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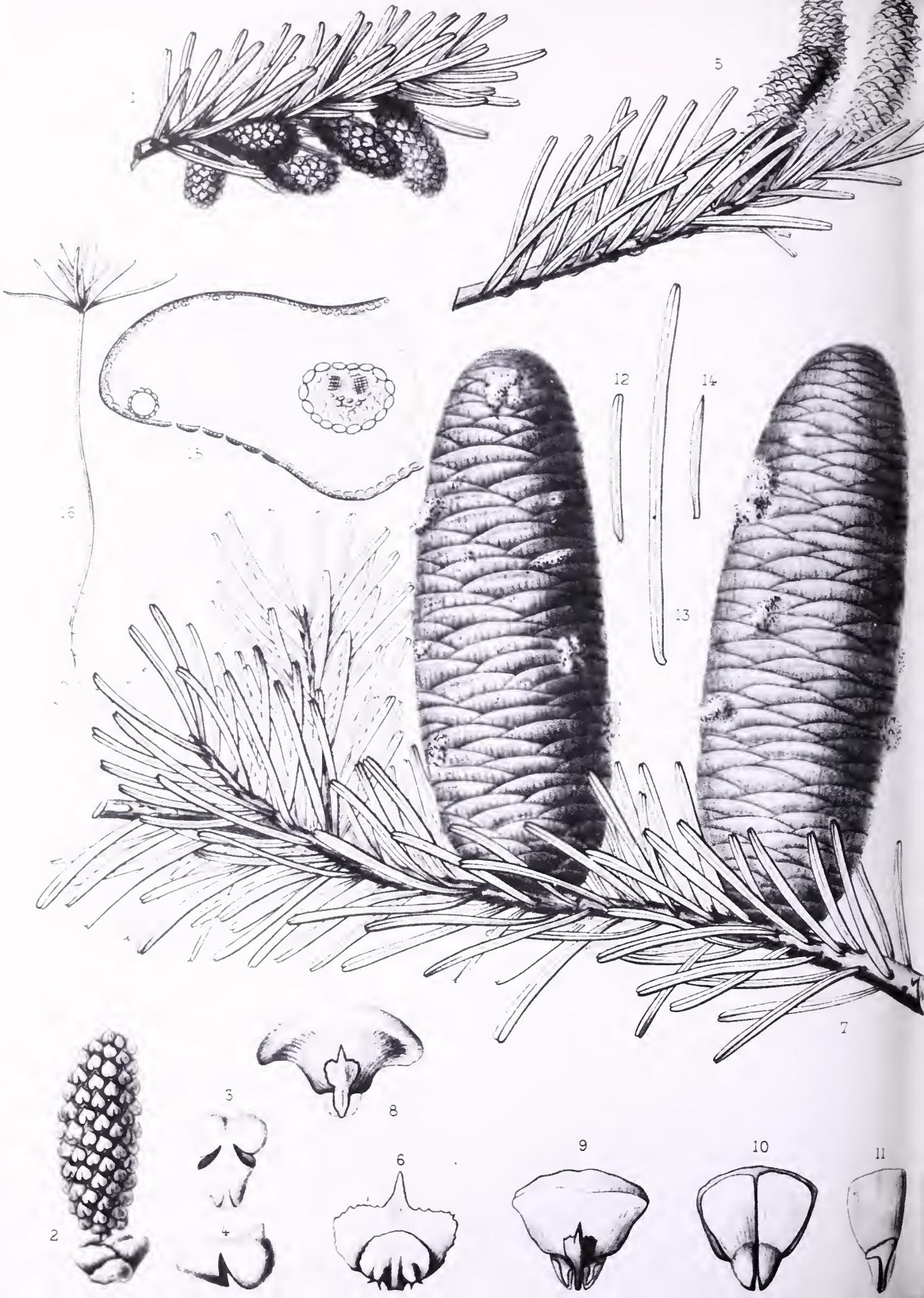
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Front cover:—*Abies concolor* (Gordon) Engelmann, the white fir, photographed in the Arnold Arboretum by Herbert Wendell Gleason on August 12, 1930. Taken from a hand-colored glass lantern slide prepared by the J. Horace McFarland Company of Harrisburg, Pennsylvania. (See page 21.) *& Inside front cover*:—*Abies pinsapo* Boissier, the Spanish fir, photographed by an unidentified person in the Serrania de Ronda, Spain. (See page 39.) *& This page*:—Foliage (top) and habit of *Abies veitchii* Lindley, Veitch's fir, the latter taken by Herman A. Howard. (See page 46.) *& Inside back cover*:—*Abies holophylla* Maximowicz, the needle fir, photographed by Ernest H. Wilson in the forests near Choanji, Kongo-san, Kogen Province, Korea, on October 16, 1917. This tree was ninety feet (27.5 m) tall; its trunk had a girth of ten feet (3 m). (See page 30.) *& Back cover*:—*Abies lasiocarpa* (Hooker) Nuttall, the subalpine fir, photographed in the Amethyst Lakes region of Jasper National Park, Canada, by Ethan W. Johnson. (See page 43.) All photographs except the last one are from the Archives of the Arnold Arboretum.

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Richard Warren
Ethan W. Johnson





A Guide to the Firs (*Abies* spp.) of the Arnold Arboretum

Richard Warren

Ethan W. Johnson

Twenty-five of the thirty- to forty-odd species (and hybrid species) of the wide-ranging Northern Hemisphere genus *Abies* currently grow in the Arnold Arboretum

Abies is the scientific name of the firs, or, as is more common in Britain, of the silver firs. Botanists took many years to agree upon it (Warren, 1982). Virgil (70–19 B.C.) applied the word “*abies*” to the wood employed for the ribs of the Trojan horse (Virgil, circa 19 B.C.). This may have led to the modern naming of the genus; certainly it influenced the naming, in 1883, of a species from northwestern Anatolia—*Abies equi-trojani* Aschers & Sint.

The English word “fir” is of Scandinavian (Old Norse) origin and referred originally to pine, which in that part of the world is Scotch pine (*Pinus sylvestris* L.). Many English still refer to their pines as “firs.” Their use of “silver fir” as the common name for members of the genus *Abies* is due to the whiteness of the undersides of the leaves in most species.

The aims of this guide are, first, to highlight the morphologic characters of the genus *Abies* so that it may readily be distinguished from related genera and, second, to accentuate the characters that clearly separate the species of *Abies* from each other.

The Genus *Abies*

The genus *Abies*, as do the genera *Pinus*, *Picea*, and *Larix*, grows widely in the North Temperate Zone around the world, reaching from the Arctic Circle (*Abies sibirica*) to the Tropical Zone, at 15 degrees North latitude (*Abies guatemalensis*) in Central America. In general, it is not as hardy in Arctic climates as are members of the genus *Picea*, but *Picea* does less well than *Abies* in southern cli-

mates like that of the Mediterranean area.

There are some thirty to forty species in the genus *Abies*, depending on the author. Liu (1971), for example, lists forty-one species, sixteen varieties, and six hybrids. *Abies* competes for third place with *Picea* as the genus of conifers in the Northern Hemisphere containing the greatest number of species (*Pinus* contains about one hundred species and *Juniperus* about sixty). This guide is based on the species of *Abies* in the Arnold Arboretum—twenty-three species and two named hybrids, twenty-five in all (see the list on page 13).

Opposite: Drawings made by Charles Edward Faxon of various macroscopic and microscopic structures of the grand fir (*Abies grandis* Lindley). From Charles Sprague Sargent's *The Silva of North America*. (See page 29.)

Habit

Erect. Narrow. Pyramidal. With the notable exception of *Abies nordmanniana*, the branches do not droop. The leader is seen upright and rigid against the sky as in *Picea* (not nodding as in *Tsuga*).

Bark

Smooth at first but stippled with horizontal rows of resin blisters appearing like lenticels. With age the lower bark in most species becomes rough. Departures from these generalizations form the basis for the identification of certain species.

Buds

Ovate or round (less pointed than in *Picea*). Resinous or not resinous. It is to be noted that the resinosity or nonresinosity of the buds is useful in distinguishing species but is of no use after they have broken open in the growing season (May through July) until the new ones have formed. The resin may present to the eye either as semicrystallized white granules or as glairy, clear material. Both are sticky to the touch.

Branchlets

Surface generally even in contour but often fissured or undulate. Not roughened nor scaled. Hairy or not hairy according to species. When the leaves fall off the branchlet symmetrical, round leaf scars are left. These scars are different from those on the branches of *Picea*, which are at the tips of woody pegs, or projections from the branchlet surface called *sterigmas*. The leaf scars in *Pseudotsuga* (Douglas fir) are also rounded but are slightly raised from the branchlet surface.

Foliage

Leaves are in two ranks, each rank consisting of two or more rows in which the shorter leaves are above. They tend to be arranged in a pectinate fashion, with a "V" between the rows above and less of a V below. Prominent exceptions are *Abies koreana*, and *Abies pinsapo*, whose leaves, although more dense

below, are arranged all around the branchlet. Also, the nearer the situation of the branchlet to the crown, the greater the tendency to suppression of the V.

Leaves

Flattened, linear. Above: few or no stomata (exceptions showing stomata above, such as *Abies concolor*, *Abies lasiocarpa*, *Abies magnifica*, *Abies pinsapo*, and *Abies procera* give a first clue to identity), a groove usually being present. Below there are two longitudinal bands made up of several rows each of stomata varying in color from white to gray-green. The bands are framed by three longitudinal, slightly raised, green ribs, the midrib, and the sideribs. The tip of the leaf is rounded or pointed or notched. The attachment of the leaves to the branchlet is by a rounded end of the pedicel, which looks like a suction cup.

Resin Canals

Resin canals are tubular channels in the leaf tissue lined with resin-secreting cells. Their position in the leaf relative to other structures seen in cross section is of use in distinguishing between species, as is true to some extent in all conifers. This is particularly so in the genus *Abies*, where the position is more constant and reliable than in other conifers.

Firs have two resin canals. They are seen with a lens as two holes in the cut surface of a transected leaf from which drops of resin emerge (see the figure, page 10). The two categories of position are marginal, wherein the canal edge touches the hypoderm, and median, when it does not.

Since the relative position of the canal within the leaf may vary between its base and its tip, make the section of the leaf near its middle. Use a very sharp instrument, such as a razor blade, and wipe away the emerging resin droplet, which may be so large as to obscure the position of the canal. A hand lens and a good light are needed. A dissecting microscope is a useful "luxury."

Cones

The barrel-shaped, upright megasporangiate cones of *Abies* occur, as they do in most conifers, in the uppermost branches of the tree. The young cones of most species are purple, but the color changes to brown later in the year. A few conspicuous exceptions have cones that are green when young—*Abies nephrolepis forma chlorocarpa*, *Abies homolepis* var. *umbellata* (*Abies Xumbellata*), and *Abies veitchii* var. *olivacea*, for example. Ovuliferous (seed-bearing) scales of *Abies* cones are woody, each bearing two winged seeds on its adaxial surface. They mature in one growing season and disintegrate on the tree. The scales detach in the fall, and the seeds are dispersed by the wind. The central spikelike element of the cone denuded of scales remains erect on the branchlet for up to a year or more.

The bracts of *Abies* cones are in certain species longer than the cone scales. The tips are then visible, and they are described as "exserted." This is a helpful lead toward identity. All species of the genus *Abies* are monocious. Pollination is by wind.

Similar Genera and Distinguishing Characters

Genera of evergreen trees that might be confused with are *Picea* spp. (the spruces), *Tsuga* spp. (the hemlocks), *Pseudotsuga* spp. (the Douglas firs), and *Taxus* spp. (the yews). The salient differences among them are tabulated on page 12.

The first important step is examination of the branchlet for the character of the leaf scars. The next is the leaves themselves. The bud and the cone, when available, are extremely, if not definitively, important, but they are not as dependably available as the leaves. Study of the bark and habit should come next. Having accomplished examination of these, then reexamination of the specimen in more detail (hairiness and color of branchlet, resin canals in leaves) is advisable. This order of examination can obviously be changed if one is in the presence of the tree

itself from the outset. The habit and the bark will then naturally be examined first.

The following seventeen species, in addition to those listed on page 13, which grow in the Arnold Arboretum, are recorded as belonging to the genus *Abies*. Some have in the past been tried in the Arnold Arboretum and failed and therefore have not been included in this report. We make note of them here for completeness in overviewing the genus but have appended no descriptions. We will refer to them occasionally.

- Abies bracteata* (D. Don) D. Don ex Poiteau
- Abies chensiensis* Van Tieghem
- Abies ernestii* (Rehder) Liu
- Abies delavayi* Franchet
- Abies durangensis* Martinez
- Abies guatemalensis* Rehder
- Abies hickeli* Flous & GausSEN
- Abies kawakamii* (Hayata) Ito
- Abies mariesii* M. T. Masters
- Abies mexicana* Martinez
- Abies nebrodensis* (Lojacono-Pojero) Mattei
- Abies numidica* De Lannoy ex Carrière
- Abies pardei* GausSEN*
- Abies pindrow* (Lambert) Royle
- Abies religiosa* (von Humboldt, Bonpland & Kunth) Schlechtendal & Chamisso
- Abies squamata* M. T. Masters
- Abies vejari* Martinez

Having determined that an unknown is a member of the genus *Abies* one must establish which, if any, of the above species best fits the characters observed. Since keys are often difficult to follow, we have chosen to present the material in tabular form (pages 6 and 11). Smoothness of bark, resinosity of buds, ridges or grooves on the branchlet surface, hairiness of branchlet, stomata situated on the upper surface of the leaves in addition to the underside, whiteness of stomata, position of resin canals, and degree of exertion of scale bracts of the cones are considered the most significant characters.

*A plant designated "*A. pardei*" does grow in the Arnold Arboretum, but an irregular taxonomic feature (glabrous branchlets) casts doubt on its identity and prompts us to omit it from the list.

Tabulations According to Important Characters

Bark

Young bark is relatively smooth (*i.e.*, is not scaly or ridged). "Smoothness" does not rule out a "pigskin," pebbly character, and the old bark roughened with flat or elevated plates or ridges. The following are exceptions:

Old bark smooth

- Abies sachalinensis*
- Abies veitchii*

New bark rough

- Abies holophylla*
- Abies homolepis*

Bud

Most buds in firs, as in spruces and pines, are resinous. The following five exceptions are useful only when the buds are unbroken:

- Abies alba*
- Abies cephalonica*
(occasionally resinous)
- Abies cilicica*
(occasionally resinous)
- Abies holophylla*
(occasionally resinous)
- Abies nordmanniana*

Ridges or grooves on surface of branchlet

Branchlets conspicuously ridged and grooved (gentle undulations and shallow fissures not included):

- Abies firma*
- Abies holophylla*
- Abies homolepis*
- Abies nephrolepis*
- Abies pinsapo*
- Abies sachalinensis*

Hairiness of branchlet

Hairiness of branchlets is best looked for on the previous year's growth. A hand lens is helpful. A thorough examination is necessary to derive a concept of the trend. Scattered hairs are occasionally found in the grooves of those listed as not hairy.

Conspicuously hairy

- Abies alba*
- Abies balsamea*
- Abies ×borisii-regis*
- Abies concolor*
- Abies fraseri*
- Abies grandis*
- Abies lasiocarpa*
- Abies magnifica*
- Abies nordmanniana*
- Abies sachalinensis*
- Abies sibirica*
- Abies veitchii*

Slightly hairy

- Abies amabilis*
- Abies firma*
- Abies nephrolepis*
- Abies koreana*
- Abies procera*

Not hairy

- Abies ×bornmuelleriana*
- Abies cephalonica*
- Abies cilicica*
- Abies fargesii*
- Abies holophylla*
- Abies homolepis*
- Abies pinsapo*
- Abies recurvata*

Stomata on upper surface of leaves

The leaves are the most important vegetative element of a conifer for distinguishing the species from each other.

Leaves with stomata on their upper surface (when present here, stomata concentrate on the tip and in the dorsal groove):

General

- Abies concolor*
- Abies magnifica*
- Abies pinsapo*
- Abies procera*

Partial

- Abies amabilis*
- Abies ×borisii-regis*
(occasionally)
- Abies ×bornmuelleriana*
- Abies cephalonica*
- Abies fraseri*
- Abies lasiocarpa*
- Abies sibirica*

The fourteen other species show no stomata on the upper surface.

Stomata on underside of leaves gray or green (not white)

- Abies ×borisii-regis*
gray-green
- Abies cilicica*
gray-green
- Abies concolor*
glaucous
- Abies firma*
gray-green
- Abies holophylla*
gray-green
- Abies lasiocarpa*
gray
- Abies pinsapo*
gray
- Abies recurvata*
green

The seventeen other species show white stomata on the lower surface.

(continued on page 11)



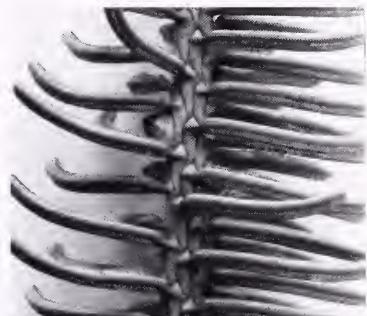
View toward the south in the Arnold Arboretum's Pinetum (left). *Abies concolor* is in the foreground, *Abies homolepis* in the background. The small plant is *Abies concolor* 'Candicans', which was damaged by vandals. A fine, 25-meter-tall, 60-year-old specimen of *Abies concolor* (right). All photographs on pages 7 through 10 were taken by Ethan W. Johnson.



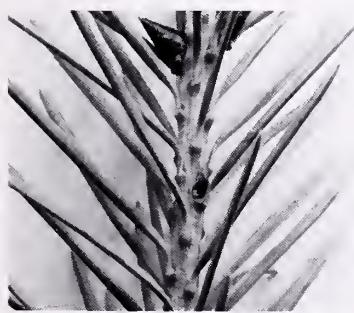
a



b



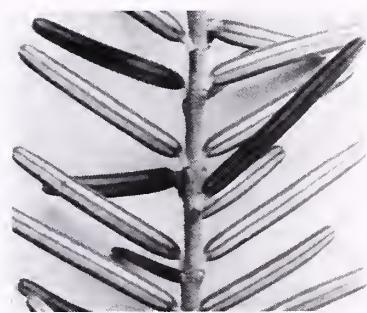
c



d



e



f

Leaf attachments of coniferae. *Abies concolor*: leaf bases resembling suction cups (a); *Abies veitchii*: leaf scars circular (b); *Picea koyamai*: pegs, or sterigmata (c); *Pseudotsuga menziesii*: leaf scars slightly raised, oval (d); *Taxus cuspidata*: oblique, easily peeling attachments (e); *Tsuga caroliniana*: petioles tiny, leaf scars raised (f).



Bark. *Abies balsamea*: resin blisters numerous on otherwise smooth bark (left); *Abies holophylla*: bark flaking off in papery strips (right).



Grooving of branchlets. *Abies homolepis*: Branchlets grooved (left); *Abies concolor*: branchlets not grooved (right).



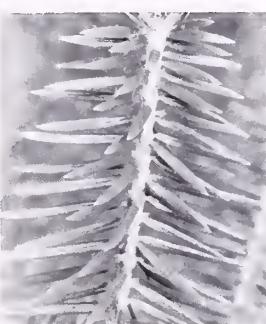
Hairiness of branchlets. *Abies alba*: hairs on branchlets visible to the naked eye (left); *Abies concolor*: hair on branchlets short, best observed with the aid of a magnifying glass (right).



a



b



c



d



e



f



g

Leaf attitudes and contours. *Abies firma*: leaves on lower (immature) branches with bifid tips (a); *Abies procera*: leaf bases curved in hockey-stick fashion (b); *Abies recurvata*: leaves pointing back, away from terminal (c); *Abies pinsapo 'Glaucia'*: leaves short, stiff, and stout (d); *Abies lasiocarpa*: leaves long, slender, and supple (e); *Abies grandis*: leaves spreading nearly at right angles to the branchlet (f); and *Abies koreana*: leaves that reach out on all sides of branchlet, no "V" (g).



a



b



c



d

Leaf markings and resin canals. *Abies cephalonica*: dorsal stomata often present in groove at tip of leaves (a); *Abies lasiocarpa*: dorsal stomata usually above middle of leaves (b); *Abies concolor*: resin canals marginal (c); *Abies holophylla*: resin canals median (d).



Cones. *Abies koreana*: bract scales exserted (left); *Abies concolor*: bract cones hidden in cones (right). A silvery resin is dripping from the cone.

(continued from page 6)

Position of resin canals

Species accompanied by an asterisk (*) appear in both columns.

Marginal

- Abies alba*
- Abies amabilis*
- **Abies ×borisii-regis*
- Abies ×bornmuelleriana*
- Abies cephalonica*
(occasionally
submarginal)
- **Abies cilicica*
- Abies concolor*
- Abies grandis*
- Abies nordmanniana*
- Abies procera*
- Abies recurvata*

Median

- Abies balsamea*
- **Abies ×borisii-regis*
(occasionally on
fruiting branches)
- **Abies cilicica*
(occasionally on
fruiting branches)
- Abies fargesii*
- Abies firma* (occasionally
more than two resin
canals)
- Abies fraseri*
- Abies holophylla*
- Abies homolepis*
- Abies koreana*
(occasionally
submarginal)
- Abies lasiocarpa*
- Abies magnifica*
- Abies nephrolepis*
- Abies pinsapo*
- Abies sachalinensis*
- Abies sibirica*
- Abies veitchii*
(occasionally
submarginal)

Cones

In *Abies*, cones are harder to obtain than are those of other conifers. The most conspicuous characteristic in differentiation of species is the exsertion of the bract scales, or their lack of exsertion. Other features, such as cone-scale shape, color, and size, and shape of cone, are less important.

Cone bracts

Markedly exserted

- Abies alba*
- Abies ×borisii-regis*
- Abies ×bornmuelleriana*
- Abies cephalonica*
- **Abies fargesii*
- Abies firma*
- Abies fraseri*
- Abies procera*
- Abies veitchii*
(occasionally slightly)

Slightly exserted

- Abies nephrolepis*
- Abies nordmanniana*
- Abies sachalinensis*
(often hidden)
- Abies koreana*

Hidden

- Abies amabilis*
- Abies balsamea*
- Abies cilicica*
- Abies concolor*
- Abies grandis*
- Abies holophylla*
- Abies homolepis*
- Abies lasiocarpa*
- Abies magnifica*
- Abies pinsapo*
- Abies recurvata*
- Abies sibirica*

Genera of Coniferæ with Pectinate, Linear Leaves

Character	<i>Abies</i>	<i>Picea</i>	<i>Pseudotsuga</i>	<i>Taxus</i>	<i>Tsuga</i>
Branchlet	Circular, flush leaf scars	Leaf scars on woody sterigmas	Leaf scars circular, very slightly raised, like <i>Tsuga</i>		Leaf scars on small, prickle-like pegs
Bud	Round or ovoid, usually resinous	More pointed than <i>Abies</i> , resinous in all species	Conspicuously long and pointed, as in <i>Fagus</i>	Very small	Very small
Bark	In youth gray, smooth but for resin blisters; in age, rough	Dark gray, rough, in large or small thin plates	Brown-gray, often like <i>Picea</i> with thicker plates; older trees have ridges with deep fissures	Pink-brown, shredding in thin, flat plates of varying length	Brown to dark green, long, 2-5 cm wide, broken plates, appressed, longitudinal, not shredding
Leaves (cross section)	More flattened (two-sided) than rhomboid (four-sided)	More rhomboid than flattened	Flattened	Flattened	Flattened
Leaves (stomata)	Stomata on lower surface only in most species	Stomata on four sides in most species	Stomata on lower surface only	Stomata (green) on lower surface only	Stomata on lower surface only
Cone	Upright; scales deciduous; bracts exserted in some species; monœcious	Pendent, deciduous; monœcious	Pendent, deciduous, trident bracts exserted; monœcious	Single seed almost covered by an aril; diœcious	Pendent, deciduous; monœcious

The Firs of the Arnold Arboretum

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Standardized Approach

*In describing the genus *Abies* and those of its species that grow in the Arnold Arboretum, we list characters in the same sequence. Though we do not provide a key, we do provide summary tabulations that group by character the species that possess it (see pages 6, 11, and 12).*

*Examine an unidentified specimen in the sequence suggested—that is, its habit first, then its bark, branchlet including bud, foliage, leaf, and, finally, cone. There may be some disagreement on definitions of the above terms because they overlap. Some categories, such as “branchlet,” “foliage,” and “leaf,” have been arbitrarily defined. “Branchlet” as used here includes both the new shoot and the adjacent growth of recent years. Except in late summer and fall, the previous year’s growth usually is the most useful for determining color, hairiness, and texture of the surface. We deal with leaf scars under “Branchlet” rather than under “Leaves,” while the arrangement of leaves on the branchlets we treat under “Foliage.” Leaf color we usually discuss under “Leaves,” unless there was some particular advantage in describing the color imparted to the whole leaf, as in the blue Spanish fir, *Abies pinsapo forma glauca*, in which case we refer to it under “Foliage.”*

The descriptions are based on our personal inspection of living material, most of it from the Arnold Arboretum. References from the literature reinforce our observation. When we refer to trees growing in the Arnold Arboretum they are older, established plants. We include infraspecific taxa and cultivars if they grow at normal rates; slow-growing taxa and dwarfs we refer to only if they are the sole representatives of the species in the Arnold Arboretum or if they possess some special feature that is worthy of note.

Dimensions

The dimensions of the species are based on cultivated trees unless we specifically state that we are dealing with a native habitat. Conifers in cultivation in the United States today usually are no more than one hundred fifty years old and thus do not indicate the size they eventually will achieve in their natural habitats.

Foliage

The foliage available for examination usually is taken from the tree at a level between 1.5 and 3 meters from the ground. Foliage on the upper, better-lit, “fruiting” branches differs from that lower down on the tree. At the high levels the branchlets and leaves are thicker and stiffer, and the leaves, in addition, are shorter, more upswept, pointed, and curved

with resin canals that become, in plants where they are typically marginal, more median.

Cone

Be prepared to do without a cone for examination. With few exceptions the cones of *Abies* are borne in the crown of the tree and disintegrate there when mature. So climbing or using some other method of reaching the upper part of the tree is necessary unless one is fortunate enough to find a cone-bearing top branch knocked off by a strong wind or a heavy load of snow. The only other conifer genus whose cones behave in the same way is *Cedrus*, but in *Cedrus* some cones grow lower down the tree and therefore are more accessible from the ground.

Variations within Taxa

In pursuing the identification of plants by morphologic characters one is dealing with unstable factors and must not expect a single individual in a taxonomic category to be exactly like another. George Russell Shaw, in his monograph *The Genus Pinus* (1914), quoted Schimper:

There are species... and this is equally important for the systematist and the physiologist,... which so completely react to the changing requirements of moisture that extreme forms can appear to belong to dissimilar species.

In the following treatment it has been necessary to seem positive about the presence or absence of certain characters, knowing that a small proportion of the specimens do not conform. The character of hairiness versus hairlessness of the branchlet, for instance, may depend on whether a high magnification is used. The branchlets of *Abies concolor* generally appear glabrous to the naked eye or through a hand lens, but the dissecting microscope will show short hairs. The foliage of

Abies ×bornmuelleriana is listed as pectinate on the upper surfaces of the branchlets, but one of our trees does not show this. The undersides of the leaves of *Abies nephrolepis* are recorded as having no midrib, but one of our plants does show a thin one.

The great importance of looking at all the characters in a given plant and being prepared to choose which ones are determining cannot be overemphasized. A certain amount of familiarity with the species is necessary in achieving an authoritative opinion. The tabulations are guides only, not infallible descriptions. But this is true also of keys.

A Note on the Symbols and Terms Used

The most important characteristics for distinguishing a species from similar ones are signalled by the device "☒" and are set in ***boldface italic type***. In many cases the degree to which a character expresses itself is rated as "0," "+," "1+," "2+," "3+," or "4+."

The hardiness zones used to indicate the cold hardiness of species are those of the Arnold Arboretum, not those of the United States Department of Agriculture.

***Abies alba* Miller: EUROPEAN SILVER FIR**

Abies alba grows widely in Europe, mostly in mountain areas, from 38° North latitude to 52° North latitude between 30° and 27° East longitude. In Britain, where, it is cultivated very widely and has been for centuries, it is almost regarded as native. It is the most common on the continent of Europe.

Abies alba is hardy in Zones IV–VII in the eastern United States and in the Arnold Arboretum, which grows 9 specimens. All

but 3 are less than 20 years old. One of the 3 oldest plants is a magnificent tree of approximately 25 m in height; its trunk is 66 cm in diameter. The record is not available, but it is known to have been growing there for at least 60 years. The next oldest is 50 years old and 16 m tall.

No infraspecific relatives of *Abies alba* grow in the Arnold Arboretum.

Habit	Foliage	Above
Reaching 50 m in height Pyramidal when young	<i>Above</i> Leaves pointing forward 90°–60° from branchlet Pectinate, with a wide V	Shiny green No stomata (occasional exceptions) Shallow groove
Bark Gray, smooth, except in old trees, on which it is rough and fissured	<i>Below</i> Pectinate, pointing 80° from branchlet	No midrib Below Stomata white Margins not revolute Not keeled Resin canals marginal
Bud Very small Round to conical Not resinous	Leaves 2 cm x 2 mm Flattened, linear Sides parallel Tips round or slightly notched Not curved Margins entire Flexibility 2+	
Branchlet Light tan to dark brown 2+ hairy, scattered Surface regular to slightly undulating Flexibility 2+		Cones 11 x 4 cm Cylindrical 1+ tapered both ends Green-purple, turning brown Bracts exserted

Similar Species

- *Abies nordmanniana*: leaves above point forward, eliminating the V and concealing the branchlet surface
- *Abies balsamea*: upper surfaces of leaves less glossy; resin canals median; buds resinous; resin blisters on bark
- *Abies amabilis*: leaves arranged like those of *Abies nordmanniana* but more curved and often with scattered stomata on their upper surfaces
- *Abies veitchii*: leaves 4+ flexible with strikingly blue-white, chalky bands beneath

Abies amabilis (Douglas) J. Forbes: RED FIR

Abies amabilis grows from southern Alaska to the Oregon-California border at medium elevations. It is very common on the Olympic Peninsula in Washington. One of its common names is "lovely fir," a translation of the Latin *amabilis*. It lives up to the epithet, its spirelike crown distinguishing it from the slightly rounded tops of other firs of the

same stature, such as *Abies procera*. *Abies amabilis* is hardy in Zones V-VII.

The Arnold Arboretum contains only one mature specimen of *Abies amabilis*, the slow-growing cultivar 'Spreading Star', an attractive dwarf accessioned in 1971 and now 40 cm tall.

Habit	Foliage	Above
Pyramidal, graceful, spirelike	Above	Shiny green
Growing to 80 m in its native habitat	Leaves pointing forward 40°–60° from branchlet	Occasional patches of stomata at tip or rarely scattered sparsely in lines
Bark	A rank of appressed, forward-growing leaves occupying center and covering branchlet	Grooved shallowly
White-gray	V wide	Below
Smooth, except at base, which on old trees is very rough	Below	Stomata 3+–4+, white
Bud	Pectinate, leaves pointing forward 70°–80° from branchlet	Margins not revolute
Small		Not keeled
4+ resinous		Resin canals marginal
Branchlet	Leaves	Cones
Gray-brown	Up to 3 cm x 2 mm	10–15 x 5–6 cm
Dense, with short hairs	Flattened, linear	Barrel-shaped
Surface undulating	Sides parallel	Purple, becoming brown
	Tip truncated, occasionally notched	Bracts (with rare exceptions) hidden
	Curved slightly (1+) in flat and lateral dimensions	
	Margins entire	
	Flexibility 3+	

Distinguishing Characters

- Crushed foliage reputed to smell of tangerines
- A specimen of *Abies* with leaves like those of *Abies veitchii* but longer and more curved, and arranged like those of *Abies nordmanniana*, but appressed in the center of the V, and having few stomata above and marginal resin canals likely to be *Abies amabilis*

Similar Species

- *Abies nordmanniana*: leaves flexible, point forward covering the branchlet, but with median resin canals and no white patches of stomata near tips on upper surface; cones with exserted bracts
- *Abies veitchii*: leaves with similar very white lines of stomata below, flexible, and pointing forward above the branchlet, but with median resin canals

Abies balsamea (Linnæus) Miller: BALSAM FIR

Abies balsamea is native to the northern United States and Canada, from Newfoundland to Alberta. It is fragrant with a balsam odor and is used for pulp and Christmas trees in the northeastern United States. The name "balsam fir" is applied to other firs in various localities: to *Abies fraseri* in the Appalachians, *Abies lasiocarpa* in the Southwest, and *Abies concolor* in the Sierra Nevada of California. All members of the genus *Abies*, in fact, possess varying amounts of resin (or balsam).

A cold-climate tree, *Abies balsamea* does not do well in the Boston area. It is hardy to Zone II, but Zone V is often too mild; some

trees native to the warmer coastal parts of New England do well in Zone V, however. One of the best specimens in southern New England, a tree transplanted from southern Maine as a seedling, is approximately 12 m tall; it grows next to a small pond in northeastern Connecticut (Storrs).

The Arboretum grows two specimens of *Abies balsamea*; accessioned about thirty years ago, they are 11 m and 12 m tall, respectively.

Its only infraspecific taxa in the Arnold Arboretum's collections are slow-growing forms.

Habit	Branchlet	Above
• Growing slowly, reaching no more than 20 m in 50 years	2+ undulating ridges covered with fine hairs	Dark green, not conspicuously shiny
Symmetrical, conical; crown spirelike, lasting into mature years		No stomata
In maturity, not distinguished as an ornamental		Grooved
Bark	Foliage	No midrib
Gray-green	Above	Below
• Smooth except for prominent resin blisters	Leaves pointing forward	2 white bands of stomata, • or fewer rows to each band
Rougher in old age	80°–45° from branchlet	Margins not revolute
Buds	Pectinate, with a wide V	Midrib 1+ prominent
Small, less than 6 mm	Below	Not keeled
4+ resinous	Pectinate, leaves pointing 45°–90° forward	Resin canals median
	Leaves	Cones
	1.5–2 cm x 1.5–2 mm	5–8 cm long
	Flattened in cross section	Cylindrical
	Sides parallel	Green-purple, turning brown
	Tip entire, occasionally with a tiny notch	• Bract tips usually hidden
	Not curved	
	Margins entire	
	Flexibility 2+	

Similar Species

- *Abies alba*: buds nonresinous; leaves shiny; resin canals marginal
- *Abies amabilis*: leaves shiny above, 3 cm long, flexible
- *Abies fraseri*: shoots densely hairy; 8–12 rows of stomata in each band on undersurfaces of leaves; tips of cone bracts exserted
- *Abies nordmanniana*: leaves project forward, covering the shoot; buds nonresinous; resin canals marginal
- *Abies veitchii*: leaves 4+ flexible; conspicuously chalky white stomata on undersurface of leaves

Abies *×borisii-regis* Mattfeld: BULGARIAN FIR

A hybrid of *Abies cephalonica* and *Abies alba*, *Abies ×borisii-regis*, the Bulgarian (or King Boris) fir, grows in Bulgaria and Greece. It was described in the early 1920s and named for King Boris of Bulgaria, who was monarch at the time the plant was identified as a separate species. A previous name was *Abies alba* var. *acutifolia*, a useful point to remember because one of its outstanding characteristics is its pointed leaves. The hybridization may have taken place when *Abies alba* mi-

grated southward in Europe as the cooling for the Ice Age began.

Abies ×borisii-regis is hardy in Zones V–VII. In the Arnold Arboretum 3 magnificent 60-year-old specimens grow. Acquired as seeds from trees growing wild in Greece, they are 16 to 20 m tall and 60 cm in diameter.

No infraspecific relatives of *Abies ×borisii-regis* grow in the Arnold Arboretum.

Habit
A handsome, densely branched, dark tree with glossy foliage and a broadly conic crown

Bark
Very dark gray
Smooth; high on old trees

Bud
Pink-brown, ovoid-conical
4 mm
Resinous

Branchlet
Light brown
3+ hairy
Surface 1+ grooved
Flexibility 2+

Foliage
Above
Pectinate
V very wide
Leaves pointing forward 60° from branchlet

Below
Pectinate
Leaves pointing 80°–90° from branchlet

Leaves
3–3.5 cm x 2.5 mm
Flattened, linear, tapering at tip
Sides parallel
Tip long, pointed
Curved 2+ in flat dimension
Margins entire
Flexibility 3+

Above
• Very shiny deep green, no stomata except occasionally scarce at tip
Grooved prominently
No midrib
Below
Stomata gray-green
Margins subrevolute
Not keeled
Resin canals marginal but reported to be median on fruiting branchlets

Cones
8–12 x 3–4.5 cm
Cylindrical, gradually tapering from base to broad rounded tip
Bracts markedly exserted

Similar Species

- The long, pointed leaves suggest *Abies holophylla*, but in that plant the branchlets are not hairy, the resin canals in the leaves are in the median position, and the bud is only slightly resinous. The cone of *Abies holophylla*, furthermore, does not expose its bracts. The leaves of *Abies holophylla* are lighter green.

A striking feature of the specimens in the Arnold Arboretum is the glossiness of the upper surface of their leaves. This is often matched by one of its parents, *Abies alba*, which plant differs, however, in having nonresinous buds and shorter, less pointed leaves.

Abies ×bornmuelleriana Mattfeld: TURKISH FIR

Named for Joseph Bornmüller (1862–1948), a German botanical explorer in Asia Minor, *Abies ×bornmuelleriana* is native to the north shore of Asia Minor, on the Black Sea. A hybrid between *Abies cephalonica* and

Abies nordmanniana, it was described in 1925.

Abies ×bornmuelleriana is hardy in Zone V. The Arnold Arboretum has 2 specimens, the older of which is 27 years old and 6 m tall.

Habit	Foliage	Above
Broad Rounded conical	<i>Above</i> Not pectinate (occasional exceptions) <i>Incomplete V</i> Leaves pointing forward 30° from branchlet <i>Below</i> Pectinate	Shiny green Stomata scarce in groove at tip Shallow groove No midrib
Bark Gray, smooth, but pebbled like pigskin Old bark rough		<i>Below</i> Stomata whitish gray Margins not revolute Keeled by midrib Resin canals marginal
Bud Resinous 2+		
Branchlet Glabrous Undulating Greenish tan	Leaves 2.5–3 cm × 2 mm Linear Sides bitapered Tip a rounded, entire point, occasionally emarginate Curved 2+ in the flat plane Margins entire Flexibility 1+	Cones 12–15 × 4 cm Cylindric turret-shaped Bracts exserted

Distinguishing Characters

- *Abies ×bornmuelleriana*: evenly placed between its two parents, sharing some qualities of each (both have marginal resin canals and exserted cone bracts, although in *Abies nordmanniana* they are less conspicuous than in *Abies cephalonica*), but *Abies ×bornmuelleriana* has the glabrous branchlets and resinous buds of *Abies cephalonica* (not seen in *Abies nordmanniana*)

Similar Species

- *Abies nordmanniana*: leaves point forward above the branchlet but buds nonresinous
- *Abies cephalonica*: stomata on the upper surface but leaves more pointed and never emarginate

Abies cephalonica Loudon: GREEK FIR

Abies cephalonica is native to Greece and other parts of the southern Balkans, where it grows in mountainous areas. Widely planted elsewhere in Europe, it is hardy from Zone V to the milder parts of Zone VII. Three mature specimens grow in the Arnold Arboretum. They are 103, 88, and 33 years old and measure 23 m, 22 m, and 13 m in height and 70–75 cm in diameter.

