

MISSOURI BOTANICAL GARDEN¹

by John E. Elsley and Peter H. Raven

Abstract. The paper briefly outlines the history and development of the Missouri Botanical Garden in St. Louis, America's second oldest botanical garden. Following a description of some of its present functions and aims, is an outline of various new features which are an integral part of a recent master plan to rejuvenate horticulture at the institution. In the conclusion is an explanation of the recently commenced efforts to expand and diversify the collections of hardy trees and shrubs: an operation which it is hoped will, in time, become a benefit to local horticulture and arboriculture.

Since its foundation in 1859, the Missouri Botanical Garden (Shaw's Garden) has strived to fulfill the dream of its English founder, Henry Shaw, namely, to rank as one of the world's greatest botanical institutions. Following his arrival at St. Louis in 1819, the 19-year-old Shaw proceeded to seek business success with his hardware products, much in demand at this time by the westward bound pioneers. Within a period of 20 years, Shaw's shrewd and demanding business standards rewarded him with a financial fortune, enabling him to retire at an early age to devote the remainder of his life for establishing his botanical garden. Prior to his death in 1889 his dream had attained fruition. Shaw in the intervening period had wisely sought the guidance of such notable figures as the German physician and botanist Dr. George Engelman, Sir William Hooker, Director of the Royal Botanic Gardens, Kew, and the Harvard botanist Dr. Asa Gray. Surrounding his country home, Tower Grove (now restored as a museum), Shaw established formal gardens, an arboretum, and various architectural features including the Linnaean House, completed in 1882. It today is the oldest continually operating greenhouse west of the Mississippi River. Adjoining the Garden, he also landscaped Tower Grove Park complete with pergolas, statues, an ornate bandstand, and many fine trees. Today this park exemplifies one of the finest Victorian city landscapes in North America.

Since its foundation, the Garden has remained a private institution, originally operating from the

endowment created by Shaw's estate. Progressively the Garden has evolved this century and concurrently this original endowment has provided a diminishing proportion of the annual budget. The Garden's growth and development are increasingly reliant on the support of its many friends. Today, the herbarium contains some 2½ million dried plant specimens and the library with 75,000 volumes ranks as one of the world's finest collections of botanical literature. Both these important collections are now housed in the superbly designed John S. Lehmann Building, opened in 1972. In addition to botanical research, prominent horticultural achievements include much of the pioneer breeding work related to tropical water lilies, undertaken by George Pring, and the dedication in 1960 of the Climatron, a 'space age' conservatory in the form of a geodesic dome without internal supports constructed on the R. Buckminster Fuller concept.

Recently, concerted efforts have been initiated to rejuvenate horticultural activities. Plans have included the complete redesigning of areas previously not under cultivation together with the renovation and upgrading of existing features. An extensive new rose garden incorporating many of the latest cultivars is already creating considerable visitor interest as has an English style Woodland Garden, created in a previously neglected wooded area. The existing tree canopy provides summer shade so essential for the successful cultivation of a wide range of plants in this region. May 1977 will witness the dedication of an 11-acre Japanese Garden, the largest of its kind in the United States which focuses on a 4½-acre lake and three islands with the overall layout including such traditional features as bridges, waterfalls, a teahouse, plum arbor, dry landscape garden, pebble beach, and numerous lanterns. Advanced plans for two future projects have been prepared, one for an extensive boxwood garden and the other a Home

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Taxodium distichum, swamp cypress. Specific variation is clearly demonstrated by this seed-raised group of *T. distichum*. This vigorous, formal, deciduous conifer makes an ideal specimen landscape subject, especially suitable for city plantings.

Demonstration Center. The latter will serve an increasing demand for both theoretical and practical horticultural education.

