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Publisher: Taylor & Francis
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Transactions of the Botanical Society of Edinburgh

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/tped18>

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Published online: 01 Dec 2010.

To cite this article: Phillip Sewell (1891) The Use of Sphagnum Moss in Open-Air Gardening in the Riviera , Transactions of the Botanical Society of Edinburgh, 18:1-4, 343-349, DOI: [10.1080/03746609109468071](https://doi.org/10.1080/03746609109468071)

To link to this article: <http://dx.doi.org/10.1080/03746609109468071>

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The Use of Sphagnum Moss in Open-Air Gardening in the Riviera. By PHILLIP SEWELL.

(Read 8th May 1890.)

During the last few years various articles have appeared in the *Gardeners' Chronicle* and elsewhere upon the use and value of *Sphagnum Moss* for gardening purposes. "Fertilised moss," as it has been called, has been advocated for the growth of various classes of plants, not alone for use in orchid-houses and stoves, but for those grown in the open air in England. It is probable that in a cold, damp climate it will never be much in demand for out-door gardening; but we are able to furnish details as to its use in Mr Hanbury's notable garden of La Mortola, which show in a most convincing manner its real value for the growth of decorative plants in regions with conditions of climate similar to those which obtain along the Riviera.

Such evidence might also be forthcoming from the Botanical Gardens at Genoa, from whence Mr Hanbury copied the plan of introducing beds of *Sphagnum*. At Genoa it has answered remarkably well, and there may be seen plants growing with extraordinary vigour of *Pinus*, *Abies*, *Picea*, *Pittosporum*, *Pimelea*, *Erica*, *Arbutus*, *Diosma*, *Citrus*, *Cytisus*, *Genista*, among many others.

Perhaps no portion of Mr Hanbury's wonderfully cultivated thirty acres is so generally admired as is the long and gracefully-curved stretch of covered walk known in all Italian gardens by the name of "pergola" or "topia." But at La Mortola the "pergola" is no mere lengthy arbour, covered over by vine-trellises, as is most commonly the case in gardens of the Riviera.

It is a marvellous piece of decorative gardening, planned not only to show to the best advantage the many climbers which here luxuriate, but with a view to the unrivalled landscapes to be seen from it.

It extends for some two hundred yards or more along the steep hillside, and, thanks to Mr Hanbury's opinion as contrasted with that of the gardener who constructed it, possesses angular irregularities in its course, which allow of

sudden changes of vista from among the gracefully-festooned pillars on the seaward side; from it the eye may wander over masses of verdure from rare trees and shrubs to the waters of the Mediterranean.

But the "pergola" has an especial interest from the bordering wealth of flowers, grown more or less in the cool shade of the climbers in curiously constructed beds of Sphagnum Moss. Inasmuch as the presence of these bordering flower-beds gives a finished effect to this portion of the garden which it did not possess a few years ago, it is well to describe with some detail the nature of the difficulties, and the steps which have been taken to overcome them by the use of beds of Sphagnum.

From the requirements of the design that shade should be afforded by numerous climbers, it appeared at first impossible to have other than a very formal and ordinary edging to the gravel walk, which is bounded on the one side by a generally low retaining-wall, above which, as on the other side, are steeply sloping beds. The climbers appeared to usurp all the nutriment placed about the roots of any plants which it was attempted to grow on either side of this walk. There was also at times a destructive splashing produced by the drip from branches and woodwork overhead.

The beds, as I shall explain later, have been so constructed that the roots of the climbers and of the surrounding trees cannot have access to the rich stores of nutritious compost of pure Sphagnum, or of Sphagnum and pressed root-fibres which have passed through the stables. The moss binds together with a firm surface; it retains moisture admirably, the only difficulty in connection with its use being that the blackbirds on every occasion are ready to peck at it and strew it about the adjoining walks in their search for food.

The main result of the introduction of these distinct beds has been that not only have plants grown well in such positions of disadvantage as we have indicated, but it has been possible, in a tidy manner, to grow plants in places about the garden walls of the Palazzo Orengo, where otherwise they could not have survived. Moreover, several interesting species, which it had not before been possible to

grow in the ordinarily prepared soil of the garden, and which, we may presume, are not grown elsewhere in the Riviera, may now be seen to thrive remarkably well in such conditions.

Before we proceed to enumerate the plants so grown, we would give actual measurements of some of the Sphagnum beds, which may convey the clearest impression as to this novel method of gardening.

The extensive beds bordering the "pergola" walk are rarely more than a foot and a half across, whilst the average of extreme depths is little above four inches. This statement as to the depth of the compost will, we expect, be received with some surprise; but when it is recognised that the moss is merely heaped up upon flat slabs of cemented stone or slate, and that the beds are in no sense troughs, whilst the depth of moss slopes away to nothing towards the edges, it will be seen that a breadth of a foot and a half does not allow of any very considerable filling up in the middle.

