Transplanting Spruces and Yews. Those visitors or students in the Arboretum who have faithfully followed development through the season may have noticed the recent transplanting of some Spruces and Yews to new locations, the object being to give an exposure more favorable to the known or probable requirements of the group, or to give more ground area for development. In the cases of some exotic Spruces, four to six feet high, it was sought to place them on a cool and not too dry north slope, in the Peters Hill section of the Arboretum, instead of upon the sunny southern exposure where they have made rather slow growth.

Those interested in Spruces in their native habitats, particularly where the trees extend their range on hills, in temperate or south temperate zones, as in the southern Rocky Mountains, must have noticed the healthy, dense spruce and fir stands on slopes facing the north, usually in marked contrast to the irregular and often depauperate growth on warmer slopes facing the south, this growth often being composed of other kinds of trees more adapted to hot, dry situations where Firs and Spruces would make poor development. While these conditions may be considered as the rule in nature, there are species which appear cosmopolitan and adapted to a wide range of soil and climatic conditions, a good example being the Norway Spruce (Picea Abies = P. excelsa) which has a natural range in Europe extending from the Pyrenees, in Northern Spain, and the Alps and Balkans, north to Norway, Sweden and western Russia.

Transplanting large Spruces in September and October, or later in mild weather, may be accomplished with every chance of success if proper care is taken in digging and handling. Lifting with a mass of soil about the roots of course is most advantageous. The plants in the Arboretum were lifted and transferred with about a square yard of soil or a ball three feet in diameter, and one and a half to two feet in depth. This secured a good mass of roots although many slender roots and rootlets were cut off and remained in the ground. Trees so planted should continue growth next spring with very little interruption. If the ground is very dry it is a good plan to wet it before digging and again to wet it after replanting. This treatment before digging will make the soil adhere better about the roots, and any exposed rootlets remain
covered with minute particles of earth which give a protective advantage. By wetting down the ground after planting the soil becomes better compacted about the rootlets. They are then better able to withstand winter conditions by functioning to take up water to replace that lost by transpiration through the foliage.

The Yews transplanted were a form of the well known Japanese Yew, *Taxus cuspidata*. This form has been given the name of *Taxus cuspidata Thayerae*, or Thayer Yew. It is a plant very recently added to the horticultural trade, although originating some years ago on the Bayard Thayer estate in Lancaster, Massachusetts. The original was a plant selected from many other seedlings raised from seed collected from several trees of the typical arborescent form of *Taxus cuspidata*, with central trunk and broadly conical form. From these seedlings a single peculiar form was selected which gave indications of being sufficiently distinct to have a value for horticultural purposes. This form does not develop a typical central trunk but has a low, wide-spreading habit, sending up many ascending branches which may become depressed or horizontal as they elongate with age; many of the branches forming supplementary roots where they rest upon the ground.

*Taxus cuspidata Thayerae* appears likely to develop stems six to eight feet or more in height and to spread indefinitely, so that if individual specimens are wanted plenty of space must be allotted to them.

Many plants were sent to the Arboretum from the Thayer estate in October, 1924, and these were reported to have all been raised from seed, not cuttings, collected from the original peculiar selected plant. The fact that these seedlings do not in any case seem to revert to the arborescent form but remain low and spreading like the selected mother plant, is very interesting. The plants show a vigorous growth and give promise of being a decided acquisition to the forms of *Taxus cuspidata* already in cultivation. Plants received October 1, 1924, were two or three feet high and measured about three feet in diameter through the branches. They are now from three to five feet in height and from tip to tip some of the plants spread across fifteen feet of ground. Specimens recently transplanted have been spaced about twenty-five feet apart, with the understanding that if the space allotted is found to be insufficient as the plants develop, intervening plants may be removed. If the central part of the plants continues to maintain a green state as the branches grow outward, it is easily conceivable that they will cover a surprisingly large area if unobstructed by other vegetation, and if they are not affected by unforeseen diseases.

Looking forward for fifty or a hundred years growth, so as to show possible development, is the reason for the recent transplanting of some of the plants in the Arboretum.

J. G. Jack.

*Juniperus virginiana Growing on a Rock.* About twelve years ago, children at play in a New England pasture carried to the summit of a large granite rock a small plant of *Juniperus virginiana* and without giving attention to a single one of the rules that are usually observed in transplanting Conifers, crowded its roots into a crevice. A little earth was laboriously supplied. The Juniper grew on year after year. It withstood
JUNIPERUS VIRGINIANA
Photographed at North Easton, Massachusetts, August, 1931,
by Professor Oakes Ames
the severe drought of 1930 and in the summer of 1931 was apparently in perfect health. It is now about ten feet high.

In July and August 1930 there were very few days when rain fell in sufficient quantity to penetrate the soil. The summit of the rock, seventeen feet above the ground, fully exposed to the scorching heat of the sun, would seem to have presented conditions of extraordinary aridity, yet the Juniper was able to obtain the moisture necessary for its need.

It is well known that plants transpire, that is, they give off water taken in by the roots, the process of transpiration taking place at the surface of the leaves. It is a relentless process in the life of a plant and the means of modifying it are severely circumscribed. The quantity of moisture giving off varies, of course, some species of plants giving off more or less than others. The higher the temperature the greater is the rate of transpiration. It has been ascertained that a plant of Indian corn, if kept moist at the roots, will transpire during the season of growth fully forty gallons of water, and a Birch tree with two hundred and fifty thousand leaves is said to have given off ninety gallons of water in a day. Perhaps a very clear conception of what transpiration signifies may be had if it is borne in mind that in the summer season an average leaf gives off an amount of water equal to its area and two-fifths of an inch (1 cm.) deep.

But how, we may ask, did the Juniper, seventeen feet above the ground on the top of a rock, exposed to the full heat of the sun in a time of excessive and abnormal drought, obtain the moisture needed for its survival? Henry Correvon in "Rock Garden and Alpine Plants" refers to rocks as being comparable to saturated sponges which soaked with water are reservoirs of coolness and moisture that Nature uses with due circumspection for watering and irrigation. A rock mass absorbs moisture and gives it off to the atmosphere and to the roots of plants. It would seem that this is the simplest explanation to satisfy curiosity regarding the capacity of a Juniper to survive on the summit of a rock under conditions of exceptional dryness.

Plants of Current Interest. Because of the late frosts and fine weather, fall coloring has been at its best this year in the Arboretum. The early flame of Red Maple and *Cercidiphyllum* around the north meadow has come and gone and the finest coloring is now to be found in the neighborhood of Hemlock Hill. The color in that part of the Arboretum, heightened by the dark green background of the Hemlocks, is just approaching its best and should remain fine for another two weeks. The American Beeches are a brilliant yellow brown. Their English cousins, slower to color, are just turning from green to yellow. The small groups of Sorrel-trees or Sour-woods (*Oxydendrum arboreum*) are making a fine showing with their bright reds, yellows, and browns.

The current number of the English "Gardeners' Chronicle" (October 17) carries as a supplement a picture of *Fothergilla monticola* from a photograph taken in the Arboretum. It is interesting that just at the moment when their picture is being featured in a London journal, these same shrubs should be showing the very height of their fall color.