

# *Araucaria:* Pines of the Southern Hemisphere

Gary Cromwell



**B**UNYA-BUNYA, Star-Pine, Klinki, Monkey Puzzle Tree. Such exotic common names refer to species of *Araucaria*, one of two genera belonging to the family Araucariaceae. Araucarias are graceful evergreen coniferous trees now limited naturally to the southern hemisphere, including eastern Australia, New Caledonia, New Guinea, New Hebrides, Norfolk Island, Argentina, Chile, Brazil, and Paraguay.

The name "Araucaria" is derived from two sources: the prefix stems from Arauco, a province of southern Chile, and *ria* is Spanish for river mouth. The genus was named by A. L. de Jussieu, a French botanist who described the plants in his *Genera Plantarum* of 1789. Araucarias are members of the order Pinales and are believed by botanists to be related to the true pines (genus *Pinus*). At one time, some of the species were called pines; for example, *Araucaria angustifolia* is the Parana-Pine or Candelabra Tree, which dominates a large forested area in South America from southern Brazil into Paraguay and northern Argentina.

Numerically, this genus is not a large one. Estimates of extant species and varieties are from 12 to about 18. Most occur naturally in the Australian-New Caledonian area of the world, and none exist on islands east of New Zealand. Where they occur, *Araucaria* forests tend to be sparse in numbers and the trees



*This 27-year-old bunya-bunya tree (Araucaria bidwillii) is located south of the Arboretum entrance pool.*

Photo by William Aplin



often form isolated towerlike habits.

Araucarias may attain a height of 200 feet in their natural ranges. Under cultivation in subtropical or temperate regions, height of the trees may range from 20 to 80 feet or more. According to one eyewitness, some Norfolk Island-Pine (*Araucaria heterophylla*) specimens in Hawaii grow to 150 feet. Juvenile forms of different species may resemble one another, at least until they attain a height of about 30 to 40 feet. Mature trees are distinctive in both height and appearance.

Nearly every species of *Araucaria* has an interesting growth pattern. Because the general form of the trees is more or less symmetrical, they make outstanding skyline specimens. Large branches are thick and few in number. They are spirally arranged or whorled around the main stem and bear secondary branches called branchlets. With age and sufficient growth, branches may lose their erect posture and become pendulous. Leaves are mostly dark green, glossy, and stiff. They may be nearly linear to lanceolate to triangular, with a decurrent base (extending down along the axis) and a pointed tip. As the leaves of so many species are prickly, one is advised to squeeze gently when handling the branchlets. Leaves are densely and uniformly arranged around the branchlets, often are two-ranked, and are dimorphic (having two different forms). Juvenile leaves tend to be larger and more spreading in relation to the branchlet and adult leaves may be either slightly open or closely appressed and overlapping on the branch axis.

Araucarias do not shed individual leaves; instead, they gradually drop the smaller branchlets, which accumulate around the tree base. Branchlets of such species as the Bunya-Bunya or Bon-Yi (*A. bidwillii*) and the Hoop-Pine (*A. cunninghamii*) are regarded as favorite decorative materials by fanciers of dried plant arrangements.

The plants mostly are dioecious (sexes occur on separate plants). Male cones are cylindrical and catkin-like, with numerous spiral overlapping cone scales called microsporophylls. They are situated terminally on branches, either singly or in clusters. Female cones are globose to cylindrical and larger, with their cone scales or macrosporophylls in a continuous spiral series with the leaves. When mature, the large female cones shatter and thereby release their extraordinarily large wingless seeds. The female cone scale with its associated indistinct bract is shed as a unit.

Technical differences in reproductive structures are the most important factor considered by taxonomists in segregating the araucarias from the true pines; for example, *Araucaria* species usually have only one seed per cone scale while members of the pine family most often bear two or more seeds on each scale. There also are cellular differences in the immature seeds of both groups.

Araucarias can be cultivated as are other conifers, although they tend to be more cold sensitive. The trees will survive in thin soils and will withstand neglect, but they thrive better in richer soil with moderate watering. Propagation may be by seeds, cuttings, or grafting. The grower should be aware that seeds of most species are short-lived. Additionally, it is best to consider species growth requirements before selecting a specimen.

These plants are highly regarded for their timber and ornamental value in the southern hemisphere and as a source of industrial resins. As is the case with *Pinus* in the northern hemisphere, araucarias are one of the most important timber sources south of the equator. Especially valuable for furniture manufacturing and multiple construction uses are *Araucaria angustifolia* (Argentina), *A. araucana* (Chile), *A. bidwillii* (Australia), *A. cunning-*

*hamii*, (Australia), and *A. klinkii* (New Guinea). The seeds of *A. angustifolia*, *A. araucana*, *A. bidwillii*, and perhaps other species are edible.

