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The Arboretum is asked for information about dwarf conifers. In many genera of conifers dwarf individuals, which are seminal or rarely bud-variation forms, have appeared and have been multiplied by nurserymen and others interested in the cultivation of such plants, the largest number of such abnormal forms being found naturally among the seedlings of species which have been the most largely cultivated. The seedlings of no other conifer, perhaps, show so great variation as those of the *Arborvitæ* of the eastern United States, *Thuya occidentalis*. Some of these forms are very dwarf, forming round compact heads only a foot or two high; others grow into large globular masses; others are narrow pyramids, and some have pendulous branches. They vary, too, in the color of the foliage, that of some forms being of different shades of green, and that of others yellow. Like many other dwarf conifers, several of these forms are well suited for the decoration of the rock garden and for dwarf hedges or small beds. The collection of the forms of *Thuya occidentalis* in the Arboretum is probably one of the largest in existence and contains many interesting specimens. It is established on Yew Path leading from the Valley Road to the Hemlock Hill Road, and adjoining the *Arborvitæ*s is the collection of *Chamæcyparis* or White Cedars. The species of this genus from the Pacific Coast are not hardy in New England, so it is not possible to grow here various dwarf forms of *C. Lawsoniana* which are common in European collections. Of the Japanese species, often called *Retinosporas*, there are several dwarf forms, the most beautiful of these perhaps being the variety *nana* of *C. obtusa*. For those who admire plants with colored foliage *C. pisifera argentea* is an attractive small plant. Of the White Cedar of the eastern United States (*C. thyoides*) there are a few interesting dwarf forms. The most conspicuous of these is probably the variety *ericoides*, of dwarf, compact, pyramidal habit, with leaves which as well as the branches, turn reddish brown with the first cold weather and retain this color until spring. Another interesting form is the variety *leptoclada*, also of dwarf habit and bluish green color.

One of the most valuable of all the dwarf evergreens is that variety of the Japanese Yew (*Taxus cuspidata*) which is now cultivated in American gardens as variety *brevifolia*, but is not to be confounded with *Taxus brevifolia*, which is a California tree. This variety of the Japanese Yew has very dark green leaves and wide-spreading, rather irregularly growing branches; it attains a height of only four or five feet but sometimes covers a space ten or fifteen feet in diameter. Seedlings raised from this plant often assume the upright growth of the typical species. In the collection of Yews on Yew Path there is also a small very compact plant of a form of *Taxus cuspidata* which is one of the most distinct and beautiful of all the dwarf evergreens in the Arboretum; this appears to be a unique plant and has not received a name. Nearly all the forms of the European Yew (*Taxus baccata*) suffer more or less severely here from cold and several of them are unable to survive a New England winter. There is, however, one form which is perfectly hardy; this is a broad, flat-topped, rather compact shrub not more than two feet high, with exceedingly dark green foliage. This variety is sometimes sold in American nurseries as *Taxus repandens*; this name has not been published, however, in any of the technical books on conifers and we know nothing here of its

origin. It has lived here entirely uninjured for several years on the edge of the group of Yews on Hemlock Hill Road at the entrance of Yew Path, one of the most exposed positions in the Arboretum. This is certainly a plant of great value for this part of the country.

Among the Junipers there are several dwarf forms of the arborescent species. Of our common Red Cedar, *Juniperus virginiana*, a form with branches spreading close to the ground grows at several places on the coast of Maine. The plants of this form in the collection are too young to show their habit; it has not yet received a name. The form *globosa* of the Red Cedar is a small, round, handsome shrub well worth a place in collections of these dwarfs. The var. *tripartita*, which is not rare in European nurseries, is a low broad shrub with spreading and erect branches forming a wide open head. There are a number of large plants of this form on the left of the entrance to the path which leads from Yew Path to the knoll on which the Juniper collection is established.

Of *Juniperus chinensis* the best known dwarf form is the variety *procumbens*, with elongated branches spreading into wide mats. Of this species there are also in the collection plants of a dwarf form with erect stems forming small, round-topped shrubs. Of the European Savin (*J. Sabina*) the var. *tamariscifolia* is a vigorous prostrate shrub, and the variety *humilis*, which is the smallest of all the Junipers in the collection, is only a few inches high with small, spreading prostrate stems.