Certainly about the roots of one or two of the more vigorous plants, *e.g.*, *Pleroma* and *Hardenbergia*, the compost is heaped up so as to reach a maximum depth of a little more than seven inches, but, as we have indicated, such a depth is extremely exceptional. It is indicative of the slight depth of moss that a small plant of *Ardisia crenulata* has raised itself very visibly out of the bed by shoving with its stout-growing roots against the slabs of slate upon which the moss has been placed.

In place of slates firmly cemented together, stones or bricks may be used; the prime object of their so solid construction being to isolate the nutritious compost from the ordinary soil in which are the greedy roots of the surrounding plants. In some situations, however, the moss is placed upon a solid retaining-wall, behind which, though not quite on a level with the Sphagnum bed, is a steeply sloping bed of ordinary earth. In certain of the sunny or shadier angles of the house pockets of moss are formed by means of larger irregular stones placed directly upon an ordinary pavement. In one of these pockets, where the compost is somewhat deeper than usual, a magnificently luxuriant growth of *Hardenbergia ovata* is to be seen, which a few weeks ago

was densely covered with its striking lilac-coloured racemes of flowers. In the same place there may also be seen *Boissicæ*, *Tellima*, *Leucophyta*, *Saxifraga*, *Erica arborea*, and *Primula*.

The positions of these beds are varied in regard to exposure to light, and to the direct rays of the sun. Some are absolutely in the shade, others in an almost continuous glare of the sunshine; but plants may readily be found suitable for one or the other position.

The attention which the *Sphagnum* beds require is but little. In dry weather watering three or four times in the week is necessary, whilst in winter once a week is sufficient. From the nature of the moss, water may be applied quickly, and without a rose to the can.

The following plants, growing at the present time in these shallow beds of *Sphagnum Moss*, refuse altogether to grow in the ordinary beds in the garden, or else they remain as stunted and almost lifeless plants, little larger year by year than when they were first planted:—*Æschynanthus angustifolia*, *Æschynanthus grandiflora*, *Alpinia vittata*, *Anthurium cordatum*, *Ardisia crenulata*, *Aristolochia Thwaitesii*, *Bauera rubioides* (perhaps also in loam), *Billbergia thyrsoidea*, *Billbergia "discolor,"* *Billbergia "fasciata,"* *Bossicæ heterophylla*, *Bossicæ ovata*, *Bossicæ rufa*, *Cypripedium insigne*, *Cyrtanthera magnifica*, *Cyrtanthera polyantha*, *Calceolaria rugosa*, *Daphne rupestris*, *Didymocarpus Griffithii*, *Dietes bicolor*, *Dipteracanthus canescens*, *Dipteracanthus "squamulosus,"* *Dracæna "Hookeri,"* *Fuchsia gracilis*, *Fuchsia procumbens*, *Gardenia citriodora* (not healthy), *Gonospermum fruticosum*, *Hardenbergia ovata*, *Hebeclinium atrorubens*, *Hebeclinium "Panamense,"* *Hiptage Madagloti*, *Kalmia latifolia*, *Lopezia macrophylla*, *Lachenalia pendula*, *Monstera deliciosa*, *Philodendron pinnatifidum*, *Pleroma macranthum*, *Pimelia "mirabilis,"* *Rondeletia (Rogeria) cordata*, *Sansevieria Zeylanica*, *Scutellaria cordifolia*, *Skimmia "oblata,"* *Tetranema mexicanum*, *Thomasia purpurea*, *Thomasia "comosa."*

Many species of ferns—e.g., of *Lomaria*, *Polypodium*, *Pteris*, *Platycerium* and *Adiantum*—were grown in shady places in these beds, nor would it be possible to grow them so well without more constant attention in other parts of the garden. The following plants appear, on the whole, more at home in

the beds of Sphagnum than in other soils in the garden. Whenever there is any contrast noticeable between the plants so grown under these different conditions, the characters associated with the Sphagnum-grown plants are as follows:—they have a more vigorous vegetation, larger leaves and longer shoots; commonly a deeper green in the foliage, many of the plants grown in ordinary soil being yellowish in colour; at times, too, there is associated with this more vigorous vegetation a scarcer display of flowers, a feature very clearly marked in *Senecio speciosus*. Not uncommonly, however, in such plants as *Erica arborea* and *Cantua dependens*, the time of flowering is much earlier (even as much as from three to five weeks) than when the plants are grown in the ordinary soil of the garden. The growth in Sphagnum may, perhaps, have some effect upon the ripening of the wood, for not only have we these cases of earlier flowering, but there is the curious fact that *Streptosolen Jamesoni* grown in Sphagnum was not killed in the recent frost and fall of snow, whilst larger plants of the same species grown in the ordinary beds were killed. These plants, some of which, at least, grow better in the Sphagnum, are as under—*Asparagus plumosus*, *Begonia* (many species), *Cantua dependens*, *Cineraria cruenta* (vars.), *Cyclamen persicum*, *Daphne indica*, *Daphne hybrida*, *Diosma ericoides*, *Epacris* (several species), *Erica* (several species), *Eranthis hyemalis*, *Freesia refracta* (from seed), *Grevillea Thelemo-niana*, *Juncus spiralis*, *Primula auricula*, *Primula acaulis*, *Primula cashmeriana*, *Primula sinensis*, *Primula tubiflora*, *Russelia juncea*, *Tellima grandiflora*, *Tradescantia* (species). (When larger they do not grow so well for want of room.)