Among the more famous in the genus is *Araucaria araucana*. As a sapling, it has a pyramidal shape and open branches. Older trees have a bizarre mass of twisting, ropelike branches which seem to defy climbing, hence the name Monkey Puzzle Tree. It does best in moist coastal air and soil but must be containerized for home gardens in the desert. *A. araucana* is slow-growing, about one foot annually. In cultivation, it may reach a height of 80 to 100 feet.

Another species of exceptional ornamental value is the New Caledonia-Pine, *A. columnaris*, also known as *A. cookii*. This tree is preferred by some over *A. heterophylla*, and the two species may be confused by the amateur horticulturist. New Caledonia-Pine is a tall columnar tree, reaching to a height of 200 feet on its native island. Juvenile leaves are broadly needlelike and adult leaves are oval to triangular. Leaves of this species are a deeper green but about the same size as those of *A. heterophylla*. New Caledonia-Pine is also found naturally on small islands of the New Hebrides.

The Los Angeles State and County Arboretum currently has three species in its collection and expects to acquire additional representatives. *Araucaria* trees included at present are the Bunya-Bunya (*A. bidwillii*), the Hoop-Pine (*A. cunninghamii*), and the Norfolk Island-Pine or Star-Pine (*A. heterophylla*). Bunya-Bunya is an Australian tree of moderate growth, reaching a mature height of 80 to 100 feet in botanic gardens. It has a rounded top and long pendulous branches, and it casts dense shade. Branches are characterized by alternating segments of larger juvenile leaves and smaller oval mature leaves. *A. bidwillii* may be seen south of the Arboretum's administrative complex, just west of the road leading to the



lower lagoon, and in the Australian sector west of the service yard.

Hoop-Pine, another Australian native, may reach a height of 100 feet when grown in the north. It is readily identified by its elongate upswept branches, tufts of leaves at branchlet tips, and its awl-like overlapping leaves which clasp the branchlets. Several 30-foot specimens of *A. cunninghamii* are growing in the Australian section northwest of the research building.

Among the most beautiful species in the Arboretum's collection is the renowned Norfolk Island-Pine, sometimes called Star-Pine. A fine young specimen may be seen adjacent to the fence on the south side of the Santa Anita Depot. This species is indigenous to Norfolk Island, in the Tasman Sea east of Australia. It grows moderately in cultivation to around 100 feet tall, with a habit of a nearly perfect pyramid. All of its leaves have acutely pointed tips; the juvenile ones are narrow, short and curved and the adult leaves are fairly triangular, compact and crowded. It may be containerized outdoors in warmer climates and enjoyed as a house plant in colder areas. It was introduced into the Hawaiian Islands about the 1860s and is still widely used there as a Christmas tree.

Fossilized parts of *Araucaria* trees have been found in New Zealand and Antarctica. These plants are thought to have been once widespread in North America, Europe, Asia, South America, and even to have forested parts of Africa and Antarctica. Araucarian ancestry probably dates back 150 to 200 million years to the late Paleozoic or early Mesozoic eras. If this is so, these early trees probably flourished during the age of great reptiles or dinosaurs, in the Jurassic and Cretaceous periods of the Mesozoic era. Also, accumulating *Araucaria* fossil evidence lends support to the theory that the continents of South America, Australia, and Antarctica may



*This specimen of Norfolk Island pine (Araucaria heterophylla) was planted from a 15-gallon can in 1971 and is already over 20 feet high. It is growing next to the restored Santa Anita Depot in the Arboretum historical section.*

Photo by William Aplin



have been connected in prehistoric times as part of an ancient continent referred to by natural historians as Gondwanaland.

Why did the ancient araucarias presumably die out in such large numbers? No one knows for sure. Could the gradual cooling and drying of the earth over millions of years have limited the occurrences of trees adapted to a warmer mois-

ter climate, or did mountain-building or a series of catastrophic events in nature ultimately cause their decline? At least the climatic changes seem to have been a factor promoting the extinction of the dinosaurs. Botanists have considered the possibility also that the araucarias may have failed to continue to distribute themselves successfully because of their large cones and exceptionally

large seeds. Both of these features are regarded as primitive in living conifers, and large seeds as a rule are difficult to disperse. It seems fortunate for us that some of them survived, for they deservedly are treasured ornamentals.