	Foliage
Habit	<i>Above</i>
Conical with a dome-shaped crown	Leaves pointing 70°–90° from branchlet
Transverse branches, long and strong	♂ Leaves going around shoot to some extent, leaving the upper side without a V
Bark green	<i>Below</i>
Bark	Incompletely pectinate, but leaves less dense below than above, pointing 60° from the branchlet
Gray-brown, occasionally with a touch of pink	
Younger parts of the tree with beech-gray bark, smooth but for pigskin stippling	
Older parts fissured into 2 x 3-cm plates	
Bud	Leaves
Round, with domed tip	2–3 cm x 2 mm
Resinous 1+–2+	Flattened, linear with 2+ keel
♂ Bud-scale tips slightly reflexed	Sides parallel but tapered at both ends
Branchlet	♂ Tips pointed, entire on most specimens but occasionally rounded and notched
Light brown	Curved 2+ in flat plane
Shallow fluted grooves	Margins entire
♂ Glabrous	Flexibility 1+–2+
Flexibility 1+	

Abies cephalonica var. *græca* differs from the type in having shorter, stiffer leaves crowded on the upper surface of the shoot. Its previous name was *Abies cephalonica* var. *apollinis*. The Arnold Arboretum grows 2 specimens, 1 accessioned in 1900 and 13 m tall, the other accessioned in 1943 and 9 m tall.

Above	♂ Shiny dark green, with a patch of stomata at the tip
Groove present	
No midrib	
Below	
Stomata in two white rows	
Margins not revolute	
Midrib prominent, making a keel	
Resin canals marginal or submarginal, very small	
Cones	
10–23 x 5 cm	
Cylindrical	
Tip sharply tapered, but with a point	
Bracts exserted	

Distinguishing Characters

- Leaves dark green, stiff-pointed, often with small patches of white stomata at the tip of upper surface; bud scarcely resinous

Similar Species

- *Abies pinsapo*: leaves stiff, pointed, but unlike those of *Abies cephalonica* dramatically stiff, distributed all around the shoot with no semblance of a V above or below, and with rows of stomata beside the midrib and below
- *Abies × borisii-regis*: branchlets hairy; leaves shinier and shorter
- *Abies × bornmuelleriana*: shingled arrangement of leaves on the upper surface like *Abies nordmanniana*

***Abies cilicica* (Antoine & Kotschy) Carrière: CILICIAN FIR**

Abies cilicica grows in Turkey, Syria, and Lebanon. (Cilicia is on the southern coast of Asia Minor directly west of Syria.) It has to some extent the same distribution as *Cedrus libani*. Hardy in Zone V, it is not common in cultivation, but the Hunnewell Pinetum in Wellesley, Massachusetts, has three specimens. One of them (of unknown age) is a patriarch 18 m in height and with a trunk 100 cm in diameter. Two 50-year-old specimens

grow in the Arnold Arboretum's Pinetum area; they are 9.5 m and 14 m tall.

Abies cilicica and *Abies nordmanniana* are closely allied. Their geographic ranges touch southern Turkey (*Abies cilicica*) and northern Turkey (*Abies nordmanniana*). *Abies cilicica* has been termed "a weak *nordmanniana*."

No infraspecific relatives of *Abies cilicica* grow in the Arnold Arboretum.

Habit Narrow columnar, with spirelike crown	Foliage <i>Above</i> Incomplete V Leaves curved forward at 30°–60°, loosely covering shoot <i>Below</i> Incompletely pectinate, pointing 45° forward ⌘ On all sides leaves standing apart from each other, "trying" to point all around the branchlet	Above Pea-green to dark green, shiny Scattered stomata in dorsal groove at the very tip in most plants Grooved No midrib <i>Below</i> Stomata gray-green Margins not revolute Midrib prominent 2+ Kealed 3+ Resin canals marginal (on cone-bearing branchlets the resin canals are reported to be median)
Bark Beech gray, with stippling arranged circumferentially Fissured on old trees and scaly low down	Leaves 3.0+ cm x 2 mm Flattened, linear Sides parallel all the way except at base and tip Tip rounded, with a tiny notch Curved 2+ in flat plane Margins entire ⌘ Flexibility 3+	Cones 14 x 4 cm Cylindrical, with noticeable taper toward tip, which is rounded Peduncle very short Bracts hidden
Bud Ovoid, with conical tip Chestnut brown Scale tips free Nonresinous		
Branchlets Light brown to yellow Grooved longitudinally in very shallow, wide grooves Hairy 2+ Flexibility 2+		

Similar Species

- *Abies nordmanniana*: buds nonresinous; resin canals marginal; leaves on upper side of shoot cover it without a V, but much more densely arranged; cone bracts exserted (not hidden as in *Abies cilicica*); stomata on the lower surface of leaves far whiter than those of *Abies cilicica*

Abies concolor (Gordon) Engelmann: WHITE FIR

Abies concolor's native range is a scattered one. On the Pacific coast it is principally in California, in the Sierra Nevada and the coastal range extending into Mexico. It also is found in the southern Rocky Mountain states: Utah, Colorado, Arizona, and New Mexico. The epithet "concolor" refers to the fact that both surfaces of the leaf show the same blue-gray color.

Abies concolor is hardy in Zone IV–VII, and it flourishes in the Arnold Arboretum. Along with *Abies homolepis*, it was one of the favorite conifers of Charles Sprague Sargent when he was Director. Of the total of 19 normally fast-growing specimens of *Abies con-*

color (13 *Abies concolor*, 3 *Abies concolor* 'Violacea' [bright-blue foliage], 2 *Abies concolor* 'Conica', and 1 *Abies concolor* 'Candidans' [very light pale-blue foliage]), the Arboretum grows 10 that date from the Nineteenth Century, most of them over 20 m tall, with sturdy trunks of 50–70 cm in diameter at breast height.

In the Arnold Arboretum *Abies concolor* seem to have been particularly vulnerable to hurricanes. The records show that of 64 specimens introduced since 1874, 41 are no longer with us; of those, 21 were uprooted in the hurricanes of 1938, 1954, and 1985.

Habit

Conico-columnar, rounded, different trees favoring one or the other of these contours, not entirely depending on whether they grow crowded or in the open
Crown rounded
Old trees massive, growing to 60 m in their native habitat
Handsome; one of the best for cultivation

Bark

Smooth whitish gray, with resin blisters, in young trees or on new branches of old trees
Rough and fissured into 5 x 12-cm plates on the lower boles of old trees
Can be of corky texture, somewhat resembling *Pseudolarix amabilis*

Bud

Broad
Conico-globular
7 mm long
Resinous 2+
Scale tips appressed

Branchlet

Yellow-green or olive-green
Glabrous or scarcely hairy
Surface regular, no grooves

Foliage

Above
Leaves pointing forward
30°–40° from branchlet
Gray-green
No V
Below
Wide V
Pointing 80° from branchlet
Spreading, curving upward
Leaves above and below widely spaced

Leaves

5–6 cm x 2 mm
Linear, flattened in cross-section
Sides parallel
Tips rounded, no notch
Curving 3+ towards upper side
Margins entire
Flexibility 3+

Above

Light glaucous green
Stomata so numerous, though small, as to give a homogeneous glaucous color
No midrib, but a suggestion of a shallow groove

Below

Stomata as above but with a 1+ midrib
Felt as a keel
Resin canals marginal

Cones

5 x 12 cm, but many sizes
Purple when young, brown later
Columnar, but with gradually curving sides and a taper
Ends rounded
Bracts concealed

Distinguishing Characters

- The widely spaced, glaucous leaves with their characteristic curve are distinctive

Similar Species

- Abies grandis*: leaves as long as those of *Abies concolor*, resin canals also marginal, and buds also resinous, but with no stomata on the upper surfaces of its leaves and the leaves not curved (*Abies concolor* var. *lowiana* tends to resemble *Abies grandis* in these features)

arnoldia

New England
Horticultural
and Botanical
Calendar

(Late Winter–Spring 1988)

Horticultural and Botanical Calendar

Please be sure to mention Arnoldia whenever you attend an event that was listed in the New England Horticultural and Botanical Calendar

Through April 13

"Orchids: Jewels of the Plant Kingdom." Arnold Arboretum (AA). A photographic exhibition on orchid biology by Dr. Kerry S. Walter. Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA. No charge. *Information:* (617)524-1718.

Through May 20

Semester in Sustainable Design. New Alchemy Institute (NAI) and National Audubon Society Expedition Institute. College-level program in sustainable agriculture, resource systems, and ecologically sound technologies (permaculture design, organic market gardening, solar-greenhouse management, integrated pest management, energy-efficient building design). Academic credit available. *Information:* Virginia Rasmussen, NAI, 237 Hatchville Road, East Falmouth, MA 02536; (617) 564-6301.

Through June

Guided Spring Walks. Winterthur Museum and Gardens (WMG). Admission charge. Reservations suggested. *Information, reservations:* WMG, Winterthur, DE 19735; (302)654-1548.

March 31

"Landscapes and Architecture: A Delicate Balance." Frederick Law Olmsted National Historic Site (FLO NHS) and Department of Landscape Design, Graduate School of Design (GSD), Harvard University. Lecture by Cynthia Zaitzevsky, historian and author. No charge. 7 p.m., Piper Auditorium, GSD, 48 Quincy Street, Cambridge, MA. *Information:* Visitor Services Office, FLO NHS, 99 Warren Street, Brookline, MA 02146; (617)566-1689.

"A Garden for All Seasons." Human Services of Dedham-Endicott Greenhouse (HSD-EG). Lecture by Elsa Bakalar. 8 p.m., Noble and Greenough School Auditorium (Pine Street entrance), Dedham, MA. Admission charge. Register by mail. HSD-EG, Post Office 1305, Dedham 02026.

April 7

"Tropical Rain Forest, Part 1." Connecticut Forest and Park Association. Lecture and slide program by Professor Joel Meisel. James L. Goodwin Forest and Park Center (JLGFP), 16 Meriden Road (Route 66) Middlefield. *Information:* Linda Rapp, JLGFP, Middletown 06457; (203)346-2372.

April 9–May 8

Spring Bulb Display. Blithewold Gardens and Arboretum (BGA). Thousands of daffodils, scyllas, tulips, and corycuses in bloom. 10 a.m.–4 p.m., BGA, Ferry Road (Route 114), Bristol, RI 02809-0417. No charge. *Information:* (401)253-2707.

April 12

"The Saint Vincent Botanical Garden: Captain Bligh and the Breadfruit." Massachusetts Horticultural Society (MHS). Lecture by Professor Richard A. Howard, past Director of the Arnold Arboretum. 7 p.m., Pine Manor College, Chestnut Hill, MA. Registration fee. Preregistration required. *Information:* MHS, 300 Massachusetts Avenue, Boston 02115; (617)536-9280.

April 15–29

"A Finnish Scientist Describes North America." Helsinki University. Exhibit of photographs, first printed reports, Swedish editions of travel accounts, manuscripts, plant specimens from the travels of Pehr Kalm in North America, 1716–1779. Thomas Jefferson University (TJU), Philadelphia, PA. No charge. *Information:* Jill M. Pasternack, Office of the Dean, College of Graduate Studies, TJU, Philadelphia 19107; (215)928-5799.

April 16

Opening Party. Garden in the Woods. Tour of the Garden, books, plants for sale. 3–5 p.m., Garden in the Woods, Hemerway Road, Framingham, MA 01701. *Information:* (617)7630-2374.

April 21

"Tropical Rain Forest, Part 2." Connecticut Forest and Park Association. Lecture and slide program by Professor William Jahoda. James L. Goodwin Forest and Park Center (JLGFP), 16 Meriden Road (Route 66) Middlefield. *Information:* Linda Rapp, JLGFP, Middletown 06457; (203)346-2372.

April 22–24

Ninth Annual Conference. Hydroponic Society of America. Tours, speakers, exhibits. Clarion Hotel, Millbrae, CA. Registration charge. *Information:* Gene Brisson, Hydroponic Society of America, Post Office Box 6067, Concord, CA 94524; (415) 682-4193.

April 23 and 24

Family Days. Garden in the Woods. Children, no charge; charge for adults. Garden in the Woods, Hemenway Road, Framingham, MA 01701. *Information:* (617) 877-7630, 237-4924.

April 23–May 1

Historic Garden Week in Virginia. Garden Club of Virginia. Private homes, gardens, and historic landmarks open to the public. *Information:* Detailed guidebook available free of charge after March 1, 1988, from: Historic Garden Week Headquarters, 12 East Franklin Street, Richmond 23219 (by mail, \$1 postage and handling); (804) 644-7776, 643-7141.

Third International Heritage Roses Conference and Seventh Huntington Symposium on Old Roses. Huntington Library and Botanical Gardens. "Rose Gardens and Historic Restoration." Lectures, private viewing of rare rose books, tours, workshop-clinic, displays and exhibits, sale of root roses. *Information and registration form–brochure:* Clair G. Martin III, Chairman, Huntington Botanical Gardens, 1151 Oxford Road, San Marino, CA 91108.

April 24

Walking Tour of North Easton, Massachusetts. Frederick Law Olmsted National Historic Site (FLO NHS) and Easton Historical Society. No charge. 1 P.M., meeting at the North Easton Train Station, 80 Mechanic Street. Tour of Olmsted and H. H. Richardson design landmarks in the pastoral village of North Easton. *Information:* Visitor Services Office, FLO NHS, 99 Warren Street, Brookline, MA 02146; (617) 566-1689.

April 26

"**Perennials Plus.**" Massachusetts Horticultural Society (MHS). Lecture by Pamela Harper, author, lecturer, photographer. 7 P.M. Pine Manor College, Chestnut Hill, MA. Registration fee. Preregistration required. *Information:* MHS, 300 Massachusetts Avenue, Boston 02115; (617) 536-9280.

April 30

Arbor Day. Massachusetts Arborists Association (MAA). Ruth Ippen Tree Walk, Belmont. *Information:* MAA, 1357 Washington Street, West Newton, MA 02165; (617) 332-8683.

May 4–6

Brandywine Valley Gardens Conference. "Country Houses and Gardens of the Brandywine Valley." Hagley Museum and Library, Longwood Gardens, Mount Cuba Center, Nemours Mansion and Gardens, Rockwood Museum, and Winterthur Museum and Gardens. Major symposium on the past, present, and future of the unique enclave of gardens, museums, and estates clustered along a ten-mile stretch of the Brandywine River from Wilmington, Delaware, north into nearby Pennsylvania. Illustrated presentations, tours. Registration fee. *Information:* Brandywine Valley Conference, Hagley Museum and Library, Post Office Box 3630, Wilmington 19807; (302) 658-2400, extension 305.

May 7

Plant Sale. Blithewold Gardens and Arboretum (BGA). "Garden Favorites": hard-to-find annuals and perennials. Gardening books, tools, accessories for sale in shop. 10 A.M.–3 P.M., BGA, Ferry Road (Route 114), Bristol, RI 02809–0417. *Information:* (401) 253-2707.

May 10

"**Victorian Gardens.**" Massachusetts Horticultural Society (MHS). Lecture by Professor Diane McGuire, author, garden historian. 7 P.M., Pine Manor College, Chestnut Hill, MA. Registration fee. Preregistration required. *Information:* MHS, 300 Massachusetts Avenue, Boston 02115; (617) 536-9280.

May 19

The Hidden Gardens of Beacon Hill. Beacon Hill Garden Club. Self-guided tour of Boston's Beacon Hill Historic District. 9 A.M.–5 P.M., rain or shine. Tickets in advance (on tour day if available). *Information:* Gail Weesner, 54 Pinckney Street, Boston, MA 02114; (617) 227-9648, -4392.

May 28–June 5

Festival of Flowers and Gardens. The Lakeside Group. Public exhibition of contemporary approaches to horticulture, floral and landscape design (outdoor promenade, galleries, marketplace, special events). 12 NOON–8 P.M. (weekdays), 11 A.M.–7 P.M. (weekends), Navy Pier, Chicago, IL. Admission charge. *Information:* The Lakeside Group, 600 North McClurg Court, Suite 1302A, Chicago 60611; (312) 787-6858.

May 31–June 15

"**Landscapes that Stirred the Imagination: Studies in English Romantic Literature and Art.**" Radcliffe Seminars of Radcliffe College. Study tour of sites in England associated with Romantic writers and painters. Fee. *Information:* Center for Continuing Education, Radcliffe College, 6 Ash Street, Cambridge, MA 02138; (617) 495-8600.

June 4

Secret Garden Tour. Benefactors of the Arts Ltd. Tour of the Historic Point Section of Newport, RI. Admission fee (tickets in advance or on day of tour). *Information:* Benefactors of the Arts, 33 Washington Street, Newport 02840; (401) 847-0514.

June 6–9

Rare Species Management Conference (in conjunction with Fifteenth Annual Natural Areas Conference and Tenth Annual Meeting of the Natural Areas Association). "Rare Species and Significant Habitats." College of Environmental Science and Forestry, State University of New York, Syracuse (CESF). *Information:* Dr. Donald J. Leopold, CESF, Syracuse 13210.

June 7–8

Flower Show. Rhode Island Federation of Garden Clubs. "Blithewold Revisited." 1–8 p.m. (June 7), 10 a.m.–6 p.m., Blithewold Gardens and Arboretum, Ferry Road (Route 114), Bristol, RI 02809-0417. *Information:* (401)253-2707.

June 11

Plant Sale. New England Wild Flower Society (NEWFS). Over 150 varieties of wildflowers, a wide selection of perennials. Staff members will be on hand to answer questions. 10 A.M.–2 P.M., Garden in the Woods, Hemenway Road, Framingham, MA; *Information:* (617) 877-7630, 237-4924.

Mid-June–mid-August

Professional Development Courses. Graduate School of Design, Harvard University (GSD). Forty-four summer courses and workshops for architects, landscape architects, and other professionals in design and related fields. Registration fees. *Information:* Office of Special Programs, GSD, 48 Quincy Street, Cambridge, MA 02138; (617)495-9340.

June 16

"The Victorian Landscape in America: The Garden as Artifact." Morris Arboretum. Symposium. Morris Arboretum, Philadelphia, PA. Registration fee. Reservations required. *Information:* Agatha H. Hughes, (215)257-5777; Morris Arboretum, 9414 Meadowbrook Avenue, Philadelphia 19118.

July 16–19

World Congress. International Federation of Landscape Architects. Boston.

August 3–5

National Meeting. American Conifer Society. Longwood Gardens, Kennett Square, PA. Tours of Longwood, area gardens, nurseries; fountain show; talks. (Post-conference tours, ASugust 6, 7.) *Information:* Longwood Gardens, Post Office Box 501, Kennett Square 19348-0501; (215)388-6741, extension 504 (8–11:30 A.M., 12:30–4 P.M.).

NEWS

FROM THE ARNOLD ARBORETUM

Number 3

Winter 1988

Students and Volunteers in Children's Program Explore the Arboretum's Botanical Bridge to China

China's contribution to the floral riches of the western world is evident at the Arnold Arboretum. Hundreds of species now growing on the grounds are products of a botanical bridge to China that spans nearly a century (see the article about

Ernest Wilson on page 3).

The most recent addition to the Arboretum's children's field studies is an expansion of "Around the World with Trees" and is based on the past and present experiences of the Arnold Arboretum's plant explorers to China. A multidisciplinary classroom curriculum to complement this field study is being developed and tested with the teachers and students of the Baldwin School in Brighton.

According to Diane Syverson, Children's Program Coordinator, "The new field study helps children explore the ways different value systems affect and are reflected in a society's social and natural environment."

Students are transformed into plant explorers, not only learning about explorers who for centuries have travelled the globe in search of new plants for agricul-

tural and ornamental use, but also about plant diversity and identification as they use word-maps and compasses to discover some of the famous trees brought back by plant hunters and growing along Chinese Path in the Arboretum.

For the past five years, Children's Program volunteers have served elementary schools by providing hands-on lessons in botany, ecology, horticulture, and natural history. The Program is funded by grants from the Junior League of Boston, the Institute of Museum Services, and private donations. In the last year, thanks to 25 volunteers, more than 1,500 third through sixth graders were able to participate in one of the four field studies offered by the Arboretum to supplement schools's science curriculum.

A SPECIAL THANKS TO LAST YEAR'S CHILDREN'S VOLUNTEERS

SYLVIA ANDERSON, BROOKLINE

BARBARA BALASA, NEWTON

ANNE SOPHIE BAUER, BOSTON

**SUSAN DESTAFANO,
WINCHESTER**

**MARGARITA DROZDOFF,
CAMBRIDGE**

KATRINA EBBE, BROOKLINE

JENNIFER FILIS, BOSTON

JIM GORMAN, SOUTH BOSTON

CATHY HALLIGAN, CHELMSFORD

**ANDRIA LAWSON,
CHESTNUT HILL**

MARIANNE LILLE, HINGHAM

BETTY LINDEMANN, WELLESLEY

CHRIS McARDLE, BROOKLINE

TISH MEAD, CHESTNUT HILL

**ELEANOR PEACOCK,
JAMAICA PLAIN**

MARKIE PHILLIPS, WESTON

DENNIS PIANA, SOMERVILLE

TINA RAWSON, BOSTON

LAURIE RUSSELL, WAYLAND

**HONI SCHIFFMAN,
JAMAICA PLAIN**

DIANE SILLARI, SOMERVILLE

**KIM STREETMAN,
NEWTON HIGHLANDS**

SISTIE TORREY, WESTON



Students of the Baldwin School in Brighton perform a flower dance at their parents' day celebration in the Arboretum. These students participated in the development of the fourth- and fifth-grade curriculum packet that uses the Arboretum's Chinese collections.

Arboretum and Boston Visual Artists Union Announce Art Competition for 1988 Lilac Sunday Poster

More than 20,000 lilac lovers turn out for the legendary celebration known as Lilac Sunday and during the three weeks the

Arboretum's lilacs are in peak bloom. Since 1982 the Arboretum has produced a poster for each Lilac Sunday, usually

commissioning an artist to create the poster. This year the Arboretum, working in conjunction with the Boston Visual Artists Union, announces a special Art Competition for the Lilac Sunday Poster.

Fifty "Best Lilacs for New England"

Everyone agrees that the springtime view of the Arboretum is among the more spectacular sights in New England. One of the reasons for this is the lilac collection. But some of the lilacs have suffered a severe decline and are being removed to allow for new plantings, so this year visitors to the collection will find a major restoration under way. Included in a group of new lilacs planted this fall is the Arboretum's choice of 50 "best lilacs for New England." A list of these 50 lilacs is available to the public. For a copy, send a stamped, self-addressed envelope to Jo Procter, Arnold Arboretum of Harvard University, Jamaica Plain, MA 02130-2795.

For Booklovers Who Garden...

Joan Poser, an Arboretum volunteer and the book buyer for The Shop at the Arboretum, suggests it's time to settle down with a good garden book when the cold weather and the snow force even the most ardent plantsperson indoors. Reading during the winter is certain to sow some fresh ideas for the garden.

Poser was asked to select the "Ten Best Titles for Booklovers Who Garden," and she divided her choices into two categories of books: large, handsome, lavishly illustrated books suitable for "strolling" through by either the novice or the expert gardener, and the "how-to" books for the gardening enthusiast.

Her choices are:

Flowering Trees and Shrubs, by Judith Leet (Abrams, \$29.95)

Trees, by Benjamin Perkins (Salem House, \$24.95)

A Garden of Roses, by Alfred Parsons, R.A. (Salem House, \$29.95)

Private Gardens of England, by Penelope Hobhouse (Harmony, \$40.00)

Lanning Roper and His Gardens, by Jane Brown (Rizzoli, \$37.50)

Wyman's Garden Encyclopedia, by Donald Wyman (Macmillan, \$50.00)

Manual of Woody Landscape Plants, by Michael A. Dirr (Stipes, \$30.00)

Right Plant, Right Place, by Nicola Ferguson (Summit Books, \$14.95)

Perennials: How To Select, Grow & Enjoy, by Pamela Harper and Frederick McGourty (HP Books, \$9.95)

Gardening by Mail 2, by Barbara J. Barton (Tusker, \$16.00)

The last book, according to Poser, is a compilation of mail-order services for everything from African violets to zinnias; a good present for armchair gardeners who thought they had everything.

Poser has been an Arboretum Associate and volunteer since 1982. Prior to coming to the Arboretum, she edited children's books for both Random House and Franklin Watts, was a free-lance editor of medical literature, and edited the publications of the Robert Hull Fleming Museum and the Shelburne Museum in Vermont.

Artists are requested to submit original, two-dimensional artwork. Any size or medium, with the exception of photography, is acceptable. Abstract and realistic interpretations are equally valid. One artwork will be selected to be used as the image on the 1988 Lilac Sunday poster. The artwork will be used intact, and the poster will be designed and produced by the Arnold Arboretum.

A jury chosen by the Arboretum and the Artists Union will select the winning entry. In addition, some of the entries will be selected for display in an exhibition and benefit auction in honor of the Lilac Collection, whose refurbishment begins this year. The jury also will select the entries to the Lilac Collection Exhibition.

The entries selected will be on exhibit at the Arboretum for three weeks prior to Lilac Sunday (May 22). Artists will price their original works for sale.

On Friday, May 20, the Arboretum will host a Champagne Evening Benefit for the Lilac Collection. For ticket information, please call Jo Procter at the Arboretum, (617) 524-1718. Tickets are \$35 per person, \$60 per couple. Then, the artists's original work will be auctioned by silent auction (with artists's prices being the floor for bids). Artists will receive 75 percent of the sale price, with 25 percent being contributed to the Arboretum and the Lilac Fund.

February's Chinese New Year Celebration Awakens Memories of Wilson's Contributions to the Arnold Arboretum

Perhaps a bit like the rhyme, "If February give much snow/A fine summer it doth foreshow," Ernest "Chinese" Wilson's extensive plant collecting in the Orient did foreshow the luxuriant plantings now growing in the Arboretum. And, providentially, February, the month of Wilson's birth, also marks the beginning of 1988's Chinese New Year (the year 4686).

Wilson's collection and introduction of plants found during his trips to the Orient in the early part of this century were his legacy to the Arboretum. Trained as a "nursery-lad," he became a gardener at the Birmingham Botanical Garden and Kew. Deciding he preferred botany to horticulture, he enrolled in the Royal College of Science in South Kensington, but scarcely had he begun his studies than the Veitch nursery asked him to go to China, plant hunting for them. On his way to China he came to Boston, where he met Charles Sprague Sargent, spending five days with him at the Arboretum.

Then, when Sargent made the decision to plant hardy woody plants collected from the entire North Temperate Zone, rather than exclusively North American and European plants, he asked Wilson to make an expedition for the Arboretum to China. Wilson went to China for the Arboretum in 1907 and 1910. During these expeditions, he wrote approximately 80 letters to Sargent describing his observations.

In 1984, Carin Dohlman, at the suggestion of Mary Ashton, came to the Arboretum as a volunteer. She had a master of library of science degree from Simmons College and had worked for the China Trade Museum. As a volunteer, she undertook the transcription of Wilson's letters, which, she says, "are a thorough report of what he had seen on these plant expeditions."

The results of his trips to China for the Arboretum were impressive: 2,262 packages of seeds, 1,473 kinds of living plants and cuttings, and 30,000 herbarium specimens of around 2,500 species, plus his photographic plates.

Today, visitors to the Arboretum can see some of Wilson's introductions or collections along the Chinese Path. Some to look for are *Davidia involucrata* 'Vilmoriniana', *Acer griseum*, *Cotoneaster divaricatus*, *Pyrus pyrifolia*, *Albizia julibrissin* 'Ernest Wilson', and *Malus toringoides*.

Wilson happened to be one of the best collectors of his time. His plant expeditions also took him to Japan, Korea, Taiwan, South Africa, Australia, India, New Zealand, and Tasmania.

In his letters and his journals, Carin Dohlman says, "He described his observation of plants growing in the various far corners of the earth."

A 1986 Institute of Museum Services grant to the Arboretum, with Sheila Connor, the Arboretum's horticultural archivist, as principal investigator, made it possible for Carin Dohlman to assist by transcribing Wilson's collection notes, diaries, journals, and approximately 100 letters from this trip to Japan, Korea, and Taiwan.

While Alfred Rehder estimated the number of species Wilson introduced into cultivation in England and the United States at more than a thousand, there is no way of determining the exact numbers. At the time of his death Wilson was working on a book of his introductions. In preparing materials for this book, Dohlman reports, Wilson wrote to his English friends, who had planted his introductions. In one of his letters, he wrote, "No parent could be prouder of reading his school report of his favorite child.... My plants are as children to me."

Kaye Is Named to Top Library Post

Geraldine C. Kaye has been appointed Librarian of the combined botanic libraries, including the Arnold Arboretum's collections. The Arboretum's libraries in the Hunnewell Visitor Center and the Harvard University Herbaria in Cambridge grew from the collection gathered by Charles Sprague Sargent, first director of the Arboretum and author of *The Silva of North America*. The Arboretum's holdings number over 91,000 volumes, with its horticultural collection at Jamaica Plain and its works on systematic botany, floras of the Old World, and other scientific literature in Cambridge.

Recently, Gerry Kaye recounted how she became interested in botany and libraries.

Which came first, your interest in plant sciences or library science?

It is interesting to look back and see where and when our career decisions were influenced. I was born in Winnipeg, Canada, and lived along the northern edge of Canada in gold-mining camps—my father was a miner—until I developed bronchial asthma and went to live with an uncle and aunt in British Columbia. My uncle was a market gardener who made a specialty of knowing the Latin names of the plants he was growing.

Was that influence felt early in your career? Did you major in botany in college?

No, I went into chemistry because I'd had a marvelous high-school teacher who made chemistry exciting. I did extensive work in biology, too; but when I graduated from McGill University, I got a job in cloud physics. We'd track the path of storms across the landscape, trying to work out the dynamics of the circulation of air, how storms build up, and their life histories. We wanted to be able to predict

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KAYE

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them more accurately, with eventual thoughts of controlling them. Bad storms are a tremendous economic blow to crops.

How did you come to Harvard?

I have a rather checkered career, as do many women my age who stopped for a while to raise a family. But I first left Canada to come to Harvard Square; it was a magnet for young people in the 1960s, and I wanted to see what it was like. I got a job at Bolt Beranek and Newman, a research and consulting firm that was then specializing in acoustics and information technology. There I met my husband, who is now a consulting acoustician and who designs sound systems for large places. He designed the sound systems for the Orange Bowl and for Great Woods, in Mansfield, Massachusetts, and "wired" Halifax, Canada, for the Pope's visit.

While I was "retired" to raise our two children, I gardened in the Fenway and practically wore out the books in the Massachusetts Horticultural Society's library. During summer vacations, I studied the plants of Cape Cod and the rest of the year visited the Arboretum in Jamaica Plain whenever I could.

When your children were in school, did you come back to work?

Yes. In 1973 I was offered a part-time job in a fungal-genetics lab at Harvard. I joined a project looking at the wild relatives of the commercial mushroom. We started surveying wild relatives to see if we could find a wider gene pool. This is, after all, something that is being done for all kinds of domestic crops because of concern that a monoculture (having no variety in genetic materials) means a disease could come along and wipe out an entire crop plant, leaving nothing to fall back on.

I know you are involved in mycology. This was the beginning of your interest?

Yes, I joined the Boston Mycological Club, began collecting and identifying wild mushrooms, and learning more and more about mushrooms. In 1978 when the lab project closed, Donald Pfister, Director of the Harvard University Herbaria, asked me if I'd like to work in the Farlow Library. (The Farlow is the mushroom taxonomic institution.) I found I liked library work so well that I went to Simmons College for my master of library science degree and became Librarian in 1983. In 1985 I was made Acting Botany Librarian of the Economic Botany Library, also.

Briefly noted...

Al Fordham, formerly the Arboretum's Plant Propagator, was awarded a Certificate of Appreciation and Honorary Life Membership by the International Lilac Society and The Walter F. Winkler Award for outstanding achievement from the

New England Chapter of the American Rock Garden Society.

Jennifer Quigley, Research Assistant in the Records Office, has just been appointed to the Board of Directors of the Rock Garden Society.

Plant

Propagators Meet

Four Arnold Arboretum plants—people participated in the 37th annual meeting of the International Plant Propagators Society (Eastern Region), held in Chicago recently.

Al Fordham, an Arboretum Associate and the retired plant propagator at the Arboretum, delivered a paper on the "Propagation of *Davidia involucrata* 'Vilmoriniana'" and *Aesculus parviflora*."

Gary Koller, managing horticulturist at the Arboretum, discussed "Runts, Rogues, and Rejects: The Search for Dwarf and Compact Flowering Shrubs."

Rob Nicholson, a plant propagator at the Arboretum, gave a paper on "Propagation of Rare Woody Endemics of Eastern North America."

Jack Alexander, plant propagator at the Arboretum, and Koller moderated the new plant forum, in which plants, both new and old, that deserve greater landscape use, are presented. These included the Arboretum's *Leycesteria formosa*, *Betula apoiensis*, *Schizophragma hydrangeoides* (seeds of these three are available for distribution), and *Pinus nigra* 'Arnold Sentinel'.

Koller is a director of the International Plant Propagators Society.

News from the Arnold Arboretum is written by Jo Procter, the Arboretum's Public Affairs Officer. Members of the Friends of the Arnold Arboretum are invited to send news of awards, honors, horticultural achievements, and personal news of note to her for this column, "Briefly noted..." Please address your correspondence to her at the Arboretum, 125 Arborway, Jamaica Plain, MA 02130-2795.

Organization Meetings

A Faithful Catalog of Horticultural and Botanical Meetings Scheduled for the New England Area

Some organizations hold meetings at regular intervals, others do not. All of the meetings listed below are open to the public. Organizations always welcome new and prospective members. It is advisable to verify the information given below directly with the contact person listed. Please do not call the Arnold Arboretum.

Meetings Regular

AMERICAN RHODODENDRON SOCIETY (MASSACHUSETTS CHAPTER)

Third Wednesday (varies), beginning in September, 7:30 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham. Contact: Barbara Emeneau (617) 729-0725.

BONSAI STUDY GROUP OF THE MASSACHUSETTS HORTICULTURAL SOCIETY

First Sunday, 2 p.m., Wellesley College Greenhouse, Wellesley. Contact: John Palmer (617) 443-5084.

CONNECTICUT HORTICULTURAL SOCIETY

Third Thursday, 8 p.m., Hoadley Auditorium, Connecticut Historical Society, 1 Elizabeth Street, Hartford. Lecture followed by plant forum and plant auction. Contact: Connecticut Horticultural Society, 150 Main Street, Wethersfield 06109; (203) 529-8713.

CONNECTICUT ORCHID SOCIETY

Second Wednesday, 7:30 p.m., at different locations. (June, members only; July, August, no meetings.) Contact: E. M. Wolf (203) 456-1657.

GARDENERS AND FLORISTS CLUB

Third Tuesday, 7:30 p.m., Wellesley College Greenhouse, Wellesley, MA. Contact: Del Nickerson, Wellesley College Greenhouse.

GREEN INDUSTRY COUNCIL

First Wednesday, 12 noon-1:30 p.m., Case Estates, Weston, MA. Information: (617)435-6335.

HOBBY GREENHOUSE ASSOCIATION OF EASTERN MASSACHUSETTS

Second Saturday, alternate months (January, March, May, etc.), 1:30 p.m., Wellesley College Greenhouse, Wellesley. Members need not own greenhouses. Contact: Joseph Rajumas, 8 Davis Street, Holliston 01746.

INDOOR GARDENING SOCIETY OF AMERICA (CONNECTICUT CHAPTER)

Fourth Wednesday, 7:30 p.m., Cooperative Extension Service Building, 1280 Asylum Street, Hartford. Contact: Michael Archaski, 64 Rhodes Street, New Britain 06051; (203) 225-5828.

MASSACHUSETTS ORCHID SOCIETY

Second Tuesday, 7:30 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham. Occasional special workshops at 7 p.m. Contact: D. Fye, (617) 358-7547; C. Lee (617) 443-6566; or M. A. Grigg, 38 Monadnock Road, Worcester 01609.

MOBY DICK AFRICAN VIOLET SOCIETY

Second Thursday, 7 p.m., Dartmouth Library, South Dartmouth, MA. Contact: Mrs. Ruth Warren (617) 679-1189.

NEW ENGLAND BROMELIAD SOCIETY

Third Sunday, September-June, 1 p.m., Wellesley College Greenhouse, Wellesley, MA. Contact: Paul R. Carlberg (617) 791-1533 or (617) 757-5012; or DeeDee Bundy (617) 526-1952.

NEW HAMPSHIRE ORCHID SOCIETY

Second Saturday, 1:30 p.m., Concord Public Library, Concord. Location may change. Contact: Paul Sawyer, RFD 2, Box 174, Canaan 03741; (603) 523-7410 after 5 p.m.

Meetings Irregular

AMERICAN BEGONIA SOCIETY (BUXTON BRANCH)

Suburban Experiment Station, 241 Beaver Street, Waltham, MA: November 12, 8 p.m.; January 30, 1988, 9 a.m.; February 20, 1988, 9 a.m.; March 23, 1988, to be announced; April 27, 1988, to be announced; May 11, 1988, 8 p.m.; June 8, 1988, 8 p.m. *Contact:* Wanda Macnair (617) 876-1366.

AMERICAN FERN SOCIETY (SOUTHERN NEW ENGLAND CHAPTER)

Approximately monthly, changing locations. *Contact:* Peggy (617) 799-5897.

AMERICAN GLOXINIA AND GESNERIAD SOCIETY (NEW ENGLAND CHAPTER)

Approximately monthly, 1 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. *Contact:* H. Friedberg (617) 891-9164.

AMERICAN HEMEROCALLIS SOCIETY (NEW ENGLAND CHAPTER)

Second Saturday, 10:30 a.m.-4 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. Location subject to change. *Contact:* Suzanne Mahler (617) 878-8039.

AMERICAN ROCK GARDEN SOCIETY (NEW ENGLAND CHAPTER)

Saturday or Sunday, February-October (approximately monthly, at changing locations). *Contact:* Helga Andrews (617) 443-8994.

IRIS SOCIETY OF MASSACHUSETTS

September, November, January, and March. *Contact:* Mrs. John H. Burton, 188 Sagamore Street, South Hamilton 01982; (617) 468-3646.

NEW ENGLAND HOSTA SOCIETY, INC.

Meetings irregular, usually Sunday, 10 a.m.-2 p.m., at changing locations. *Contact:* Mabel-Maria Herweg, 11 Puritan Lane, Dedham, MA 02026; (617) 326-1939.

NORTHEAST HEATHER SOCIETY (CHAPTER OF THE NORTH AMERICAN HEATHER SOCIETY)

Meetings held at least four times a year on weekends, at various locations throughout New England. *Contact:* Walter K. Wormick, Post Office Box 101, Alstead, NH 03602; (603)835-6165.

Ongoing Activities

ARNOLD ARBORETUM

The Arborway, Jamaica Plain, MA 02130-2795. A 265-acre public park of hardy trees, shrubs, and vines from all over the world, many of them from China and Japan. Open daily, sunrise-sunset. No charge. Visitor Center at Main Entrance open Tuesday-Sunday, 10 a.m.-4 p.m. Exhibits, slide show, public information, rest rooms. Arboretum Shop sells books, postcards, film, gift items, etc. Group van or guided walking tours available by appointment. Driving permits issued to elderly or handicapped, Monday-Friday, 9 a.m.-4 p.m. *Information:* (617) 524-1718; *recorded information on lectures, events:* 524-1717.

Volunteers are always needed to work in every area, with staff or on independent projects, on the Living Collections, in the library, gift shop, or herbarium; guiding tours; etc. Volunteers receive training and other benefits. *Contact:* Volunteer Coordinator, Arnold Arboretum, Jamaica Plain, MA 02130-2795; (617) 524-1718.

Horticultural and Botanical Calendar. Published in each issue of *Arnoldia*, the quarterly magazine of the Arnold Arboretum. It serves organizations in the New England area, though events taking place elsewhere are often listed. A standard form for submitting announcements accompanies each issue of the Calendar. *Arnoldia* invites your participation. Copy deadlines are December 15, March 15, June 15, and September 15 for the Winter, Spring, Summer, and Fall issues, respectively. *Mailing address:* Calendar, *Arnoldia*, Arnold Arboretum, Jamaica Plain, MA 02130-2795; *information:* (617) 524-1718.