The following plants were also growing as well in the Sphagnum as in the open ground—*Hebeclinium* (*Eupatorium*) *macrophyllum*, *Hyacinthus* (sps.), *Pelargonium zonale*, *Melicope ternata*, *Margyricarpus setosus*, *Saxifraga Cotyledon*, *Chorizema*, *Correa* (sps.), *Fuchsia Riccartoni*, *Libonia* (sps.), *Lotus Jacobæus*.

Many seedlings of annuals and biennials were readily germinating, or had produced plants of some size. Amongst these were—*Aubrietia* (sps.), *Arabis rosea*, *Alonsoa* (sps.), *Aquilegia* (sps.), *Ianthe buzulifolia*, *Ionopsidium acaule*, *Phyllanthus Niruri*. We might notice also many other species of hard-wooded or bulbous plants—*Rhododendron*, *Tulipa*, *Iris*—

including many of the common bedding-out plants of English gardens, which from time to time are placed in these beds, and removed as soon as they have finished flowering. A few species, notably *Imantophyllum*, thrive better in the stiffer soil of the ordinary beds. The leaves are more yellow when grown in the restricted space in the *Sphagnum* beds, whilst the flowers in the latter case are in consequence poorer and often abnormal. In one of these beds also, *Linnaea borealis*, which was introduced from Edinburgh in December, has grown well; making, as it appears to us, larger, thinner, and perhaps more evidently serrated leaves than formerly. It will be interesting to observe how the summer affects this plant. Doubtless also many of the *Ericaceæ* and other plants of the damp upper slopes of the further mountains could be grown in this way, at this altitude, which is approximately that of the sea-level; nor must any who have seen the remarkably full list of plants grown at Mortola, which has been lately printed by Mr Hanbury, suppose that the lists given in this paper include all those from the Mortola collection which would thrive better in these exceptional beds. Doubtless experiments would show scores of others; the above lists are of those only which are so grown at the present time.

Mr Hanbury informs us that through several previous years he has grown a vigorous and regularly flowering plant of the Edelweiss (*Gnaphalium Leontopodium*) in one of the beds of *Sphagnum*. It appeared to him to have a more drawn-out appearance in leaves and flower-stalks than is common to the plant when grown in high altitudes.

Were time at our disposal, we think that much more might be learnt from these data regarding the beds of *Sphagnum* than the mere fact that it allows a good collection to be very materially enriched by its use. We have already hinted at certain general tendencies in such variations as we have instanced among plants grown in one species of bed or the other, but more detailed examination of leaves and roots—both of plants grown in this country in *Sphagnum* and in ordinary beds, and also in Britain—would prove highly instructive. We should, at least, gain definite information regarding that which every amateur or professional gardener should desire to know—viz., how to recognise

a plant's requirements, or evidence of response to different environments in its external morphology. It may be that this is mainly a question for the botanist, and that there is no likelihood of more than an infinitesimal gain in the practical details of horticulture from knowledge under this head.

We are well aware what a risky and thankless task it is to put forward hypotheses to account for facts which all are ready to receive; but we would venture on a hypothesis in regard to this subject. It is as follows:—The Sphagnum, apparently so unsuited as a medium for the growth of *Erica*, *Epacris*, *Hardenbergia*, *Primula sinensis*, &c., in Britain, is in the Riviera kept sweet and wholesome, though more often watered it may be, by reason of the vastly warmer and drier climate. In Britain, just the same nutriment, and the same loose substance as a compost, might be given to the plants as is given in the Riviera, yet it cannot be imagined that there would be the same amount of circulation of the water held by the investing medium about the plants' roots. Consequently, in place of sweetness, there would be sourness and stagnation. We would even say that the same amount of direct sunshine and the same amount of warmth might be given to these plants, supposing we were to grow them in Sphagnum in Britain as we do in the Riviera, yet in the greenhouse in Britain there would not be that dry air, that absence of humidity, and that freshness of the wind which here causes quick evaporation; and hence it would appear improbable that the food about the plants' roots could be presented in a suitable way by using Sphagnum in England, though it may well be used here.

We come to a similar conclusion in reference to the different habitats of the same species of plants as observed growing in Lapland and at the Yugor Straits. Soils, whether of peat or clay or sand, had little meaning, except inasmuch as they retained or drained off the water resulting from the melting of the snows or from rain. In Lapland a steep hill-side covered with peat answered much the same purpose as the nearly level tracts of sand along the shore of Northern Siberia.

However this may be, such facts of distribution or of cultural methods should teach us something to be put to use some time as to the adaptability and the requirements of our garden plants.