*Gary Cromwell is a biologist and plant taxonomist in the Department's Research Division.*

## LOS ANGELES STATE AND COUNTY ARBORETUM, Arcadia

### MARCH 10, 11—9 a.m. to 5 p.m.

Cactus and Succulent Show  
Presented by San Gabriel Valley  
Cactus and Succulent Society

### MARCH 11—2 p.m.

Sunday Afternoon Lecture  
Exotic Economic Plants  
Dr. Enari, Arboretum senior biologist

### MARCH 16—8 p.m.

Theodore Payne Foundation Lecture  
"Effects of Air, Water, Land on Natives" James Roof, former director,  
Tilden Botanical Garden, Berkeley

### MARCH 31, APRIL 1—9 a.m. to 5 p.m.

Aril Show  
Presented by Aril Society

### APRIL 1—2 p.m.

Sunday Afternoon Lecture  
Medicinal Plants Used by American  
Indians  
Gary Cromwell, Arboretum biologist

### APRIL 21, 22—9 a.m. to 5 p.m.

Amaryllis Show  
Presented by Amaryllis Society

### APRIL 22—10 a.m.

Sunday Morning Walk  
Groundcovers  
Charles Lee, Arboretum horticultural  
consultant

### APRIL 22—2 p.m.

Sunday Afternoon Lecture  
Growing and Using Annual Plants  
Ronald Call, Arboretum education  
specialist

### APRIL 28, 29—9 a.m. to 5 p.m.

Pacific Rose Show  
Presented by Pacific Rose Society

### MAY 6—9 a.m. to 4 p.m.

Baldwin Bonanza  
Presented by California Arboretum  
Foundation

### MAY 20—9 a.m. to 5 p.m.

Epiphyllum Show  
Presented by Epiphyllum Society

## CALENDAR

### MARCH, APRIL, AND MAY

### MAY 26, 27—9 a.m. to 5 p.m.

Santa Anita Bonsai Show  
Presented by Santa Anita Bonsai  
Society

## DESCANSO GARDENS, La Canada

### MARCH 3, 4—Sat., 12 a.m. to 5 p.m.

Sun. 9 a.m. to 5 p.m.

Camelia Show  
Presented by Southern California  
Camellia Council

### MARCH 24, 25—Sat., 12 a.m. to 5 p.m.

Sun. 9 a.m. to 5 p.m.

Daffodil Show  
Presented by Southern California  
Daffodil Society

### MARCH 31, APRIL 1—9 a.m. to 5 p.m.

Bonsai Show  
Presented by Descanso Gardens  
Bonsai Society

### APRIL 29—10 a.m.

Sunday Morning Walk  
Native Plant Section  
Don Graf, senior tour guide

### MAY 17—10 a.m. to 4 p.m.

Paseo Por Descanso  
Presented by Descanso Gardens Guild  
(Reservation deadline, May 11)

## SOUTH COAST BOTANIC GARDEN, Palos Verdes Peninsula

### MARCH 4—2 p.m.

Colorful Spring Plantings and  
Baskets Demonstration  
Rocky Marshall, Crest Nursery

### MARCH 11—2 p.m.

Orchids for the Amateur  
Jerry Rehfield, president, South Bay  
Orchid Society

### MARCH 18—2 p.m.

Flower Arrangements  
Mazie Jeanne George, president,  
South Coast Camellia Society

### MARCH 21—2 p.m.

A Safari to Your Backyard  
Jess Morton, president, Palos  
Verdes Audubon Society

### MARCH 25—10 a.m.

Sunday Morning Walk  
Aquatic Plant Section  
Edward Hartnagel, assistant superin-  
tendent

### APRIL 1—2 p.m.

How Our Ancestors Prepared Cotton,  
Linen, Wool, etc. At Home Demon-  
stration, Carolyn Osborne

### APRIL 22—2 p.m.

How To Divide Dahlia Bulbs  
Fred McKelvey, Inglewood  
Dahlia Society

### APRIL 29—2 p.m.

Spring Concert  
Richard Schwalbe, director  
Palos Verdes Symphonic Band

### MAY 6—2 p.m.

Crafts and Arts People Can Do  
At Home  
Fred Rompage

### MAY 19, 20—9 a.m. to 5 p.m.

Fiesta De Flores  
Presented by South Coast Botanic  
Garden Foundation

### MAY 26, 27, 28—10 a.m. to 5 p.m.

Cactus and Succulent Show  
Presented by South Coast Cactus and  
Succulent Society

### MAY 27—2 p.m.

Demonstration on How to Graft A  
Cactus  
Presented by South Coast Cactus and  
Succulent Society





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