Such new features have the added advantage of providing locations in which we can expand our collections of hardy plants especially woody subjects. St. Louis is included in hardiness zone 5 and is subject to a range of exacting climatic conditions which are restrictive to many species. The continental climate is dominated by hot humid summers (midsummer average 86.5 deg. F) with an average rainfall of 35.89 inches. Especially injurious to woody plants are the sudden temperature fluctuations which occur early in the year, warm spells encouraging new growth which is then cut back as temperatures plunge sometimes to around zero. Few regions of the world experience climatic conditions similar to

those encountered in St. Louis, two notable exceptions being parts of the Balkan peninsula and central Japan, especially the island of Honshu. A major emphasis will be to establish native species from such locations and already we are noting encouraging results from seeds recently obtained from central Japan. Additionally, we plan to expand our collections of native American species especially those from the Midwest. Material is procured, where possible, from superior native specimens. It is hoped that such a program, in addition to broadening the spectrum of our living collections will eventually stimulate the wider usage of a more varied range of woody species in both public and private plantings.

In addition to 78 acres in the City of St. Louis, the Garden controls the 2,200-acre Shaw Arboretum situated 40 miles west of the City of

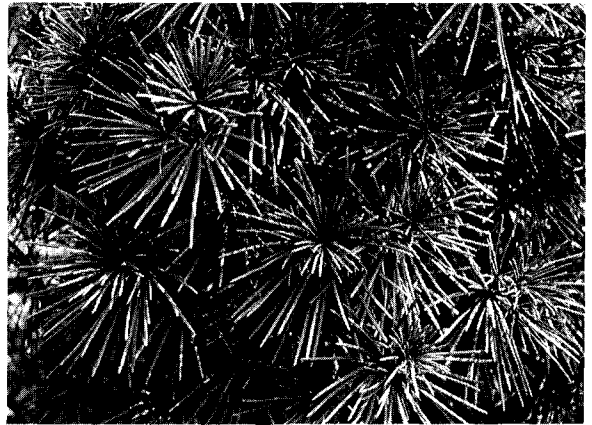
Gray Summit, an area encompassing many varied native Missouri habitats and a scenic stretch of the Meramec River. Sections of the arboretum were planted with a collection of conifers during the 1930's when air pollution threatened their existence at the city location. Today, considerable improvements have been achieved in lessening the detrimental effects of air pollution inasmuch as we are reintroducing many coniferous subjects into the city Garden, while the Arboretum will provide an ideal setting for testing and expanding our woody collections.

In climates where the regime severely restricts the successful growth of a wide range of plant species, coniferous subjects able to withstand the prevailing conditions assume major ornamental value especially during the winter period. We are especially optimistic by the performance of the bigeneric hybrid Leyland cypress x *Cupressocyparis leylandii* 'Leighton Green' (*Cupressus macrocarpa* x *Chamaecyparis nootkatensis*), a subject inheriting the desirable qualities of vigor and hardiness from its parent species. Somewhat surprisingly, a specimen of the Arizona cypress, *Cupressus arizonica*, has flourished even to the extent of fruiting; a highly desirable plant on account of its perpendicular formal habit, glaucous foliage and exfoliating bark.

Although appearing to require some shelter during early life, a factor applicable to many other species, the giant sequoia, *Sequoiadendron giganteum* (Syn. *Sequoia gigantea*), is a North American native worthy of wider ornamental usage.

The Siberian spruce, *Picea omorika*, is one of the most beautiful and adaptable spruces in cultivation and our initial efforts with established specimens of this Yugoslavian native are encouraging. It rapidly forms a tall, graceful slender tree with short drooping branches which become upturned at their tips; an excellent plant for accent planting.

Several Japanese conifers appearing to have considerable potential include the fast-growing Japanese cedar, *Cryptomeria japonica*, the fir, *Abies veitchii*, which is repeatedly extremely tolerant to city conditions, and the rarely encountered umbrella pine, *Sciadopitys verticillata*,



Sciadopitys verticillata, Japanese umbrella pine. A desirable conifer with fused leaf pairs appearing in dense whorls reminiscent of the spokes of a wheel, showing a preference for some degree of shade.

a subject preferring partial shade and shelter, the fused leaf pairs appearing in dense whorls reminiscent of the spokes of a wheel. Two deciduous species, the golden larch, *Pseudolarix amabilis*, and the Japanese larch, *Larix kaempferi* (Syn. *L. leptolepis*), each possess desirable characteristics. The former, although slow-growing, produces long attractive foliage which turns a vivid golden yellow in fall, whereas the latter species bears glaucous gray-green leaves and is especially tolerant of shallow soils.

