—A very pretty evergreen species. Grows ten inches high, and is well adapted for glass-cases;

also a good one for bouquets. This will do in a greenhouse or frame.

Aspi. macrophyllum. — A rather large-growing evergreen Fern, a foot and a-half high. Is well suited for planting out on rockwork in a warm house.

Aspi. molle. — This is a very common Fern, but it is worth growing. It will do for bouquets, and will grow in a greenhouse, either in a basket or pot. Caudex tufted.

Asplenium nidus. — A noble species when well grown. This evergreen Fern has a tufted caudex. Fronds grow six feet long. There are two varieties of this plant: one grows much larger than the other. We have a plant of the largest kind, which is twelve feet across, growing on a piece of rockwork eight feet high. This is an excellent position for the plant, exhibiting the under-side of the fronds to great advantage. It also makes a fine pot-plant.

Asp. planicaule.—A small-growing Fern, and will do well planted in a glass-case; also well suited for bouquets. Grows six inches high.

Asp. radicans. — A lovely evergreen species. Fronds grow a foot and a-half long. This makes a splendid pot-plant; is also useful for bouquets and glass-cases.

Asp. viviparum.—A very pretty species. Grows a foot high, and is well adapted for glass-cases; also for bouquets. It does not require so much heat as some of the Ferns. This forms young plants on the fronds, which should be taken off and potted, according to directions on Propagation.

Blechnum Brasiliense. — A handsome and strong-growing evergreen species. Fronds two feet high. This is a noble Fern for planting on rockwork in a warm part of the house, where there is plenty of room to spread out

its beautiful fronds. It will also do well in a large pot. This has a tufted caudex.

Ble. concovadense.—Another noble species; grows in the same way as the preceding one, and about the same height.

Ble. Polypodioides.—A desirable evergreen species. Grows a foot or more high, caudex creeping. This requires less heat than some others.

Cassebera hastata.—An upright-growing evergreen Fern, about a foot or more high, caudex tufted. This will grow in a glass-case, and is useful for bouquets.

Cheilanthes.—There are some pretty species in this class. They are generally small, and are very suitable for glass-cases and bouquets. These are not so easy to cultivate as some of the other species, requiring a good degree of heat, with not too much water at the roots, and their soil made finer with silver-sand.

Che. lendigera.—One of the most elegant Ferns, about ten inches high, caudex tufted. This rare Fern is a good one for glass-cases, also for bouquets, and makes a handsome pot-plant.

Che. acrophylla.—A very elegant evergreen Fern. Grows a foot or more high, caudex tufted. Useful for bouquets.

Che. micropteris.—A pretty evergreen species, ten inches high, caudex tufted. A good one for glass-cases and for bouquets.

Che. micromera.—A pretty evergreen species, caudex tufted. Grows about ten inches high.

Cibotum Baometz.—A handsome Fern. Grows rather large, about two feet high, and is well adapted for planting out in a warm house; caudex creeping.

Coniopteres fraxinfolia.—A very distinct-looking

Fern. Grows two feet high, caudex tufted. This forms young plants on the fronds, which should be taken off and laid on a pot of mould, with a bell-glass over them, till they are large enough to handle, when they should be planted in small pots and put in a little bottom-heat.

Con. viviparum.—This is one of the most elegant, distinct species we have; evergreen; caudex tufted; fronds ten inches high. A very useful Fern. It will do as a pot-plant, or for a glass-case, and the fronds are pretty for bouquets. This plant, like the preceding species, forms young plants on the fronds, which should be treated in the same way.

Cyrtogonium repandum.—A very singular-growing species, a foot or more high. Is best grown in a pot. This beautiful Fern was imported by Messrs. Rollisson of Tooting, from their collector in Java.

Darea cicutaria.—This is a most compact-growing, but at the same time one of the most elegant of all the exotic Ferns. Grows ten inches high. It will thrive well in a glass-case, and makes a splendid pot-plant; caudex tufted; requiring a good degree of heat. The finest plant I ever saw of this was grown by Mr. Woolley, gardener to H. B. Ker, Esq., Cheshunt, and shown at the Chiswick Show in the year 1852.

Davalla Canariensis.—Haresfoot Fern. A handsome species, fronds a foot high. This will do on a block of wood; it may be grown with the tender kinds, but is a greenhouse plant, and is best grown in a pot: is useful for cutting for bouquets. An evergreen Fern with a creeping caudex.