Certificate in Gardening Arts. Arnold Arboretum. Botany and horticulture courses on theories and practices of good gardening (propagation, maintenance, design, plant selection, plant systematics, etc.). Work towards certificate may commence at any time during the year (some required courses may be entered only in spring). No time limit for fulfilling requirements, but final project (required) will usually be prepared within one year of completion of coursework. *Details and catalog:* (617) 524-1718.

Plant Information Hotline. Monday and Tuesday, 1-3 p.m. (617) 524-1718.

Field Study Experiences. School programs of the Arnold Arboretum for third- to sixth-grade classes. "Plants in Autumn: Seeds and Leaves" (September–November); "Hemlock Hill" (all seasons); "Around the World with Trees" (all seasons). Fee. Weekdays, 10 a.m.–12 noon (advance registration required).

Barkley Begonia Collection, Northeastern University Greenhouses, 135 Cambridge Street (Route 3, 1 mile south of Route 128), Woburn, MA 01801. Open Monday–Friday, 8 a.m.–12 noon, 1–5 p.m., other times by appointment. Group tours by arrangement. Closed weekends and holidays. No charge. *Information:* Wanda Macnair, 177 Hancock Street, Cambridge, MA 02139; (617) 876-1356.

Margaret C. Ferguson Greenhouses, Wellesley College, Route 135, Wellesley, MA 02181. Exhibits of desert and tropical plants, ferns, orchids. Seasonal displays. Open daily, 8 a.m.–4:30 p.m. Guided tours available by appointment. No charge. *Information:* (617) 235-0320, extension 3094.

Frederick Law Olmsted National Historic Site ("Fairsted"), 99 Warren Street, Brookline, MA. Boston offices of F. L. Olmsted and his two sons, surrounded by landscaped grounds. Open Friday–Sunday, 10 a.m.–4:30 p.m. No charge. Group tours by appointment. *Information:* U. S. Department of the Interior, National Park Service, 99 Warren Street, Brookline 02146; (617) 566-1689.

Garden in the Woods, Hemenway Road, Framingham, MA 01701. A 45-acre botanical garden containing the largest landscaped collection of wildflowers and native plants in the Northeast. Informal walks (10 a.m., Tuesday). Group tours by reservation. Open Tuesday–Sunday, 9 a.m.–4 p.m.; closed Monday. Admission charge. *Information:* (617) 877-7630, 237-4924.

Ashumet Holly Reservation and Wildlife Sanctuary of the Massachusetts Audubon Society, 286 Ashumet Road, East Falmouth, MA 02536. Two trails meander amid hollies and past an Oriental lotus pond. Open Tuesday–Sunday, DAWN–DUSK. Admission charge. *Information:* (617) 563-6390.

New Alchemy Institute, 237 Hatchville Road, East Falmouth, MA 02536. Research institution founded to develop ecologically sound food systems through organic gardening, integrated pest management, solar ponds, solar greenhouse design and management, tree crops, energy conservation. Film, guided tours. Open 10 a.m.–4 p.m., Monday–Friday; 12 noon–4 p.m., Saturday, Sunday. Guided tours, Saturday, 1 p.m. Admission charge. *Information:* (617) 563-2655.

Lowell Holly Reservation, South Sandwich Road, Mashpee, MA 02649. One hundred thirty-five acres with two miles of shoreline, stands of beeches and hollies, walking trails. Open daily, 10 a.m.–SUNSET, free on weekdays, parking and boat-landing fees on weekends. *Information:* (617) 749-5780, 921-1944.

Mytoi Gardens, off Dike Road, Chappaquiddick Island, Marthas Vineyard, MA 02539. Eleven-acre Japanese-style garden with small pond, azaleas and rhododendrons, Hanoki cypress, hollies, daffodils. Open daily, SUNRISE–SUNSET. No charge. *Information:* (617) 794-5780, 921-1944.

Sedgwick Gardens at Long Hill, 572 Essex Street (Route 22), Beverly, MA. Collection of some 400 species of plants, including weeping Japanese cherries, azaleas, tree peonies, koelreuterias, oxydendrums, sophora, and stewartias, all identified and catalogued with their scientific names. Open daily, 8 a.m.–SUNSET. Admission charge. *Information:* The Trustees of Reservations, 572 Essex Street, Beverly 01915; (617) 922-1536, 921-1944.

The Stevens-Coolidge Place, 5 Wood Lane, North Andover, MA. House and carefully maintained grounds with expansive lawns, colorful gardens accented by formal hedges, specimen trees. A Trustees of Reservations property. House open Sundays 1–5 P.M. (admission charge); grounds open daily, 8 A.M.–SUNSET (no charge). *Information:* Superintendent, Stevens-Coolidge Place, North Andover 01845; (617) 682-3580.

Moseley Estate State Park, Curzon's Mill Road, Newburyport, MA. Scenic and historic Nineteenth Century estate; 476 acres of gardens, rolling agricultural land, pine forest, and mountain laurel. Open daily, 8 A.M.–SUNSET.

Rhododendron State Park, Fitzwilliam, NH 03447 (off Route 119). Sixteen-acre park with wild rhododendrons that bloom in mid-July. Open daily, 8 A.M.–SUNSET. No charge. *Information:* (603) 532-8862.

Maple Hill Farm, 117 Ridge Road (off Routes 122 and 133), Hollis, NH 03049. Herb garden, reflecting pool, perennial beds, rock garden, arbor, drying-plant beds, 1,600 acres of water, woods, and meadows. Open all the time, year round. No charge. *Information:* Beaver Brook Association, 117 Ridge Road, Hollis; (603) 465-7787 (9 A.M.–12 NOON, Monday–Friday).

Botany and Woodland Trails, Southern Vermont Art Center, Mount Equinox, Manchester 05254. Botany Trail on slopes of mountain, with woods, wildflowers, ferns, pool, scenic vistas. Open Tuesday–Saturday, 10 A.M.–5 P.M. (admission charge), Sunday, NOON–5 P.M. (free). *Information:* (802) 362-1405.

Tower Hill Botanical Garden, 30 Tower Hill Road (Route 70), Boylston, MA 01505. Grounds open weekdays, 8:30 A.M.–5 P.M., weekends (May–October), 10 A.M.–4 P.M., closed holidays. *Information:* Worcester County Horticultural Society, 30 Tower Hill Road, Boylston; (617) 869-6111.

Elliott Laurel Reservation, Route 101, Phillipston, MA 01331. Thirty-three acres of open fields, hardwood forest, pine woods, and mountain laurel. A property of the Trustees of Reservations. Open daily, SUNRISE–SUNSET. No charge. *Information:* (617) 921-1944, 537-2377.

Norcross Wildlife Sanctuary, Monson-Wales Road, Wales, MA 01081. Three miles of trails through over 3,000 acres of woodlands. Open Monday–Saturday, 9 A.M.–5 P.M. No charge. *Information:* (413) 267-9654.

Berkshire Garden Center(BGC), Routes 102 and 183, Stockbridge, MA. Fifteen-acre botanical garden with herb garden, display gardens, perennial borders, solar greenhouses. Open daily, 10 A.M.–5 P.M. Admission charge. *Information:* BGC, Stockbridge 01262; (413) 298-3926.

Champion Greenhouse, One Champion Plaza, Stamford, CT 06921. Ongoing program of horticultural shows, exhibits, and displays. Open 11 A.M.–5 P.M., Tuesday–Saturday. Group tours by appointment. *Information:* (203) 358-6688.

Abies fargesii Franchet: FARGES'S FIR

This slow-growing fir comes from China, where it grows at elevations of between 2,000 m and 3,900 m in the provinces of Hupeh, Szechuan, Sikiang, Shensi, and Kansu. It was discovered by the French missionary Père Paul Guillaume Farges, probably about 1892, and introduced by Wilson and planted in 1911. It is hardy in the Arnold Arboretum

(Zone V), where there are 2 specimens. The taller is 10 m in height. *Abies fargesii* is rare in collections in the United States, but there is 1 specimen of it in the Hunnewell Pinetum in Wellesley, Massachusetts.

No infraspecific relatives of *Abies fargesii* are recorded.

Habit	
Subconical	
Branches upturning, short; reaching 35 m in its native habitat	
Thick	
Crowns of old trees flattened	
Bark	
Rough and scaly, even in youth	
Buds	
Columnar	
Resinous	
6 mm	
Reddish	
Branchlet	
Homogeneous reddish brown	
Glabrous	
Undulant grooves and ridges	

Foliage	
Above	
Dark, shiny green	
V present	
Leaves pointing at right angles (80°–90°) from branchlet, those on the upper side becoming dramatically shorter (to 1 cm) towards the end of branchlet	
Below	
Pointing 60°–90° from branchlet	
Leaves	
1.5–2.5 cm x 2.5 mm	
Flattened, linear	
Sides bitapered (taper greater at base, almost club-shaped)	
Tip short, rounded with notch	
Not curved	
Margins entire	
Flexibility 2+	

Above	
Dark, shiny green	
No stomata	
Shallow groove	
No midrib	
Below	
Stomata gray-white	
Margins nearly revolute	
Not keeled	
Resin canals median	
Cones	
Peduncle short	
5–8 cm x 3–4 cm	
Bracts markedly exserted and reflexed	

Similar Species

- In mid-southern China, *Abies fargesii* has several neighbors with overlapping habitats: *Abies chensiensis* (plus its varieties *smithii*, *fabri*, and *georgii*), and *Abies fargesii*'s own varieties *faxoniana* and *sutchuensis*. These all have bright red-brown branchlets, except for *Abies chensiensis* and *Abies recurvata*, on which they are yellow. Because of the rarity of these in cultivation in New England, they are merely listed, not discussed, here. Other than these, *Abies fargesii* has no competitors for identification.

Abies firma Siebold & Zuccarini: MOMI FIR

The range of *Abies firma* is the southern half of the Japanese archipelago. It is widespread there, growing at elevations of 50–1,600 m, between 30° and 39° North latitude. It thus also contains the habitat of *Abies homolepis*, which is discontinuous within it but at a higher elevation, and which it resembles somewhat.

Abies firma reaches 50 m in height in its native range and has been called the most beautiful of the Japanese firs, but, as Charles Sprague Sargent pointed out, although it is

very hardy in Massachusetts, environmental stress prevents it from assuming the beautiful proportions it demonstrates in Japan. The epithet "*firma*" means stout. Sargent wrote of trees in Japan with trunk diameters of 4–6 feet (1.2–1.8 m). It is hardy in Zone VI in cultivation in the United States. The Arnold Arboretum has 1 mature specimen that is 50 years old and 18 m tall.

No infraspecific relatives of *Abies firma* have been reported.

Habit

Reaching 20 m in cultivation when mature
Wide, with horizontal branches
Pyramidal crown becomes broad and often irregular in old age
Has been called the most beautiful of the Japanese firs (Bean, 1976; Liu, 1971)

Bark

As in other species of the genus, young trees and recent growth on old trees having gray bark that is smooth but of a pebbly, pigskinlike texture
Old bark on old trees rough, with peeling scales rather than thick plates

Bud

Round, with a slightly conical tip
5 × 4 mm
Milk-chocolate brown, scarcely resinous
Bud scales appressed

Branchlet

Brown-green to yellow-green
Surface with shallow fissures as in *Abies homolepis*, but far less conspicuous
Hairs in the fissures, not on the ridges
Flexibility 1+

Foliage

Above
Pectinate, with a wide V
Leaves pointing forward to a 75° angle with the branchlet
Below
Pectinate; angle with branchlet 60°–80°

Leaves

2–3 cm × 2–3 mm
Flattened, linear
Sides bitapered
Tip on young trees bifid, forming a notch with two sharp points on either side of it
Curved 1+–2+ toward lower side and 1+ laterally
Margins entire
Flexibility 1+

Above

Shiny green
No stomata
Shallow groove

No midrib

Below
Stomata gray-green
Margins revolute
Not keeled

Cones

10–12 × 4.5 cm
Cylindrical but tapered from base to outer end, which is rounded
Peduncle short
Green, turning brown
Bracts markedly exserted

Distinguishing Characters

- The characteristic notch at the outer end of the leaf set between two spiny tips is diagnostic, even if the tree is an older one and may show this on a very limited number of leaves. If an example does not come forward and no leaf tip is notched, one must look for the very flattened, broad, bitapered leaves with revolute margins, nonwhite stomata below, and scarcely resinous buds.

Similar Species

- *Abies homolepis*: fissures in the branchlets more distinct; leaf stomata whiter below
- *Abies recurvata*: leaves mostly recurved and leaf stomata green below; buds very resinous; resin canals marginal
- *Abies chensiensis* (not discussed here): can have sharp-pointed, notched leaves, but resin canals marginal and cone bracts hidden

Abies fraseri (Pursh) Poiret: FRASER FIR

Abies fraseri has been called the more southerly version of *Abies balsamea*. Its range is the southern Appalachian Mountains, the mountainous areas of Virginia, North Carolina, and Tennessee. Although listed as hardy to Zone IV and being a mountain tree,

it has not done well in the Arnold Arboretum. At present our 2 specimens, which were acquired as seedlings from the National Arboretum, are 13 years old.

No infraspecific relatives of *Abies fraseri* grow in the Arnold Arboretum.

Habit

A small tree, reaching no higher than 25 m
Conical in shape when young
Like *Abies balsamea*, favored for Christmas trees
Branches tending to ascend from the trunk at an angle of 45°

Bark

Dark gray, with resin blisters
Becoming rough and fissured on old trees

Bud

Small (2 x 3 mm)
Reddish brown
Scales seen as prominent through the invariable coat of resin

Branchlet

Yellow-gray to red-brown
Hairs short, stiff, red, in confluent patches
Surface undulating
Flexibility 2+

Foliage

Above
Medium-wide V, often violated by aberrant leaves
Leaves pointing forward 60°–80° from branchlet
Below
Pectinate
Leaves pointing forward 45° from branchlet

Leaves

2 cm x 1 mm
Flattened, linear
Sides parallel
Tip rounded, with tiny notch
Not curved
Margins entire
Flexibility 2+

Above

Green, more matte than shiny
Stomata often in a patch in the tip of the groove
Groove shallow
No midrib

Below

•
Stomata in two ranks of 8–12 rows each, whiter than in *Abies balsamea*
Resin canals median

Cones

4–6 x 2.5–3.5 cm
Cylindrical, but tapered on both ends
Green, turning brown
Sessile

**•
Bracts markedly exserted****Similar Species**

- *Abies balsamea*: also has resin blisters on bark of young trees

Distinguishing Characters

- Has more rows of stomata on the under surface of the leaves and thus shows a whiter underside than does *Abies balsamea*
- Cones, if present, with bracts exserted

Abies grandis Lindley: GRAND FIR

Abies grandis is hardy in Zone IV and very commonly cultivated in Britain but rare in New England. The Arnold Arboretum has two specimens, one 86, the other 97 years of age, that were planted on Hemlock Hill, where there was good protection by the mature hemlocks at that time. They have grown

successfully to heights of 21 m and 22 m and to diameters of 90 cm and 92 cm, but now are hidden away from their neighbors. They are well worth a visit because of their unique pectinate foliage.

No infraspecific relatives of *Abies grandis* grow in the Arnold Arboretum.

Habit

True to its name, the tallest of the true firs, growing to 100 m in its native habitat

Popular in cultivation in climates where it is truly hardy, growing rapidly (up to 1 m a year)

Branches pendulous at their bases, turning up at the end so that the tree in its prime is narrow columnar and the crown spirelike

Bark

Young bark (less than 50 years old) gray with a pebbled surface
Old bark thickened, in broad, deep grooves with prominent plates in between

Bud

Round, resinous
Very small (<5 mm)
Scale tips divergent

Branchlet

Olive green to bright red-brown
Faint hairs
Shallow longitudinal grooves
Flexibility 3+

Foliage

Above
Leaves widely pectinate at 70°–80° angle from branchlet
Below
As in "Above"

Leaves

2–5 cm x 2 mm
Flattened, linear; proximal ends sharply twisted
Sides parallel
Tip rounded and notched
Not curved
Margins entire
Flexibility 3+

Above

Shiny, dark green
No stomata
Prominent groove
No midrib

Below

Stomata gray-white
Margins subrevolute
Not keeled
Resin canals marginal

Cones

7–10 x 3–3.5 cm
Submarine shaped
Rounded at both ends
Green, turning brown
Bracts concealed

Similar Species

- *Abies concolor* var. *lowiana*: stomata on upper surface of leaves

Distinguishing Characters

- The long, parallel-sided, pectinately arranged, separately spaced leaves making the branchlets flattened sprays, to an extent not seen in any other fir (except *Abies concolor* var. *lowiana*)

Abies holophylla Maximowicz: NEEDLE FIR

Introduced by Ernest H. Wilson in 1905, *Abies holophylla* comes from northeastern China and Korea, where it has a limited distribution along the border. It is hardy in Zones V and VI and may prove successful in colder and warmer areas as well.

The Arnold Arboretum grows 6 plants, but none of the original Wilson introductions survive. The oldest are 2 specimens received

as plants from the Ames private collection in North Easton, Massachusetts, in 1923. They are, respectively, 20 m and 18 m tall and have boles 67 cm and 30 cm thick. The bark consists of slightly raised, thin, 2.0–2.5-cm-square plates.

No infraspecific relatives of *Abies holophylla* are recorded.

Habit
Reaches 40–50 m in its native habitat
Branches short and ascending, crown broad and pyramidal
A graceful, tall tree

Bark
• *Bark in thin plates on all plants, young and old*
• *The smooth, gray, homogeneous bark of most young firs not seen in Abies holophylla*

Bud
5 mm
Ovate-conic; light brown
Scales appressed, with contours easily visible
Resinosity varies but averages slight (1+–0); in very occasional plants, 3+

Branchlet
Prominently ridged and sharply fissured longitudinally; both ridges and fissures shallow and broad, unlike those of *Abies homolepis*, which are narrow
Glabrous
Milk-chocolate brown

Foliage
Above
V wide
Leaves pointing forward 80° from branchlet
Below
Imperfectly pectinate, pointing forward 45° from branchlet
• *Leaves on both sides standing apart from each other*

Leaves
Length: 2.5–3.5 cm
Width: 2 mm
Flattened, linear
Sides parallel
• *Tip long drawn-out point, no notch*
0–1+ curved in flat plane
Margins entire
Flexibility 2+
Above
Matte green
No stomata
Groove very shallow
No midrib
Below
• *Stomata gray-green*
Margins not revolute
Not keeled
Resin canals median

Cone
8 x 10 cm
Cylindrical, with rounded ends
Peduncle short
Bracts concealed

Distinguishing Character

- Youngest bark scaly on trees of any age

Similar Species

- *Abies borisii-regis*: leaves often pointed, but darker green; branchlets hairier
- Firs with conspicuously pointed leaves (excluding *Abies bracteata*, which is extremely rare and has the widest [3 mm] and longest [up to 6 cm] leaves of the firs]: leaves orderly, glossy green above and white below)
- Firs with leaves that stand apart from each other (e.g., *Abies concolor*, *Abies grandis*, and *Abies cilicica*): tips of leaves not pointed

Abies homolepis Siebold & Zuccarini: NIKKO FIR

Abies homolepis grows in the southern half of Japan, between 33° and 37° North latitude at elevations of between 700 m and 2,200 m. Its range, which is discontinuous, overlaps that of *Abies firma*, which is more densely distributed. "Homolepis" means "similar scales." It formerly was called *Abies brachyphylla* ("short leaves"), in contrast to many other firs. It is hardy to Zone V. Charles Sprague Sargent, writing 70 years ago, remarked on how well *Abies homolepis* and *Abies concolor* flourished here in their early years. They have continued to do so.

The Arnold Arboretum's holdings of *Abies homolepis* and its infraspecific relatives are 18 trees, several about 100 years old. (The total number of plants of this group of *Abies homolepis* growing in the Arnold Arboretum is: *Abies homolepis*, 9; *Abies Xumbellata*, 8; *Abies homolepis forma tomomi*, 1, or, 18 in all. Seven were acquired before 1900 and others soon thereafter [2 in 1902 and 4 in 1908].) As with *Abies concolor*, the tallest are 20–25 m tall, and their boles are up to 100 cm in diameter. They are important features of

the Arboretum's Pinetum, having fulfilled Sargent's predictions. It is of interest, however, that of all 34 specimens of *Abies homolepis* and its relatives planted starting in 1880 none of the 16 that are no longer with us were uprooted in hurricanes. For contrast with *Abies concolor* in this respect, see page 23.

Abies Xumbellata

Abies Xumbellata is a relative of *Abies homolepis*, recognized by Ernest Wilson under the name *Abies homolepis* var. *umbellata*. It differs in that its cone tips are umbilicated to more than those of the species. Most recent opinion considers it to be a hybrid between *Abies homolepis* and *Abies firma*, and its name has been changed to *Abies Xumbellata*.

Abies homolepis forma tomomi

Abies homolepis forma tomomi has slightly shorter leaves and is less densely branched than the species.

Habit

A broad-growing tree with long branches and a dome-shaped crown, conspicuously broad in old age

Bark

Rough and scaly over the resin blisters, unlike most other firs, even on young trees
Scales small and thin at first, in old trees coarse, with 3 x 10-cm scales

Buds

Rounded, with a conical point 6 mm
Resinous 2+
Scales appressed but prominent

Branchlet

Yellow-brown
Glabrous

• Longitudinally ridged and fissured with fissures so narrow that the whole contour is grossly smooth
Flexibility 1+

Foliage

Above
Conspicuous V
Leaves pointing 80°–90° from branchlets
Below
Incompletely pectinate, pointing 60°–90° from branchlet

Leaves

2.5 cm x 2 mm
Flattened, linear
Sides parallel to 1+ bitapered
Tip rounded, sometimes entire but usually a small notch
Curved 0–1+
Above
Dark green, not conspicuously shiny
No stomata
Groove medium
No midrib
Below
Stomata gray-white
Margins not revolute
Midrib 1+
Not keeled
Resin canals median

Cones

8 x 3 cm

Purple when young, brown when

mature

Evenly bitapered (submarine-shaped)

Sessile

Bracts hidden

Distinguishing Characters

- The sturdy, yellow, glabrous branchlets with the tight, deep fissures are nearly unique

Similar Species

- Abies holophylla*: branchlets prominently ridged but not with narrow fissures; leaves long and pointed

- Abies firma*: tips of young leaves bifid; Even without that, leaves broad, very flat, bitapered; furrows of branchlets not narrow and deep

Abies koreana E. H. Wilson: KOREAN FIR

The range of *Abies koreana* is southern Korea and the volcanic island of Cheju Do (Quelpart) up to elevations of 2,000 m. The type specimen is in the herbarium of the Arnold Arboretum in Cambridge, Massachusetts. It is hardy from Zone V to Zone VII.

The Arnold Arboretum grows six specimens of *Abies koreana*, one of them an original specimen from the group introduced to the West by Ernest Wilson in 1917. It is 18 m

tall and has a trunk 70 cm in diameter.

The prostrate forms, usually called *Abies koreana* 'Prostrate Beauty', follow the tendency of the types to set cones when young. They are popular in dwarf-conifer collections. Six specimens are growing in the Arnold Arboretum's collections of dwarf conifers, where there are also two plants of *Abies koreana* 'Aurea'.

Habit	Branchlet
A slow-growing tree, rarely reaching more than 20 m in height	Light gray-green
Pyramidal when young	Lustrous
Crown becoming broad with age	Scattered hairs
Foliage dark and rather dense	No undulations or furrows
Bark	Foliage
Gray	<i>Above and below</i>
Smooth when young, later very rough, with deep grooves and plates	• Leaves pointing all around, less dense below
Resinous	No V
Bud	Pointing forward at angles from branchlet of 45° to almost 90°
5 mm	Viewed end-on, a circular rosette of green leaves offsetting the cluster of three resinous buds, with flashes of white to the under surface
Round, with blunt, pyramidal tip	Leaves
Covered with resin that obscures the scales	1–1.5 cm x 2+ cm Flattened, linear Sides bitapered but wider at tip Tip curved, with tiny notch or no notch

Curved 1+ toward upper side
Margins entire
Flexibility 1+-2+
<i>Above</i>
Matte dark green
No stomata
Shallow groove
No midrib
<i>Below</i>
Stomata very white and broad
Margins not revolute
Not keeled
Midrib narrow
Resin canals median (occasionally submarginal)

Cones
5–7 x 2.5–2.8 cm
Cylindrical; narrower at rounded ends
Violet when young
Bracts markedly exserted
Cones readily produced
• Many young plants bear cones

Similar Species

- *Abies sachalinensis* and *Abies veitchii*: leaves longer but conspicuously more flexible than those of *Abies koreana*
- *Abies sachalinensis*: stomata on undersides of leaves dull white; bark smooth until an advanced age
- *Abies veitchii*: undersides of leaves very white but bark smooth and bract scales of the cones hidden or their tips barely visible
- *Abies nephrolepis*: leaves also longer than those of *Abies koreana*, linear (not bitapered), with dull-white stomata below; bark smooth; more hairs on branchlet; cone scales kidney-shaped

Abies lasiocarpa (Hooker) Nuttall: SUBALPINE FIR

With the exception of *Abies balsamea*, *Abies lasiocarpa* is the most widely distributed species of *Abies* in the United States. Hardy in Zones V–VI, it grows from southern Alaska to the Mexican border in the Rocky Mountains (35°–63° North latitude), often in association with *Picea engelmannii*. In addition, it occurs in the mountains of Washington and Oregon.

"*Lasiocarpa*" (meaning "hairy fruit") refers to the hirsuteness of the cones. "Subalpine," an adjective commonly applied to this species, is appropriate, since *Abies lasiocarpa* is a mountain tree.

Alfred Rehder stated that *Abies lasiocarpa* "does not do well in the eastern states." It is hardy in the Arnold Arboretum, which contains three mature trees in addition to the variety *arizonica*. The growth of the three

has been slow to average. Acquired in 1942, 1958, and 1966, they are 11, 3, and 2.5 m tall, respectively.

Abies lasiocarpa var. *arizonica*

Abies lasiocarpa var. *arizonica* (Merriam) Lemmon is a common variety, more popular as an ornamental than the species. It is distinguished from the species by its more intensely whitish blue leaves, which have emarginate tips, and by its corky bark (hence its common English name, cork-bark fir). There is one handsome specimen in the Arnold Arboretum. Dating from 1932, it is now 20 m tall; its trunk is 40 cm in diameter.

In the Arboretum's dwarf-conifer collection there are three specimens of *Abies lasiocarpa* 'Compacta'.

Habit Narrow, spirelike, with short, upcurved, dense branches Can grow to 40 m but winds at timberline in its native habitat discourage such statures	Branchlet Silvery tan, almost fawn-colored on some plants Grooved shallowly No fissures Hairy 1+-scattered, in grooves	Above Matte green-gray Distal half with two bands of several rows of tiny stomata Shallow groove No midrib
Bark Smooth, gray, slightly roughened when young, with resin blisters Bark of older trees rougher, fissured Bark on some plants with rusty tinge	Foliage Above Gray Incomplete V or no V Leaves pointing forward at 45° from branchlet Below Incompletely pectinate, leaves pointing forward 30°–40° from branchlet	Below Two bands of light-gray stomata Margins not revolute Midrib prominent Resin canals median
Bud 5–6 mm Ovate Resinous Scales obscured by the resin	Leaves 2.5 cm x <2 mm Flattened, linear Sides parallel Tip round, with tiny notch Curved 1+ toward upper surface Margins entire Flexibility 2+	Cones 8–10 x 3.5 cm Cylindrical to submarine-shaped Bracts hidden Purple when young

Distinguishing Characters

- One of the few members of the genus with full lines of stomata on the upper surface of leaves, the others being *Abies concolor*, *Abies magnifica*, *Abies pinsapo*, and *Abies procera*

Similar Species

- *Abies concolor*: leaves much longer and more widely spaced; resin canals marginal
- *Abies magnifica*: leaves quadrangular in cross section and running parallel to the shoot before spreading from it
- *Abies pinsapo*: leaves 4+ stiff, at right angles to the branchlet, very pointed
- *Abies procera*: leaves like those of *Abies magnifica* but not quadrangular in cross section

Abies magnifica A. Murray: RED FIR

Abies magnifica grows in northern California and southern Oregon, its range being more southerly and at slightly higher elevations ($35^{\circ} 40' - 45^{\circ} 3'$ North latitude and 1,400–2,700 m) than that of *Abies procera* ($41^{\circ} - 48^{\circ} 30'$ North latitude and 900–2,000 m), which in some ways it resembles, particularly in the presence of stomata on the upper surface of its leaves and the arrangement of the leaves at their origins from the branchlets. It is reputed to be hardy in the warmer parts of Zone V but less frost hardy than *Abies procera*. The name "red fir" derives from the color of the bark. The translation of the Latin name to "magnificent fir" is more appropriate and is sometimes used.

The Arnold Arboretum grows only 1 specimen—*Abies magnifica* 'Nana'—which is 50

cm tall and not thriving, but no specimens of the species. We list it here chiefly for comparison with *Abies procera*, which also appears in the Arboretum only in its dwarf form. The Hunnewell Pinetum in Wellesley, Massachusetts, does possess a specimen 17 years old and 1.5 m tall. It is healthy but not fast-growing.

Abies magnifica var. *shastensis*

Even though the Arnold Arboretum does not possess a specimen of it, we list *Abies magnifica* var. *shastensis* Lemmon here because it is well known as a natural variety. It is distinguished from the type because the bract scales on its cones are exserted. This suggests that it is a hybrid between *Abies magnifica* and *Abies procera*.

Habit	Branchlets	Above
A columnar tree with a spirelike head, one of the most elegant known	Red-brown	Gray-green
Can grow to 70 m in the wild (trees cultivated in Britain for over 100 years have reached about half that height)	Shallowly grooved longitudinally	Stomata present in two full bands
Trunks of mature trees often branchless for half their heights	Hairy	No groove
Bark	Foliage	Small midrib
Smooth (but for resin blisters in youth) and very light gray	Above	Below
Becoming deeply furrowed in age, revealing reddish inner bark	Gray-green	Stomata in two gray-white ranks
	No V, leaves paralleling branchlets at their origins, then turning at right angle outward and upward	Keel present
Buds	Below	Resin canals marginal
Ovoid, acute at tip	As in "Above," but spray more flattened	
Brown		Cones
Small, 4 mm		15–25 x 10–12 cm
Hard to see because terminal leaves crowd about them		Sessile or nearly so
Resinous on the upper aspect		Purple at first, brown when mature
		Nearly cylindrical, thick
		Bract scales hidden
	Leaves	
	2–3 cm x 2 mm	
	Flattened, linear	
	Sides parallel	
	Tips rounded, without notch	
	Not curved but angled as described	
	Margins entire	
	Flexibility 1+	

Similar Species

- *Abies procera* (its only "look-alike"); leaves with dorsal groove (appear diamond-shaped in cross-section); cone bracts not hidden

Abies nephrolepis Maximowicz: KHINGHAN FIR

The native range of *Abies nephrolepis* is North Korea. Some have called it the eastern-Asiatic form of *Abies sibirica*. The specific epithet "*nephrolepis*" refers to its cone scales, which, when looked at individually, are kidney-shaped; this characteristic is not different enough to distinguish it from other members of the genus. Alfred Rehder and

Ernest Wilson considered that its name should be *Abies sibirica* var. *nephrolepis*.

The Arnold Arboretum has 3 specimens, all of them over 60 years of age. One, *forma chlorocarpa* Wilson (cones green when young), was introduced by Wilson in 1917 and is now a beautiful tree 20 m in height. No other infraspecific forms are known.

Habit
Columnar, broad, conical,
short branches
Crown conical, becoming
irregular

Bark
Beech gray, pebbly
Becomes shallowly fissured on
old trees

Bud
Conical, blunt
Light reddish brown
Resinous
Scales prominent in relief
under the resin

Branchlet
Yellow-gray
Shallowly ribbed or grooved
Hairy 2+

Foliage
Above
V; pointing forward 60° from
branchlet
Below
Pectinate; pointing forward 60°
from branchlet

Leaves
2 cm x 2 mm
Flattened, linear
Sides parallel
Tip rounded, with notch
Not curved
Margins entire
Flexibility 3+

Above
Dull green
No stomata
Groove present
No midrib
Below
Stomata dull white
Margins not revolute
Not keeled, midrib thin
Resin canals median

Cones
5 x 2.5 cm
Cylindrico-ellipsoid
Purple, turning brown
Bracts exserted

Similar Species

- *Abies sachalinensis* and *Abies sibirica* (see the table on page 45)

Abies nordmanniana (Steven) Spach: CAUCASIAN FIR

The range of *Abies nordmanniana* lies just east of the eastern shore of the Black Sea. Introduced to the West (Britain) in 1836, it is a strong, beautiful addition to collections in the British Isles. Named after Alexander Nordmann (1803–66), a Finnish botanist and one of its discoverers, *Abies nordmanniana* is hardy in Zones V–VII.

The Arnold Arboretum acquired two mature, narrow and tall specimens from a nursery in Holland in 1903. Twenty-six meters

tall and with boles 55 and 64 cm in diameter, they are among the most impressive specimens in the Arboretum's Pinetum.

The only infraspecific relative in the Arnold Arboretum is *Abies nordmanniana* 'Pendula', which grows at the same rate as the species but differs from it by the exaggerated pendulousness of its branches. Although 30 years old, it has lost its crown and is only 2 m tall.

Habit	Branchlet	Leaves
Growing to 60 m in the Caucasus Mountains	Olive, with a brownish tinge	2–3 cm × 2.5 mm
Conical, with a narrow, spirelike crown	Surface shallowly grooved (fissured) longitudinally	Linear, curving 2+ in the flat plane
Main branches horizontal, lower branches sweeping downwards	No undulations or ridges	Midrib 2+, thickened in a keel, as are the side ribs
Living up to its reputation of having an impressive, lordly aspect	Covered with moderately dense, short, stiff hairs	Sides parallel
Starting to grow late in spring [a characteristic useful in cultivation], which makes it insensitive to late frosts		Tip rounded, notched
		Curving 2+ in the flat plane
Bark		Margins entire
Smooth above to rough below		Flexibility 1+
Grayish when smooth; brownish when rough		Above
		Glossy 1+
Bud		No stomata
• Red-brown, conical-ovate, not resinous		Groove prominent
		Midrib prominent
		Below
		Stomata white-gray
		Margins not revolute
		Keel on midrib
		Resin canals marginal
		Cones
		5 × 14 cm
		Cylindrical, tip pointed
		Bracts just exserted

Similar Species

- *Abies alba*: leaves also shiny, with notched tips, nonresinous buds, and hairy branchlets, but arranged in a pectinate V above the branchlet
- *Abies amabilis*: leaves above likewise cover the branchlet but are flexible 3+ and occasionally have some stomata on the tip of the upper surface

Abies pinsapo Boissier: SPANISH FIR

The native range of *Abies pinsapo* is a localized one near Ronda in southern Spain, where it was discovered and described and whence it was introduced to cultivation early in the Eighteenth Century by Pierre Boissier (1810–85). Because its short, stiff, sharp leaves emerge at right angles, it has been called by some the "hedgehog fir." It is not uncommon in cultivation and is hardy from

Zone VI into parts of Zone VIII.

Infraspecific Relatives

The most common horticultural variety is 'Glauca', one specimen of which is in the holdings of the Arnold Arboretum. It was accessioned 44 years ago and is a sturdy plant 7.5 m tall.

Habit	Foliage	Above
Relatively short branches set in pseudowhorls, making for a columnar, or narrow, pyramidal tree	• Short leaves radiating around branchlet	Matte green
Growing up to 30 m	Above	Covered with tiny white stomata in two bands on either side of slightly elevated midrib
Bark	Below	Below
Remaining remarkably smooth on the lower trunks of certain trees, but rough in most	Leaves at right angle (90°) to branchlet	Two bands of gray stomata
Bud	No V on either side but leaves less dense on underside	Midrib definite but not conspicuous
Small (3 mm)	Some leaves occasionally recurved	Not keeled
Resinous	Leaves	Resin canals median
Scale tips visible in relief under the resin	1–1.5 cm x 2 mm	
Branchlet	Flattened, linear	
Glabrous	Sides parallel, bordering on bitapered	
Surface rusty red	• Tip an obtuse horny point; not notched	
Conspicuously grooved and fissured	Curving 1+ toward underside	
	Margins entire	
	• Flexibility 0	

Distinguishing Characters

- Leaves short, stiff, at right angles to branchlet

Similar Species

- Looks superficially like a spruce, particularly the tiger-tail spruce (*Picea polita*), which has similarly stiff leaves
- The roughness of the branchlet surfaces at the points where the leaves are attached resembles that seen in *Picea polita*
- If no sterigmas at the leaf attachments and if specimen belongs to the genus *Abies*, the only confusion would be with a hybrid of *Abies pinsapo* and *Abies nordmanniana*

{*Abies ×insignis*}, *Abies cephalonica* (*Abies ×vilmorinii*), or *Abies numidica* (*Abies ×marocana*); though uncommon, these hybrids of *Abies pinsapo* must be suspected in specimens with stiff, short, prickly leaves that are not entirely characteristic of the species, *Abies pinsapo*, itself.

Abies procera Rehder: NOBLE FIR

One of the tallest trees of the West Coast ("procera" means tall, or slender), the noble fir grows on the western slope of the Cascade Mountains, from Washington to upper northern California. Its range is continuous with that of *Abies magnifica*, which, although it overlaps with that of *Abies procera*, is primarily south of the California-Oregon border. As noted under *Abies magnifica*, these two species can be regarded as "nonidentical twins." They share many characteristics.

Abies procera was described by David Douglas in 1825 and introduced into Great Britain, where it has always flourished. Although none of the original introductions are

still living, some survived until 1968. Specimens planted as long ago as 1840 were registered as still living in the early 1970s (Bean, 1976, Volume 1, page 65). The only examples of the species in the Arnold Arboretum are dwarfs, the well known beautiful cultivars 'Glauca' and 'Glauca Prostrata', on which the characteristics of the typical foliage can be studied.

In the United States *Abies procera* is just hardy to Zone V but not common. The Hunnewell Pinetum in Wellesley, Massachusetts, grows one specimen (under its earlier name, *Abies nobilis*). It is 4.5 m high, and the bole is 5 cm in diameter at breast height.

Habit	
Reaching 80 m in its native habitat	
Bole straight; can remain unbranched for over 40 m	
Branches relatively short, making for a narrow crown that is, however, rounded at its top	
 Bark	
Smooth, reddish gray for many years, eventually becoming rough with soft plates	
 Bud	
Very small, about 3 mm (hard to see among the terminal forward-growing leaves)	
Resinous	
Scale tips divergent	
 Branchlet	
Reddish brown	
Hairy 1+	
Surface regular	
Suggestion of longitudinal grooves	

Foliage	
Above	
Incomplete V; most leaves in a wide V, but many singles arising in center of it; all pointing 70°–90° from the branchlet	
Below	
Pectinate with occasional strays; pointing forward 60°–80° from the branchlet	
*Leaves both above and below characteristically running forward parallel to the branchlet for 2 mm before departing at the angle mentioned (seen more easily from the lower aspect of the branchlet); similar in this feature to <i>Abies magnifica</i>	
 Leaves	
2–3 cm × 2 mm	
Linear, flattened	
Tip rounded, notched or not notched	
Curved 1–2+ toward lower surface	
Margins entire	
Flexibility 1–2+	
 Above	
Matte green	
*Stomata in bands on both sides of shallow groove (in some cases a lens is needed to observe this)	
No midrib, but upper surface can be slightly convex and surmounted by the groove, which can change to a midrib near the tip	
Below	
Stomata small, numerous, white	
Margins not revolute	
Midrib prominent	
Resin canals marginal	
 Cones	
10–15 × 6–7 cm	
Subcylindrical (submarine- or blimplike)	
Green when young, turning brown	
Bracts strongly exserted and reflexed	

Similar Species

- *Abies concolor*: stomata in full bands on the upper surfaces of leaves but leaves long, flexible, widely spaced
- *Abies lasiocarpa*: stomata in full bands on the upper surfaces of leaves but leaves extend from the branchlet directly, with no appressing of the initial few millimeters; resin canals median; cone bract scales hidden
- *Abies magnifica*: stomata in full bands on the upper surfaces of leaves (resembles *Abies procera* more than any other species), but leaves have no groove on their upper surface and cones have hidden bracts (Note: Cone bracts of *Abies magnifica* var. *shastensis* exserted; if none available, one must rely on leaf characteristics)
- *Abies pinsapo*: stomata in full bands on the upper surfaces of leaves but leaves rigid 4+, with no groove on upper side; tips horny; at right angles to branchlets
- See also *Abies lasiocarpa*

Abies recurvata M. T. Masters: MIN FIR

The English name of *Abies recurvata* derives from the Min River in central China (Szechuan), where the tree grows between 25° and 45° North latitude. Hardy in Zone V, it is uncommon in cultivation.