Special attention has been directed to establishing a comprehensive collection of hollies, a genus displaying remarkable diversity among its species and hybrids, and often considerably underrated for ornamental usage. In addition to its values as an evergreen, the American holly, *Ilex opaca*, is represented as an ornamental fruiting species by a range of excellent selected cultivars including 'Miss Helen' and 'Chief Paduke' with red berries and 'Morgan Gold,' 'Goldie' and 'Canary' bearing yellow fruits. No subject surpasses the winter fruiting effect of the deciduous possum haw, *I. decidua*, outstanding cultivars of which include 'Warren Red,' 'Pochahontas' and 'Sundance.' The Japanese longstalked holly, with spineless, lustrous foliage, has proved one of our hardiest exotic evergreens, and in company with the American inkberry, *I. glabra*, merits wider utilization. In cul-

tivation the dwarf, small-leaved Japanese species, *I. crenata*, is particularly variable. The cultivar 'Convexa' forms an excellent low-hedging plant in our conditions and 'Red Lion,' a more compact cultivar than 'Helleri,' has great value as a ground cover.

Justifiably, the Japanese maple, *Acer palmatum*, is, in its many forms, one of our most popular garden plants. However, Japan and China are the home of a wide range of other equally desirable maples ideally suited for small gardens. These include the following species now included in our collections, *A. argutum*, *A. ginnala*, *A. cissifolium*, *A. crataegifolium*, *A. mono*, *A. japonicum* 'Aconitifolium' all with attractive foliage, *A. rufinerve*, *A. capillipes*, *A. davidii*, *A. forestii*, and *A. hersii*, with striated bark, hence the name snake bark maple and paperbark maple, *A. griseum*, older trees of which have exfoliating bark revealing a smooth cinnamon-colored under-bark.

Generally, birches are short lived in this area due to the warm summers and their susceptibility to attack by borers, nevertheless they are, even on a short-term basis, excellent landscape plants. The Swedish birch, *Betula pendula* 'Dalecarlica,' forms a tall graceful specimen with drooping branchlets and deeply dissected leaves, which markedly contrast to the equally distinctive dwarf dome-shaped weeping form of Young's weeping birch, *B. pendula* 'Youngii.' Three Asiatic species of which we are potentially optimistic are the Japanese white birch, *B. platyphylla japonica*, with beautiful white bark, the Himalayan birch, *B. utilis*, a variable species displaying white or brown peeling bark and *B. ermanii*, a tall-growing species with a pinkish-white trunk. The ornamental value of our native trees is demonstrated by the river birch, *B. nigra*, a subject remarkable for its shaggy bark and its tolerance to variable soil conditions.

The English Woodland Garden has enabled us to establish a range of species requiring varying amounts of shade. Massed plantings of the Japanese Kurume azaleas and different cultivars of the American dogwood, *Cornus florida*, will provide a patchwork of colors in the spring. Although camellias are not hardy, several close

relatives of this genus in the Theaceae family are proving valuable.

Stewartias are multipurpose plants, the large white flowers are produced during July and August when many other subjects are past flowering, rich fall coloring is another attribute and the trunk and bark of older specimens is often attractive. Most of the species originate from Asia, including *S. koreana*, *S. pseudocamellia*, and *S. monodelpha*, although *S. malacodendron* and *S. ovata* are native to the southeastern United States.