Dav. desecta.—A new Fern from Java. A climbing species, and will do well planted against a wall in a warm house. This is another of Messrs. Rollisson's importing.

Dav. pentiphila.—A very pretty climbing Fern. This was also imported by the same firm as the preceding one.

Dedymochlæna pulcherrima.—A noble evergreen species, fronds two feet high, caudex tufted. This is a fine kind for planting out on rockwork in a warm house, where there is plenty of room for it to spread its beautiful fronds. It also makes a fine pot-plant.

Doodia aspera.—A pretty evergreen species; fronds eight inches high, caudex tufted; will do in a glass-case, also in a basket suspended from the roof with not too much heat.

Doo. lunulata.—A dwarf-growing evergreen species; caudex tufted; fronds eight inches high. This will do in a glass-case or a cool greenhouse.

Doo. rupestres.—Another dwarf species. Grows about the same height as the former, caudex tufted, and evergreen. This does not require much heat, and will do in a greenhouse; also in a glass-case.

Diplazium Shepherdii.—A very distinct Fern, fronds a foot high; grows well in a pot, or planted out in any part of the house; caudex tufted; evergreen.

Drynaria diversifolia.—A very good Fern, and quite new. Has been but recently imported by Messrs. Rollisson from Java.

Dry. quercifolia.—This is a most curious and rare Fern, and will do well on a block of wood; also in a pot. These two plants require a good degree of heat to grow them well.

Goniophlebium sepultum.—A dwarf-growing species, about six inches high, and is suitable for growing in a glass-case with not too much heat.

Gymnogramma.—The plants of this genus are called

gold and silver ferns. The underneath part of the fronds of some are covered with a substance resembling gold in colour, and others resemble silver. They are much prized. Scarcely any one comes into a fern-house without noticing them. Some ferns-growers find their culture difficult, but at this place they grow very freely; requiring a good heat, but moderate supply of moisture at the roots, and a good quantity of silver-sand mixed with the mould. There are several species. The following are among the best.

Gym. calomelanos.—A pretty evergreen species, silver-coloured underneath the fronds. This has a tufted caudex, and grows a foot or more high. This will do planted out in any part of the house; also makes a good pot-plant, and useful for bouquets.

Gym. chrysophylla.—A desirable evergreen species. Grows a foot or more high, caudex tufted; makes a fine pot-plant. This is gold-coloured underneath the fronds; very suitable for bouquets.

Gym. Massonii.—A strong-growing evergreen species, about two feet high, caudex tufted. This is not so pretty as some, but it does well planted out in any part of the house.

Gym. sulphurea.—One of the finest of the gold species. The fronds are exceedingly delicate and rich in colour. Grows a foot high, caudex tufted: a good one for bouquets, and would do well planted in a basket suspended from the roof, so that the fronds might be seen from beneath, which would show them to the best advantage. All the other species will grow in the same way, but when grown in baskets they require more moisture.

Gym. tartarea.—A good species. Grows nearly two feet high, caudex tufted. This is also one of the silver Ferns, and is suitable for bouquets.

Hemionites palmata.—A very singular and pretty species, grows eight inches high; this will do in a glass-case, and is suitable for bouquets. It requires a good degree of heat, but not too much water at the roots. It forms young plants on the fronds, which should be taken off when rooted and put into small pots. Evergreen, caudex tufted.

Leptobrochia leptophylla.—A very neat-growing evergreen species, eight inches high, caudex tufted; will do in a glass-case, and useful for bouquets, as the fronds will last a long time in water.

Lygodium scandens.—This is a very pretty, climbing, evergreen species, very suitable for training up a rustic pole, or along the rafters of the house. It will also do trained in a pot round some sticks. It requires a good degree of heat.

Nothalæna distans.—A small, evergreen, drooping species, fronds eight inches long, and will do well in a basket; also makes a pretty pot-plant. It does not require as much heat as some others.

Onoclea sensibilis.—A desirable species. This is quite hardy, and will do planted out in the British Fernery. It grows a foot high, caudex creeping.

Onycilium lucidum.—A pretty little evergreen Fern; caudex somewhat creeping; fronds from six inches to a foot high. This will do in a basket suspended from the roof, also in a glass-case; it does not require so much heat as some of the Ferns. I have seen it do well in a greenhouse. A useful species for bouquets.