Of the conifers of the Pacific coast, with the exception of Lawson's Cypress and the Douglas Spruce (*Pseudotsuga mucronata*), no dwarfs have yet appeared, or, if they have appeared, they have not been multiplied in nurseries; and this seems to be true of the Firs, Spruces, Pines and Hemlocks of Asia with one exception; this is the dwarf form of the Japanese *Pinus densiflora* (var. *pumila*) which is much cultivated in Japanese gardens and is one of the handsomest of all dwarf conifers. This little Pine, which sometimes grows to the height of six or eight feet and forms a head of spreading branches ten or twelve feet through, is perfectly hardy here and is now well established with a number of other dwarf conifers on Conifer Path. Unlike other dwarf conifers, this plant flowers freely and occasionally bears cones. There are dwarf forms of the common White Pine of the eastern states, *Pinus Strobus*, which are decorative plants, and several dwarf forms of the so-called Scotch Pine (*P. silvestris*) which are more pyramidal in habit than forms of the White Pine. The most commonly cultivated dwarf Pine, however, is the Mugho Pine (*P. mughus* or *pumilio*). This is a shrub of the mountains of central and southern Europe and a form of *Pinus montana*, growing sometimes with that tree as on the Pyrenees, and sometimes, as on the Dolomites, by itself without other forms of the species. In cultivation it is a broad shrub with numerous erect stems occasionally reaching the height of fifteen feet and covered with dark green foliage. Plants in cultivation produce cones freely and the seedlings probably retain the habit of the parent. There are two quite distinct forms in the Arboretum collection, one with much coarser leaves than the other. This Pine is perfectly hardy and grows rapidly, but long before it reaches its full size it loses the lower branches and compact form which is the chief beauty of the young plants.

No other conifer, with the exception, perhaps of the eastern American Arborvitae, has shown so great seminal variation as the European or Norway Spruce (*Picea Abies*), and some of these forms are among the most

attractive of all the dwarf conifers. Some of the best of these are variety *Clanbrasiliana*, a low bush seldom more than six feet high, var. *Gregoriana*, usually not more than one to two feet high, and the varieties *pumila* and *pygmaea* both of exceedingly dwarf habit. Of our native Black Spruce (*Picea Mariana*) the var. *Doumettii* is a compact pyramidal plant which does not often grow more than ten or twelve feet tall and is of bluish color. An interesting dwarf form of the Rocky Mountain Blue Spruce. (*P. pungens* or *Parryana*, or as it should be called, *P. Menziesii*) appeared several years ago in the Arboretum nurseries and promises to be valuable as a decorative plant; it has not yet received a name. There is in cultivation, too, a dwarf of the Spruce tree of the Caucasus (*P. orientalis*) which, however, is little known in collections, and in the Arboretum collection are two plants of a dwarf Douglas Spruce.

The genus *Abies*, the Firs, have as yet produced few dwarf forms. The best known is probably the dwarf of the Balsam Fir of northeastern North America (*A. balsamifera*), known in gardens as *A. Hudsonica*, a very dwarf and not particularly attractive plant. There is a dwarf pyramidal form of the Fir of central Europe (*A. Picea*) but this after a few years is apt to lose its dwarf habit and grow into a tall tree. A dwarf form of the Rocky Mountain *A. lasiocarpa* was raised several years ago in the Arboretum and is still a true dwarf in habit, although grafts taken from this plant are beginning to assume the narrow pyramidal habit of the species. The original plant can be seen in the bed of dwarfs on Conifer Path where there are three grafted plants of the dwarf Rocky Mountain Blue Spruce.

The common Hemlock of the eastern states (*Tsuga canadensis*) has a strong tendency to seminal variation, and dwarf and other abnormal forms of this tree often occur in the woods. The most distinct and interesting of these is a compact form with closely appressed pendulous branches forming a broad, low round-topped mass. Many years ago four or five plants of this form were found by the late Joseph Howland of Mattapan, New York, on one of the mountains back of Fishkill Landing on the Hudson River and were named by him Sargent's Hemlock for his friend and neighbor Henry Winthrop Sargent. Only one or perhaps two of these wild plants are now living, although the variety has been much propagated by nurserymen by grafting its branches on the common Hemlock. These grafted plants, as they grow more rapidly and are of more open habit, are less compact and less beautiful than the original seedlings. The plant in the Arboretum among the large collection of dwarf Hemlocks on Hemlock Hill Road is a grafted plant, but at Holm Lea in Brookline there is one of General Howland's original plants. The beautiful Carolina Hemlock (*T. caroliniana*) has not been very largely cultivated, but among the plants in the Arboretum Pinetum near the corner of Centre and Walter Streets are two plants which look as if they were true dwarfs as they are less than one-quarter of the size of the other trees of the same age growing with them and show no tendency to form an upright stem.

The Bulletins will now be discontinued until the spring.

The Arboretum will be grateful for any publicity given these Bulletins.



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