Hawthorns handsome in the autumn. Some of the American Hawthorns are more beautiful when their fruits ripen in the autumn than they are when the white flowers cover the branches in the spring and early summer, and there are great horticultural possibilities in these plants which are particularly valuable in those parts of the country where the soil is impregnated with lime. Indeed American Hawthorns, although they do not require lime, are lime-loving plants, and the largest number of species and the handsomest plants are found where lime abounds. In the parks of cities like Chicago, St. Louis and Pittsburg, where the smoke of bituminous coal is fatal to many plants, it has been found that American Hawthorns grow better than most trees and shrubs. It is impossible in one of these Bulletins to do more than mention briefly a few species which are exceptionally beautiful at this season and have shown themselves well suited for general cultivation.

Crataegus arkansana. This tree is a native of the valley of the White River in central Arkansas and was first raised in the Arboretum in 1880. It belongs to the Molles Group of the genus which is distinguished by its large usually tomentose leaves, large flowers and large scarlet, or rarely yellow, edible fruit. Like the other species of the group, C. arkansana is a tree which in the deep rich soil of Arkansas bottom-lands sometimes grows to the height of forty feet. The fruit of many of the species of this group, like C. Arnoldiana and C. mollis, ripens in August and September and soon falls; that of C. arkansana does not ripen until the middle of October when the leaves are still green.
and remains on the branches until the end of November. This late ripening of the fruit after that of the other large-fruited species has disappeared makes *C. arkansana* one of the interesting and valuable species. The largest plant in the Arboretum is on the left-hand side of the South Street entrance just outside the gate where it is growing with a plant of *C. submollis*, a species of the same group, which loses its fruit early in September.

Nearly all the species of the Tomentosae Group, named for one of the species, *C. tomentosa*, and distinguished by the longitudinal cavities on the inner faces of the nutlets, have lustrous and showy fruits with the exception of *C. tomentosa* itself and some of the species closely related to it. *Crataegus prunifolia* is one of the handsome plants of this group. It is a large, compact, round-topped shrub or small tree with brilliant scarlet fruit and lustrous leaves which turn bright orange and scarlet in the middle of October. Although this plant was cultivated in England more than a hundred years ago and is certainly a native of North America, it is still unknown in this country as a wild plant. For at least a century botanists have considered *C. prunifolia* a variety of the Cockspur Thorn (*C. Crus-galli*) because the leaves somewhat resemble in shape the leaves of that tree, no one apparently having taken the trouble to examine the nutlets. *Crataegus succulenta* is another beautiful member of the Tomentosae Group with drooping clusters of scarlet fruits which remain hard until late in the autumn and then suddenly increase in size and become soft, succulent and translucent. It is a small tree not rare in the region from Massachusetts to Illinois and one of the handsomest species of the group. *Crataegus macracantha*, another species of this group, is remarkable for the long stout spines which thickly cover the branches and which would make it a good hedge plant. This species is particularly showy when the flowers in large, round-topped compact clusters open in June, but the fruit is less beautiful than that of *C. succulenta*. Species of this group are abundant in the neighborhood of Toronto and other parts of southern Ontario, and some of these Canadian plants, although they are not old enough yet to produce fruit here, promise to become important additions to the collection.

*Crataegus nitida* from the bottom-lands of the Mississippi River in Illinois near St. Louis, a member of a southern group (Virides), is, as has often been said in these Bulletins, one of the handsomest of the American species cultivated in the Arboretum. It is a wide-branched, flat-topped tree sometimes thirty feet high with narrow, dark green shining leaves which late in October assume the most brilliant shades of orange and scarlet, rather small flowers in numerous crowded clusters, and drooping, oblong, brick-red fruits marked by small white dots. Very different in appearance is another tree from the neighborhood of St. Louis, *C. coccinioides*. This has broad, deeply-lobed leaves which also become orange and scarlet late in October, but the flowers are an inch in diameter with twenty stamens and deep rose-colored anthers. The flowers are arranged in compact from five- to seven-flowered clusters, and are followed by subglobose, dark crimson, lustrous fruits.
marked by large pale dots and nearly an inch long, and rather longer than broad. The fruit ripens about the middle of October as the leaves turn color and does not entirely fall before December. Another member of the same group as the last *C. durobrivensis* (Dilatatae), the Rochester Thorn, is valuable for the winter garden because the dark crimson fruit, which is nearly three-quarters of an inch in diameter, remains on the branches uninjured by frost until midwinter. It is a large shrub with flowers an inch in diameter in many-flowered clusters.