Three plants grow in the Arnold Arboretum, all from the original introduction by

Wilson in 1911. It has been a slow grower; the tallest of the Arboretum's trees is 9 m tall. The Hunnewell Pinetum in Wellesley, Massachusetts, grows one plant.

Abies recurvata is not recorded as having cultivars or infraspecific forms.

Habit

Reaches 40 m in its native habitat
Pyramidal, the crown becoming flattened with age

Bark

Gray or red-brown
Smooth in youth, later becoming rough with 2- to 3-cm-long flaking plates

Bud

5–7 mm or larger
Light grayish brown with a roseate tinge
Covered with gray resin through which the outlines of the prominent bud scales can be seen in relief

Branchlet

Silvery yellow-gray
Glabrous
Flexibility 1+
Surface undulate with shallow, wide grooves and ridges

Foliage

Above
Stiff, sturdy leaves point backwards, often to 60° from branchlet
Many leaves nearly at a right angle, occasionally slightly forward
Below
Same as "Above"

Leaves

2–3 cm × 3 mm
Flattened, linear
Sides bitapered
Tip pointed
Flexibility 1–2+

Above

Shiny green, often pale
No stomata
Shallow groove
No midrib
Below
Stomata green
Margins revolute 1+
Not keeled
Resin canals marginal

Cones

6 × 4 cm
Chunky, conical, with rounded ends
Purple until maturity, then brown
Bracts hidden

Distinguishing Characters

- Leaves recurved and green beneath, making it difficult to confuse *Abies recurvata* with any other species of *Abies*

Abies sachalinensis M. T. Masters: SACHALIN FIR

Abies sachalinensis (formerly called *Abies veitchii* var. *sachalinensis*) is restricted to the Kurile and Sachalin Islands and to Hokkaido, the northern island of Japan. Its relationship to certain neighboring firs—*Abies sibirica* and *Abies nephrolepis*—has been noted. It is hardy from Zones II–VI. The Arnold Arboretum grows seven specimens, two of them at the Case Estates in Weston, Massachusetts. Two of those growing at the Arnold Arboretum itself (in Jamaica Plain) are 105 and 93

years old and 17 and 18 m tall, respectively. One of our specimens is the variety *mayriana*, which came as seed in 1932 from Hokkaido. It is now 12 m tall.

In addition to *Abies sachalinensis* var. *mayriana* Miyabe & Kudo, the only other recorded infraspecific relative is *Abies sachalinensis* var. *nemorensis* Mayr, which has smaller cones than the species and hidden bracts; it does not grow in the Arnold Arboretum.

Habit	Foliage		
Growing to 40 m	<i>Above</i>	Incomplete V, leaves pointing forward 30°	<i>Above</i>
Columnar	<i>Below</i>	Pectinate with occasional strays; leaves pointing forward 30°; rather closely set	<i>Below</i>
Dense foliage in the crown	Leaves	3–3.5 cm x 1.25–1.5 mm Flattened, linear Sides parallel the whole length of the leaf Tip blunt, with tiny notch Curved 1+ Margins entire Flexibility 3+	Shiny green No stomata (occasionally a few in the groove at the tip) Groove well defined No midrib <i>Below</i> Dull white Stomata very small and numerous in narrow bands Margins not revolute Not keeled Resin canals median and conspicuously large
Bark			
Gray	Cones	7 x 2 cm Between ellipsoid and cylindrical Coffee-colored	
Pebbly, otherwise smooth, even in older trees, but in them finally becoming scaly	Branchlet	Bracts exserted	
Bud			
Conical, with a domed tip			
Resinous 4+			
Scales prominently bulging, but tips not spreading			
Conspicuously white			
Branchlet			
Gray-brown			
Furrowed gently longitudinally			
Hairy 3+			

Similar Species

- *Abies nephrolepis* and *Abies sibirica* (which have thin, flexible, regularly arranged leaves) are the species that most resemble *Abies sachalinensis* (see *Abies sibirica* for discussion)

Abies sibirica Ledebour: SIBERIAN FIR

The range of *Abies sibirica* lies between 40° and 140° East longitude, from Moscow almost to the Sea of Okhotsk, the most extensive in the genus *Abies*. Because of its great resemblance to its neighboring species, *Abies sachalinensis*, a systematic descrip-

tion of *Abies sibirica* will not be made below, but only its differences from *Abies sachalinensis* mentioned. It is hardy to Zone II.

The Arnold Arboretum grows one specimen, now 40 years old, that is 12 m tall and 30 cm in diameter.

Similar Species

- *Abies sachalinensis*: branchlets ribbed (not ribbed in *Abies sibirica*), stomata below dull white (white in *Abies sibirica*), cone bracts exserted (hidden or only slightly exserted in *Abies sibirica*). See the table, below.

Notes on Three Similar Species of *Abies*

Three members of the genus *Abies*, neighbors in eastern Asia, *Abies nephrolepis*, *Abies sachalinensis*, and *Abies sibirica*, are strikingly similar. All three have resinous buds; hairy branchlets; narrow, flexible, linear leaves with parallel sides; and large, median resin canals. The following table lists some features—unfortunately not always constant—that help to distinguish them.

Character	<i>Abies nephrolepis</i>	<i>Abies sachalinensis</i>	<i>Abies sibirica</i>
Bark on mature trees	Rough	Rough	Smooth
Branchlet ribbed	No	Yes	No
Stomata on upper side of leaf	No	No	Yes
Color of leaf stomata	Dull white	Dull white	White

Abies veitchii Lindley: VEITCH'S FIR

A rather small fir whose native range extends from central Japan southwards in detached populations, *Abies veitchii* was introduced to cultivation in the West by John Gould Veitch (1839–70), the illustrious English botanist and nurseryman. Veitch made two extensive collecting trips to the Far East, one in 1860 and one in 1864–66. He died in 1870 at the age of 31, leaving his name attached to hundreds of plants, and a legacy of plant collecting that has been carried on in his name for 100 years. It was under the Veitch firm that Ernest Wilson got his start.

Abies veitchii is subalpine and seldom seen below 1,500 m. It is hardy in Zones III–VI.

Habit Slender, with short, level branches when young Cylindrical, with a spirelike crown; in maturity, branches more wide-spreading, forming a broadly pyramidal tree	Branchlet Gray-yellow Covered with short hairs Surface regular Unribbed	Above Shiny green No stomata Groove shallow No midrib Below Stomata chalky blue-white Margins revolute 1+ Midrib and marginal green bands thin Resin canals median to submarginal
Bark Gray, becoming only slightly roughened in old age Smooth, with resin blisters	Foliage <i>Above</i> V occasionally incomplete Leaves pointing forward 45° from branchlet <i>Below</i> Pectinate Leaves pointing forward 45° from branchlet	Cones 6 x 2 cm Cylindrical Sessile Purple, turning dark brown Bracts slightly exserted
Bud 4 mm Spherico-conical Red-brown Resinous	Leaves 2–3 cm x 2 mm Flattened, linear Sides parallel Tip truncated, notched Not curved Margins entire Flexibility 3–4+	

Similar Species

- *Abies nephrolepis*, *Abies sachalinensis*, and *Abies sibirica*: leaves also parallel-sided, flexible; resin canals median; branchlets hairy; and buds resinous, but the whiteness of the undersides of their leaves far less bright
- *Abies delavayi* group: undersides of leaves also white, but branchlets conspicuously red-brown and midrib and marginal green bands of leaves very prominent; leaves stiffer

and resin canals marginal; undersides of leaves tending to be revolute.

•*Abies koreana*: undersides of leaves bright white, but leaves radially arranged and conspicuously shorter than those of *Abies veitchii*; cone bracts prominently exserted and reflexed.

Glossary of Terms

Adaxial. Facing toward the axis.

Diœcious. Having staminate and pistillate elements on separate plants.

Emarginate. With a shallow notch at the apex (as of a leaf).

Entire. Margin continuous, not broken by divisions, teeth, or serrations.

Exserted. Projecting beyond an encircling organ or part.

Glabrous. Smooth; free of roughness or hairs.

Hypoderm. In a leaf, the layer of thick-walled cells between the epiderm and the mesophyll.

Glairy. Having the appearance of white-of-egg. (Said of resin.)

Infraspecific. Of taxonomic rank lower than a species. For convenience, the rank of cultivar is included here, although strictly it is inaccurate to do so.

Keeled. Having an under surface longitudinally ridged like the bottom of a boat.

Lenticel. Roughened area on a plant's surface that allows exchange of gasses between the atmosphere and the internal structure of the plant.

Linear. Long and narrow. In the case of a conifer leaf, the term infers that the leaf's sides are parallel.

Midrib, siderib. Narrow, green, longitudinal bands on the under surface of a leaf, framing the bands of stomata. If the midrib is raised, the leaf is "keeled."

Monœcious. Having staminate and pistillate elements on the same plant.

Pectinate. An arrangement, usually of leaves, in which parts relate to each other in a comblike fashion. Most *Abies* leaves spread in two lateral ranks, creating a "V" between them that can vary from wide to incomplete or nearly absent.

Resin canal or resin duct. An intercellular space lined with resin-secreting cells.

Revolute. Rolled backward or downward, as the edge of a leaf.

Sessile. Attached immediately at the base, with no intervening stalk or pedicel.

Sterigama. A peg-shaped projection from the surface of a stem or of a branchlet to which a leaf is attached.

Stoma (plural, stomata). The pore in a leaf, usually on its lower surface, appearing as a whitish or grayish dot, and arranged in rows.

Umbilicate. Depressed or indented like a navel.

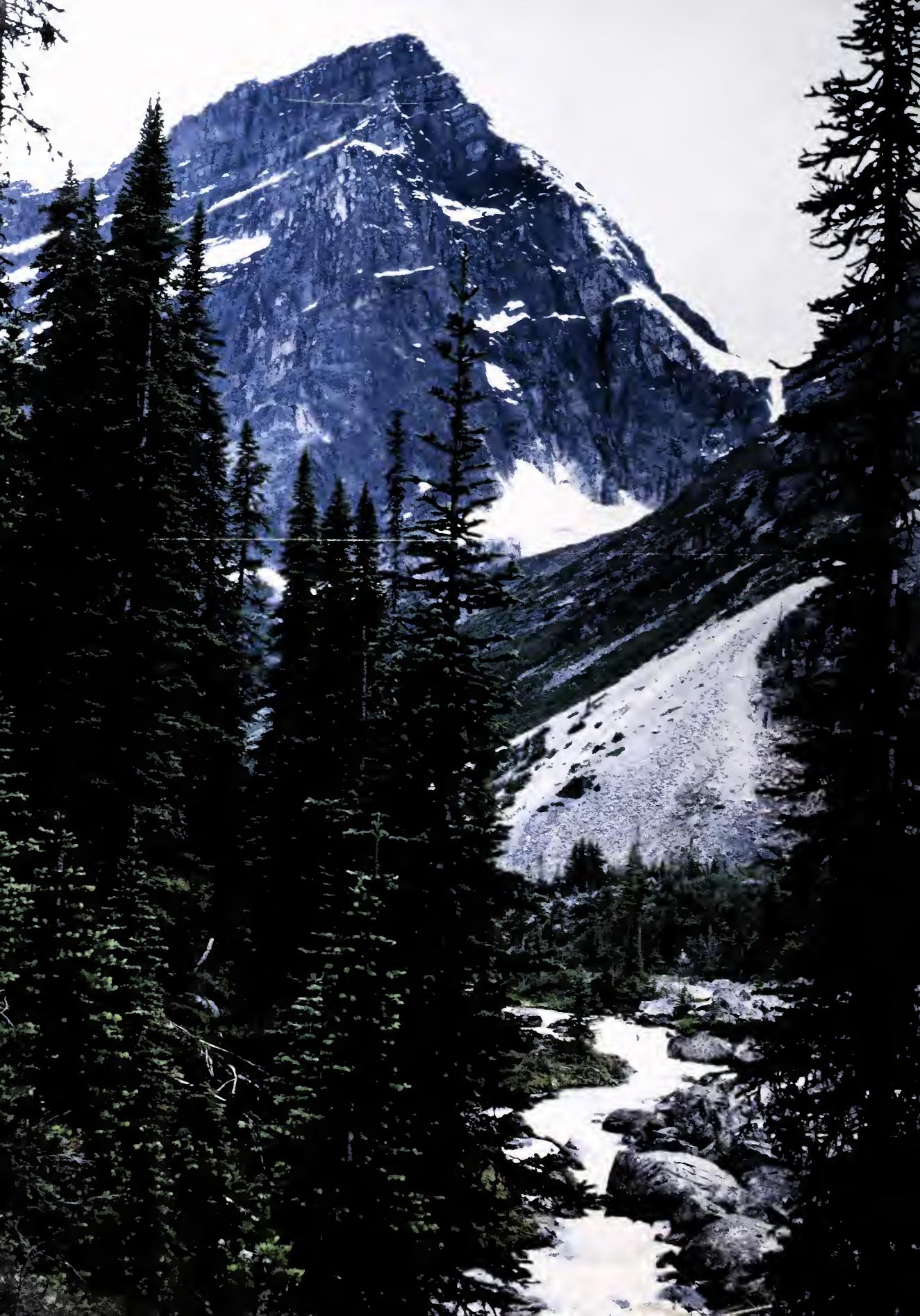


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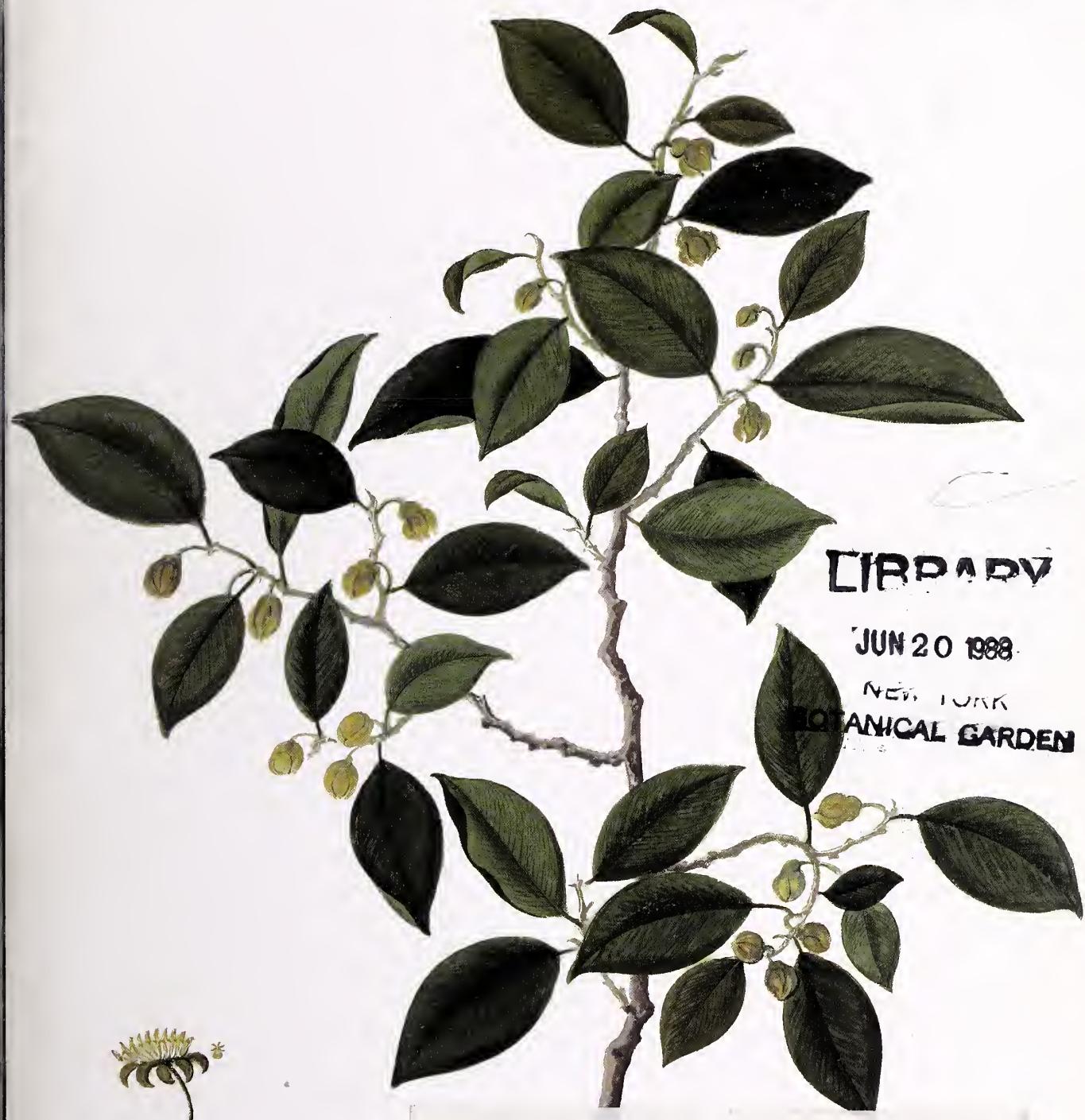




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Front cover:—Painting of *Aquilaria sinensis* (Loureiro) Gilg, a rare Chinese shrub. (See pages 2 through 8.)
☞ **Inside front cover:**—Portrait of Chen Huanyong (1890-1971) as a young man. From *The Index*, the junior annual of the Massachusetts Agricultural College, for 1913. Used through the courtesy of the Archives of the University of Massachusetts at Amherst. (See page 9.)
☞ **This page:**—The Chinese characters for the name Chen Huanyong. Courtesy of Sidney L. Tai, Harvard-Yenching Library. (See page 9.)
☞ **Inside back cover:**—“Nine Dragon Pine,” a famous lacebark pine (*Pinus bungeana*) of the Chieh Tai Ssu Temple in the Western Hills, located forty miles west of Beijing. Said to have been planted nine hundred years ago, the tree is called the “Nine Dragon Pine” in reference to its nine main trunks. (See page 32.)
☞ **Back cover:**—Various structures of *Pinus bungeana*, the lacebark pine (1: section of a leaf; 2, stamen; 3 and 4, female bract with scale; 5, cone; 6 and 7, female bract with scale, in fruiting stage; 8, seed). From *Curtis's Botanical Magazine*, 1909. (See page 32.)

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The Vulnerable and Endangered Plants of Xishuangbanna Prefecture, Yunnan Province, China

Zou Shou-qing

Efforts are now being taken to preserve endangered species in the rich tropical flora of China's "Kingdom of Plants and Animals"

Xishuangbanna Prefecture is a tropical area of China situated in southernmost Yunnan Province, on the border with Laos and Burma. Lying between 21°00' and 21°30' North Latitude and 99°55' and 101°15' East Longitude, the prefecture occupies 19,220 square kilometers of territory. It attracts Chinese and non-Chinese botanists alike and is known popularly as the "Kingdom of Plants and Animals." The Langchan River passes through its middle.

Xishuangbanna is very hilly, about 95 percent of its terrain being hills and low, undulating mountains that reach 500 to 1,500 meters in elevation. The highest peak is 2,400 meters in elevation. High mountains in the north, including the Wuliang and Ailao Mountains, block the cold air from the north and trap warm, humid air from the Indian Ocean, creating a hot, humid, windless tropical climate. The mean annual temperature is 18 C to 22 C, and, depending upon elevation and topography, 1,000 millimeters to 2,200 millimeters of precipitation fall annually; as a result, tropical forest and other tropical vegetation flourish on hillsides and in valleys. A great diversity of vegetation types—including tropical rain forest, seasonal rain forest, montane rain forest, and evergreen

broadleaf forest—occurs in Xishuangbanna. Coniferous forest develops above 1,200 meters. In addition, Xishuangbanna lies at the transitional zone between the floras of Malaia, Indo-Himalaya, and South China and therefore boasts a great number of plant species. So far, about 4,000 species of vascular plants have been identified. This means that Xishuangbanna, an area occupying only 0.22 percent of China, supports about 12 percent of the species in China's flora. The species belong to 1,471 genera in 264 families and include 262 species of ferns in 94 genera and 47 families, 25 species of gymnosperms in 12 genera and 9 families, and 3,700 species of angiosperms in 1,365 genera and 208 families.

The tropical features of Xishuangbanna's flora are quite distinct. Such tropical families as the Dipterocarpaceae, Myristicaceae, Tetramelaceae, Anonaceae, and Dillenaceae, and such genera as *Ficus*, *Artocarpus*, *Antiaris*, *Dysoxylum*, and *Aphanamixis* are represented. About 60 percent of the species in Xishuangbanna's flora also occur in Vietnam, Laos, Burma, and India. During the past two centuries, many species from the Indo-chinese peninsula and other tropical regions have been successfully introduced into Xishuangbanna. Among them have been *Cassia siamea*, *Mesua ferrea*, *Crinum asiaticum*, *Cananga odorata*, and *Bixa orellana*.

There are many endemic species in Xishuangbanna's flora, such as *Manglietia wangii*, *Polyalthia cheliensis*, *Phœbe puwen-*

Cycas pectinata Griffith, a rare and vulnerable species. It is a spectacular ornamental plant, and its fruit and stem are used in medicine by the Dai minority of China. Photographs by the author.

sis, and *Horsfieldia tetrapala*; a number of relict species, such as *Cycas pectinata*, *Podocarpus wallichii*, *Magnolia henryi*, and *Sladenia celastrifolia*; and many rare species, such as *Manglietia fordiana*, *Michelia hedysperma*, *Paramichelia baillonii*, and *Pseudoduvoria indochinensis*. According to data collected by Li Yanhui, 153 endemic species, 31 relict species, and 133 rare species grow in Xishuangbanna; of them, 110 are endangered or vulnerable (see the list on pages 6 and 7).

Twenty-eight wild types of cultivated plant species and their relatives occur in Xishuangbanna's flora, among them *Oryza minuta*, *Camellia sinensis* var. *assamica*, *Coix lacryma-jobi*, *Citrus grandis*, and *Momordica subangulata*. Some may prove to have significant value in genetic research and breeding.

More than 1,000 species in Xishuangbanna's flora are economically important. About 500 of them are medicinal plants that are used locally or in traditional Chinese medicine; among these are *Amomum villosum*, *Taraktogenos merrillana*, *Cissampelos parairae* var. *hirsuta*, and *Homalomena occulta*. *Rauvolfia yunnanensis* has become an important source of reserpine, and *Maytenus hookeri* is alleged to have anti-cancer properties.

More than 100 species of tree in Xishuangbanna's flora grow fast or produce high-quality timbers, the best example being *Dalbergia fusca* var. *enneandra*, which has purple-black heartwood. Its wood is very hard, heavy, and tough and so is used as a substitute for rosewood. The fast-growing species *Anthocephalus chinensis* is another example. It is the most productive timber tree in tropical tree plantations. *Toona ciliata*, *Paramichelia baillonii*, *Gmelina arborea*, *Altingia excelsa*, *Chukrassia tabularia* var. *velutina*, and *Dysoxylum bineceæfolium* are all valuable hardwood timber trees that are used in industry and construction.

Xishuangbanna's flora contains more than 100 oil-bearing species. *Horsfieldia tetrapala*, *Jatropha cureas*, *Hodgsonia macro-*

carpa, *Ostodes katharinæ*, and *Pyrularia edulis*, for example, are important sources of food oil or industrial oil. Ten species—*Calamus flagellum*, *Calamus palustris*, *Calamus nambariensis*, etc.—yield rattan. Many species are aromatic, tanning, or resin and gum plants, among them *Elsholtzia blanda*, *Cinnamomum mollifolium*, *Phyllanthus emblica*, and *Sterculia villosa*.

During the past 20 years, many forests in Xishuangbanna were ruined. More than 13,000 hectares of forest were cut each year as a result of shifting cultivation, conversion to rubber plantations, and demands for timber and fuel by local people. Recently, the forest cover of Xishuangbanna has declined sharply, from about 60 percent to 33 percent. Many hillsides that once were covered with rain forests are now grassland of cogongrass and low shrub. Along with the destruction of tropical forests, obviously, many plant and animal species have been threatened. It is estimated that one species is lost for every 700 hectares of tropical forest ruined. If this is so, then more than 800 species of plant have been lost or are in danger of being lost. If remedial measures are not taken today, many species with valuable properties will be lost. This would be a big mistake, one that our descendants would be unlikely to forgive.

The first volume of the *Plant Red Data Book for China*, recently issued by the Academia Sinica (the Chinese Academy of Science), lists 389 endangered species of Chinese plants. The Book gives their morphological features, distributions, and statuses and describes methods for their conservation. Fifty-four of the species it lists are native to Xishuangbanna.

The Chinese government devotes more attention to nature conservation now than it once did. For example, 310 nature reserves, with a total area of 167,000 square kilometers, have been established throughout the country, and the funding of nature-conservation programs has been increased. In Xishuangbanna Prefecture, some 600,000 hectares of tropical forest survive. To protect re-

maining ecosystems and species, 200,000 hectares of land (about one tenth the prefecture's area) have been set aside as reserves, including the Mengyang, Mengla, Menglun, Menghai, and Dashujiao reserves, and a team of 150 forest guards has been organized. The guards patrol forests, prevent

forest fires, stop hunting and timbering within nature reserves, and deal with criminal cases of vandalism.

The Yunnan Institute of Tropical Botany, Academia Sinica—formerly the Botanical Garden of Xishuangbanna—is located in the prefecture. It is has become an active center



Caryota urens Linnæus, the wine (or sago) palm, is an endangered species in China. The Dai minority use the tasty starch in the middle of the trunk for food.

for the study and conservation of tropical plants. More than 2,500 local and otherwise tropical plant species, including dozens of endangered species, have been introduced and cultivated there.

Xishuangbanna is a treasure house of natural resources. Its flora, one of the richest in

China or for that matter in the world, contains many rare, endemic, and economically valuable species. A veritable treasury for our well-being, it has suffered seriously in the past. We must now work hard to prevent further losses to it.

Vulnerable and endangered members of Xishuangbanna's flora

(The symbols indicate that a species is vulnerable (*) or endangered (‡); species listed as endangered in the *Plant Red Data Book for China* are printed in boldface type.

Relict species

- * *Alsophila spinulosa* (Wallich ex Hooker) Tryon
- * *Cycas pectinata* Griffith
- * *Anchangiopteris henryi* Christ & Giesenhangen
- * *Cycas siamensis* Miquel
- * *Podocarpus imbricata* Blume
- ‡ *Podocarpus wallichii* Presl
- ‡ *Podocarpus fleuryi* Hickel
- * *Podocarpus neriifolia* Wight
- ‡ *Cephalotaxus oliveri* Masters
- Magnolia henryi* Dunn
- * *Sladenia celastrifolia* Kurz
- * *Cenocentrum tonkinense* Gagnepain
- ‡ *Borthwickia trifoliata* W. W. Smith
- * *Silvianthus bracteata* Hooker filis
- * *Pittosporopsis kerrii* Craib
- * *Cephalostigma hookeri* C. B. Clarke
- * *Campanumœa parviflora* (Wallich) Bentham
- ‡ *Zippelia begoniæfolia* Blume

Endemic species

- * *Manglietia wangii* Hu
- * *Manglietia microgyna* Liou
- ‡ *Magnolia delavayi* Franchet var. *albivillosa* Liou
- ‡ *Cyathocalyx yunnanensis* Y. H. Li & P. T. Li
- ‡ *Cyathostemma yunnanensis* Hu
- * *Desmos yunnanensis* (Hu) P. T. Li
- ‡ *Coniothalamus chinensis* Hu
- ‡ *Cinnamomum austroyunnanensis* H. W. Li

- * *Cinnamomum mollifolium* H. W. Li
- ‡ *Litsea dilleniæfolia* P. Y. Bai & P. H. Huang
- ‡ *Neolitsea menglaensis* Yang & P. H. Huang
- * *Horsfieldia pandurifolia* Hu
- ‡ *Horsfieldia tetratepala* C. Y. Wu
- * *Myristica yunnanensis* Y. H. Li
- ‡ *Anemone filisecta* Wu & Wang
- ‡ *Capparis foehiensis* B. S. Sun
- ‡ *Xanthophyllum yunnanensis* C. Y. Wu
- * *Helicopiosis lobata* (Merrill) Slaum var. *microcarpa* C. Y. Wu & T. Z. Hsu
- Helicopiosis terminalis* (Kurz) Sleumer
- Homalium laoticum* Gagn. var. *glabretum* C. Y. Wu
- * *Parashorea chinensis* Wang Hsie
- ‡ *Pellacalyx yunnanensis* Hu
- ‡ *Camellia taheishangensis* F. S. Zhang
- ‡ *Garcinia lancilimba* C. Y. Wu ex Y. H. Li
- ‡ *Garcinia xishuangbannaensis* Y. H. Li
- ‡ *Ochrocarpus yunnanensis* H. L. Li
- ‡ *Grewia falcata* C. Y. Wu
- ‡ *Sloanea cheliensis* Hu
- ‡ *Pterospermum yunnanensis* Hsue
- ‡ *Pterospermum mengluensis* Hsue
- * *Ostodes kuangii* Y. T. Chang
- * *Sauropolis coriaceus* C. Y. Wu
- * *Lithocarpus yiwuensis* Huang & Y. T. Chang
- * *Maytenus diversicymosa* S. J. Pei & Y. H. Li
- * *Maytenus pseudoracemosa* S. J. Pei & Y. H. Li
- ‡ *Maytenus inflata* S. J. Pei & Y. H. Li
- ‡ *Maytenus pachycarpa* S. J. Pei & Y. H. Li

- * *Protium yunnanensis* (Hu) Kalkm.
- * *Amoora calcicola* C. Y. Wu & H. Li
- * *Walsura yunnanensis* C. Y. Wu
- * *Buchanania yunnanensis* C. Y. Wu
- * *Mastixia caudatilimba* C. Y. Wu
- * *Nyssa sinensis* Oliv. var. *oblongifolia* Fang & Soong
Nyssa yunnanensis W. C. Yin
- * *Diospyros atrotricha* H. W. Li
- * *Marsdenia incisa* P. T. Li & Y. H. Li
- * *Kopsia officinalis* Tsiang & P. T. Li
- * *Radermachera microcolyx* C. Y. Wu & W. C. Yin
- * *Callicarpa yunnanensis* W. Z. Fang
- * *Salvia fragarioides* C. Y. Wu
- * *Arisaema austroyunnanensis* H. Li
- * *Achasma yunnanensis* T. L. Wu & Senjen

Rare species- * *Manglietia fordiana* Oliver
- * *Michelia hedyosperma* Law
- * *Mitrephora wangii* Hu
- * *Litsea magnolifolia* Yang & P. H. Huang
Litsea pierrei Lecomte var. *szemaois* Liou
- * *Machilus rufipes* H. W. Li
- * *Knema cinerea* Warburg var. *glaucia* Y. H. Li
- * *Horsfieldia kingii* (Hooker fils) Warburg
Fleutharrhane macrocarpa (Diels) Formanék
- * *Piper pubicatum* C. de Candolle
- * *Argemone mexicana* Linnaeus
- * *Lagerstroemia intermedia* Koehne
- * *Crypteronia paniculata* Blume
- * *Cochlospermum vitifolium* Sprengel
- * *Aquilaria sinensis* (Loureiro) Gilg
- * *Zanonia indica* Linnaeus
Tetrameles nudiflora R. Brown
Terminalia myriocarpa Heurck & Müller
Argoviensis
Anogeissus acuminata (Roxburgh ex de Candolle) Guillaumin var. *lanceolata* Wallich ex Clarke
- * *Quisqualis caudata* Craib
- * *Combretum olivæforme* Chao
Carallia lancefolia Roxburgh
- * *Calophyllum polyanthum* Wallich ex Choisy
Mesua nagassarium (Burman fils) Kostermans
- * *Colona sinica* Hu
- * *Sloanea tomentosa* (Bentham) Rehder & Wilson
- * *Pterygota alata* (Roxburgh) R. Brown
- * *Vatica xishuangbannaensis* G. D. Tao & J. H. Zhang
- * *Pterospermum acerifolium* Willdenow
- * *Bombax insignis* Wallich

- * *Hibiscus austroyunnanensis* C. Y. Wu & K. M. Feng
- * *Erythroxylum kunthianum* (Wallich) Kurz
Ixonanthes cochinchinensis Pierre
- * *Chætocarpus castanocarpus* Thwaites
Dalbergia fusca Pierre
- * *Whitfordiodendron filipes* (S. T. Dunn) S. T. Dunn
- * *Distilopsis yunnanensis* (H. T. Chang) C. Y. Wu
- * *Cyclobalanopsis rex* (Hemsley) Schott
- * *Trigonobalanus doichangensis* (A. Camus) Formanék
- * *Celtis wightii* Planchon
- * *Antiaris toxicaria* (Persoon) Leschenault
Artocarpus lakochha Roxburgh
Laportea urentissima Gagnepain
Poikilospermum suaveoleens (Blume) Merrill
- * *Maytenus hookeri* Loesener
- * *Garuga pierrei* Guillaumin
Toona ciliata Roemer
- * *Toona microcarpa* (de Candolle) Harms
Xerospermum bonii (Lecomte) Radlkofler
Pometia tomentosa (Blume) Teysmann & Binendijk
- * *Nyctocalos shanica* MacGregor & W. W. Smith
Gmelina arborea Roxburgh
- * *Homalomena gigantea* Engler
- * *Tacca chantrieri* André
- * *Caryota urens* Linnaeus

Wild types of cultivated plants

- * *Oryza meyeriana* (Zollinger & Moritz) Baillon var. *granulata* Tataoka
- * *Oryza minuta* J. Presl
- * *Camellia sinensis* (Linnaeus) O. Kuntze var. *assamica* (Masters) Kitamura
- * *Litchi chinensis* Sonnerat
- * *Citrus grandis* Osbeck
- * *Mangifera sylvatica* Roxburgh
- * *Cucumis hystrich* Chakrav.
Panax zingiberensis C. Y. Wu & Feng ex C. Chow
- * *Hovenia acerba* Lindley var. *kiukiangensis* (Cheng & Hu) C. Y. Yu

Zou Shou-qing, a research associate at the Yunnan Institute of Tropical Botany, Academia Sinica, was exchange visiting scholar at the Arnold Arboretum of Harvard University in 1986. He received a B. A. degree in forestry in 1965 from the Nanjing Institute of Forestry.

More about the front cover

The illustration on the front cover of this issue of Arnoldia is part of a painting done in China nearly a century and a half ago by a Chinese artist working for the American merchant, Warren Delano (1809–1898), of Boston. Given in 1930 to the Arnold Arboretum by Delano's son, Frederic Adrian Delano, the painting is one of more than six hundred that the elder Delano commissioned during his two decades or more of residence in China. It depicts a rare Chinese shrub, Aquilaria sinensis (Loureiro) Gilg. The first excerpt printed below describes the paintings and gives details about Delano's gift to the Arboretum. The collection is far from unique, however, as the second excerpt attests.

Mr Frederic A. Delano has presented to the Library the most unique gift of recent years, to serve as a memorial to his father Warren Delano, 1809–1898, with the purpose of making it "of real value to students."

It consists of six hundred and eleven paintings of Chinese fruits, flowers and vegetables, natural size, beautifully executed by native artists on sheets 15" x 19". Some of them are well-known plants that have been introduced into this country such as the Rose, Peony, Chrysanthemum, Camellia, etc., but many of them are very rare. In his presentation letter Mr. Delano writes, "My father, Warren Delano, was one of the early Boston merchants engaged in the China trade—and went there in 1835. He lived in China for more than 20 years, between 1835 and 1866, chiefly in Canton, Macao and Hong Kong connected with the house of Russell & Co. During his stay he endeavored to learn about the products of the country and in the 40's he collected and had drawn by Chinese artists over 500 paintings of the 200 or more fruits, flowers and vegetables."

These paintings are replete with interest, botanical, artistic, and historical. They were apparently done by various artists with varying degrees of skill over a period of years. The paper on which they were painted is evidently of English manufacture, the earliest water-marks being "I. Taylor 1794" and "E. & P. 1794", and the latest "Ruse & Turners 1832." Between these are various other dates, many of which bear the name of J. Whatman, and in 1828, "J. Whatman, Turkey Mill" with design resembling a coat-of-arms.

The paintings are exquisitely drawn, in beautiful colors marvelously preserved, with details of

fruit and flower, some bearing both on the same plant. Occasionally two plants are figured on the same sheet.

—*Journal of the Arnold Arboretum*, Volume 11, Number 2 (April 1930), pages 131 and 132.

The Horticultural Soc[iet]y. of London is indebted to J[ohn] Reeves for a fine collection of coloured drawings of Chinese plants, executed in his own house under his superintendence by Chinese draughtsmen. Such drawings first brought us to a knowledge of the *Chinese Prime rose...*, *Dendrobium nobile*, many of the finest *Camellias*, Chrysanthemums, *Azaleas*, *Moutans*, and above all of the *Glycine (Wistaria) chinensis*, which plants were subsequently introduced into English gardens. In this way was formed that collection of authentic drawings of Chinese plants, by far the most extensive in Europe, which now forms part of the library of the Horticultural Society.

A similar collection is now in the British Museum. Mr. Carruthers, Report Bot. Dep. Brit. Mus. for 1877, states that 654 Chinese drawings of plants, executed under the superintendence of the late John Reeves, were presented by Miss Reeves (his daughter or perhaps grand daughter).

—*History of European Botanical Discoveries in China*, by Emil Bretschneider, Volume 1, pages 257 and 258.

Transplanting Botany to China: The Cross-Cultural Experience of Chen Huanyong

William J. Haas

After studying at the Arnold Arboretum, a Chinese student returns to his homeland, becoming a leader in botanical work

Chen Huanyong (Woon-Young Chun)¹ came to Boston in the autumn of 1915 to study at the Arnold Arboretum, Harvard University's museum of living trees. The arboretum, located on a 265-acre site in Jamaica Plain, Massachusetts, about five miles from the center of Boston, was set up in 1872 with funding from the trust created by the legacy of New Bedford merchant James Arnold. A condition of the gift was that the university "establish and support an Arboretum . . . which shall contain as far as is practicable, all the trees . . . either indigenous or exotic, which can be raised in the open air. . . ."² Trees from Asia were heavily represented at the arboretum, and trees of Chinese origin thrived there. The new Chinese student flourished at the arboretum also. Freshly graduated from the New York State School of Forestry at Syracuse University, Chen had already spent five years in the United States since leaving his native Shanghai. Now he would spend four more years in the United States, doing graduate work among the trees at the arboretum.

By the time Chen arrived in 1915, Charles Sprague Sargent (1841–1927), director of the arboretum from 1873 until his death, had established the Arnold Arboretum as a center for the study of Chinese trees. Sargent's interest in East Asian species was inspired by Asa Gray's observation that the floras of east-

ern Asia and northeastern North America were closely related. This significantly implied that the species of one region might grow well in the other. While Gray's work provided theoretical underpinning for Sargent's horticultural interest in East Asia, it was the flourishing of seeds sent to Sargent by Emil Bretschneider (1833–1901), a Russian physician in Beijing, which gave Sargent the practical demonstration that plants collected in China would be viable in America.³

Sargent began slowly to collect Chinese species; he acquired specimens through European institutions and through a trip of his own to China. In 1907 he hired Ernest H. Wilson (1876–1930) from the British horticultural firm Veitch & Sons, to collect for the arboretum in western China. These fabulous collections from western China made him and the arboretum world-famous. Later, Sargent obtained the services of the collector and ethnologist Joseph F. C. Rock (1884–1962).⁴ The arboretum's collections of plants from China increased rapidly.⁵ But it was not just acquisition of Chinese collections that made the arboretum an important center. The study of these collections, especially by Alfred Rehder (1863–1949), assistant at and later curator of the arboretum's herbarium, also contributed to knowledge of the flora of China.