Platycerium alcicorne.—A curious-growing evergreen species; fronds eight inches high, which are like a stag's horn; will do well on a flat block of wood nailed against

a wall, with plenty of moisture at the roots ; it will also do well in a pot.

Pla. grande.—This is a rare and curious evergreen kind ; the fronds of this are more like a stag's horn than the former one : the fronds when grown strong attain the height of a foot, and sometimes more. This requires the same treatment as *alcicorne*, and grows in the same way. There is a fine specimen of *grande* at the Royal Gardens at Kew ; it is growing on a flat piece of board in a warm house.

Platyloma cordifolia.—A very distinct Fern, grows ten inches high. It makes a very pretty pot-plant.

Pla. flexuosa.—A desirable species, ten inches high. This does not require so much heat as some of the kinds.

Polystichum aristata.—This is a more hardy Fern than some of the kinds ; it will do in a greenhouse, and is a good one for glass-cases.

Polypodium aureum. — A large-growing evergreen species ; fronds two or three feet high. When grown strong, this is well adapted for planting out in any part of the house, and will do on a block of wood with hoops.

Poly. effusum.—An elegant-evergreen Fern. Grows two feet high, with a slow-creeping caudex. This species forms young plants on the fronds, and may be propagated by potting them. This makes a splendid plant on rock-work in any part of the house : it is useful for bouquets ; also makes a beautiful pot-plant.

Poly. glaucum.—A desirable species, much like *aureum ;* the fronds are more glaucous, and not so large : it requires the same treatment as *aureum*, and grows in the same way ; caudex creeping, and will do on a block of wood ; evergreen.

Poly. phymatoides. — A handsome climbing Fern, fronds a foot and a-half long, with a creeping caudex. To grow this plant to perfection it ought to be planted against a wall, which should always be kept damp. We have this Fern climbing against a wall fourteen feet high. A noble object: it is an evergreen species; it also makes a fine pot-plant.

Pteris falcata.—A pretty evergreen species. Grows ten inches high, and will do well in a glass-case; this will do with less heat. I have seen this growing well in a greenhouse.

Pte. longifolia.—A beautiful, graceful-growing, evergreen species; it makes a fine pot-plant, and is well adapted for growing in baskets suspended from the roof; requires plenty of water at the roots all the year. This species seeds very freely, and if the house be damp the young plants will come up on the walls in every direction; they may be left to grow, as they look well, and will not interfere with any others. Is also a good one for bouquets.

Pte. miser. — A small-growing species, three or four inches high; an evergreen Fern: will do well in a glass-case.

Pte. rotundifolia. — A pretty, distinct species; fronds ten inches long. A good one for a glass-case or basket; also makes a pretty pot-plant. It does not require so much heat as some; it will do in a greenhouse; also in a basket suspended from the roof.

Pte. serrulata. — A graceful-growing evergreen species; fronds about ten inches long, caudex tufted. It is also a good one for planting in a basket suspended from the roof, with plenty of water at the roots. This seeds

freely, and generally comes up on the walls, where its growth produces a good effect.

Pte. umbrosa. — An elegant-growing evergreen species; frond a foot and a-half high. Makes a fine pot-plant, and also a good one for planting out in the house: requires a good degree of heat to grow it well.

EXOTIC LYCOPODIUMS.

This is an elegant class of plants, resembling in many respects the Ferns, with which they are usually associated in their culture. They require the same kind of treatment as exotic Ferns; are by no means difficult to grow; and are well adapted for glass-cases; also for cutting for bouquets. Some of them are easily propagated by cutting fronds off the plant, and laying them on the top of some light soil, mixed with silver-sand. I generally accomplish this by putting some drainage in the bottom, and filling it up with the soil, then fastening the frond on the soil with some small pegs, giving a gentle watering with a fine syringe, and placing a bell-glass over them to keep them close. They will strike root readily, if plunged in a little bottom-heat. When they begin to root they should be potted in small pots, and kept in a damp, warm place. There are some species that root all up the stem: these may be cut in pieces and potted, with a bell-glass over them till they are rooted. They may also be laid in small pots, and left till they are rooted. Afterwards cut them off, and place them in a warm, shady place, and keep moist. Those with a creeping under-ground stem may be cut into pieces, with some of the fronds and roots attached, and treated as above. Lycopodiums, like Ferns,

look well dried and laid on white paper: they require the same process of drying as is recommended for the British Ferns.