**Crataegus pruinosa.** This is the type of another northern group distinguished by its thick leaves usually broad at the base with long slender stems, large flowers and large fruit often broader than high, frequently angled, green or red covered with a pale bloom, surmounted by a prominent calyx raised on a tube, and hard dry flesh. Many of the species are handsome in spring and autumn and the type of the group, *C. pruinosa*, especially deserves the attention of planters. It is a small tree which grows naturally from southern Vermont to Missouri and along the foothills of the Appalachian Mountains. It has thick, blue-green leaves; the flowers are sometimes an inch in diameter and conspicuous from the twenty large, deep, rose-colored anthers, and the fruit, which is arranged in broad drooping clusters, is subglobose, rather more than half an inch in diameter, apple green until late in autumn, when it becomes dark purple red and very lustrous.

**Dwarf Hawthorns.** From the middle to the end of October there is not a more interesting group of small shrubs in the Arboretum than that of the species of Crataegus in the Intricatae Group which is arranged on the lower side of the road at the eastern base of Peter's Hill next to the Crabapple Collection. These shrubs are confined to the northern United States and Canada, and are perhaps more numerous in Pennsylvania and Michigan than in other parts of the country. They bloom later than most of the American Hawthorns, the flowers of all of them are large and conspicuous with yellow, rose-colored or pink anthers. The fruit ripens late and is scarlet, red, orange, yellow or russet, and its beauty is increased by the brilliant colors of the leaves at the time it ripens. A large number of these plants are now in the collection. One of the handsomest this year is *C. cuprea* with scarlet foliage and russet or copper-colored fruit. This little shrub was first detected in a vacant lot in the city of Wilmington, Delaware, and is not known to grow naturally beyond the limits of that city. *C. Delossii*, found growing several years ago by the side of a road near Toronto, is unusually full of its orange and red fruit this autumn. This species differs from the others of the group in the large number of fruits (ten to fifteen) compactly arranged in dense clusters. The autumn leaves are green and yellow. Other species of this group deserving attention are *C. infera* from the neighborhood of Sellersville, Bucks County, Pennsylvania, with orange-red fruit and brilliant orange and red autumn leaves; *C. fructuosa*, a shrub five or six feet tall which has only been found on the Serpentine Ridge near West Chester, Pennsylvania, with deep orange-red fruit in small erect clusters, and dark red-purple autumn leaves; and *C. modesta*, a little shrub often not more than
twelve or eighteen inches high, first noticed on a hill near Rutland, Vermont, but now known to grow in many places in southern New England and to range into eastern Pennsylvania, and conspicuous in the autumn with its bright scarlet leaves and green, yellow or orange and red fruits. Two species of the group in the southern Appalachian Mountain region, C. Buckleyi and C. Boyntonii, are small trees and have grown in the Arboretum into dense pyramids now eight or ten feet tall, and still covered with dark green leaves which later turn to shades of orange and scarlet.

The Tulip-tree (Liriodendron) is unfortunately not a native of eastern Massachusetts, although it occurs in the western part of the state and in Rhode Island. It is perfectly hardy here, and has grown to a large size in the neighborhood of Boston. It is therefore surprising that this tree is not more generally planted here for the American Liriodendron is one of the most magnificent trees of the northern hemisphere, growing as it does when all the conditions of soil and climate favor it, as in the rich "coves" of the southern Appalachian Mountains, to the height of two hundred feet and forming a trunk eight or ten feet in diameter and free of branches for half its height. The tulip-shaped flowers and the leaves, which are of unusual shape, are beautiful and interesting, but attention is now called to this tree on account of the beautiful color of the autumn foliage. This when the leaves first lose their green color is bright clear yellow but later as they begin to fall becomes darker and the color of old gold. In October in those parts of the country like Delaware County in eastern Pennsylvania, and on the slopes of the southern mountains where the Tulip-tree forms a considerable part of the forest and often raises its head high above its humbler companions, its spire-like bright golden crowns produce a beauty which can be found in no other part of the world. The Chinese Tulip-tree of recent discovery has not proved hardy in the Arboretum. It is a much smaller tree than the American species with smaller flowers but larger and handsomer leaves.

Pyrus Calleryana. This Pear-tree, which was raised here from seeds collected by Wilson in western China, has less beautiful flowers than many other Pear-trees, and the russet-colored fruit is not more than half an inch long. It may, however, prove to be one of the most valuable plants introduced into the United States by the Arboretum, for it is now believed by American pomologists that it will prove to be a blight-resisting stock on which to graft the varieties of garden pears. The Arboretum trees appear to be the only ones in the United States large enough to flower and this year they have produced a good crop of fruit which will be sent to the Department of Agriculture for distribution.