Just as Americans had to travel to European

herbaria to study American plants, Chinese had to come to American and European institutions to study Chinese plants. Unless they used the research collections in Western herbaria, Chinese botanists would have had to begin work on the flora of their country from scratch. The arboretum had the strongest collections of Chinese trees in the world. Chen came to Harvard specifically to use that material, explaining that "it would take me a lifetime of travel to study what I can find out here about Chinese trees in a few years."⁶

Education in the United States, 1909–1919

It was Marion Case of Weston, Massachusetts, who first alerted Chen to the importance of the Arnold Arboretum. In 1909, Case, daughter of a Providence, Rhode Island, merchant, used land she had inherited to start a small institution in Weston for experimentation in farming and education. Known as Hillcrest Gardens, it is now the Case Estates of the Arnold Arboretum. Chen had come from Shanghai to the United States in 1909 and enrolled in courses in forestry and entomology at the Massachusetts Agricultural College in Amherst. In 1910, Case hired him as her summer assistant. For five summers between 1910 and 1919, Chen helped Case manage and teach the young boys employed at Hillcrest. The boys liked Chen because, in her view, the "quiet courteous ways he had inherited from his Spanish mother appealed to them."⁷

Chen's success in the Hillcrest job may have been as much due to his father's influence as to his mother's. Chen's parents probably met while his father was in Cuba as a diplomatic representative of the Qing court. The couple had fourteen children; Chen, the thirteenth, was born in Hong Kong in 1890. Some time later, the family moved to Shanghai, where Chen's father taught English at the Thomas Hanbury School, a boys' school named after the British businessman who financed it. Chen's summer work at Hillcrest was similar to what his father did towards the end of his career.⁸

Arnold Arboretum botanists like John G. Jack (1896–1935), an assistant professor of dendrology (the study of trees) made Hillcrest a center for diffusing horticultural knowledge by giving lectures there during the summer. It was probably on these occasions that Jack developed a friendship with his future protégé, Chen.⁹ The friendship must have been heightened by mutual interest in China's flora; Jack had gone to China in 1905 at his own expense to collect specimens for the Arnold Arboretum.¹⁰

Chen's commitment to forestry as a career deepened after his first summer at Hillcrest. Chinese students with an ardent desire to strengthen their country often claimed that the subject they studied was the one most crucial to China's future. In the January 1911 issue of the *Chinese Students' Monthly*, the organ of the Chinese Students' Alliance, Chen explained why "Forestry in China" was important. He vividly described the cancer of deforestation, a scourge which contributed to flood, famine, and unfavorable climate. China was once an Eden of luxuriant forests and crystal streams, but indiscriminate removal of trees had laid bare entire provinces. Fertile topsoil had been washed from hillsides and carried to the sea. Chen called for education as the antidote to "the poison of popular ignorance." Schools should be established to train men for a forest service. Using the advantages of Western science, a government bureau cooperating with the people could succeed in reforestation. Chinese students should arouse national interest in a movement for reforestation.¹¹

It was an exciting time for Chinese students everywhere. In October 1911, the Xinhai revolution overthrew the Qing dynasty; by 1912 there was a new Chinese republic. Chen's ambition in forestry required more specialized training. In 1912 he transferred from the Massachusetts Agricultural College to the New York State School of Forestry at Syracuse University. The school had excellent facilities, including a forestry summer camp in the Catskill Mountains, which Chen

attended in 1914.¹²

While completing his undergraduate training at Syracuse, Chen became active in the Chinese Students' Alliance, which had chapters throughout the United States. Chen was a delegate to the alliance's ninth annual conference, held at Cornell University in Ithaca during the last week of August 1913. Delegates participated in vocational conferences, athletics, literary events, entertainments, a banquet, a picnic, and elections; Chen was elected to the *Chinese Students' Monthly*'s English Editorial Board. Delegates also demonstrated their concern with China's international relations. There was anxiety in China because the "consortium," an international banking syndicate, was forcing loans on China and monopolizing its loan business. In 1910, the consortium was a four-power affair, Britain, France, Germany, and the United States; in 1912, six-power: Japan and Russia were added. At Ithaca, students' alliance delegates staged a mock parliament, a scaled-down version of the Chinese house of representatives in session. The main business was an impeachment hearing for the premier because he had concluded the "Five Power loan."¹³

Over the next year Chen revealed growing distress over the vagaries of cross-cultural experience and contact. He wrote two short stories on this theme for the *Chinese Students' Monthly*. The fictional "East Is East and West Is West" was most likely autobiographical. A young Shanghai man embarks on a voyage to study in the United States, leaving behind his fiancée, Miss Mei, "beautiful, not in the striking beauty of the American girl, but in that serene and saintly loveliness so characteristic of the girls of the East." Attending a small New England college, the young man adopts Western styles and habits. He meets a Chinese woman, a graduate of Wellesley College more suited to his newly Americanized tastes. He marries her and does not return to China. Back in China, Miss Mei's faith and hope are crushed by the desertion. She goes to live in a nunnery, its silence

"unbroken save by the murmur of low-droning prayers and the tinkles of temple bells."¹⁴

In "Bitter Strength"—a translation of the word coolie [*kuli*]—Chen used fiction to cry out against Westerners' mistreatment of the Chinese. A rickshaw coolie in the British colony of Hong Kong spends a day striving to earn money for his family. By day's end, the weakened coolie has obtained just the amount he needs to bring home to his aged mother. A British infantryman demands to be taken to the barracks where he is late for his return. The coolie pleads exhaustion, but the half-drunk soldier tells him to "run like the devil or have his head broken." On the way, the coolie's muscles fail and he drops the cart. Cursing, the infantryman's "right hand shot out, and the dirk sank deeply into the helpless body." The coolie's corpse is disposed of in the waters off the bund.¹⁵

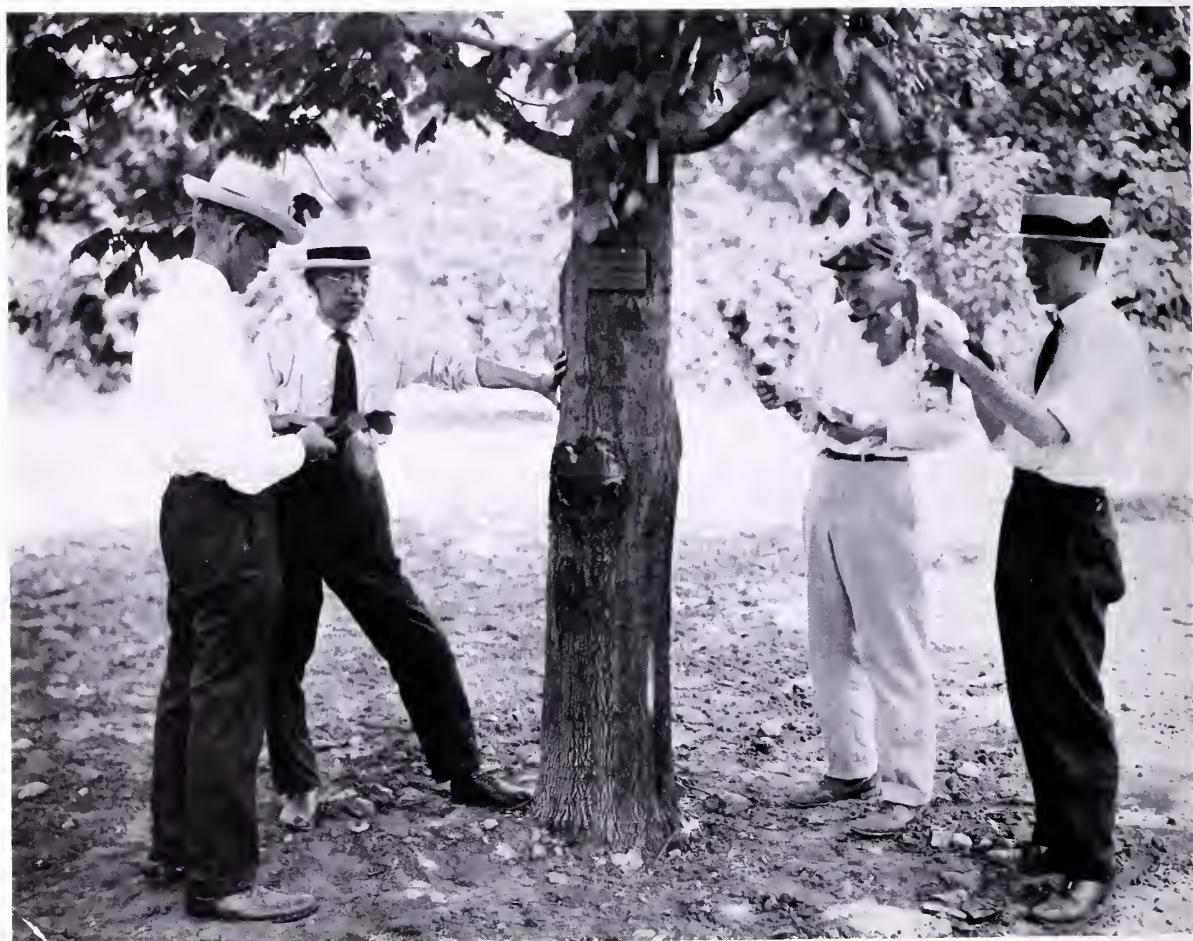
After graduating the forestry school at Syracuse in 1915, Chen enrolled at Harvard's Bussey Institution for Research in Applied Biology. Rather than become a forester, he was going to become a dendrologist. The Arnold Arboretum did not officially offer instruction, but students could arrange to take courses with John Jack and work at the arboretum by registering at the Bussey. That year, another Chinese student, Qian Songshu (S. S. Chien, 1883–1965), also registered at the Bussey to work with Jack. While studying at the arboretum, Qian published in the New England Botanical Club's journal, *Rhodora*. For this publication, Chen later celebrated him as "the first Chinese botanist to describe new species of plants."¹⁶ The following year, Chen and Qian were joined at the arboretum by yet another Chinese student, Zhong Xin-xuan (H. H. Chung).¹⁷ John Jack was good at teaching, and all his students adored him. He went out of his way to help them, often paying their wages for work at the arboretum out of his own pocket or arranging Harvard loans for them. He arranged a loan for Chen at the beginning of 1916.

Chen was more adventurous than most of the dozen or so Chinese pursuing graduate

studies in various Harvard departments. Unlike his compatriots, who resided in graduate dormitories or near school, Chen lived first on St. Botolph Street and later on Gainsborough Street, in an "artsy" section of Boston's Back Bay—only a stone's throw from the Massachusetts Horticultural Society, Symphony Hall, and the New England Conservatory of Music.¹⁸ During his third year in Boston, the *Boston Globe* interviewed the cosmopolitan Chen, the student who had come "From China to Boston to Study Chinese Trees." Chen explained his work at the

arboretum and put it in a larger context; Chinese had been coming to America to study for twenty-five years. At present there were 1,600 other Chinese studying in America, most intending their studies to be of direct benefit to China.¹⁹

During every semester of his four years at Harvard, Chen registered for John Jack's forestry courses. His studies went well and in the spring of his final year, 1919, he received one of Harvard's Sheldon Travelling Fellowships to collect plants in southern China. The day Chen graduated, Charles Sargent called



Professor John G. Jack (at left) and three of his Chinese students examining a black maple (*Acer saccharum* var. *nigrum*). The student on the right has been identified as Chen Huanyong. Taken in the Arnold Arboretum during the summer of 1917. Photograph from the Archives of the Arnold Arboretum.

the talented student into his office and gruffly advised him: "Chen, your botanical career is just commencing." Sargent told him to go home and familiarize himself with plants in the field; unexplored Hainan Island would be best. The Sheldon Fellowship would cover the work for a year.²⁰ Everything was set until the University bursar made an unusual demand: part of Chen's fellowship had to be turned over for immediate repayment of the Harvard loan that John Jack had arranged. Fortunately, the dean of the Bussey Institution, entomologist William Morton Wheeler, interceded on Chen's behalf. Wheeler was conducting his own world-wide taxonomic study of ants (this later included ants of China) and recognized the value of having Chen collect Chinese plants for the arboretum.²¹

Since Sargent wished to expand his program for acquiring Chinese specimens, he arranged to use Chinese students trained at the arboretum as collectors after they returned to China. Chen Huanyong was the first to return to China in this role. The plan was for Chen to leave for China in September, do fieldwork there for a year and then return to the States for a year to study and distribute the material he had collected. Sargent wanted Chen to devote all his energy to collecting woody plants and seeds, but Jack encouraged Chen to broaden his scope to include herbaceous plants and insects. The trip would be financed by Chen's fellowship, subscriptions for the collection of special material, and sale of specimens after Chen returned. John Jack touted the quality of the specimens Chen would make in an effort to get more financing. He asked Professor B. L. Robinson to purchase material from Chen's expedition for Harvard's Gray Herbarium.²²

Located off the South China coast opposite the province of Guangdong, Hainan Island was tropical and rough. Westerners had already published memoirs of explorations there. The first to traverse the island was the Reverend Benjamin Henry, a Presbyterian missionary from western Pennsylvania who

became founding president of Canton Christian College in 1893. Later renamed Lingnan University, the College was modeled on the Presbyterian-founded Protestant Syrian College, now known as the American University of Beirut. Henry visited Hainan in the 1880s and paid special attention to the aborigines; he found some young aborigine women "quite handsome in spite of the blue lines tattooed over their faces."²³

With "the foolhardiness of young manhood" and a handbook for explorers, Chen went to Hainan alone. Malaria was a constant threat, and after nine months with the aborigines, he was stricken. His fever reached 105 degrees, his body was covered with sores caused by leeches and malnutrition, and his left hand swelled "to the size and color of a boxing glove." He was carried out of central Hainan's Five Finger Mountains on a stretcher.

Chen recuperated in Nanjing and packed his collections of plants, insects, and reptiles for shipment to Boston. Disaster struck. The shipment burned in a fire at the Shanghai warehouse of the China Merchants Steamship Navigation Company. At least Chen still had the collections of Hainan material he retained in Nanjing. Some time later, a commissioner of the Chinese maritime customs offered Chen facilities for making collections in northwestern Hubei province. In 1922, Chen, Qian Songshu, Qin Renchang (R. C. Ching), and "old Yao," a retired collector who had assisted Augustine Henry, an Irish physician in the Imperial Chinese Customs Service, went to Hubei province and collected together. Chen and Qian's herbaceous specimens were sent to the Gray Herbarium; Chen's woody specimens, to the Arnold Arboretum. Chen considered this to be "partial atonement" for his "Hainan failure."²⁴

The Nanjing Years, 1920–1927

Chen began his teaching career in Nanjing in 1920. During the first decades of twentieth-century China two separate educational sys-

tems were in place, one run by Chinese, the other run by Christian missionaries. At the elementary and secondary level, Chinese and foreign schools were seldom concerned with each other, but at the college and university level, there was competition for faculty and funding. Competition was keenest in Beijing, Guangzhou, and Nanjing, cities having both Chinese and Christian universities. Chen's first teaching position was at the University of Nanking, a Protestant mission school administered by American officers in Nanjing and American trustees in New York City. The University inculcated its students with Christianity through required attendance at religious classes and chapel. Chinese faculty were integrated into the Christian program by having to lead the weekly Bible study class. When it was Chen's turn to preach, he chose "The Beauty of Forests and Poetry" for his topic. He enchanted the school's teachers and students without saying a word about the Bible. Chen's sophisticated protest probably coincided with protests from Chinese students against requirements for religious education. In any case, after Chen took his turn, weekly scholarly talks replaced the Bible-study class.²⁵

Chen was discontented at the University of Nanking: "I am Chinese; I don't like to work in a Christian school."²⁶ Before long, he switched over to the recently established and Chinese-run National Southeastern University, also in Nanjing. Its president, Guo Bingwen (P. W. Kuo), the first Chinese to get a Ph.D. from Columbia University's Teachers College, recruited professors from the best of the "returned students."²⁷ Although Southeastern's finances were shaky, its superb faculty and Chinese administration made it appealing to the most capable Chinese. Chen was not the only Chinese to cross over from the University of Nanking to Southeastern. The loss of top-flight faculty caused the University of Nanking administration to have hard feelings, feelings that were exacerbated as competition for funding also developed.

The sciences were strong at Southeastern,

especially biology. In 1922, this strength led the Science Society of China to establish its biological laboratory in Nanjing, staffed mainly with Southeastern University faculty. Southeastern botany professor Hu Xiansu (H. H. Hu, 1894–1968) became head of the laboratory's botany division. Unlike Chen, Hu Xiansu had returned to China for seven years between finishing his undergraduate degree at the University of California at Berkeley in 1916 and starting graduate training at Harvard in 1923. When Hu returned to China in 1916 he began teaching at the Nanjing Higher Normal School, the predecessor institution of Southeastern University. Chen felt that it was because of his influence that Hu decided to study at the Arnold Arboretum.²⁸

Hu's first direct contact with the arboretum was through correspondence with Charles Sargent. Sending specimens was a standard way of contacting eminent botanists. In 1920, Hu sent Sargent a collection of woody specimens from Jiangxi province in exchange for their identification.²⁹ Just as Chen had done with the Hubei collections, he sent to the arboretum, Hu built up research collections at Southeastern by attaching Sargent's identifications to an identically numbered duplicate set he retained in Nanjing.

Hu enrolled at the Bussey Institution from September 1923 to June 1925 and took four forestry courses with John Jack.³⁰ In the same way he had helped Chen, Jack arranged a university loan for Hu. But Hu could not borrow as much money as Chen had because Chen's Harvard loan had not yet been repaid. An officer of the university criticized Jack for arranging Chen's loan, intimating that Jack had "backed up a 'crook' for scholarships & other favors from the college." Jack told Chen that his carelessness "handicaps & jeopardizes my work in the University on behalf of Chinese students. You have made it harder for them to get scholarships, loans, &c, especially upon my recommendation when your case is remembered, as it is."³¹ Chastened by Jack's rebuke, Chen repaid half the loan

immediately.

After he returned to Southeastern in 1925, Hu received Jack's explanation of this matter. While Jack criticized Chen, he did not comment on Harvard officials' lumping of Chinese students together. Hu now understood that the university administration saw Chinese students at Harvard as a group. It sensitized him to the danger of negative Harvard attitudes towards Chinese based on stereotypes. Hu raised the money to repay the other half of Chen's loan, "in anxiety of his [Chen's] error which may cast an ugly shadow upon the character of Chinese students at Harvard...."³²

Part of Chen's problem repaying the Harvard loan was the disarray in Southeastern's finances; payment of faculty salaries was often in arrears, sometimes as much as eight months. Despite financial problems, Chen was productive during his years in Nanjing. In 1922, he brought to press his manual, *Chinese Economic Trees*, a project he had started at the Arnold Arboretum. The same year he wrote up a comparison of Chinese and Japanese pines for *Kexue* [Science], the journal of the Science Society of China. Before long he began a study of the genera and species of the laurel family in China that would be published in the first volume of *Contributions from the Biological Laboratory of the Science Society of China*. By publishing the *Contributions* in English, Chinese biologists could address the international scientific community from the pages of a publication of one of their own institutions. Further, through exchange of the *Contributions*, the biological laboratory could build up its library with publications from institutions throughout the world.

At the end of 1923, disaster struck. The science building housing the library and the natural history collections at Southeastern burned down. Southeastern's herbarium was lost; thousands of specimens painstakingly mounted on sheets of paper, labelled, and filed had gone up in smoke. What had seemingly just started had now to be started all



Hu Xiansu (1894–1968), better known as H. H. Hu, a student of John Jack's from 1923 to 1925. Photograph from the Archives of the Arnold Arboretum.

over again. Chen's work could not but suffer. The University of Nanking mentioned the tragedy in criticisms of Southeastern botany. During the spring of 1924, Southeastern arranged to receive a set of the National Geographic Society collections made by Qin Ren-chang, a forestry student working his way through the University of Nanking as a teaching assistant at Southeastern University. University of Nanking botanist Albert Steward attempted to win the set for his herbarium by undermining confidence in Southeastern. His method was to write Elmer Drew Merrill

(1876–1956), the preeminent American expert on Chinese plants. Steward knew that Merrill, through his connections in Washington, could influence where the specimens would go.

Merrill had become a leading authority on the flora of China during his years as director of the Philippines Bureau of Science. His influence derived from promoting institutional ties, setting up herbaria—he did this for Lingnan University and the University of Nanking—and identifying Chinese specimens in prodigious quantities with phenomenal speed. He determined approximately 75,000 Chinese specimens from 1914 to 1929. In 1924, Merrill became dean of the University of California's College of Agriculture at Berkeley, a position that increased his influence.³³

When Steward wrote to Merrill in 1924, there were more herbarium specimens of Chinese plants in Western institutions than in institutions in China. Steward explained that it was "a source of regret as well as of inconvenience to botanists working in China that so many fine collections of Chinese plants have been taken completely out of the country." Steward used a progressive argument for a parochial purpose. It had already been decided that the National Geographic specimens would go to an herbarium in China, Southeastern's herbarium, but Steward whittled away at Southeastern. It was unsafe; their fire the past winter showed this. The plants that it had were not properly arranged. "The men in charge of their work have not shown ability, serious interest, or a spirit of cooperation along this line." He singled out Chen. The University of Nanking had apparently contributed to the financing of Chen's 1922 expedition to Hubei. Steward claimed that Chen owed him specimens and was angry that Chen's "god-father friend Professor Jack who was to have identified the Hainan collection" received the woody plants Chen collected in Hubei. Steward felt that John Jack was the source of Arnold Arboretum pressure for Southeastern to be given

the specimens.³⁴ He got nowhere with his complaints. Merrill had his own relationship with Chen and was eager to work on Chen's Hainan material.³⁵ Nanking's bid for the set of National Geographic material failed.

Botanical work at Southeastern picked up in 1925. Qin Renchang began full-time work at Southeastern after he graduated the University of Nanking, and Hu Xiansu returned from Harvard. Hu, like Chen, won Charles Sargent's confidence while he was at the Arnold Arboretum. A fund for botanical exploration in China was to be set up with Sargent and Marion Case as two of the trustees. Hu would oversee the work in Nanjing, Southeastern being the chief beneficiary. Hu naïvely mentioned this to John Reisner, dean of the University of Nanking's College of Forestry and Agriculture.

Reisner lobbied Merrill for help to make Nanking the beneficiary instead. "No one in China is more sympathetic with the aspirations of the Chinese than I am," Reisner explained as he denounced Hu Xiansu, "a strong pro-China individual" enthusiastic about botanical work. Unfortunately, Hu's "enthusiasm has never been able to lead to practical organization of their [Southeastern's] herbarium work which would result in a usable file of herbarium material." Of course, Reisner brought up the Southeastern fire. He admitted that there were also collections at the science society's biological laboratory, collections under the control of Hu Xiansu, "but they are in the same condition as botanical plants in Chinese institutions always are, unorganized and of no value to anybody in their present condition." Reisner asked Merrill to recommend cooperation with the University of Nanking to Sargent.³⁶ Hu found out about Reisner's efforts to get Sargent's support and was outraged because Reisner "always professes friendship and cooperation with us.... If this is Christian spirit, no wonder our young men now endeavor to spread a national-wide anti-Christianity propaganda."³⁷

After Hu's return to China in 1925, Hu and

Chen began a long and fruitful collaboration on their *Icônes Plantarum Sinicarum*, illustrations and descriptions of Chinese plants. The first of five large-format volumes—the drawings were life-sized—came out in 1927. Chen and Hu dedicated it to Charles Sargent “through whose deep interest in Chinese Botany the knowledge of our ligneous flora has been greatly advanced.” That same year Chen took a year’s leave from Southeastern to research the flora of South China. He had an appointment as professor at National Sun Yatsen University in Guangzhou, but he spent most of the winter and spring at the Hong Kong Botanical Garden studying Chinese plants with Qin Renchang. Instead of returning to Southeastern at the end of his leave, Chen stayed on at Sun Yatsen.³⁸ Hu also left Nanjing; he was appointed head of botany at the new Fan Memorial Institute of Biology in Beijing.

Institution Building in South China, 1927–1937

Developments at Sun Yatsen were rapid. The China Foundation, the organization which controlled the moneys from the United States’ remission of China’s Boxer War indemnities, decided to support Chen’s work. In 1928, the foundation funded a new botany institute at Sun Yatsen with Chen as head. The following year the foundation secured Chen’s salary by making him a China Foundation Science Professor. Chen launched an ambitious program of collecting in South China while building up the institute’s library and herbarium through exchanges, especially with curator Alfred Rehder at the Arnold Arboretum and Elmer D. Merrill at the University of California. Merrill’s primary interest was the flora of South China, and he and Chen established a close working relationship. Merrill respected Chen because of the high quality of his work, and complaints from Lingnan University did not change his feelings.

Merrill took the measure of a botanist by the quality of his specimens and his field

notes. Until 1932, most of the Lingnan collections sent to Merrill for identification came from Floyd McClure (1879–1970), a graduate of Ohio State University who came to Lingnan in 1919. The material McClure sent was often sterile (it had no fruits or flowers), not accompanied by adequate notes and labels, and not ample enough for division; this was important in case Merrill needed to send a portion of a specimen to a specialist for determination. Merrill criticized McClure severely for the low quality of the study sets he was receiving. McClure blamed the illiterate coolies he had been sending into the field for the poor specimens collected. By contrast, Merrill was especially pleased with the specimens coming from Chen’s institute. Chen attributed this to the fact that his “assistants are college graduates, not coolie collectors, able to observe as well as collect.”³⁹

Although there was competition, relations between Protestant Lingnan University and Chinese Sun Yatsen University were not nearly so strained as those between Nanking and Southeastern. The tension between botanists of the two schools seemed due to Lingnan’s sense of having proprietary rights in South China. Perhaps Lingnan’s desire to control South China botanical exploration came from president James McClure Henry, son of Benjamin Henry, South China explorer and first Lingnan president. James Henry may have seen Chen as a newcomer to South China. Lingnan was certainly threatened by how fast Chen was taking hold of the South China work. The chairman of the biology department and editor of the university’s *Lingnan Science Journal*, William Hoffman, was put off by Chen’s unwillingness to accept limitations. Chen was more assertive than the typical Chinese scholar, and Hoffman did not know how to deal with him. No one at Lingnan had been wronged by Chen, but Hoffman was suspicious, explaining to Merrill that Chen “has pulled off a number of ‘crooked’ deals in his relationship with scientists and scientific institutions of which I am aware.”⁴⁰

According to Chen, the friction was due to his unwillingness to fall in with Lingnan's plans. After Lingnan obtained a substantial grant from the China Foundation, an informal meeting among Chen, Hoffman, and a few of the other Lingnan people was called to discuss plans for cooperation. Hoffman made three proposals: that the two institutions exchange specimens, divide the territory, and not visit the same locations in the same season. Exchange of specimens, Chen replied, need not be contingent on Lingnan's getting a grant. Chen saw the other proposals as restrictions under the mask of cooperation. He explained his position in no uncertain terms: "I came to Kwangtung [Guangdong] to study the flora of Kwangtung, and ... I intend to go any place, any time and as many times as necessary, so long as I find means to do so ... to accomplish two principal objects—to publish a good flora of the province, and to gather and sow seeds of as many rare plants as possible in order to save them from certain extinction."⁴¹

During 1930 Chen reached out to the foreign scientific community in China and around the world. Chen usually did not publish in the journals of foreign institutions in China, but in 1930 he published "Forestry and the Conservation of Resources" in the *Lingnan Science Journal*. Chen was trying to increase awareness among foreigners of one of China's critical problems. Also in 1930, Chen's botany institute started publishing an English-language journal. Formerly, Sun Yatsen University's publications had been in Chinese and dealt with problems of only local interest; the new journal was intended for "the scientific world as a whole." Chen and his colleagues accepted Merrill's advice to have a one-word title for ease of citation; they called the journal *Sunyatsenia* because the University was founded by Dr. Sun, "the 'father' of our republic...."⁴²

Chen attended two international scientific congresses in 1930. At the Fourth Pan-Pacific Science Congress in Java, Chen gave a paper on the flora of Guangdong. In August, the

Fifth International Botanical Congress met in Cambridge, England. For the first time in the history of the meeting, there was a symposium on the flora of China, and for the first time there was attendance by Chinese botanists. The symposium brought together experts on China's flora from Leningrad, Copenhagen, Berlin, Vienna, Florence, Paris, London, Edinburgh, Aberdeen, New York, Nanjing, and Guangzhou. Chen participated as the representative of the Botanical Institute of Sun Yatsen University, the Science Society of China and the national government of China. In his address to the symposium, he reviewed the development of botany in China, dividing its history into three phases, "the period of ancient Chinese research, the period of early European research, and the period of modern Chinese research."

In the first period, from the first to the nineteenth centuries, botanical information was compiled and published in herbals, encyclopedias, and dictionaries; in the second period, beginning in the eighteenth century, European botanical explorers collected plants in China, enriching the herbaria of leading botanical institutions in the West—this was the material Chen was studying while in Europe; in the third period, Chinese themselves were "undertaking a re-examination of the vegetation of their own country on a scientific basis." This last period began in 1916 when Qian Songshu published his species of *Ranunculus* in *Rhodora*. Chen summarized the publications of the other leading Chinese botanists, Zhong Xinxuan, Hu Xi-ansu, Qin Renchang and himself. Of the five, only Qin had not been trained at Harvard's Arnold Arboretum. Chen surveyed the leading botanical institutions in North, Central, and South China and described the growth of libraries and herbaria. Many in his audience already were familiar with the story. Through exchanges, they had obtained volumes of Chinese botanists' publications for their libraries and specimens with Chinese botanists' labels for their herbaria. Chen appealed for their continued cooperation in the build-

ing of reference collections in China.⁴³

Before and after the conference there was time for study of the collections at Kew Gardens in London and discussions with Merrill. At the beginning of 1930, Merrill left the University of California to become director of the New York Botanical Garden. Merrill had money for exploration, and Chen proposed a botanical expedition to Hainan under the joint auspices of the New York Botanical Garden and his own institute.⁴⁴ The idea developed into a series of expeditions carried out over the next few years. The European trip was a punctuation point in Chen's career. He was now working as an equal with his Western colleagues; he was part of the international botanical community.

During the 1930s, work on the flora of South China steadily expanded under Chen's leadership. In 1934, the China Foundation upgraded Chen's science professorship to a research professorship so that Chen could coordinate botanical work in Guangdong and Guangxi provinces. The foundation and the Guangxi provincial government provided funds to organize the Research Institute of Botany at the University of Kwangsi (Guangxi), with Chen as head. The institute used the building of the former British consulate in Wuzhou. The situation at the University of Guangxi was congenial; president Ma Junwu was specially interested in biology—he had translated Darwin's *Origin of Species* into Chinese—and was sympathetic to Chen's research.⁴⁵

In 1935, Chen's work and the work of botanists throughout China benefited from Merrill's change of position from Director of the New York Botanical Garden to Administrator of Botanical Collections at Harvard University. Now the leading Western expert on China's flora was united with the extensive collections of Chinese plants at the Arnold Arboretum and the Gray Herbarium. That same year Chen and Hu Xiansu published volume four of their *Icones Plantarum Sinicarum*, dedicated to Merrill "in recognition of his signal contribution to the knowl-

edge of the flora of Hainan and Kwangtung [Guangdong]."

The 1930s were productive years for Chen, and he became accepted as the leading figure in South China botany by both Chinese and foreigners. He was held in affectionate regard, and his personal life was a major item of gossip among botanical workers at Sun Yat-sen, Lingnan, and Kwangsi. In the mid-1930s Chen started collaborating with his niece, Chen Shuzhen, known as Faith, on Chinese trees of the storax family. Chen had already married the daughter of a wealthy Hong Kong family, but the marriage had not produced children. When Chen and Faith were seen constantly working together, rumors of a romance became rife among South China botanical workers. After Chen's wife died, he remarried, but not Faith. He married his housemaid, who bore him two children, a boy and a girl.⁴⁶

The War Years, 1937–1945

Botany in China and Chen's career developed swiftly until the outbreak of war with Japan in 1937. The country was shocked when Japanese troops invaded the capital in Nanjing, looting and raping with fierce savagery. Chen worked at the botanical institute in Guangzhou until the city fell to the Japanese in October 1938. Chen later recounted to Merrill his escape to Hong Kong during the Japanese bombing:

Bombs fell on the compounds of our Institute. . . . You suggested removal to Hong Kong in readiness for instant shipment of the herbarium and library to New York, for the duration, at your expense. . . . We moved somehow. Finally Canton [Guangzhou] was completely evacuated but I slipped alone into Shameen [Shamian]. . . . The Japanese used Germans to search residences of Shameen for Chinese refugees. They came to my hiding place at midnight but I tricked the Nazis. When my mission failed I made my way by foot to Hong Kong disguised as a coolie.

Chen and his coworkers resumed operations in the Kowloon section of the British colony

as best they could. The China Foundation continued its support, but those funds were not sufficient. Chen's "sister-in-law mortgaged her house to keep the Institute running." When Chen cabled Merrill for money, Merrill sent small amounts out of his own income.⁴⁷

The Japanese captured Hong Kong on Christmas day, 1941. Japanese soldiers with fixed bayonets took possession of the institute's Kowloon premises. Chen again successfully obtained sanctuary for the institute's botanical work. He asked the director of education of the Japanese puppet government in Guangdong for permission to move the botanical collections of Sun Yatsen University back to Guangzhou. Chen got permission and an appointment as professor in the puppet government's Kwangtung University, which had taken over the Lingnan University campus. The institute moved back.

After the Japanese defeat, the Chinese Nationalist government charged Chen with "cultural collaboration" with the enemy because of his willingness to deal with the puppet government. The popular fervor surrounding the war-criminal trials produced hysterical accusations. Chen had gone against the Chinese tradition of absolutely opposing the enemy; now his own enemies had an opportunity to attack him. An investigating committee of the Ministry of Education and representatives of a group of professors and staff of Sun Yatsen University claimed that Chen worked for the Japanese puppet government as director of the "Bureau of International Propaganda." Chen got a lawyer, the same Sun Yatsen University law professor appointed to defend the Commander of Japanese forces in South China, and solicited letters from Merrill and other colleagues attesting to the value of his actions to save the herbarium. Since there was no Bureau of International Propaganda, and since Chen's actions regarding the institute's collections seemed justified, the charges were quashed.⁴⁸

In 1946, Merrill arranged funding for Chen to come to the United States to work at Harvard for a year or two. With the criminal charges dropped it now seemed possible, but the Sun Yatsen University chancellor requested Chen stay in China, and Chen had "no alternative but to comply." Chen worked to get his two institutes moving again, but over the next year he became depressed. No one at the Guangzhou institute was adequately paid. There was dissatisfaction, hopelessness, and a loss of will. Chen felt time slipping by. Since the Japanese capitulation, the institute had made no progress. Chen told Merrill: "I am only a few months this side of sixty with nothing much to look forward to aside from a lonely old age. I am utterly tired in body and spirit but goad myself on with feigned optimism." Chen felt the ambition for a final spurt of accomplishment. He asked the seemingly indefatigable Merrill: "Out of your rich life and experience what would you think I must do to get out of this slough of despond?"⁴⁹

Chen did not know that Merrill had spared his Chinese colleagues news of his own despondency. Merrill resigned the directorship of the Arnold Arboretum in June 1946 over a controversy about the use of the arboretum's endowment, an endowment that he was largely responsible for building up. Merrill stressed to contributors that their gifts would only be used for arboretum purposes and used the funds to augment the living collections of the arboretum as rapidly as possible. He was criticized for obtaining more material than the arboretum could digest. The Harvard administration promoted a plan that would use the arboretum's endowment for botany work in general at Harvard. Merrill fought the plan, maintaining that he was following the indenture of 1872 to establish and support an arboretum "which shall contain as far as is practicable, all trees and shrubs 'whether indigenous or exotic, which can be raised in the open air....'" The new plan would wreck the great heritage of Charles Sargent. Merrill lost the battle with Harvard, and he lost his

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New England
Horticultural
and Botanical
Calendar

(Spring 1988)

Horticultural and Botanical Calendar

Please be sure to mention Arnoldia whenever you attend an event that was listed in the New England Horticultural and Botanical Calendar

Through June 18

"Arboretum Flowers." Arnold Arboretum (AA). Colored-pencil drawings by Barbara Nachmias-Kedesdy of the flowers of trees and shrubs in the Arnold Arboretum. Maps showing where the trees and shrubs grow in the Arboretum accompany the exhibit, as does information on their provenance and culture. 8:30 A.M.-4 P.M., Monday-Friday, 10 A.M.-4 P.M., Saturday and Sunday, Closed on national holidays. Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA. No charge. *Information:* AA, Jamaica Plain 02130-2795; (617)524-1718.

Through June

Guided Spring Walks. Winterthur Museum and Gardens (WMG). Admission charge. Reservations suggested. *Information, reservations:* WMG, Winterthur, DE 19735; (302)654-1548.

Through July 31

Sixth International Exhibition of Botanical Art & Illustration. Hunt Institute for Botanical Documentation (HIBD). Ninety-seven paintings by 93 artists. 8:30 A.M.-12 noon, 1-5 P.M., Library, HIBD, Carnegie Mellon University, Pittsburgh, PA 15213. No charge. *Information:* (412)268-2434.

May 28-June 5

Festival of Flowers and Gardens. The Lakeside Group. Public exhibition of contemporary approaches to horticulture, floral and landscape design (outdoor promenade, galleries, marketplace, special events). 12 noon-8 P.M. (weekdays), 11 A.M.-7 P.M. (weekends), Navy Pier, Chicago, IL. Admission charge. *Information:* The Lakeside Group, 600 North McClurg Court, Suite 1302A, Chicago 60611; (312)787-6858.

May 31-June 15

"Landscapes that Stirred the Imagination: Studies in English Romantic Literature and Art." Radcliffe Seminars of Radcliffe College. Study tour of sites in England associated with Romantic writers and painters. Fee. *Information:* Center for Continuing Education, Radcliffe College, 6 Ash Street, Cambridge, MA 02138; (617)495-8600.

June 4

Secret Garden Tour. Benefactors of the Arts Ltd. Tour of the Historic Point Section of Newport, RI. Admission fee (tickets in advance or on day of tour). *Information:* Benefactors of the Arts, 33 Washington Street, Newport 02840; (401)847-0514.

June 6-9

Rare Species Management Conference (in conjunction with Fifteenth Annual Natural Areas Conference and Tenth Annual Meeting of the Natural Areas Association). "Rare Species and Significant Habitats." College of Environmental Science and Forestry, State University of New York, Syracuse (CESF). *Information:* Dr. Donald J. Leopold, CESF, Syracuse 13210.

June 7

"Two Dozen Plants for a Better Garden." Trustees of Reservations. Long Hill Horticultural Lecture by Marco Polo Stufano. 10 A.M., The Sedgwick Gardens, Long Hill Reservation, 572 Essex Street, Beverly, MA 01915. Admission charge. Registration required. *Information:* (617)922-1536, 921-1944.

June 7-8

Flower Show. Rhode Island Federation of Garden Clubs. "Blithewold Revisited." 1-8 P.M. (June 7), 10 A.M.-6 P.M. (June 8), Blithewold Gardens and Arboretum, Ferry Road (Route 114), Bristol 02809-0417. *Information:* (401)253-2707.

June 10-12

"Asian Plants for American Gardens." Longwood Gardens. Conference on old and new plants introductions from Asia. Lectures, panel discussions, tours. Longwood Gardens, Kennett Square, PA 19348. Registration fee. *Information:* (215)388-6741, extension 516 (weekdays, 8-11:30 A.M., 12:30-4 P.M.)