One of North America's most famous native trees is *Franklinia alata*, discovered by the American botanist John Bartram, around 1765 on the Alatomaha River in Georgia. It was last seen in the wild in 1790 and probably is now extinct in its native habitat. Thanks initially to the effort of John Bartram and his son, William, the plant was propagated and distributed widely, although today the plant is still uncommon and deserves to be more widely planted. Its sweetly-scented, cream-colored flowers, with a prominent orange stamen mass, are produced towards the end of our hot summers and its large shiny leaves turn crimson in the fall.

Two species of the snowbell tree, *Styrax japonica* and *S. obassia*, regularly produce their elegant pendulous white flowers in June. The flowers of the latter species have a strong fragrance. A small specimen of the spectacular dove tree, *Davidia involucrata*, has survived the past three winters in this protected location although the tree, even when mature, is often shy in producing flowers which are subtended by two large white bracts.

More reliable is the sorrel tree, *Oxydendrum arboreum*, a member of the Ericaceae from the eastern United States which produced spectacular crimson and yellow fall coloration. In addition, slender drooping racemes of white flowers are formed in July and August.

Several magnolias have been included in our woodland plantings with encouraging results. These include the Asiatic species, *Magnolia dawsoniana* and *M. sprengeri*, both introductions of the great American plant hunter, E.H. Wilson, and *M. obovata* (Syn. *M. hypoleuca*) the

Japanese counterpart of the eastern North American umbrella tree, *M. tripetala*. One of the finest clones of the commonly grown hybrid saucer magnolis is *M. x soulangiana* 'Lennei' which produces large, fleshy, purple, goblet-shaped flowers, a plant encountered too infrequently.

Many of our North American trees are represented by closely related species overseas and the following are a selection of these which we are now cultivating. The Formosan sweetgum, *Liquidambar formosana*, forms a beautiful specimen with duller green, three- to five-lobed leaves when compared with our native sweetgum, *L. styraciflua*.

Two distinctive hornbeams are the widely spreading *Carpinus japonicus* and *C. orientalis*, a slower growing species with potential for planting in restricted spaces. Three species of hackberries of great interest are *Celtis caucasica*, a medium sized tree from eastern Bulgaria and western Asia, *C. tournefortii*, a small tree from south-east Europe and Asia Minor with shiny green leaves and *C. sinensis* from Asia, which is thought to be resistant to witches'-broom disease.

is not commonly cultivated, its close relative from southern Europe, the hophornbeam, *O. carpinifolia*, forms an elegant rounded tree remarkably resistant to pest and disease attacks.

The Japanese zelkova, *Zelkova serrata*, has been widely planted in its various forms throughout North America having the qualities of both a desirable habit and freedom from Dutch elm disease which has caused havoc with the closely related elms. Two further Zelkovas which appear to have merit are both Chinese, *Z. sinica*,

whose young growths are pinkish in color and *Z. shneideriana*. The former is another one of E.H. Wilson's introductions.

The wing nut, *Pterocarya fraxinifolia*, from the Caucasus to North Persia and its close relative from Asia *Platycarya strobilacea* are both members of the Juglandaceae (walnut) family. The former eventually produces a large wide-spreading specimen and the latter a beautiful small compact tree with typical pinnate leaves.

In Japan and China, *Idesia polycarpa* forms an ornamental medium-sized tree with large leaves somewhat reminiscent of our native catalpas. Large clusters of attractive red pea-like fruits appear on female trees later in the season. As geographical races of this species differ in their hardiness potential it is possible that this species could become established. The Japanese raisin tree, *Hovenia dulcis*, is widely cultivated in Japan and India although a native of China. From an ornamental viewpoint it is outstanding for its handsome polished foliage.

As time progresses we shall probably encounter difficulties with the hardiness of some of the species mentioned in this short article. The plants mentioned are only a selection of those we are attempting to establish in our collections and as our hardy plant program develops we intend to evaluate increasing numbers of subjects. We certainly would welcome any advice and assistance from arborists who are in any way interested in our eventual goal of making available a much wider range of plants to enrich our landscapes.

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