The following list contains all that I have seen :—

Lyc. apoda. — A small-growing species, about two inches high; makes a very pretty pot-plant; will do in a glass-case or on rockwork, requiring but little mould to grow in.

Lyc. apothecum.—Another small-growing species, suitable either for pot or glass-case.

Lyc. Brasiliense. — A pretty little dwarf species. This will do either in a glass-case or pot without too much heat.

Lyc. cæsium.—This is an elegant and attractive little Lycopode. The habit of growth is peculiarly graceful, and the colour exceedingly bright. It looks very beautiful when grown in a pot, drooping in rich verdure over the sides. It requires a considerable degree of moisture, and attains the greatest freshness and brightness; of light bluish-green colour in the shade. It is apt to become brown if exposed fully to the light.

Lyc. cæsium arborum. — A magnificent species, and, when well grown, the handsomest of the genus. It is a climbing plant, and looks well twining round a rustic pillar or planted on rockwork, where its beautiful form may be seen to greatest advantage. When it is planted against a pillar, this should be surrounded with moss for the plant to cling to. The fronds are a foot or more long, and of a most beautiful greenish-blue colour, shading into purple. It requires to be grown in the shade, with plenty of heat and moisture. Is an excellent plant for bouquets. We are indebted to H. Bellenden Ker, Esq. of Cheshunt, Herts, for introducing this fine species.

Lyc. circinale. — An elegant dwarf-growing species, about six inches high; makes a pretty pot-plant, and is a good one for glass-cases; also for cutting for bouquets.

Lyc. Cumingii.—This is a very curious-looking species; grows a few inches high. The only place in which I ever saw this plant was in the fine collection of Messrs. Loddiges of Hackney, where it was growing on a block hanging against the wall in the orchid-house.

Lyc. cuspidatum.—A very elegant Lycopode; grows like *cordatum.* This does well in a glass-case; and is suitable for cutting for bouquets.

Lyc. denticulatum.— A beautiful, dwarf, free-growing species, well adapted for planting out in the British Fernery, as it is quite hardy; it also does well in a greenhouse, either in pots or planted out round the sides of the path.

Lyc. dichotoma.— A very elegant Lycopode. Grows in the way of *Stoloniferum*, but not so large; well-suited for glass-cases and useful for bouquets; grows six inches or more high.

Lyc. gnidioides.— A very curious dwarf species, and is best grown in a pot; also imported by Messrs. Rollisson.

Lyc. lepidophyllum.—This is one of the most beautiful of all the Lycopode; a dwarf, compact-growing species: it makes a pretty pot-plant, and well suited for a glass-case.

Lyc. Louisianum. — A small-growing kind, in the way of *denticulatum;* it makes a pretty pot-plant when grown well, and will do in a glass-case: it also looks pretty when planted in different parts of the rockwork of a warm house.

Lyc. phlegmaria. — A curious-growing species; it comes up like a yew-tree. This is best grown in a pot in a warm house.

Lyc. plumosum.— One of the prettiest of the genus. Grows six inches high, and is a beautiful one for a glass-case; also good for bouquets. It does not require so much moisture at the roots as some of the sorts.

Lyc. Schottii.— A beautiful and free-growing plant, which sometimes attains the length of two feet: when grown strong, this is well adapted for cutting for bouquets, and will do well planted out on the rockwork.

Lyc. stoloniferum.— An elegant free-growing Lycopode, about a foot high. This is well suited for a glass-case; also a beautiful one for bouquets. It does not require so much heat as some of the other species.

Lyc. tetranagonum.— A very curious Lycopode, differing in habit of growth from any of the other species. It is an upright-growing plant. This new species has been lately imported by Messrs. Rollisson of Tooting, who received it from their collector in Java.

Lyc. umbrosum.— One of the handsomest of the genus. Grows six inches high. This makes a pretty pot-plant, and is well-adapted for a glass-case. It is also useful for bouquets, and looks well planted out in a warm house.

Lyc. viticulosum.— A very elegant species. Grows in the way of *umbrosum*, and about the same height. This is a splendid one for a glass-case, also for bouquets, and will do well planted out in a warm house.

Lyc. Wildenovii.— A remarkably handsome species, about ten inches high. This makes a pretty pot-plant, and is well suited for a glass-case; also one of the finest of all the Lycopode for bouquets. This, like the preceding one, will do well planted out on rockwork, in a warm place, with plenty of water at the roots.

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