June 11

Plant Sale. New England Wild Flower Society. Over 150 varieties of wildflowers, a wide selection of perennials. Staff members will be on hand to answer questions. 10 A.M.-2 P.M., Garden in the Woods, Hemenway Road, Framingham, MA. *Information:* (617)877-7630, 237-4924.

Calendar Section

June 11 and 12

"Topiary for the Home, Garden, and Business." Callaway Gardens and Longwood Gardens. Conference. Lectures, workshops led by nationally recognized authorities; demonstrations; exhibits. Callaway Gardens, Pine Mountain, GA. Registration fees; preregistration required. *Information:* Education Department, Callaway Gardens, Pine Mountain 31822; (404)663-5153.

Mid-June-mid-August

Professional Development Courses. Graduate School of Design, Harvard University (GSD). Forty-four summer courses and workshops for architects, landscape architects, and other professionals in design and related fields. Registration fees. *Information:* Office of Special Programs, GSD, 48 Quincy Street, Cambridge, MA 02138; (617)495-9340.

June 16

"The Victorian Landscape in America: The Garden as Artifact." Morris Arboretum. Symposium. Morris Arboretum, Philadelphia, PA. Registration fee. Reservations required. *Information:* Agatha H. Hughes, (215)257-5777; Morris Arboretum, 9414 Meadowbrook Avenue, Philadelphia 19118.

June 20-September 30

"Poisonous Plants." Arnold Arboretum (AA). Staff exhibit of both familiar and lesser-known poisonous plants. 8:30 A.M.-4 P.M., Monday-Friday, 10 A.M.-4 P.M., Saturday and Sunday, Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA. No charge. *Information:* AA, Jamaica Plain 02130-2795; (617)524-1718.

June 28

"Trees and Shrubs for Year-Round Interest." Trustees of Reservations. Long Hill Horticultural Lecture by Julie Morris. 10 A.M., The Sedgwick Gardens, Long Hill Reservation, 572 Essex Street, Beverly, MA 01915. Admission charge. Registration required. *Information:* (617) 922-1536, 921-1944.

July 13-15

"Perennials, Ground Covers, and Flowering Shrubs." Graduate School of Design, Harvard University (GSD). Intensive seminar on unusual and little-known species and useful new cultivars as elements of exterior landscape design. Guest lecturers, field trips. 8:30 a.m.-6 p.m., Arnold Arboretum, Jamaica Plain, MA. Fees. Preregistration required. *Information:* Professional Development, GSD, 48 Quincy Street, Cambridge, MA 02138; (617)495-9340.

July 16-19

World Congress. International Federation of Landscape Architects. Boston.

July 18-22

"Deciduous Flowering Shrubs." Longwood Gardens. Course on the best summer-flowering shrubs for landscape use. Lectures, laboratory study sessions, field trip. Registration fee. *Information:* Continuing Education, Longwood Gardens, Post Office Box 501, Kennett Square, PA 19348-0501; (215)388-6741, extention 516 (8-11:30 A.M., 12:30-4 P.M.).

July 20-23

"Turning Points in Anglo-American Landscape History." Graduate School of Design, Harvard University (GSD). History of British landscape design and its relationship to the development of American landscape design. Field trip. 9 a.m.-5 p.m. Fees. Preregistration required. *Information:* Professional Development, GSD, 48 Quincy Street, Cambridge, MA 02138; (617)495-9340.

July 28 and 29

"Selecting Conifers for the Landscape." Graduate School of Design, Harvard University (GSD). Two-day workshop for designers. Identification workshop; field trips. 9 a.m.-5 p.m., Arnold Arboretum, Jamaica Plain, MA. Fees. Preregistration required. *Information:* Professional Development, GSD, 48 Quincy Street, Cambridge, MA 02138; (617)495-9340.

August 3-5

National Meeting. American Conifer Society. Longwood Gardens, Kennett Square, PA. Tours of Longwood, area gardens, nurseries; fountain show; talks. (Post-conference tours, August 6, 7.) *Information:* Longwood Gardens, Post Office Box 501, Kennett Square 19348-0501; (215)388-6741, extension 504 (8-11:30 A.M., 12:30-4 P.M.).

August 7-21

"Principles of Ecology." Graduate School of Design, Harvard University (GSD). Intensive two-week field course on quantitative description of natural and managed plant communities, use of ecological principles in design and maintenance of landscapes. Nantucket Field Station, University of Massachusetts, Nantucket, MA. Fees. Preregistration required; early registration urged *Information:* Professional Development, GSD, 48 Quincy Street, Cambridge, MA 02138; (617)495-9340.

September 9 and 10

"Topiary for the Home, Garden, and Business." Callaway Gardens and Longwood Gardens. Conference. Lectures, workshops led by nationally recognized authorities; demonstrations; exhibits. Longwood Gardens, Kennett Square, PA. Registration fees; preregistration required. *Information:* Education Division, Longwood Gardens, Post Office Box 501, Kennett Square 19348-0501; (215)388-6741, extension 516..

September 11-15

Annual Conference. Association of Zoological Horticulture (AZH). The Arizona-Sonora Desert Museum, Tucson. Post-conference tours. *Information:* George Montgomery or Meg Quinn, c/o Arizona-Sonora Desert Museum, 2021 North Kinney Road, Tucson 85743.

September 20

"Planting for Color in the Perennial Garden." Trustees of Reservations. Long Hill Horticultural Lecture by Elsa Bakalar. 10 A.M., The Sedgwick Gardens, Long Hill Reservation, 572 Essex Street, Beverly, MA 01915. Admission charge. Registration required. *Information:* (617) 922-1536, 921-1944.

June 28

"Create Your Own Stone Planter." Trustees of Reservations. Long Hill Horticultural Workshop. The Sedgwick Gardens, Long Hill Reservation, 572 Essex Street, Beverly, MA 01915. Admission charge. Registration required. *Information:* (617)922-1536, 921-1944.

October 18

"Plants from the Celestial Empire for New England Gardens." Trustees of Reservations. Long Hill Horticultural Lecture by Stephen A. Spongberg. 10 A.M., The Sedgwick Gardens, Long Hill Reservation, 572 Essex Street, Beverly, MA 01915. Admission charge. Registration required. *Information:* (617)922-1536, 921-1944.

October 21-23

"Passage." International Design Symposium, Ltd. (IDS). International flower show and design symposium; lecture-demonstrations, festival of flowers, tours. Salem, MA. Registration charge. Preregistration required. *Information:* IDS, Post Office Box 263, Westwood, MA 02090; (617)326-8906.

Copy deadlines for the New England Botanical and Horticultural Calendar are December 10, March 10, June 10, and September 10 for the Winter, Spring, Summer, and Fall issues, respectively. Mailing address: Calendar, *Arnoldia*, Arnold Arboretum, Jamaica Plain, MA 02130-2795.

NEWS FROM THE ARNOLD ARBORETUM

Number 4 Spring 1988

Annual Plant Sale and Auction Scheduled for September 18—And the Sun Will Shine!

Devotees of the Arboretum's Annual Plant Sale and Auction in the fall may at times overstate the necessity for getting there early, but it's true that laggards, once there, admit they're sorry they missed any of the fun. The Sale and Auction offer the widest selection of worthy plants the gardener is likely to find in New England, plus the sights and sounds of fellow gardening enthusiasts from as far away as Pennsylvania and Ohio. It's scheduled for September 18, beginning at 9 a.m., at the Case Estates in Weston.

While members stroll down the barn aisles that are laden with thousands of breathtaking bonus plants, a membership perk for Friends of the Arboretum, the Silent Auction opens for bids. Silent Auction tables close out sequentially between 9 a.m. and 1 p.m., which adds to bidders' anxiety. As they check winnings from table to table—from the shrub table to the perennials table to the orchid table—winners cheer, and

Goodell Retires

Henry S. ("Hank") Goodell, the Arboretum's man for all seasons for more than 40 years, is retiring. Last year, when asked by a reporter what had contributed to his being such a "seasoned" employee, Goodell replied that though the workload was demanding and the workday long, he found joy in being outdoors and in working with trees and other plants.

"My favorite season is fall," says Goodell. "The colors around

Number 4

Spring 1988

Annual Plant Bonus, Sale, and Auction

Sunday, September 18, 1988
Case Estates
135 Wellesley Street, Weston

Plant Bonus and Sale

9 a.m. to 4 p.m.

Silent Auction

9 a.m. to 1 p.m.

Rare and Unusual Plant Auction

1 p.m.

losers cry.

The greening of private gardens proceeds through straight sale of plants, too. Many of these plants have been grown in the Arboretum's greenhouse, some propagated from plants collected on expeditions into remote forests of the world.

At the same time, the seeds of excitement are ripening as the Arboretum Associates set up the Rare and Unusual Auction plants in the striped yellow and

white tent behind the Red School House. From 1 p.m. auctioneers will sell off the "best and brightest" of the plants assembled for the day, all for the same worthy cause.

These activities have value, are fun, and support the Arboretum, and they are the result of hours of volunteer efforts, including searching out the plants for auction or sale. Some are from Friends' backyards, and others are donated by nurseries. Some are propagated by the Arboretum staff, and others come from private greenhouses. Plants for sale may be relatively common, but plants for auction are always out of the ordinary.

The Arboretum Associates begin the process of amassing the 4,000 plants by requesting donations of plant materials from Friends and neighbors who garden. Anyone, amateur or professional, who has quality plants is a potential "green thumb angel."

THANK YOU!

— Elise Sigal

To: The Arnold Arboretum Associates
125 Arborway
Jamaica Plain, MA 02130

Yes! I would like to.

- | | |
|--|---|
| <input type="checkbox"/> donate plants | <input type="checkbox"/> help |
| <input type="checkbox"/> perennials | <input type="checkbox"/> plan |
| <input type="checkbox"/> shrubs | <input type="checkbox"/> set up |
| <input type="checkbox"/> trees | <input type="checkbox"/> work on the BIG DAY |
| <input type="checkbox"/> houseplants | (September 18) |
| <input type="checkbox"/> orchids | <input type="checkbox"/> other _____. |
| <input type="checkbox"/> other ; | |

Please contact me:

Name

Address

The best time to call

Clockwise, beginning at top of page 3:

Peter and Mary Ashton "chair" the reception from the garden bench presented to them by the Arboretum.

Before the ceremonies honoring him, Peter Ashton and University President Derek Bok welcome some of the 250 guests.

Melville Chapin led the evening's activities in honor of Peter and Mary.

George Putnam, Vice President of the Committee to Visit the Arnold Arboretum, reflects on Peter's and Mary's contributions during their tenure at the Arboretum.

Eric West, a member of the Committee, initiates the toast to Peter and Mary.

Mary Ashton toasts her husband's next 25 years of research on the world's underexploited biological resources.

Kathleen Warren presents Peter with a gift from the Arnold Arboretum Associates.

Eleanor Cabot Bradley, an enthusiastic and generous supporter, thanks George Putnam for his gracious speech recognizing Peter's and Mary's contributions to the Arboretum.



Tribute to Peter

Saturday, the nineteenth of March





and Mary Ashton

at 17 Quincy Street, Harvard University



Goodell
continued from page 1

the Arboretum are so beautiful."

Goodell came to the Arboretum in 1946 as head arborist. He had done forestry work for the Civilian Conservation Corps and had worked for a Dedham tree company. Since coming to the Arboretum, Goodell's work in taking care of the Arboretum's trees and shrubs is reflected in the beauty of its grounds and plantings.

Gary Koller, managing horticulturist and Goodell's boss, said, "It's quiet, dependable people like Hank who nurture the Arboretum's growth and development. His skill, understated enthusiasm, dedication, and patience in dealing with the rest of us are models for all."

"Best wishes from your many friends, Hank, as well as the countless visitors who have benefited from a job well done!"

Is Hank Goodell going to put his feet up now that he's retiring? When that question was put to him, he said, with a twinkle in his eyes, "I'm going to help my son, who is also an arborist." From the sound of it, he isn't going to relax and put his feet up—except to climb trees—so not much will change for him. He will still be improving our green-spaces and urban forests.

Ancient Ginkgo

Trees May Be New Rx

The ancient *Ginkgo biloba* has had a reputation within folk medicine for its healing powers. For at least 5,000 years, ginkgo leaf extract has been a mainstay in Chinese medicine, especially in the treatment of heart and lung disease. Recently, Harvard chemists succeeded in synthesizing the ginkgo compound in their laboratories and this could lead to its use in the United States treating Alzheimer's disease, asthma, toxic shock, and various other diseases.

Although ginkgo extracts are now widely used in Asia for treating disease, they are not approved for medical use in the United States or Europe. Scientists say synthesis here will facilitate the production in large amounts of the compound, ginkgolide B, and lead to more clinical tests of its effectiveness as a medicine.

The ginkgolide molecule is so complex that many laboratories had given up trying to synthesize it, but it was assembled at Harvard by

Rare Plant "Captured" by Spongberg Blooms in Arboretum

"As far as we know, this is the first time *Magnolia zenii* has been grown outside of China," said Dr. Stephen Spongberg, the Arboretum's horticultural taxonomist. Spongberg brought five *Magnolia zenii* seeds back from China in 1980. The seeds germinated and plants propagated.

Both Peter Del Tredici, plant propagator at the Arboretum, and Spongberg have written in *Arnoldia* about *Magnolia zenii*. The five seeds presented to Spongberg when he was visiting Nanking were "given a three-month cold-stratification period, after which they were sown in 1981," according to Del Tredici. After a year in the greenhouse, they were planted outside in containers. In the fall one of the plants was put out in the nursery and the next year planted near the

Visitor Center with the other magnolias.

This spring is the first time the plant has flowered, almost 100 years after Charles Sprague Sargent introduced the first Asiatic magnolia into the United States.

Although *Magnolia zenii* is a rare and endangered species in China, it is cousin to the magnolias blooming along Commonwealth Avenue.

"It may or may not prove to be a horticultural prize; we'll have to wait to see," said Spongberg, but it is obvious that it is early flowering and fragrant.

Rooted cuttings of this small, precocious-flowering tree, whose blooms are white with purple on their outer surfaces, were offered to *Arnoldia* readers in 1985.

Briefly noted...

Gary L. Koller, managing horticulturist at the Arboretum, with **Harrison L. Flint** of Purdue University and **Charles Heuser** of Penn State University, will teach a summer course on deciduous flowering shrubs at Longwood Gardens in Pennsylvania.

Maps

The Conifer Trail and Sargent Trail maps drawn for the Harvard University *Gazette* by Jean Eisenstat were selected for inclusion in the videodisc documenting Boston suburban development, its historic and contemporary issues, prepared by the School of Architecture and Planning of MIT.

A new walking map of the Arboretum is available in the Hunnewell Visitor Center for \$1.00.

News from the Arnold Arboretum is written by Jo Procter, the Arboretum's public affairs officer. Members of the Friends of the Arnold Arboretum are invited to send news of awards, honors, horticultural achievements, and personal items of note to her for the column, "Briefly noted...." Please address your correspondence to her at the Arboretum, 125 Arborway, Jamaica Plain, MA 02130.

Elias J. Corey, professor of chemistry, and his colleagues. The structure of the natural substance had been discovered earlier by Koji Nakaniishi, a professor of chemistry at Columbia University.

Peter Ashton, who is co-principal on a National Cancer Institute grant in conjunction with the University of Illinois to collect and test tropical plants for anti-tumor activity, says, "Plant resources and their varied healing powers have been known from ancient times; now it's the starting point for chemists to create new drugs."

Plants have long been used as folk remedies. Ethnobotanists are now studying folk medicines in Africa, South America, and Asia, and the Arboretum has made its resources available to identify the plants as they are collected.

The Arboretum's Mercer Fellow, John S. Burley, is in Kalimantan leading an expedition to collect plants for screening in U.S. laboratories for their tumor reducing qualities. At the same time, other members of the expedition are talking to medicine men in remote villages in Borneo, trying to gain more information about folk medicine and plants.

One of the oldest species of tree, *Ginkgo biloba* is called a "living fossil." It is thought to have appeared more than 300 million years ago and is so unusual that it is distinguished as a separate order of gymnosperm. The ginkgo was introduced into the United States about 1784.

Organization Meetings

A Faithful Catalog of Horticultural and Botanical Meetings Scheduled for the New England Area

Some organizations hold meetings at regular intervals, others do not. All of the meetings listed below are open to the public. Organizations always welcome new and prospective members. *It is advisable to verify the information given below directly with the contact person listed. Please do not call the Arnold Arboretum.*

Meetings Held at Regular Intervals

AMERICAN RHODODENDRON SOCIETY (MASSACHUSETTS CHAPTER)

Third Wednesday (varies), beginning in September, 7:30 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham. *Contact:* Barbara Emeneau (617)729-0725.

BONSAI STUDY GROUP OF THE MASSACHUSETTS HORTICULTURAL SOCIETY

First Sunday, 2 p.m., Wellesley College Greenhouse, Wellesley. *Contact:* John Palmer (617)443-5084.

CONNECTICUT HORTICULTURAL SOCIETY

Third Thursday, 8 p.m., Hoadley Auditorium, Connecticut Historical Society, 1 Elizabeth Street, Hartford. Lecture followed by plant forum and plant auction. *Contact:* Connecticut Horticultural Society, 150 Main Street, Wethersfield 06109; (203)529-8713.

CONNECTICUT ORCHID SOCIETY

Second Wednesday, 7:30 p.m., at different locations. (June, members only; July, August, no meetings.) *Contact:* E. M. Wolf (203)456-1657.

GARDENERS AND FLORISTS CLUB

Third Tuesday, 7:30 p.m., Wellesley College Greenhouse, Wellesley, MA. *Contact:* Del Nickerson, Wellesley College Greenhouse.

GREEN INDUSTRY COUNCIL

First Wednesday, 12 noon-1:30 p.m., Case Estates, Weston, MA. *Information:* (617)435-6335.

HOBBY GREENHOUSE ASSOCIATION OF EASTERN MASSACHUSETTS

Second Saturday, alternate months (January, March, May, etc.), 1:30 p.m., Wellesley College Greenhouse, Wellesley. Members need not own greenhouses. *Contact:* Joseph Rajumas, 8 Davis Street, Holliston 01746.

INDOOR GARDENING SOCIETY OF AMERICA (CONNECTICUT CHAPTER)

Fourth Wednesday, 7:30 p.m., Cooperative Extension Service Building, 1280 Asylum Street, Hartford. *Contact:* Michael Archaski, 64 Rhodes Street, New Britain 06051; (203)225-5828.

MASSACHUSETTS ORCHID SOCIETY

Second Tuesday, 7:30 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham. Occasional special workshops at 7 p.m. *Contact:* D. Fye, (617)358-7547; C. Lee (617)443-6566; or M. A. Grigg, 38 Monadnock Road, Worcester 01609.

MOBY DICK AFRICAN VIOLET SOCIETY

Second Thursday, 7 p.m., Dartmouth Library, South Dartmouth, MA. *Contact:* Mrs. Ruth Warren (617)679-1189.

NEW ENGLAND BROMELIAD SOCIETY

Third Sunday, September-June, 1 p.m., Wellesley College Greenhouse, Wellesley, MA. *Contact:* Paul R. Carlberg (617)791-1533 or (617)757-5012; or DeeDee Bundy (617)526-1952.

NEW HAMPSHIRE ORCHID SOCIETY

Second Saturday, 1:30 p.m., Concord Public Library, Concord. Location may change. *Contact:* Paul Sawyer, RFD 2, Box 174, Canaan 03741; (603)523-7410 after 5 p.m.

Meetings Held at Irregular Intervals

AMERICAN BEGONIA SOCIETY (BUXTON BRANCH)

Suburban Experiment Station, 241 Beaver Street, Waltham, MA: April 27, 1988, to be announced; May 11, 1988, 8 p.m.; June 8, 1988, 8 p.m. *Contact:* Wanda Macnair (617)876-1356.

AMERICAN FERN SOCIETY (SOUTHERN NEW ENGLAND CHAPTER)

Approximately monthly, changing locations. *Contact:* Peggy (617)799-5897.

AMERICAN GLOXINIA AND GESNERIAD SOCIETY (NEW ENGLAND CHAPTER)

Approximately monthly, 1 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. *Contact:* H. Friedberg (617)891-9164.

AMERICAN HEMEROCALLIS SOCIETY (NEW ENGLAND CHAPTER)

Second Saturday, 10:30 a.m.-4 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. Location subject to change. *Contact:* Suzanne Mahler (617)878-8039.

AMERICAN ROCK GARDEN SOCIETY (NEW ENGLAND CHAPTER)

Saturday or Sunday, February-October (approximately monthly, at changing locations). *Contact:* Helga Andrews (617)443-8994.

IRIS SOCIETY OF MASSACHUSETTS

September, November, January, and March. *Contact:* Mrs. John H. Burton, 188 Sagamore Street, South Hamilton 01982; (617)468-3646.

NEW ENGLAND HOSTA SOCIETY, INC.

Meetings irregular, usually Sunday, 10 a.m.-2 p.m., at changing locations. *Contact:* Mabel-Maria Herweg, 11 Puritan Lane, Dedham, MA 02026; (617)326-1939.

NORTHEAST HEATHER SOCIETY (CHAPTER OF THE NORTH AMERICAN HEATHER SOCIETY)

Meetings held at least four times a year on weekends, at various locations throughout New England. *Contact:* Walter K. Wornick, Post Office Box 101, Alstead, NH 03602; (603)835-6165.

Ongoing Activities

ARNOLD ARBORETUM (Area Code 617)

The Arborway, Jamaica Plain, MA 02130-2795. A 265-acre public park of hardy trees, shrubs, and vines from all over the world, many of them from China and Japan. Open daily, sunrise-sunset. No charge. Visitor Center at Main Entrance open Tuesday-Sunday, 10 a.m.-4 p.m. Closed on national holidays. Exhibits, slide show, public information, rest rooms. Arboretum Shop sells books, postcards, film, gift items, etc. Group van or guided walking tours available by appointment. Driving permits issued to elderly or handicapped, Monday-Friday, 9 a.m.-4 p.m. *Information:* 524-1718; *recorded information on lectures, events:* 524-1717.

• **Volunteers** are always needed to work in every area, with staff or on independent projects, on the Living Collections, in the library, gift shop, or herbarium; guiding tours; etc. Volunteers receive training and other benefits. *Contact:* Volunteer Coordinator, Arnold Arboretum, Jamaica Plain, MA 02130-2795; 524-1718.

• **Horticultural and Botanical Calendar.** Published in each issue of *Arnoldia*, the quarterly magazine of the Arnold Arboretum. The calendar serves organizations in the New England area, though events taking place elsewhere are often listed. Copy deadlines are December 10, March 10, June 10, and September 10 for the Winter, Spring, Summer, and Fall issues, respectively. *Mailing address:* Calendar, *Arnoldia*, Arnold Arboretum, Jamaica Plain, MA 02130-2795; *information:* 524-1718.

• **Certificate in Gardening Arts.** Arnold Arboretum. Botany and horticulture courses on theories and practices of good gardening (propagation, maintenance, design, plant selection, plant systematics, etc.). Work towards certificate may commence at any time during the year (some required courses may be entered only in spring). No time limit for fulfilling requirements, but final project (required) will usually be prepared within one year of completion of coursework. *Details and catalog:* 524-1718.

• **Plant Information Hotline.** Monday, Tuesday, 1-3 p.m. 524-1718.

• **Field Study Experiences.** School programs of the Arnold Arboretum for third- to sixth-grade classes. "Plants in Autumn: Seeds and Leaves" (September-November); "Hemlock Hill" (all seasons); "Around the World with Trees" (all seasons). Fee. Weekdays, 10 a.m.-12 noon (advance registration required).

Calendar Section

METROPOLITAN BOSTON (Area Code 617)

Mount Auburn Cemetery, 580 Mount Auburn Street, Cambridge 02138. America's oldest garden cemetery (established in 1831). One hundred seventy acres of naturalized and formal landscaped grounds with over 3,600 canopy trees (596 species) and many flowering shrubs. Burial place of many famous Americans. Hilly terrain, lakes, vistas, accessible by 12 miles of roads and many paved paths. Observation tower with outstanding views of Boston. Open daily, 8 A.M.-7 P.M., May-September; 7 A.M.-5 P.M., October-April. No charge. *Information:* 547-7105.

Margaret C. Ferguson Greenhouses, Wellesley College, Route 135, Wellesley 02181. Exhibits of desert and tropical plants, ferns, orchids. Seasonal displays. Open daily, 8 A.M.-4:30 P.M. Guided tours available by appointment. No charge. *Information:* 235-0320, extension 3094.

Frederick Law Olmsted National Historic Site ("Fairsted"), 99 Warren Street, Brookline 02146. Boston offices of F. L. Olmsted and his two sons, surrounded by landscaped grounds. Open Friday-Sunday, 10 A.M.-4:30 P.M. No charge. Group tours by appointment. *Information:* U. S. Department of the Interior, National Park Service, 99 Warren Street, Brookline 02146; 566-1689.

Gore Place, 52 Gore Street, Waltham 02154. Federal-period mansion and grounds offering a remarkable combination of architecture, landscape design, social history, and agricultural reform. Herb garden, cutting garden, grape arbor, orchard. Mansion open for guided tours Tuesday-Sunday, 10 A.M.-5 P.M.; grounds open year round during daylight hours. Admission charge. *Information:* 894-2798.

Lyman Estate and Greenhouses ("The Vale"), 185 Lyman Street, Waltham 02154. Thirty acres of pleasure grounds and lawns, wooded areas, garden beds, and a number of ornamental trees and shrubs, including a grand copper beech and magnificent rhododendrons, Camellia House (*circa* 1820) with 100-year-old camellias, Grape House (1804) with vines dating from 1870. Fine example of a Federal period country estate with the oldest greenhouses known to be in use in the United States. Greenhouses open year round, Thursday-Sunday, 10 A.M.-4 P.M., house open only by appointment for groups of ten or more. Admission charge. *Information:* 893-7232; 891-7095 (greenhouses), 893-7431 (house).

Barkley Begonia Collection, Northeastern University Greenhouses, 135 Cambridge Street (Route 3, 1 mile south of Route 128), Woburn 01801. Open Monday-Friday, 8 A.M.-12 noon, 1-5 P.M., other times by appointment. Group tours by arrangement. Closed weekends and holidays. No charge. *Information:* Wanda Macnair, 177 Hancock Street, Cambridge 02139; 876-1356.

NORTHEASTERN MASSACHUSETTS (Area Code 617)

Sedgwick Gardens at Long Hill, 572 Essex Street (Route 22), Beverly 01915. Collection of some 400 species of plants, including weeping Japanese cherries, azaleas, tree peonies, koelreuterias, oxydendrums, sophora, and stewartias, all identified and catalogued with their scientific names. Open daily, 8 A.M.-sunset. Admission charge. *Information:* The Trustees of Reservations, 572 Essex Street, Beverly 01915; (617) 922-1536, 921-1944.

The Stevens-Coolidge Place, 5 Wood Lane, North Andover 01845. House and carefully maintained grounds with expansive lawns, colorful gardens accented by formal hedges, specimen trees. A Trustees of Reservations property. House open Sundays 1-5 P.M. (admission charge); grounds open daily, 8 A.M.-sunset (no charge). *Information:* Superintendent, Stevens-Coolidge Place, North Andover; 682-3580.

Maudslay State Park (the former Moseley Estate), Curzon's Mill Road, Newburyport. Scenic and historic Nineteenth Century estate; 476 acres of gardens, rolling agricultural land, pine forest, and mountain laurel on the banks of the Merrimack River. Many of the ornamental plantings were introduced by Charles Sprague Sargent. Open daily, 8 A.M.-sunset. No admission charge. *Information:* Massachusetts Department of Environmental Management, Division of Forests and Parks, 817 Lowell Road, Post Office Box R, Carlisle 01741; 369-3350.

CAPE COD AND THE ISLANDS (Area Code 617)

Ashumet Holly Reservation and Wildlife Sanctuary of the Massachusetts Audubon Society, 286 Ashumet Road, East Falmouth 02536. Two trails meander amid hollies and past an Oriental lotus pond. Open Tuesday-Sunday, dawn-dusk. Admission charge. *Information:* 563-6390.

New Alchemy Institute, 237 Hatchville Road, East Falmouth 02536. Research institution founded to develop ecologically sound food systems through organic gardening, integrated pest management, solar ponds, solar greenhouse design and management, tree crops, energy conservation. Film, guided tours. Open

10 A.M.-4 P.M., Monday-Friday; 12 noon-4 P.M., Saturday, Sunday. Guided tours, Saturday, 1 P.M. Admission charge. *Information:* 563-2655.

Lowell Holly Reservation, South Sandwich Road, Mashpee 02649. One hundred thirty-five acres with two miles of shoreline, stands of beeches and hollies, walking trails. Open daily, 10 A.M.-sunset, free on weekdays, parking and boat-landing fees on weekends. *Information:* 749-5780, 921-1944.

Mytoi Gardens, off Dike Road, Chappaquiddick Island, Marthas Vineyard 02539. Eleven-acre Japanese-style garden with small pond, azaleas and rhododendrons, Hanoki cypress, hollies, daffodils. Open daily, sunrise-sunset. No charge. *Information:* 794-5780, 921-1944.

CENTRAL MASSACHUSETTS (Area Code 617)

Garden in the Woods, Hemenway Road, Framingham 01701. A 45-acre botanical garden containing the largest landscaped collection of wildflowers and native plants in the Northeast. Informal walks (10 A.M., Tuesday). Group tours by reservation. Open Tuesday-Sunday, 9 A.M.-4 P.M. Admission charge. *Information:* 877-6574, -7630, 237-4924.

Tower Hill Botanical Garden, 30 Tower Hill Road (Route 70), Boylston 01505. Grounds open weekdays, 8:30 A.M.-5 P.M., weekends (May-October), 10 A.M.-4 P.M., closed holidays. *Information:* Worcester County Horticultural Society, 30 Tower Hill Road, Boylston; 869-6111.

Elliott Laurel Reservation, Route 101, Phillipston 01331. Thirty-three acres of open fields, hardwood forest, pine woods, and mountain laurel. A property of the Trustees of Reservations. Open daily, sunrise-sunset. No charge. *Information:* 921-1944, 537-2377.

WESTERN MASSACHUSETTS (Area Code 413)

Norcross Wildlife Sanctuary, Monson-Wales Road, Wales 01081. Three miles of trails through over 3,000 acres of woodlands. Open Monday-Saturday, 9 A.M.-5 P.M. No charge. *Information:* 267-9654.

Berkshire Garden Center (BGC), Routes 102 and 183, Stockbridge 01262. Fifteen-acre botanical garden with herb garden, display gardens, perennial borders, solar greenhouses. Open daily, 10 A.M.-5 P.M. Admission charge. *Information:* 298-3926.

RHODE ISLAND (Area Code 401)

Blithewold Gardens and Arboretum, 101 Ferry Road, Bristol. Historic English manor house and 33-acre estate overlooking Narragansett Bay. Rose garden, water and rock gardens. Collection of native and exotic plants. Grounds open Tuesday-Sunday, 10 A.M.-4 P.M. year round; mansion open mid-April-October, 10 A.M.-4 P.M. Closed holidays. Admission charge. *Information:* 253-2707.

NEW HAMPSHIRE (Area Code 603)

Fuller Gardens, Willow Avenue (200 yards north of the junction of Routes 101D and 1A), North Hampton 03862. Open daily, 10 A.M.-6 P.M., mid-May-October. Nominal admission charge. *Information:* 964-5414.

Rhododendron State Park, Fitzwilliam 03447 (off Route 119). Sixteen-acre park with wild rhododendrons that bloom in mid-July. Open daily, 8 A.M.-sunset. No charge. *Information:* 532-8862.

Maple Hill Farm, 117 Ridge Road (off Routes 122 and 133), Hollis 03049. Herb garden, reflecting pool, perennial beds, rock garden, arbor, drying-plant beds, 1,600 acres of water, woods, and meadows. Open all the time, year round. No charge. *Information:* Beaver Brook Association, 117 Ridge Road, Hollis; 465-7787 (9 A.M.-12 noon, Monday-Friday).

VERMONT (Area Code 802)

Botany and Woodland Trails, Southern Vermont Art Center, Mount Equinox, Manchester 05254. Botany Trail on slopes of mountain, with woods, wildflowers, ferns, pool, scenic vistas. Open Tuesday-Saturday, 10 A.M.-5 P.M. (admission charge), Sunday, noon-5 P.M. (free). *Information:* 362-1405.

CONNECTICUT (Area Code 203)

Bowen House, "Roseland Cottage," on the Common, Woodstock 06281. Colorful Gothic Revival cottage set in grounds designed to reflect the ideas of picturesque, or natural, landscaping of Andrew Jackson Downing. Open 12 noon-5 P.M., Wednesday-Sunday (May 24-September 15), 12 noon-5 P.M., Friday-Sunday (September 16-October 15). Admission charge. *Information:* 928-4074.

Champion Greenhouse, One Champion Plaza, Stamford 06921. Ongoing program of horticultural shows, exhibits, and displays. Open 11 A.M.-5 P.M., Tuesday-Saturday. Group tours by appointment. *Information:* 358-6688.



Professor Chen Huanyong, founder and first director of the South China Botanical Institute in Canton. Photograph courtesy of Professor F. H. Chen, director of the South China Botanical Institute of the Chinese Academy of Science (Academia Sinica) through Dr. Shiu-ying Hu.

health as well.⁵⁰

In June of 1949, Chen wrote to Merrill of his desperate attempts to save the institute in Guangxi as the South China situation became tense.⁵¹ It was the last time Merrill heard from Chen. The revolution under the leadership of the Chinese Communist Party was successful. Science in China would be completely reorganized.

Science in the People's Republic, 1949–1971

On 1 November 1949, the new Chinese Academy of Sciences was established and rapidly began absorbing scientific research institutes in the Beijing area. In late November, Hu Xiansu wrote to Merrill about the troubles

and suspension of work at the Fan Memorial Institute of Biology while it was being transferred to the academy's control. Hu hoped the institute could return to normal operations when the new arrangements were finalized. Hu had not heard from Chen, but explained that "Canton [Guangzhou] has been 'liberated,'" and he trusted that Chen was "doing well, as the present regime professes a high esteem to natural science and to scientists."⁵² It was not until 1954, that Chen's institute at Sun Yatsen University was also placed under the auspices of the Academy of Sciences and given a new name, South China Institute of Botany.⁵³

In September 1954, 1,200 delegates assembled in Beijing for the First National

People's Congress, the meeting which approved the constitution of the People's Republic of China. Chen and fellow botanists Qian Songshu and Qin Renchang were among the scientists who participated. On the afternoon of the fifteenth in Huai Ren Hall, Chairman Mao Zedong opened the conference, his remarks punctuated by the delegates thunderous applause. Along with general exhortations, Chairman Mao urged the people to "do their best to learn from the advanced experience of the Soviet Union...."⁵⁴ During the sessions, many delegates made speeches. The participating scientists, almost all trained in the West, must have squirmed in their seats when chemist Hou Debang, vice chairman of the All-China Federation of Scientific Societies and renowned for his research on soda manufacture, gave his speech. Hou was a graduate of the Massachusetts Institute of Technology, Pratt Institute, and Columbia University. He prefaced his remarks by confessing: "I am a person who has most deeply received American imperialist education, a person who received the severe poison of English and American capitalist education." During the anti-Japanese war, Hou supported Western science; after liberation he turned to Soviet science. Other scientists gave speeches: geologist Li Siguang, engineer Mao Yisheng, mathematician Hua Luogeng, and Minister of Forestry Liang Xi.⁵⁵ At one session, biologists including Chen, Qian Songshu and Qin Renchang proposed that each province be required to designate a forest preserve to protect wild vegetation used in scientific research. The State Council approved their proposal.⁵⁶

The same year as the National People's Congress, Chen published a paper on the characteristics of Soviet science as understood through its research on the bark of *Eucommia* (*duzhong*).⁵⁷ The following year, 1955, Chen was made a member of the Chinese Academy of Sciences. As China increasingly turned towards the Soviet Union, ideas from Pavlov's psychology and physiology, Lepeshinskaya's cell biology, Michurin's ar-

boriculture and Lysenko's genetics entered Chinese biology. A heated controversy developed between the supporters of Morganist (American) genetics and Lysenkoist (Soviet) genetics. Although Hu Xiansu's work did not bear on genetics, he involved himself in the debate as a matter of principle.⁵⁸ Chen steered clear of this trouble.

Through the 1950s and early 1960s, Chen kept publishing. Before liberation his work was mostly written in English; after liberation he wrote only in Chinese. This did not represent a total withdrawal from international botany; descriptions of new species and higher groups included the Latin descriptions required by international rules. Other colleagues also moved to the new pattern of language use. Hu Xiansu did not make the shift as rapidly as Chen, but by 1958 he also no longer wrote in anything but Chinese. This change was no doubt healthy for the development of Chinese botany, but the abrupt transition served to further isolate Chinese botanists and their colleagues in the West from each other.

China's Great Proletarian Cultural Revolution began in 1966. In most areas, scientific work came to a halt. During the anti-Japanese war, there had been research activity. Now there was no research, no writing. Many scientists suffered deprivations and indignities. The few biologists permitted to read books considered themselves fortunate in the extreme. China, at war with herself, suppressed her scientists. Because Chen had exchanged botanical specimens and literature with foreign research institutions, he was accused of having illicit relations with foreign countries (*litong waiguo*) and of being a cultural traitor (*wenhua hanjian*). Severe persecution broke him in body and mind. By the end of 1970 he was eighty-one years old and severely ill. He would not live to see the end of the cultural revolution, nor would he live to see relations with the United States reestablished.

The miseries of the Cultural Revolution reached their high point in 1971. Scientists under attack had the added anguish of seeing

their families suffer as well. Cultural Revolution politics followed Chen into Guangzhou's Sand River Hospital, where he lay terminally ill. At the beginning of January 1971, a certain professor came to extend his regards. It was reported that Chen said, "I firmly trust the party; I firmly trust the party's policies; I firmly trust Chairman Mao's line." He died a few weeks later.⁵⁹

Endnotes

1. "Chen Huanyong" is the equivalent in *hanyu pinyin*, the official romanization of the People's Republic of China, for Woon-Young Chun, Woon-Yung Chun, or W. Y. Chun, the various spellings Chen used for his name on publications or correspondence not in the Chinese language.
2. Charles Sprague Sargent, "The First Fifty Years of the Arnold Arboretum," *Journal of the Arnold Arboretum*, Volume 3, Number 3 (January 1922), pages 127 and 129.
3. For a historical summary of the literature on the similarity between the floras of eastern Asia and eastern North America, see Li Hui-lin, *Floristic Relationships Between Eastern Asia and Eastern North America* (Philadelphia: American Philosophical Society, 1971), reprinted from *Transactions of the American Philosophical Society*, New Series, Volume 42 (1952), pages 372 and 373, and D. E. Boufford and S. A. Spongberg, "Eastern Asia–Eastern North American Phytogeographical Relationships—A History from the Time of Linnaeus to the Twentieth Century," *Annals of the Missouri Botanical Garden*, Volume 70, Number 3 (1983), pages 423 to 439. For Gray's work in this area, see A. Hunter Dupree, *Asa Gray* (Cambridge: Harvard University Press, 1959), Chapter 13. A summary of Bretschneider's shipment of seeds to Sargent is contained in Bretschneider to Sargent 9/25/1893, Arnold Arboretum Archives, Harvard University.
4. See Stephanne B. Sutton, *Charles Sprague Sargent and the Arnold Arboretum* (Cambridge: Harvard University Press, 1970), Chapters 8 to 10.
5. This can be seen by following the annual reports for the arboretum's herbarium in the *Journal of the Arnold Arboretum*.
6. A. J. Philpott, "Comes From China to Boston to Study Chinese Trees," *Boston Globe*, 25 November 1917, page 25.
7. Li Shugang, "Mianhuai jiaohui, nuli pandeng" [Recall the teaching, work hard to climb], *Guangdongsheng zhiwuxuehui huikan*, Volume 2 (1985), page 126; Marion Roby Case, *The Second Summer at Hillcrest Farm* (Weston, Massachusetts, 1911), page 6.
8. Information on Chen's early years is sparse and unreliable. I have drawn mostly on a few lines in Chen Fenghuai et al., "Jinian woguo jiechu zhiwuxuejia Chen Huanyong xiasheng" [Commemorating China's outstanding botanist, Chen Huanyong], *Guangdongsheng zhiwuxuehui huikan*, Number 2 (1985), page 112. A. J. Philpott, "Comes From China to Boston to Study Chinese Trees," mentions father Chen's job at the Hanbury School. For information on the Hanbury School, see N. Gist Gee, editor, *The Educational Directory for China* (no place: Educational Association of China, 1905), Appendix C, page 34; Zhongguo shehui kexueyuan jindaishi yanjiusuo fanyishi, *Jindai laihua waiguo renming cidian* [Dictionary of foreigners who came to China in the modern period] (Beijing: Zhongguo shehui kexue chubanshe, 1981), page 189.
9. Sheila Geary, "The History of the Case Estates" (unpublished manuscript, 1981), pages 3 and 4.
10. John G. Jack, "The Arnold Arboretum: Some Personal Notes," *Chronica Botanica*, Volume 12, Numbers 4 to 6 (1948 and 1949), page 187.
11. Woon Young Chun [Chen Huanyong], "Forestry in China," *Chinese Students' Monthly*, Volume 6, Number 3 (10 January 1911), pages 274 to 276.
12. New York State College of Forestry at Syracuse University, *News Letter*, 19 August 1914, page [5].
13. Woon Yung Chun, "The Ithaca Conference," *Chinese Students' Monthly*, Volume 9, Number 1 (10 November 1913), pages 59 to 63. For the consortium, see Roberta Allbert Dayer, *Bankers and Diplomats in China 1917–1925* (London: Frank Cass and Company, 1981), page 25.
14. Woon Yung Chun, "East Is East and West Is West," *Chinese Students' Monthly*, Volume 9, Number 6 (10 April 1914), pages 491 to 493.
15. Woon Yung Chun, "Bitter Strength," *Chinese Students' Monthly*, Volume 9, Number 8 (10 June 1914), pages 602 and 603.
16. Woon-yung Chun, "Recent developments in systematic botany in China," in: *Fifth International Botanical Congress, Report of Proceedings* (Cambridge: Cambridge University Press, 1931), page 524,

- Chien Sung-shu [Qian Songshu], "Two Asiatic Allies of *Ranunculus pensylvanicus*," *Rhodora*, Volume 18, Number 213 (September 1916), pages 189 and 190.
17. For information on Qian Songshu and Zhong Xinxuan's careers at Harvard, see their respective registration cards, UA V 161.272.5 and UA V 252.276, Harvard University Archives. For a biography of Qian, see Zou Anshou, "Qian Songshu," in: Tan Jiazhen, editor, *Zhongguo xiandai shengwuxuejia zhuan* [Biographies of modern Chinese biologists] (Changsha: Hunan kexue jishu chubanshe, 1986), pages 12 to 20.
 18. For Chen's addresses, see his Bussey Institution Registration and Record Card, UA V 252.276, Harvard University Archives.
 19. A. J. Philpott, "Comes From China to Boston to Study Chinese Trees," page 25.
 20. Chen Huanyong to Elmer D. Merrill, 1/25/47, Arnold Arboretum Chinese Correspondence, Gray Herbarium, Harvard University.
 21. For Wheeler's action, see Bursar, Harvard University to John G. Jack 5/23/25, Arnold Arboretum Chinese Correspondence, Gray Herbarium, Harvard University. For Wheeler's publications on the ants of China, see the years 1921, 1923, 1927, 1928, 1929, 1931, and 1933 in the bibliography in: Mary Alice Evans and Howard Ensign Evans, *William Morton Wheeler, Biologist* (Cambridge: Harvard University Press, 1970).
 22. John Jack to B. L. Robinson, 7/1/19, Gray Herbarium Library, Harvard University.
 23. Benjamin C. Henry, *Ling-Nam or Interior Views of Southern China, Including Explorations in the Hitherto Untraversed Island of Hainan* (London: S. W. Partridge and Company, 1886), page 383.
 24. Chen Huanyong to Elmer D. Merrill, 1/25/47, Arnold Arboretum Chinese Correspondence, Gray Herbarium, Harvard University.
 25. Two Chinese Muslims quit the University of Nanking rather than submit to the religion requirements; see Jessie Gregory Lutz, *China and the Christian Colleges, 1850–1950* (Ithaca: Cornell University Press, 1971, page 92). Chen Fenghuai et al., "Jinian woguo jiechu zhiwuxuejia Chen Huanyong xiansheng," page 114.
 26. Interview with Chen Fenghuai, South China Institute of Botany, Guangzhou, Guangdong, 4/5/86. Professor Chen Fenghuai was Chen Huanyong's student at the University of Nanking. After Chen Huanyong switched to Southeastern University, Chen Fenghuai followed him there. For a short biography of Chen Fenghuai, see *Zhongguo kexuejia cidian* [Dictionary of Chinese scientists], Volume 1, pages 201 to 203 (1982).
 27. On Guo's recruitment activity, see Barry Keenan, *The Dewey Experiment in China: Educational Reform and Political Power in the Early Republic* (Cambridge: Harvard University Press, 1977), pages 56 and 57. For a biography of Guo, see *Biographical Dictionary of Republican China*, Volume 2, pages 276 and 277 (1968).
 28. Chen Huanyong to Elmer D. Merrill, 1/25/47, Arnold Arboretum Chinese Correspondence, Harvard University. For a short biography of Hu Xiansu, see Yu Dejun, "Hu Xiansu," in: Tan Jiazhen, editor, *Zhongguo xiandai shengwuxuejia zhuan*, pages 70 to 85.
 29. Hu Xiansu to C. S. Sargent 12/17/20, Arnold Arboretum Chinese Correspondence, Harvard University.
 30. For information on Hu's enrollment, see his Bussey Institution Registration and Record Card UA V 252.276, Harvard University Archives.
 31. John Jack to Chen Huanyong 5/30/25, Arnold Arboretum Chinese Correspondence, Harvard University.
 32. Hu Xiansu to John Jack 10/2/25, Arnold Arboretum Chinese Correspondence, Harvard University.
 33. Elmer Drew Merrill, "The Local Resident's Opportunity for Productive Work in the Biological Sciences," *Lingnan Science Journal*, Volume 7(1929), page 293. See R. Schultes, "Elmer Drew Merrill—An Appreciation," *Taxon*, Volume 6, Number 4 (May 1957), pages 89 to 101 for a brief overview of Merrill's career.
 34. Albert N. Steward to Elmer D. Merrill, 6/21/24, Herbarium, University of California, Berkeley.
 35. Elmer D. Merrill to Chen Huanyong, 1/15/24, Herbarium, University of California, Berkeley.
 36. John H. Reisner to Elmer D. Merrill, 11/2/25, Herbarium, University of California, Berkeley. Reisner also lobbied Cornell Professor Harry H. Love; see Reisner and T. S. Kuo to Love, 10/20/25, Herbarium, University of California, Berkeley.
 37. Hu Xiansu to John Jack 9/30/26, Arnold Arboretum Chinese Correspondence, Harvard University.
 38. Qin Renchang to Elmer D. Merrill, 6/29/27, 11/2/27, Herbarium, University of California, Berkeley.
 39. Elmer D. Merrill to Floyd A. McClure, 1/14/29; McClure to Merrill, 1/25/29; Chen Huanyong to Merrill, 1/22/29, Herbarium, University of California, Berkeley.
 40. William E. Hoffman to Elmer D. Merrill, 3/14/29, Herbarium, University of California, Berkeley.
 41. Chen Huanyong to Elmer D. Merrill, 7/22/29, Herbarium, University of California, Berkeley.

42. Chen Huanyong to Elmer D. Merrill, 11/22/29, Herbarium, University of California, Berkeley; P. F. Shen, "Forward," *Sunyatsenia*, Volume 1, Number 1 (June 1930), no page number. Merrill had also influenced Academia Sinica's Metropolitan Museum of Natural History to adopt a one-word title for its contributions, *Sinensis*; see Chien Tien-ho [Qian Tianhe], "Preface," *Sinensis*, Volume 1, Number 1 (August 1929), no page number.
43. Chun Woon-yung, "Recent developments in systematic botany in China," in: *Fifth International Botanical Congress, Report of Proceedings* (Cambridge: Cambridge University Press, 1931), pages 524 to 528. For a brief description of the Fifth International Botanical Congress, see A.B. Rendle, "A short history of the International Botanical Congresses," *Chronica Botanica*, Volume 1 (1935), pages 39 and 40.
44. Elmer D. Merrill to Chen Huanyong, 12/24/30; Chen to Merrill, 1/15/31, Herbarium, University of California, Berkeley.
45. For a brief description of the Institute, see W. Y. Chyne, *Handbook of Cultural Institutions in China* (Taipei: Ch'eng-wen Publishing Co., 1967), page 227.
46. Interview with Hu Shiu-ying [Hu Xiuying], Harvard University Herbaria, Harvard University, 8 March 1988. Dr. Hu, a botany student at Lingnan University during the 1930s, reports these "facts" of Chen's personal life as common knowledge among South China botanists.
47. Chen Huanyong to Elmer D. Merrill 1/25/47, Arnold Arboretum Chinese Correspondence, Harvard University.
48. Chen Huanyong to Elmer D. Merrill 1/15/47, 3/5/47, Arnold Arboretum Chinese Correspondence, Harvard University.
49. Chen Huanyong to Elmer D. Merrill, 9/29/48, Arnold Arboretum Chinese Correspondence, Harvard University.
50. Elmer D. Merrill, "Memorandum to Dr. P. C. Mangelsdorf," 5/20/46; Augusta S. Merrill to Richard A. Howard, 10/29/46, Archives, New York Botanical Garden. Merrill mentions his resignation of the Arnold Arboretum directorship on 1 June 1946 in Elmer Drew Merrill to Dean Paul H. Buck, 2/12/47, Arnold Arboretum Chinese Correspondence, Harvard University.
51. Chen Huanyong to Elmer D. Merrill, 6/20/49, Arnold Arboretum Chinese Correspondence, Harvard University.
52. Hu Xiansu to Elmer D. Merrill, 24/11/49, Arnold Arboretum Chinese Correspondence, Harvard University.
53. Zhongguo kexueyuan bangongting, editor, *Zhongguo kexueyuan: jieshao* [The Chinese Academy of Sciences: an introduction] (Beijing: Kexue Chubanshe, 1986), page 239.
54. For a description of the delegates attending, see *Survey of China Mainland Press* Number 884 (8 and 9 September 1954), pages 16 and 17; a translation of Chairman Mao's speech is in: *Survey of China Mainland Press*, Number 889 (16 September 1954), pages 1 and 2.
55. "Hou Debang daibiao de fayan" [Delegate Hou Debang's speech], *Renmin ribao* [People's Daily], 27 September 1984, page 4. For summaries of the remarks of Li, Mao, Hua and Liang, see Hsinhua News Agency, *Daily News Release*, Number 1746 (25 September 1954), pages 246, 247, 257, and 258. For biographies of Hou Debang and Hua Luogeng, see *Biographical Dictionary of Republican China*, Volume 2 (1968), pages 84 to 86, 185 to 187; for Li Siguang and Liang Xi, see Donald W. Klein and Anne B. Clark, *Biographic Dictionary of Chinese Communism 1921–1965*, Volume 1 (Cambridge: Harvard University Press, 1971), pages 522 to 524, 543 and 544.
56. "Chen Huanyong," *Zhongguo kexuejia cidian*, Volume 2 (1983), page 205.
57. Chen Huanyong, "Cong duzhong de yanjiu lai renshi Sulian kexue de tedian" [Study of the bark of *Eucommia* to understand characteristics of Soviet science"], *Kexue Tongbao*, 1954, Number 8, page 22.
58. For Hu Xiansu's position, see the translation of some of his remarks at the 1956 genetics symposium at Qindao in: Laurence Schneider, editor, *Lysenkoism in China: Proceedings of the 1956 Qingdao Genetics Symposium* (Armonk, New York: M. E. Sharpe, Inc., 1986), pages 21 to 24; for a full transcript of the symposium, see Li Peishan et al., *Bai jia zheng ming—fazhan kexue de biyou zhi lu: 1956 nian 8 yue Qingdao yichuanxue zuotanhui jishi* [Let a hundred schools contend—the only way to develop science: a record of the August 1956 Qingdao Genetics Conference] (Beijing: Shangwu yinshuguan, 1985).
59. Chen Fenghuai et al., "Jinian woguo jiechu zhiwuxuejia Chen Huanyong xiansheng," page 117.

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Forestry in Fujian Province, People's Republic of China, during the Cultural Revolution

Richard B. Primack

Excesses of the Cultural Revolution undermined forestry education in China and greatly harmed her forests

Fujian (Fukien) Province is situated on the coast of central China, opposite Taiwan. Until recently it was closed to foreigners, and even today special permission is needed to visit anything other than a few large coastal cities such as Fuzhou (Foochow) and Ximen (Amoy). In January 1986 I made a two-week trip to Fujian to visit my wife Margaret's relatives and to give lectures at the Fujian Forestry College. The visit provided an opportunity to evaluate the ecological status of a part of China rarely visited by foreign scientists. During the visit I learned about the devastation of Fujian's forests during the Cultural Revolution (1966–1976) and the government's response to rebuild the forests after 1976.

Lying just north of the Tropics, Fujian enjoys a subtropical climate. Most rain comes in the spring, and frosts are light except in the mountains. The major fruit tree is the orange, lychees and longans being grown in southern and coastal areas. Most of the province is hilly, with some beautiful scenic areas, such as the famous Wuyi Mountain. Fujian is very old, the province having been established as a political division more than 20,000 years ago, and is famous for its many historical places, superb handicrafts of lacquerware, and the cultured and industrious nature of its citizens.

The native forest (evergreen subtropical forest) has an extremely high diversity of woody species. Following disturbance by man, two fast-growing native conifers, Chi-

nese fir (*Cunninghamia lanceolata*) and Chinese pine (*Pinus massoniana* Lamb), regenerate very well. The Chinese pine may form almost pure stands, particularly on dry sites. The Chinese fir grows best in moist sites, often in association with other species. This ecological disclimax of conifers has been used by foresters to maximize wood production either by manipulating the forest or by planting the seedlings.

Margaret and I were met at the Fuzhou airport by her relatives, who are peasants in the rural Minqiang District. As we drove through the hill country from the airport to their home district, a distance of roughly 120 kilometers, we did not see any mature forests. The hillsides were covered with grass, low shrubs, and ferns. Many hillsides were covered with plantations of small trees of pine and Chinese fir. Most of these trees looked to be less than ten years old. Arriving at the large valley of my in-laws' village, we could see grasses (mostly *Miscanthus sinensis* and *Miscanthus floridulus*), ferns (mostly *Dicranopteris linearis*), and shrubs covering all of the slopes for miles around. Yet from my perspective it seemed curious that, despite the abundance of grassland, there didn't seem to be any grazing animals on the extensive hill slopes, except for an occasional water buffalo. When I questioned my wife's relatives about the absence of trees and grazing animals, they told me that twenty years before the valley had been heavily forested. To say the least, I was dumfounded at this abundant change in

land use in a district that had been settled for thousands of years.

The next week, we travelled for nine hours over the hill country to reach the Fujian Forestry College in Nanping, in the center of the Province. During this entire trip we saw no mature native forest or large trees—only extensive plantations of small coniferous trees and small stands of naturally regenerating pines. By the time we reached Nanping, I was full of questions about the absence of forests. Over the next week, the faculty of the Forestry College described to me how the Fujian forests and the Fujian College were damaged during the Cultural Revolution.

Before the Cultural Revolution began, in 1966, there were 2,500,000 hectares of forest, out of a total of 12,000,000 hectares. About 40 percent of the forest was warm-temperate or subtropical forest. The forest had been managed for hundreds, possibly even thousands, of years for sustained yield. Permission to cut any tree, even for local use, had to come from Forest Department officers. The forests contained large, mature trees of chestnut (*Castanopsis* species), camphor tree (*Cinnamomum camphor*), *Phœbe namu*, and *Shima superba*. Many species in these forests are superb hardwoods prized for their use in furniture. Camphor wood was especially valued for boxes because it repelled insects. Large stands of bamboo forest (*Phyllostachys pubescens*) are located within the hardwood forest and were actively managed for bamboo products.

The Cultural Revolution was a time of confusion and turmoil in China that lasted from 1966 until 1976 (Abelson, 1979). Its ostensible purpose was to eliminate capitalist and bourgeois attitudes from society and to return to the original ideals of the communist revolution. During the Cultural Revolution, leaders of all government departments came under criticism. The Forest Department was not exempt, even though its policies were of such clear benefit to the people. At public meetings the officers of the Forest Department were criticized and publicly humiliated

by the Red Guard, the youth movement of the Cultural Revolution. The department staff were told repeatedly that all true knowledge and power rested with the peasants and that the Forest Department officers were of the bourgeoisie. The Forest Department staff were urged to organize political groups to formulate forestry ideas consistent with the aims of the Cultural Revolution. The result of this political activity was that by 1970 the officers of the Forest Department had lost all control of the management of the forests. Planting of trees continued on the regular schedule, but supervision of logging completely ceased. If the peasants wanted wood, then they were not stopped, since the Cultural Revolution taught that the peasants knew best. Unsupervised cutting of trees started as a trickle, but soon the people realized that the Forest Department was not going to interfere. The peasants' hunger for wood had been carefully controlled for centuries by the Forest Department. Without this control, the hunger for wood exploded into a six-year-long orgy of illegal logging. Throughout the province, carefully managed natural forests and mature plantations were cut down and used for furniture, construction, and fuel. The peasants scrambled to cut as much wood as possible because the wood was free, and everyone wanted as much as he could get. From 1970 until 1976, most of the timber trees were cut down in certain areas of Fujian Province. The trees remaining were either small or of poor form. While some of the forests were still present, their economic value was drastically reduced. The destruction of the forests was particularly severe in the southern part of Fujian Province, where there was less forest to begin with. The hillsides around the big towns had been completely forested with Chinese firs and pines in 1966, but by 1972 the hills were totally cleared of trees. This same destruction of forests was also occurring, to a greater or lesser degree, throughout China during this period.

One of the major targets of the Cultural

Revolution was the Education Department. The Red Guards felt that this department was full of bourgeois teachers who were corrupting the youth. The Forestry College was under the supervision of the Education Department and was therefore heavily criticized. The beginning of the Cultural Revolution was a time of great uncertainty at the Forestry College. No one knew what the Cultural Revolution meant. Fighting broke out in the city of Nanping among the Red Guards and other groups within the Communist Party. In Nanping, as in the rest of China, the Red Guards gained control of the political structure and began to implement the policies of the Cultural Revolution. One of their first actions was to burn down a famous Buddhist temple, built in the ninth century, as well as churches and shrines. In the Forestry College, professors began to be criticized by forestry students belonging to the Red Guards. The professors were criticized for their supposed bourgeois attitudes and for teaching capitalist ideas that were a betrayal of the peasants. At no time during this period were specific policies of the Forestry College or the Forest Department criticized. During the first four years of the Cultural Revolution the criticism levelled against the professors increased in intensity and violence. At first, professors were being paraded in front of large public gatherings, publicly criticized, and even publicly slapped and beaten by the Red Guards. Their families were harassed in the same way. Professors began to fear for their lives. Confusion reigned at the College. Students were attending classes infrequently and were spending much of their time at political meetings. The city of Nanping was similarly in chaos. The activities of the Red Guards in the Forestry College were led by about six individuals, who were responsible for most of the violence. The remaining hundreds of students went along with the policies of the Cultural Revolution, in part because they were duped and in part because they had no choice.

Finally, in April 1970, the leaders of the

Communist Party decided to disband the Forestry College. It was felt that the College was worthless because it taught only bourgeois values. The entire faculty of the College and their families were sent out to the countryside to work at the Forest Department nurseries, where they toiled alongside peasants producing tree seedlings for planting. During this period the faculty members had no idea of how long they would remain in the countryside or what their fates would be. The faculty members were treated well by the peasants with whom they worked, and the memories of these times are not entirely unpleasant. In August 1972, with no explanation or warning, the faculty members were recalled to Nanping to reconstitute the College. But any hopes that the College would return to normal were immediately dashed. The new student body of so-called worker-peasant-soldier students was selected by the Communist Party primarily on the basis of political qualifications. No entrance examinations were required of incoming students. While many students were well qualified, others had received no prior education at all. The curriculum was rewritten by the students to conform with the views of the Cultural Revolution. Political meetings and discussions were emphasized in the new curriculum. Attending class or taking examinations was considered irrelevant. College policies and decisions and student promotions were made by student political groups. The faculty was powerless and could only passively submit to forces totally beyond its control. To resist the student political groups would have meant public criticism, through physical intimidation had ceased by this time. Students "graduated" from the College on the basis of their political views, not their knowledge of forestry.

In 1976, the Gang of Four was overthrown and the leaders of the Cultural Revolution arrested. At this point, Deng Xiao Ping, the future leader of China, returned to the government and took over the administration of science and education. The effects of these

political developments in Fujian Province were felt gradually. Over a two-year period the province returned to normal and the Forestry College's curriculum was reestablished. The leaders of the Forestry College and the Forestry Department regained control of their staffs. Students of the College again showed respect for their teachers. The Red Guard leaders in the Forestry College who had committed acts of violence were jailed for several years but never tried for their crimes. Those unqualified students who had not studied during their years at the College failed their examinations and were returned to their villages. Students who had "graduated" from 1972 to 1976 but who were unqualified were evaluated and reduced in rank.

The Forest Department reasserted its control over forest management, with no resistance from the peasants. The peasants themselves welcomed the return to normality after the chaos of the Cultural Revolution. Besides, everyone could see how badly the forests had been damaged. Since 1976, the Forest Department has vigorously continued its policy of planting trees. Two million hectares of forests have been planted since 1976, giving a total projected forest area of 5,000,000 hectares. About 35 percent of this forest is native hardwoods, mostly thinned forest or scrubby, regenerating forest. Roughly 18 percent is bamboo forest. The remaining forest is composed of Chinese fir and pine, most of which is planted and small in size. There currently is a shortage of timber trees in the province, since almost none of the planted forests are mature. The most severe shortages are of the high-quality hardwoods used in furniture manufacture. The current burst of economic activity in China has aggravated the problem by increasing the demand for construction wood. New buildings are being built everywhere throughout the cities, towns, and villages of Fujian Province, and wood is needed.

There are several bright notes in this sad story. At least 3,000,000 hectares of land have

been planted with trees during the last twenty years. As these forests mature over the next thirty years, the timber situation will gradually improve. Plantation forests will be established on all hillslopes, and much of the forest will be of good size.

The importance of forests to the people of China was reaffirmed recently by the People's Congress, which established a Tree Planting Day. On March 12 of every year, each individual, no matter where he lives, must travel to the mountains and plant a tree. However, the natural forests that were destroyed can never be regained. The Forest Department has recognized the importance of protecting the remaining stands of natural forest through a special classification: Protected State Forest Reserves. The largest of these is the 50,000-hectare reserve at scenic Wuyi Mountain. These Forest Reserves and the enormous plantings of young trees represent the continued hope of the Chinese people, despite the tragedy of the Cultural Revolution. This is a lesson for foresters, politicians, and the general public about the dangers of ignoring the realities of forest ecology.

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INTERVIEW

Chinese Botany and the Odyssey of Dr. Shiu-ying Hu

In a brief retrospective interview, a Chinese botanist who remained in the United States, recalls some highpoints of Chinese botany at Harvard over the past several decades

In the interview transcribed below, Sally Aldrich Adams captures some of the essence of recent Chinese botany as it was experienced by Dr. Shiu-ying Hu, a former member of the staff of the Arnold Arboretum. Mrs. Adams conducted this and several other interviews at Arnoldia's request so as to document the contributions that Arboretum botanists have made to the development of botany in China.

In the years when the People's Republic of China was closed to outsiders and foreign scientists could not keep up their contacts with Chinese colleagues or pursue their studies inside the country, the Arnold Arboretum was fortunate in having on its staff a botanist, Dr. Shiu-ying Hu, who could maintain at least a thread of the former association.

Dr. Hu had come in 1946 to study with Dr. E. D. Merrill for three years, and she stayed on to work for twenty-eight more, until her retirement. She still works in her office every day.

When Chinese botanists did not dare write to Americans, they could write to her; when they needed books but could not get American dollars to buy them, they turned to her. She provided, at her own expense, the literature they asked for and for several of them paid membership fees in international scientific associations so that they could receive publications. To Dr. Hu, this was a way she could serve China.

"In Peking, in Canton, in different cities, I did that for them. While there was no communication between American botanists and Chinese botanists, there was a slight communication between Chinese botanists and I!" Dr. Hu's English slips a little when she is excited, as she was when she related this to her visitor. "Whenever they needed some literature—at that time we didn't have Xerox machines—I photographed them, or I microfilmed, or some I typed, so whatever material

they needed in their work, I sent it to them. That has made many people know that there is a Chinese botanist at Harvard."

To go back to the beginning of Dr. Hu's story:

In 1934 Shiu-ying Hu went to Lingnan University in Canton (formerly Canton Christian College) as a graduate student in botany, with an assistantship in the herbarium. Impressed that every sheet of specimens had been identified by "E. D. Merrill," she said she wanted to study with this famous botanist and asked where he was. She was told that he was at Harvard and that Harvard "didn't take girls."

Just as Shiu-ying Hu got her master's degree, Japan started war with China, and her university moved to a safer area, the city of Chengtu, where West China Union University, also a missionary college, became host to several refugee colleges.

There, in addition to teaching courses in botany, Miss Hu was elected president of the International Women's Club, a circumstance instrumental in getting her to America to study with Dr. Merrill.

The vice president of the club was a Radcliffe graduate, and she sent Miss Hu's application to her own alma mater. When a fellowship offer came through, two other American friends provided money for Miss Hu's transportation. (Her salary from the university at the time was paid in rice, three bushels a month, a medium of exchange not readily

converted into tickets to America.)

Soon after Dr. Hu graduated from Radcliffe, a vacancy for a trained botanist who knew Chinese plants opened up at the Arnold Arboretum. "At that time, racial and sexual discrimination was very heavy, so my salary was about the same as the janitor's," Dr. Hu said with a smile. "Being a Chinese botanist, I had no business staying in America and not working for Chinese botany. But now in Harvard I was working for Chinese botany, so I felt all right."

One of Dr. Hu's projects in the 1950s was financed by a grant from a group of Chinese businessmen who, unable to return to Communist China, wanted to do something for their homeland. Her proposal was for a flora of China, and as the first step she completed an index to the flora in card-catalog form.

"Many people come and use my file, and that's one of the Arboretum's working tools in research on Chinese plants," she said.

The second step would have been to publish the index, but administrative and financial changes intervened, and only two plant families were published, the Compositæ and the Orchidaceæ.

"That desire to work on the flora of China was never dead," Dr. Hu said, "but I became old, and I said, 'If I can't finish the flora of this big area, I could work on the flora of a smaller area.'"

To this end, she went to Hong Kong six times between 1968 and 1975 at the invitation of the Chinese university there, and collected specimens while teaching two courses. While in Hong Kong in 1975, a tour was organized for faculty members to see science, education, and technology in the People's Republic of China. With great difficulty because of her American passport, Dr. Hu obtained the necessary permit to go.

"Mao Tse-tung was still alive. No Chinese botanist was allowed to see any foreign botanist." Dr. Hu told her story dramatically. "But I want to see Chinese botanists. How can I do it? If only I can let them know I'm in Beijing, I know they will see me, because they asked me to do so much. I made many petitions [to the Chinese government agent in

charge of the tour]; they just won't listen to me."

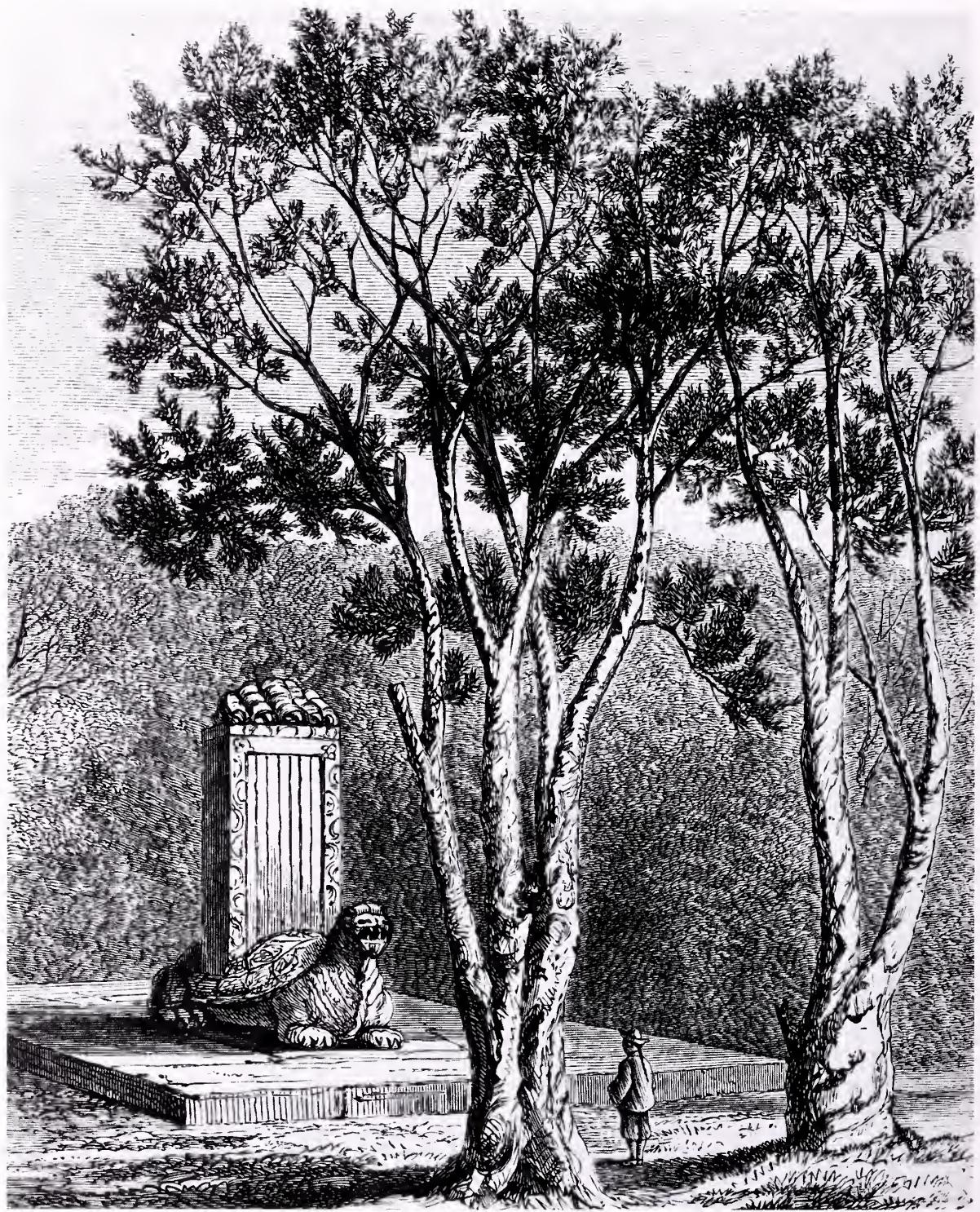
Without official sanction, Dr. Hu sent the message that she was in Beijing to a botanist friend with whom she had corresponded for years. The messenger was her nephew, who found the man in a traditional bathhouse and received only the message, "Go back." Later that night a girl appeared at Dr. Hu's hotel room and told her to go to the Institute of Botany the next day. Skipping the tour program for the day, Dr. Hu went to the institute and found a party in her honor, as well as the gratifying chance to talk with her Chinese colleagues. Further gratification came the next day as her plane was leaving. T. T. Yu, Deputy Director of the Institute of Botany and a former student of H. H. Hu, came with two other botanists to say, "Please bear our greetings to botanists elsewhere."

In 1977, after Mao died, T. T. Yu asked Dr. Hu to go to China and work with young Chinese botanists. She went the following year lecturing and giving intensive courses in Beijing, Lingnan, Manchuria, and Shanghai.

Dr. Hu made her last trip to China in 1984, when she was the keynote speaker at an international symposium in Hong Kong on Chinese medicinal-plant research and went on to Canton to give ten lectures. She was made an honorary professor at South China Agricultural University in a ceremony attended by the governor of the province and other officials. A second honor came to her in her own province, Kiangsu, where she was made an advisor of the botanical institute.

She then travelled to Tibet and Mongolia, "... and I went to places that no other foreign botanists were allowed to go. So I have in my file material to write on the frontier of Chinese botany"—both the physical frontier and the metaphorical one, she explained.

Dr. Hu is at present writing articles on Chinese food plants and on Chinese medicinal plants introduced into America as ornamental plants and weeds. "Seven hundred of them," she exclaimed. "And I had such a big part!"



Pinus bungeana Zuccarini—A Ghostly Pine

Robert G. Nicholson

This attractive, white-barked pine from China, once a favorite of emperors, would be suitable for modern parks, cemeteries, campuses, golf courses, and lawn plantings

When one sits in a garden with peach trees, flowers, and willows, without a single pine in sight, it is like sitting among children and women without any venerable man in the vicinity to whom one may look up.

—Li Li-weng

Despite its chauvinism, Li's assertion does indicate the high regard the Chinese have for pines in the garden. It also hints at the symbolic system that existed in Li's time: plants sited in a garden were not chosen for form, texture, and flower alone, but also as symbols of abstract thought or representatives of human qualities. Pines portrayed hardiness, strength of character, virtue, or stalwart friendship in adverse times. These extraordinary trees had a stately poise, a silent wisdom attained only through longevity; their age often was embodied by their gnarled habits or stout trunks. Along with bamboo and the early-flowering apricot, pines formed a trio of plants known as "the three friends of the cold season," as they lent respite to winter with their evergreen foliage or early flowering.

One pine in particular has for centuries been a favorite species for temple gardens and

courtyard plantings and has come to be known in the West as the lacebark pine, *Pinus bungeana*. It was first described by Joseph Zuccarini (1797–1848) from specimens that Aleksandr von Bunge (1803–1890) had collected in the temple gardens of Beijing; he was the first Westerner to collect the species. The first live material brought to England was a plant that Robert Fortune (1812–1880) had purchased near Shanghai. An Englishman, Fortune travelled to China four times between 1843 and 1861. His interest in China's flora enabled him to supply plants to the leading horticulturists in London. An engaging chronicler of the era, Fortune gives vivid accounts in his books of plant hunting in China during the Imperial Dynasty, a period when "barbarians" were severely limited in their movements and had to resort to subterfuge to slip into restricted areas.

In his book *Yedo and Peking* (1863), Fortune offers an account of a group of lacebark pines seen in a cemetery just west of Beijing. "Near these Royal tombstones," he wrote,

I observed a species of Pine-tree, having a peculiar habit and most striking appearance. It had a thick trunk, which rose from the ground to the height of three or four feet only. At this point, some eight or ten branches sprang out, not branching or bending in the usual way, but rising perpendicularly, as straight as a larch, to the height of 80 or 100 feet. The bark of the main stem and the secondary

Two lacebark pines (*Pinus bungeana* Zuccarini) near the royal tombstones in Beijing as illustrated in Robert Fortune's *Yedo and Peking* (1863).

stems was of a milky-white color, peeling like that of *Arbutus*, and the leaves which were chiefly on the top of the tree, were of a lighter green than those of the common Pine. Altogether this tree had a very curious appearance, very symmetrical in form, and the different specimens, which evidently occupied the most honourable place were as like one another as they could possibly be.

In all my wanderings in India, China or Japan, I had never seen a pine tree like this one. What could it be?—Was it new?—And had I at last found something to reward me for my journey to the far north? I went up to a spot where two of these trees were standing, like sentinels, one on each side of a grave. They were both covered with cones and, therefore, were in a fit state for a critical examination of the species. But although unknown in Europe, the species is not new. It proved to be one already known under the name of *Pinus bungeana*. I had formerly met with it in a young state in the county near Shang hae, and had already introduced it into England, although, until now, I had not the slightest idea of its extraordinary appearance when full grown. I would therefore advise those who have young plants in their collection to look carefully after them as the species is doubtless perfectly hardy in our climate and at some future day, it will form a remarkable object in our landscape. One of the trunks, which I measured at three feet from the ground, was 12 feet in circumference.

Since Fortune's day, there have been numerous accounts of the pine in China, generally descriptions of trees seen at temples in Beijing, and always expressing amazement at the white, milky bark. Forsythe Sherfessee, a forestry advisor to the Chinese government in the 1920s, wrote, "It is one of the most remarkable of all trees on account of the dazzling whiteness of its bark, a feature which renders it wholly and strikingly unique. In addition, its form is graceful and picturesque, and its foliage unusually delicate."

Accounts from the wild are much harder to find, testifying to the rarity of the plant. Few western botanists have seen the species in its scattered native range, the provinces of Hopei, Shansi, Shensi, Kansu, Szechuan, Hupeh, and Honan.

E. H. Wilson found the plant in two districts in western Hupeh but considered it very rare.

He reported trees 25 meters tall growing at 1,250 meters in elevation, anchored in mud and sandstone shales. Wilson wrote that "on old trees the bark on the trunk, on the main branches and exposed main roots, is milk-white and exfoliates in flakes of irregular contour."

Joseph Hers, a Belgian who collected in northern China during the 1920s, noted the plant growing "in rather large numbers in the district of Lushih (Honan), always at about 1500 meters altitude, clinging to the rocks and also south west of Taiyuanfu (Shansi) at the same altitude." He recorded that the wood is very brittle, and despite a fine grain and nice color, was used by the Chinese only for coffins. Hers' account of the lacebark pine also told of a brisk trade in wild-collected seedlings of the "white-boned pine" between Shansi and Honan to other provinces.

Two accounts detail the tree's growth in Shansi Province. In 1924, Dr. Harry Smith, a botanist from Uppsala University in Sweden, travelled through the southern and central areas of the province and reported that large areas had been clear-cut and eroded near the more settled areas. Even the cemeteries and temples did not seem to shelter the flora as in other regions of China. One very important exception existed. A temple in the western Mien-shan Mountains at Chieh-Hsiu, had preserved an entire forest of *Pinus bungeana*, numbering about 4,000 trees. The lacebark pine was the chief component of this exotic white forest, but *Cupressus* sp. and *Pinus tabulæformis* also grew in the dry, stony ground, as did an understory of *Cotoneaster*, *Pyrus*, *Lespedeza*, *Vitex*, *Vitis*, and *Rhamnus*. I can only imagine the images a nature photographer such as Eliot Porter or Ansel Adams might have produced from a forest of white-skinned conifers bedecked with soft, fresh snow. In 1929, T. Tang, on an expedition from the National University of Peking also collected in central and southern Shansi. He recorded *Pinus bungeana* from a number of sites, estimating some trees to be over 100 feet (30 m) tall. In a somewhat ominous aside,



Taken in 1913 at the Imperial Gardens, Beijing, by J. G. Coolidge, this photograph includes a specimen of the lacebark pine (far right). From the Archives of the Arnold Arboretum.

Tang records reckless lumbering, with the lacebark pine being felled and sawed into planks.

Contemporary descriptions of *Pinus bungeana* are somewhat scarce, and its present range would seem to be much less than what it once was, owing mainly to the need for fuel and lumber. Zhiming Zhang of the Beijing Botanical Garden and a former Mercer Fellow at the Arnold Arboretum, wrote to me last summer, in response to my inquiries about the plant, that "*Pinus bungeana*, generally speaking, is widespread in northern China. It appears," he continued,

everywhere as a primary urban tree, which can be found in temples, ancient graveyards, emperors' palaces, gardens and even streets. It ranges naturally about 1200–1850 meters above sea level from Shanxi to Henan Province. I saw a natural forest of it on the western Henan boundary with Shanxi province at the time when I went there for plant collection in 1981. It grows not as well as that in the city. It grows slowly when it is young and faster after ten years or more.

Our experiences with the cultivation of *Pinus bungeana* at the Arnold Arboretum echo those of Mr. Zhang, as the plant grows very slowly from seed. Seed sent from

China and sown in late March of 1986 (AA 1304-85) germinated heavily after a three-month cold stratification, but two years later

stood only three inches high. Seed that was hand delivered by a delegation of visiting Chinese botanists in 1979 (AA 79-566) germinated well, but its progeny now stands at only 27 inches high after nine years's growth in our nursery.

Our plants on the grounds also seem small for their age in comparison to other species of pine. AA 1285-64-B, a plant almost 25 years old, is a four-stemmed specimen measuring only 10 feet high and 9 feet wide, although it has put on 4 feet of growth in the last three years. Our two oldest plants were grown from seed received from the Lushan Botanic Garden in China in 1949. AA 663-49-A is planted in full sun on a rock outcrop. Its nine stems show mottled bark, and it measures 15 feet high by 20 feet wide. Its three-stemmed sibling, AA 663-49-B, is perhaps better sited and measures 26 feet high by 30 feet wide. Clearly, it is not a species for those inclined toward rapid gratification, but for gardeners who can derive pleasure in planting for future generations.

Although the lacebark pine has been in cultivation in the United States for over one hundred years, there are relatively few specimens of note, and it is mainly found on old estates and in botanic gardens. To my knowledge, the premier specimen is in Brookline, Massachusetts, at "Holm Lea," the old estate of Charles Sprague Sargent, first director of



The mosaic bark of the lacebark pine (*Pinus bungeana*) at "Holm Lea," the estate of Charles Sprague Sargent in Brookline, Massachusetts. Photographed by the author.

the Arnold Arboretum. It is over a century old, stands 65 feet high and 30 feet wide and presents an irregular-oval outline. Its texture is fine, and one can easily see the eleven strongly vertical main trunks. The thickest of these has a 5-foot circumference at breast height, while at ground level, where the trunks converge, the circumference measures 16 feet.

Its bark is a spectacular collage of color, showing irregular splotches of lime green, buff brown, and yellow against a background of silvery gray. It gives the effect of a massive abstract mosaic sculpture.

This vivid bark, however, presents a mystery: why aren't any of the trees in cultivation in the West showing white bark?

I suspect it may be either a function of age, the bark turning white with old age (as our hair does), or the result of something in our soils or our weather that precludes the formation of the white bark and that causes the pines to retain a mosaic pattern throughout their lives. As J. M. Addis reported seeing young trees with white, flaking bark in a Beijing nursery, it looks as though the mystery will continue a bit longer.

The Chinese have used *Pinus bungeana* for specimen planting in courtyards and have also lined avenues with it, letting its white boughs arch together. I suggest that it be considered for lawn plantings, public parks, cemeteries, golf courses, and corporate and college campuses. It has shown a wide range of tolerances, growing in poor alkaline soil and acid brown soils and tolerating temperatures over 100 F and below 0 F. Selective pruning during the early stages of a tree's life would help to show the trunk to best advantage and establish good form.

This amazing tree, a witness to the burials of the Celestial Empire, is still a rarity outside China. Its odyssey from remote windswept mountains in China to royal courtyards, to the estates and botanical gardens of the West is an unrivaled journey. If it proves nothing else, it is that the appreciation of beauty knows no boundaries of time or space.



Plant collector Frank N. Meyer photographed this specimen in Shantung Province in 1907. He stated that "The most noble specimen of a white-barked pine yet seen by me. Growing in the Yen-fu-tse temple [in Chu-fu]. Measures sixteen feet in circumference, six feet above the ground. I estimate its age at fifteen or sixteen centuries, though the Chinese say it is much older. For noble, serene impressiveness, I have not seen a tree yet, that can be compared with this white-barked pine. Photograph from the Archives of the Arnold Arboretum.

We are pleased to report a surplus of *Pinus bungeana* seedlings and are offering trios of two-and-one-half-year-old plants of AA 1304-85 for \$25.00, payable in advance. Orders received by September 30, 1988, will be mailed in the fall, those afterwards in the spring. Send orders, with checks made payable to "Arnold Arboretum," to:

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Robert G. Nicholson is a member of the staff of the Arnold Arboretum. He writes often for *Arnoldia* and other horticultural publications.

BOOKS

Living Treasures: An Odyssey through China's Extraordinary Nature Reserves, by Tang Xiyang. Illustrated with more than 300 color photographs. Foreword by S. Dillon Ripley. New York: Bantam Books, Inc.; Peking: New World Press. 208 pages. \$29.95 (\$34.95 in Canada).

MARION D. CAHAN

Tang Xiyang, a journalist who was banished, along with his family, to a "reform-through-labor" camp in the Chinese countryside during the Cultural Revolution, has written a delightful and informative book about his adventures in China's superb nature reserves. Tang's total concern, dedication, and unshakable resolve to protect all wildlife in spite of great physical hardship and danger are inspiring. In addition to recounting adventures of his own in more than three hundred of the reserves, he provides data on their environment, topography, and history, and on the present status of their floras and faunas. His writing, pleasantly fluid and absorbing, is complemented by gems of classic Chinese poetry and historical accounts.

China's nature reserve system is undergoing a vigorous period of growth. In a recent three-year period, one hundred seventy new reserves were established—nearly as many as were established in the previous thirty years. I found it particularly interesting to learn of the high protection that China now provides the plants and animals in the reserves. Severe penalties are imposed on those who trap or kill animals, for example.

The "human element" of animals is conveyed in touching vignettes. There is a particularly lovely story about Tang's discover-

ing an unspoiled expanse of "swan lakes" in Xinjiang's Yurdus Basin, where herdsmen live in peaceful coexistence with swans, which they consider to be the bearers of good luck from heaven. In other vignettes elephants display "community spirit," monkeys break open ropes with their teeth to rescue trapped friends. Tang describes the last surviving band of Guizhou golden monkeys, animals so rare that their scientific value is beyond calculation; the crested ibis, the rare reptile that may have prompted the myth of the dragon; the elusive panda.

This compelling and fascinating book is the first-ever joint publishing venture between the American publisher, Bantam Books, and the People's Republic of China. A few photographs, unfortunately, are not sharp; this may be due to the difficulty of holding a camera for long periods while waiting to take a shot. Also, many of the photographs were taken from a great distance. Unfortunately, too, there is no index. Despite its shortcomings, this excellent book is well worth reading.

Marion D. Cahan has been a volunteer member of *Arnoldia*'s editorial staff for the past several years. An alumna of Radcliffe College, she has studied architecture in the Graduate School of Design, Harvard University.



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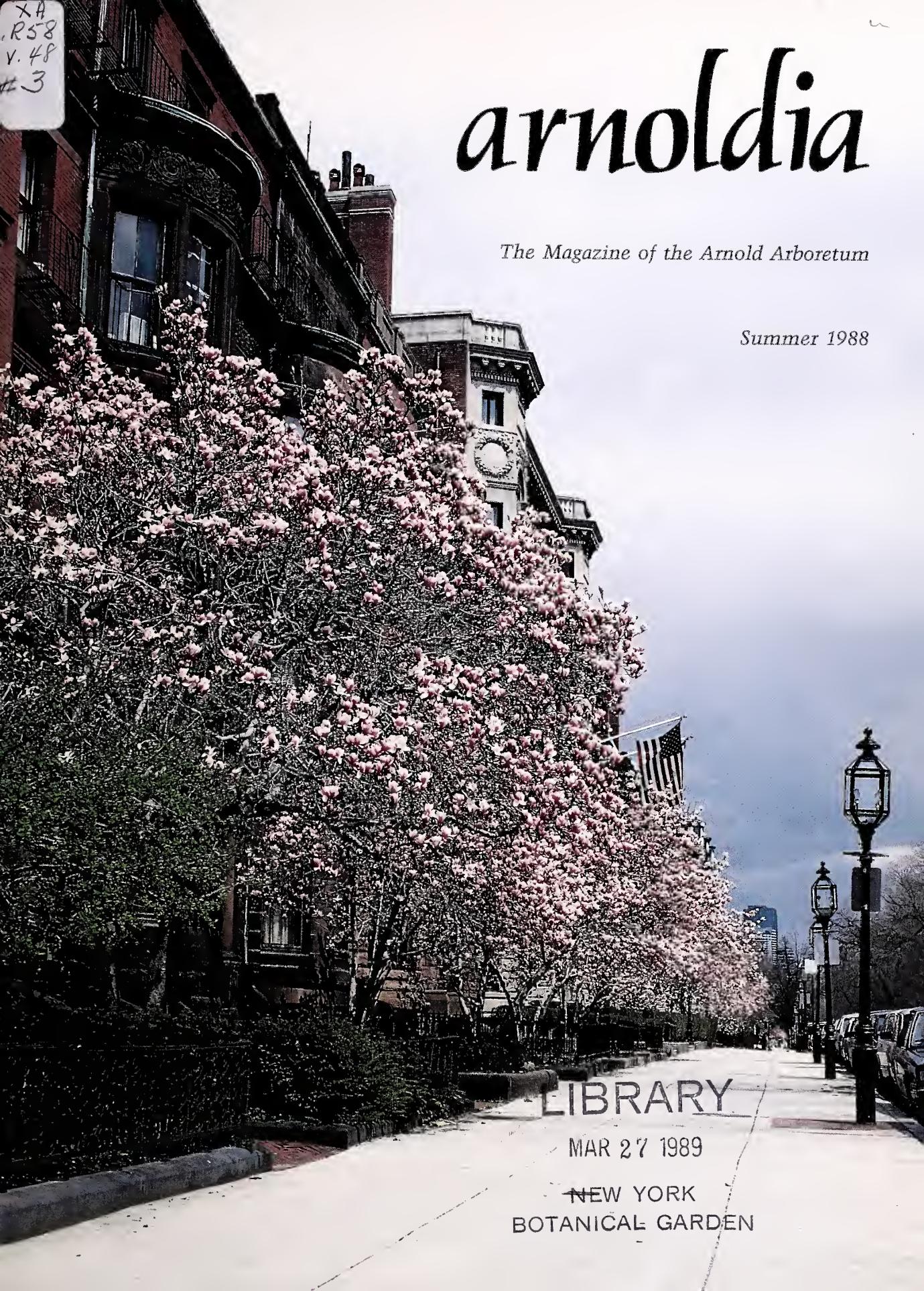


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Front cover: The saucer magnolias (*Magnolia ×soulangiana*) planted along Boston's Commonwealth Avenue during the 1960s as the result of Laura Dwight's efforts to beautify the avenue and arrest its decline. Dwight was able to marshal wide community support for her effort. Photographed by Peter Del Tredici. (An article by Judith Leet in the forthcoming Fall 1988 issue of *Arnoldia* will describe Dwight's campaign.) • *Inside front cover:* Frederick Law Olmsted, the designer of Boston's "Emerald Necklace" of parks and parkways. Photograph from the Archives of the Arnold Arboretum. Several of the articles in this and the Fall 1988 issue of *Arnoldia* will describe or refer to Olmsted's pervasive influence upon Boston's park system. • *Inside back cover:* A scene in the Boston Public Garden. Photograph copyright © 1988 by Doug Mindell. (See page 32.) • *Back cover:* An infrared aerial photograph of the Boston Public Garden. During the early 1970s, the Boston Parks Department used such infrared photography to assess the health of the Garden's trees. Photograph by Mary M. B. Wakefield. (See page 32.)

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Aerial view of Boston and Boston Harbor, looking eastward. The Charles River and the Esplanade appear in the foreground. Boston Common and the Public Garden occupy the center foreground, and several of the Boston Harbor islands are scattered in the background. Copyright © 1988 by Alex S. MacLean/Landslides.





Restoring Boston's "Emerald Isles"

Two special issues of *Arnoldia* on Boston's parks and open spaces

Boston rides the sea! Like Venus, she was born of sea-foam and spindrift, of ebb and flow. Her existence, her very identity, she owes to the sea. Like Venice, Boston is as much sea as land; the sea still flows in her veins. Some newer parts of Boston—some neighborhoods, some parks, even entire sections of the city—arose, quite literally, from out of the sea a mere century or so ago. Even now they are borne upon the salty underground waters that diffuse inland from the sea: much of the Public Garden and all of the Commonwealth Avenue Mall, for example, were built upon what once were tidal flats in the Back Bay. Dwellings and other structures in the filled areas, built on wooden pilings during the nineteenth and early twentieth centuries, are sustained to this day by the subterranean seawater, which keeps them from decaying, which keeps them, therefore, "afloat." Where the seawater fails, checked perhaps by a massive modern building, the pilings rot, and older structures founder.

Boston may have turned her sights inland or elsewhere at times, but she has never been able to cut herself off entirely from the sea: her soul still flows from, is still sus-

tained by, the sea; her heart of hearts beats yet to the systole, beats yet to the diastole of the tide.

In the late nineteenth century, after the Back Bay had been filled in, islands and peninsulas of another sort, anchored to the Common and Public Garden by way of the Commonwealth Avenue Mall, extended inland into Boston's far-flung neighborhoods, at their outer limits arching inexorably back toward their source, the sea. The result was one of Frederick Law Olmsted's crowning achievements, Boston's famous "Emerald Necklace" of parks and parkways.

Boston's bay and harbor are, like the land, studded with islands and islets of an emerald hue, only these are actual islands surrounded by water, not urbanized land. Olmsted had hoped to make them part of the Emerald Necklace. They once supported lush deciduous forests, but the forests were long since cut off. Lately, however, many of the islands in Boston Harbor have become parklands, and their forests are beginning to return. Lately, too, Boston's landbound archipelago of parks—including the Emerald Necklace—has experienced a renaissance of sorts as a tide of prosperity has

swept the region. Attitudes toward parks and other kinds of open space have undergone a sea change. There is optimism in the air. Individuals, citizens' groups, private organizations, and government agencies, in diverse and ingenious ways, have set about polishing the gems of the Emerald Necklace, the islands in Boston Harbor, and other jewels in Greater Boston's system of parks. A century after that superb system was created—a century during which Boston's parklands have endured long periods of neglect—events have come full circle. The harbor islands have been secured as parkland, and Boston's parure of emerald islands—terrestrial and marine alike—is at last complete. This little gray dowager by the sea is gray no more: she begins to glow in resplendent ornament.

This and the Fall issue of *Arnoldia* chronicle a few of the many selfless efforts Bostonians have made over the years to create, to salvage, to complete, and to rehabilitate some of their community's most precious cultural assets—its parks and other public spaces. As the articles that follow show, today's efforts build upon the devotion, hard work, selflessness, and genius of past generations.

An Overview of Boston's Park System

Boston's park system is one of the oldest and most comprehensive in the country—an extraordinary resource for its citizens and visitors. Its 2,500 acres range from the famous and beautiful 1,000-acre Emerald Necklace, stretching through the city its woodlands and vistas, to 185 neighborhood parks, playgrounds, and play areas, nearly half of them under an acre in size, offering pockets of open space and recreational opportunities in every part of the city. The system includes cemeteries, golf courses, pools, monuments, fountains, statues, foot bridges, and street trees.

The history of Boston's park system has been varied. Although the Boston Common has been common land since 1634, and the Public Garden was laid out in 1838 and deeded to the city in 1852, in 1875 Boston lagged far behind other American cities in the amount of land and attention it had paid to public parks. Only 115 acres had been designated as public open space. All this changed, however, during the last decades of the nineteenth century, which saw the birth and development of one of the country's great park systems. Public discussion about the need for urban parks began in the 1860s and, through public hearings, press debates, and political battles, culminated in the creation of the Boston Parks Commission in 1875. A year later the Commission published its first report; a public meeting, "Parks for People," urged immediate adoption of the plan. The following year, the city set aside \$900,000 to acquire and develop land, and in 1878 Frederick Law Olmsted was hired to plan a park system for Boston.

Between 1878 and 1895, Olmsted designed, and the city eventually built, a city-wide parks and parkway system and five large neighborhood parks. His Emerald Necklace was designed primarily to create country parks and a continuous chain of green, but also to solve serious water pollution and health problems resulting from the flow of sewage out of the Stony Brook and Muddy River onto the tidal flats of the Charles River. The Emerald Necklace includes the Back Bay Fens, the Muddy River, Olmsted Park, Jamaica Pond, the Arnold Arboretum, and Franklin Park. As the Back Bay filling was completed, Commonwealth Avenue Mall became a link between the Emerald Necklace and the Public Garden and Common.

The Emerald Necklace parks and the parkways linking them—the Fenway, the Riverway, the Jamaicaway, and the Arborway—were designed as one system. Today the parks are managed by the city, the parkways by the Metropolitan District Commission. An exception is the Arnold Arboretum, which is owned by the city but operated by Harvard University. Prior to construction of the Arboretum, the city bought the Arboretum land from Harvard in 1882 and leased it back to Harvard for a thousand years. Under this agreement the city accepted responsibility for building and maintaining the roads and for policing the grounds. From this point to the present, the Arnold Arboretum has functioned as a horticultural museum and as a park. Its splendid 265 acres of rolling lawns and walkways through carefully groomed trees, flowering shrubs, and rare plants make the Arboretum an especially well used and appreciated park, serving immediate neighborhoods and the entire metropolitan area.

—Excerpted from *The Greening of Boston: An Action Agenda*

Opportunities—Past, Present, Future

Twenty-one years ago an article by Edward Weeks, editor of the *Atlantic Monthly* magazine, appeared in *Arnoldia*. It dealt with the state of Greater Boston's parks in particular and environment in general. Addressing many of the issues—problems to be solved, opportunities to be seized—with which the articles in the Summer and Fall 1988 issues of *Arnoldia* deal, it provides a revealing context for evaluating the current state of affairs. Thus, it is reprinted on the following pages. There follows an article by Mark Primack, executive director of the Boston GreenSpace Alliance. Written expressly for this issue of *Arnoldia*, it responds to Weeks' article and presents a picture of the situation today.

ARNOLDIA



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OUR DISAPPEARING OPPORTUNITIES¹

Ladies and Gentlemen :

I welcome the opportunity of being the first speaker in this Parkland Conference and my theme which I shall keep coming back to is this: that the character and beauty which we strive to preserve in this city and Commonwealth too often have disappeared before we citizens ever knew that it was threatened.

The American elm is a New England character. It used to shade the oldest house; its wine-glass silhouette is a landmark in any meadow; its branches make a summer cloister of famous streets in Salem, or Williamstown, and with the lilac bush it is the last guardian of the deserted farm. Rightly it is called the Patriot Tree, for under its boughs treaties were signed with the Indians, Washington took command of his Army; George Whitefield, the evangelist, preached to thousands on Boston Common; and under it came the rushing embrace of the home-comings after Appomattox. The sight of an old elm makes you feel younger and, for the moment, surer that good things last.

A century ago in the Atlantic the "Autocrat of the Breakfast Table," Dr. Oliver Wendell Holmes, sent out a call for someone to do the biography and the photographs of the oldest elms in New England, and in time the book appeared with superb plates by Henry Brooks, and the text by Lorin L. Dame. This big folio entitled *Typical Elms and Other Trees of Massachusetts*² is a rarity today. Every tree in it was more than a century and a half old, and what beauties they were: elm, oak, ash, tupelo, and the great chestnuts which Thoreau used to measure with two-and-a-half spreads of his arms. Chief among them was the elm, known as the Great Tree; it was planted in the Common about 1640, and it suffered from its first major cavity a hundred years later; a tree dentist in 1740

¹ An address presented at the Parkland Conference, sponsored by the Trustees of Reservations, in Boston, May 24, 1967.

² Boston: Little, Brown, and Company. 1890.

cleaned out the rot, filled the cavity with "clay, and other substances," and then bandaged it—yes, bandaged it—with canvas. The big beauty lived on until February 1876, for a total of 236 years, and when the winter gales finally destroyed it Bostonians rushed to the spot and took home slabs and cuttings for table-tops and chairs.

The Dutch elm disease was not man made, nor was the blight which exterminated our chestnuts, but the fact that one of these splendid species is now extinct and the other dangerously threatened should make us more intent to preserve the good trees we have. But has it? Not that I can see. The elms at the southern extremity of the Boston Common are diseased and dying; they should be cut down and healthy ones planted in their place. In the Public Garden we have lost many of the rare trees planted there by Frederick Law Olmsted; the replacements are commonplace willows. On Commonwealth Avenue we should have a second growth to preserve the magnificence of the Mall when the elms there go. Whose responsibility is it to care for the life of our trees?

The beauty of our heritage and the skill with which we are planning for tomorrow make Boston one of the four most visually-exciting cities in the U.S., the other three being San Francisco, New York, and Washington. Let me signalize the things which have made this so, beginning with the Park Street Church, the most beautiful single building in the center of town, and the one which continually attracts the eye. Next, Saint-Gauden's monument in memory of Colonel Robert Gould Shaw, unquestionably the finest of all our city monuments. The Boston Common, the most vital and historic city Park in the nation, and across from it the Public Garden at this moment with its regiments of tulips and fruit trees in blossom in its prime. The Bulfinch State House, and close by the whole splendid monument of Beacon Hill. Then the North End, so different with a warmth and style all its own, as is well seen on North Square; it is the oldest part of our city to be in continual residence, and we must thank the Bostonians of Italian heritage for giving it the good restaurants, the friendliness, and safe streets, full of children, which are its character today.

Go to the Arnold Arboretum when the azaleas and lilacs are ready; go some late afternoon to the Fenway for the vitality of the gardens and the vista of the Museum; and if you love trees as I do, seek out those two giant elms on Branch Street which must have been planted when the Mt. Vernon proprietors were building Federalist Boston, and which are, I believe, the two oldest elms in the city today.

Finally, go at any time of night or day to the Charles River Basin, the most satisfying modern concept in our city and one that has not yet been destroyed by the automobile.

High rise of glass and concrete can be built anywhere; it is these things I speak of which rank Boston with the three other cities I cited. And how do we compare?

How are we keeping things up? Look at Park Street Church, for instance. Not long ago the ugly rumor reached me that the proprietors of the church were considering the possibility of an eight-floor office building erected so close to the church that it would cover the rear portion. This is one of those disappearing acts that could happen before any of us were the wiser, and what a shame it would be! Or consider the Shaw Monument directly facing the State House, the Monument which should have

such significance in our struggle for civil rights, the Monument which more tourists look at than any other in the city. For fourteen months it has remained in disgraceful condition, the figures streaked and defaced, the sword in Colonel Shaw's hand twisted and broken away by vandals. The same apes have torn the sword from Washington's monument in the Garden, and nobody gives a damn! I fail to understand why Boston takes such little pride in its best things—why it is not the responsibility of someone to restore our elegance. Our streets, whether in the Back Bay or on Beacon Hill, are so filthy with papers and beer cans that I should be ashamed to compare them with the residential streets Mayor John Lindsay has cleaned up in New York. As for the pollution of our nearest water, you only have to *smell* the Charles to know how foully we compare with Washington in that respect. The beauty of Boston Harbor was once known from here to Shanghai. If that shambles can be restored by Mr. Pei and Edward Logue,³ we shall be deeply in their debt.

But what about the canopy overhead? By any measurement our air ranks Boston as one of the ten dirtiest cities in the nation. Isn't it a luxury to talk about preserving the beauty and character of the city when the air we breathe, the milk and water we drink, the land we love is as polluted as it is in this Commonwealth? The problem of pollution nation-wide is appalling, and the worst thing about it is that it is all man-made, made right here in the U.S. We are all to blame. The pollution from our automobile exhausts and factory chimneys, the industrial waste which fouls up our streams, the accumulated lethal acids which run off the land into our ponds and lakes, for these we have only ourselves to blame.

It sometimes seems to me as if our scientists worked in hermetically sealed cells intent on one-half of an equation and never counting the cost. Having perfected pesticides which could be dusted on our crops and DDT sprays which might bring momentary protection to our trees, it seems never to have occurred to chemists that what they were pouring over the land and forest could not be dissolved in water and would grow more lethal in its poisoning as it passed through each living organism. One wonders if the sludge now accumulating in Lake Erie will grow to the point where even ice-breakers can no longer penetrate it.

The best we can do about pollution locally is to join up into teams of vigilantes with two objectives in mind: to clean up and protect the neighborhood for which we are responsible, and to set aside in our own domain more of the open places and wet lands, more of the woods, and what the English call the "green lungs" which our grandchildren must have in the future. This was the original and driving purpose of the Trustees of Reservations; it is something that the community can do better than the state, and indeed, better than Washington, unless of course the project proves to be as large as the Cape Cod National Seashore Park.

I think we should celebrate those communities which are taking the initiative. I think that in January the Governor ought to cite each community which has carried to completion a major project

³ Respectively, Mr. I. M. Pei of I. M. Pei and Associates, Architects, and Mr. Edward J. Logue, Development Administrator, Boston Redevelopment Authority.

in Conservation. High on any list as this moment would be the town of Dennis, which at a recent town meeting voted \$625,000 with which to purchase 1700 acres adjoining the town; 1700 acres of beach, uplands, and salt marsh taken out of reach of hit-and-run contractors, to be enjoyed in perpetuity by the people. Where can you do better than that?

I think the towns of Lincoln and Concord should be cited for their vigilance in zoning, for protection of their trees, and taking such pride in the health of their marshes and wet lands. I think we should cite Bedford for the long, patient work they have done in cleaning up their share of the Concord River. Credit should go to Framingham for its unique Garden-in-the-Woods, and for those who have built up the quarter of a million dollars which will fortify it for the future. And to Salem great credit for preserving the glory of Chestnut Street.

Now coming back to Boston, wouldn't it be wonderful if the powers that be in the State House could be persuaded to invest in the depollution of just one famous Massachusetts river? It might be the Charles; it might be the Concord; it might be as ambitious an undertaking as the Merrimack. The Commonwealth of Pennsylvania was not afraid to clean up, to depollute miles and miles of the upper reaches of the Schuylkill. Why should we sit on our hands?

A famous Canadian and a bold conservationist, Roderick Haig-Brown, has proposed that all existing pollution of air, land, or water should be taxed in proportion to the demand it makes upon the resource. "All pollution," he says, "is the use of public property for private profit. It can be most accurately measured at its source and it should be taxed." Well, why not? Too often the attitude of the authorities is how much pollution can we get by with short of causing a disaster; how much of the cost of industry or settlement can we shove forward to be paid by the next generation. But if we had a pollution tax that could be graduated so as to insure the maximum elimination over a period of years, what a God-send it would be.

—EDWARD WEEKS, *Editor*
Atlantic Monthly Press

TWENTY YEARS AFTER: THE REVIVAL OF BOSTON'S PARKS AND OPEN SPACES

Boston is in the midst of the greatest round of parkmaking and landscape restoration since the Emerald Necklace was created a century ago. After decades of neglect, bad planning and design, and a lack of capital and operating funds, both the Boston parks managed by the City of Boston and the regional parks managed by the Metropolitan District Commission are being revitalized, from Boston Common to the Blue Hills. Though we did not take many of the opportunities to create new parkland and conserve natural areas that Edward Weeks prayed for in these pages in 1967, fears about the rapid development of Boston in the last few years and the coming together of a strong open-space constituency are finally creating movement. Major new public green spaces are coming on line, under construction, or in the final stages of planning; other emerald visions are in the air. Boston in the year 2000 will be greener and even more livable than it is today.

We are emerging from an era when parks were seen as peripheral to the life of Boston; when park agencies were seen as patronage dumping grounds; when the grass went unmowed and the barrels unemptied; when fires, illegal dumping and land giveaways ravaged the forest reservations; and when there appeared to be no political constituency for our parklands. Today we are experiencing an extraordinary revival of attention to our parklands. This revival is the result of community initiative, strong leadership from groups like Boston Urban Gardeners and the Boston Natural Areas Fund, as well as from public officials, a growing number of public-private partnerships, and the realization that public parks are of great—if often unconscious—importance to urban people, residents and commuters, tourists and immigrants, young and old, rich and poor.

In 1886, Charles Eliot, landscape architect, apprentice of Frederick Law Olmsted, and instigator of both the Trustees of Reservations (the oldest land trust in the world) and the Metropolitan Park system, wrote, "For crowded populations to live in health and happiness, they must have space for air, for light, for exercise, for rest, and for the enjoyment of that peaceful beauty of nature which, because it is the opposite of the noisy ugliness of the city is so refreshing to the tired souls of townspeople." Now, a century later, some sixty-eight percent of the city's population lives in public or subsidized housing. Thirty-one percent of the city's children live at or below the poverty line. We have again come to the realization that for the many city residents who cannot afford a vacation home or a rental on Cape Cod or in the mountains of New Hampshire, the public parks are a primary resource for respite, relaxation, physical release, and contact with the natural world.

As well, the environmental movement, which gained such force in the 1960s, has finally turned its attention to the quality of city living. This trend has been reinforced by such sports as jogging, bicycling, and gardening, and by an expanding circle of birders and students of nature. Even businesses have come to see that quality open space is an attraction for customers and workers. In sum, as the recent report, *The Greening of Boston*, declared, "Parks and open spaces are fundamental to the

physical, social, and economic health of the city."

All the pieces are falling into place to translate this renewed comprehension of the meaning of urban open spaces into a real renaissance of Boston's existing open spaces and a second great decade of parkmaking a century after the first. Governor Dukakis and his administration have developed programs to restore and enlarge the urban open space inventory—with passage of a \$600 million open-space bond issue last December by the legislature, the funds should be available to implement these programs. Mayor Flynn has exerted strong leadership on the park issue, allocating over \$75 million for capital improvement of existing parklands, doubling the budget for the Parks and Recreation Department and placing a high priority on effective management of the city's parks. The Boston Parks and the MDC commissioners are dynamic leaders with vision and political savvy. In neighborhoods across Boston, residents have become stewards of the public realm, cleaning and programming the parks and demanding that public agencies fulfill their responsibilities.

At the Boston Redevelopment Authority, new open spaces are being negotiated from developers. The Mayor's Office of Capital Planning has completed the most comprehensive Open Space Plan in more than fifty years. After a lapse of decades, the Massachusetts Audubon and Horticultural societies have once again become active in Boston. And in the last three years, over one hundred community, civic, and environmental groups and public agencies have come together in the Boston GreenSpace Alliance to speak with one voice for all of Boston's parks and open spaces, existing and potential.

Though years of sustained public advocacy and support will be required, a brief review of the green-space projects, plans, and visions on our collective table shows that Boston can be known as the "City of Parks" in the year 2000.

Belle Isle Marsh Reservation

After years of citizen effort, this largest remaining saltmarsh in Boston was opened as an MDC reservation in 1986. With walking trails, boardwalk, viewing tower, and extensive educational programming, Belle Isle Marsh has become a key place for teaching city schoolchildren and adults about the ecology and value of saltmarshes. A favorite of birders, the Marsh is host to great blue herons, marsh hawks, and snowy owls.

Southwest Corridor Park

The greatest addition to Boston's park inventory since the Esplanade was created in the 1920s, this fifty-two-acre, linear parkland connects downtown Boston to the Arnold Arboretum and Franklin Park along the Orange Line transportation corridor. Completed this spring, the Southwest Corridor Park was planned and developed by the Massachusetts Bay Transportation Authority (MBTA) with much community involvement. It is managed by the Metropolitan District Commission (MDC). A dual-circulation system invites and separates bikers and joggers from slower-moving strollers. Planted with an extensive variety of trees, shrubs, vines, and flowers, the park includes twenty children's play areas,

community gardens, and numerous ball courts.

Boston Common Renewal

Boston Common, oldest public greenspace in the United States, is being restored to the people after years of decline and deferred maintenance. In the last year, the Parks and Recreation Department has pruned every tree, laid new turf, installed knee-high fencing, and removed dead elms. To prevent



View of Belle Isle Marsh in East Boston, with Boston in the background. Recently, one thousand acres of marsh in the Belle Isle area were granted special protection by the Commonwealth of Massachusetts. Photograph by Richard Howard. Courtesy of the Boston Foundation and the Boston GreenSpace Alliance.

criminal activity on the Common, a complete lighting system, made possible by a grant from the Department of Environmental Management, now illuminates the Common's walkways. Improved maintenance procedures have given the Common a new luster. More improvements are planned.

Restoration of Neighborhood Parks

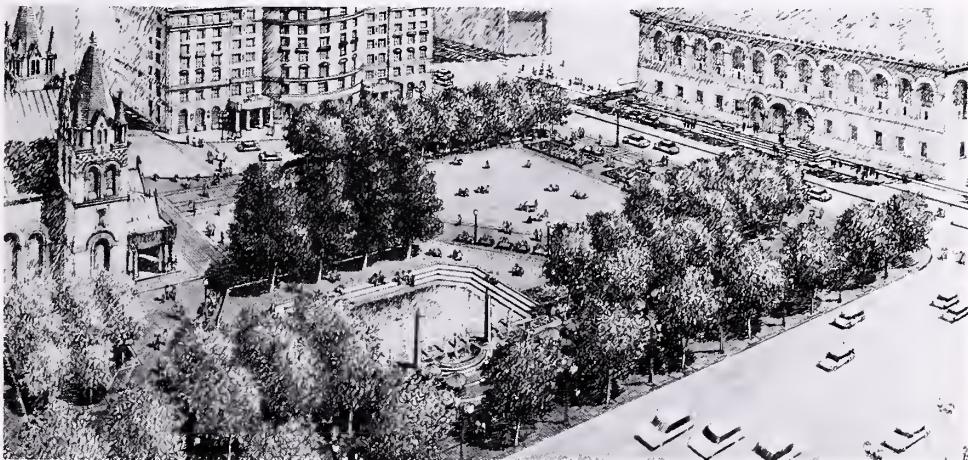
Work is well underway on the City's five-year plan to renew over one hundred neighborhood parks and playgrounds. Play and recreation equipment is being restored or replaced; new turf, benches, and signs installed; fencing and lighting repaired or replaced; and trees and shrubs pruned or planted. Over eighteen "tot-lots," so important to young children in the neighborhoods, are being rehabilitated this year alone.

Restoration of the Emerald Necklace

With \$11.25 million in grants from the Department of Environmental Management's (DEM's) Olmsted Historic Landscape Preservation Program, the City is restoring five Olmsted-designed parks: Back Bay Fens, the Muddy River, Olmsted Park, Jamaica Pond, and Franklin Park. Long-term Master Plans are nearing completion for each park, and early-action moneys have already been spent on pruning and other desperately needed work. Among the proposed priorities for construction in these parks over the next year or two are: repair of historic bridges, steps, and park furniture; removal of invasive vegetation; re-creation of a dual-circulation with a bike path instead of a bridle trail; improved water quality and water edges; and extensive landscaping. There are hopes that the Arnold Arboretum will receive funding from a second round of grants and that the Sears department store parking lot will be returned to parkland. This program is a major step in restoring the Emerald Necklace to its rightful place as one of the foremost park designs in the world.

Re-creation of Copley Square

Work is underway to rebuild completely Copley Square, a keystone park that had been poorly designed and did not work. The Copley Square Centennial Committee, an alliance of corporate abutters, Back Bay activists, and park professionals operating in conjunction with the Boston Rede-



An artist's drawing of the new Copley Square (now under construction), viewed from the corner of Boylston and Clarendon streets. The square will have a new granite fountain, expanses of grass opposite the Boston Public Library and near the new fountain, allées of London plane trees along Saint James Avenue and Boylston Street, brick paving, and seasonal flower beds. Trinity Church appears at the left of the drawing, the Copley Plaza Hotel in the left background, and the Boston Public Library at the top right. Construction is scheduled to be completed by the end of the year. Courtesy of the Copley Square Committee.

velopment Authority (BRA), has raised corporate, foundation, and public funds for this major initiative. Guided by an entirely new design commissioned by the Committee, Copley Square is being raised to street level, planted with many more trees, providing performance, concession, and farmer's market spaces, and having its circulation improved. Top-quality materials are being used, and a maintenance endowment and management plan are under development. Work will be completed on construction by this fall and on landscaping by next spring.

New Post Office Square Park

Post Office Square, in the heart of the financial district, is about to receive a new park on the site of an old parking garage. Entirely financed by corporate abutters through the Friends of Post Office Square, the project calls for demolition of the garage and construction of another, underground garage decked over with a park. The design approach has been creative, calling for fountains, sculpture, much turf, extensive horticultural materials, intimate spaces, and even a small restaurant. The landscape architect for the project, the Halvorson Company, was chosen after a comprehensive competition. Work on this exciting new park, which probably will be the most intensely used park in the city, should begin by this coming October. A portion of the proceeds from the underground garage will be allotted to neighborhood parks.

Harbor Access

The BRA and Boston Environment Department are completing an extensive plan for public access to Boston's waterfront. Negotiating amenities from waterfront developers, Harborwalk will follow walkways and open-space nodes from South Boston, through the downtown waterfront, to Charlestown and East Boston. Plans are nearing completion for 3.3 miles of public walkways and park frontage in Charlestown alone.

Dorchester Shores

Plans are moving rapidly forward at the MDC to extend the chain of linear shoreline parkland—which now runs from Castle Island to Carson Beach—along the entire Dorchester shoreline and up the Neponset River. Work should be completed within the year on two major links: Harborpoint, along the former Columbia Point Development, and Victory Road Park, the former Troy landfill beside the Boston Gas storage tanks. The old Neponset Drive-in Theater site and the adjacent dump have already been acquired, as have several other parcels and rights-of-way. The Department of Public Works has plans for a bikeway below the Southeast Expressway, linking Victory Road Park and Tenean Beach, and the MDC is negotiating an access with Boston Gas to extend the trail behind the storage tanks.

Brook Farm

The MDC is in the process of acquiring the 179-acre Brook Farm property in West Roxbury, site of the famous Transcendentalist utopian experiment of the 1840s. The site, which includes rich historic



Post Office Square, soon to be much enlarged. Photograph by Richard Howard. Courtesy of the Boston Foundation and the Boston GreenSpace Alliance.

and archaeological resources, abuts the Saw Mill Marsh and Charles River, with rolling hills, Boston puddingstone outcrops, and an old orchard with an abundance of birdlife. The property is slated to become a natural and cultural park.

Boston Harbor Islands State Park Master Plan

The Massachusetts Department of Environmental Management, in conjunction with the MDC, has recently completed a master plan for the Boston Harbor Islands that calls for preservation of the unique natural and historic character on most of the islands and for improved visitor services and public safety on more-intensively used islands. Fifteen million dollars have been allocated in the new State Open Space Bond issue to accomplish these improvements, as well as to increase access to the islands and rehabilitate components of the infrastructure. Funds will also be used to increase public access to Thompson Island, currently in private hands, and to begin development of Long Island as an addition to the island park.



The Arlington Street Church, still a Boston landmark after more than a century, and the two John Hancock towers, are framed by trees in the Boston Public Garden. In the foreground is the "Lagoon," on which the Garden's famous swanboats sail each summer. Photograph copyright © 1988 by Doug Mindell.

Central Artery

Increasingly, park advocates and public officials, including the MDC Commissioner and BRA Director, are discussing the open-space potential of the Central Artery once it is depressed and decked over. Ideas range from turning nearly the entire deck into open space, with a grand boulevard like the Commonwealth Avenue Mall, to having a mix of open space and new development that weaves separate neighborhoods back together.

Neighborhood Visions

If the grander visions of open space tend to the outskirts of the city and to the downtown, the real key to the environmental health of Boston lies in a vision of smaller neighborhood green spaces, for it is in the neighborhoods that Boston's people live and play. In neighborhoods around the city, people are concerned about the loss of open space and about the need for decent play spaces close to home. Several neighborhoods are actively participating in BRA neighborhood rezoning initiatives utilizing the City's new Open Space Zoning. In the South End, neighborhood activists want to preserve community gardens at the same time as affordable housing is created; in Brighton, the focus is on the neighborhoods extensive institutional lands; in Dorchester and Mattapan, residents want new tot-lots. In a number of communities, residents want to preserve urban wilds, sites of natural significance, as conservation lands. At public housing developments people want decent grounds and places for their children to play and grow. In Hyde Park, citizens want to add to the Stony Brook Reservation. As we pursue our big visions, we must acknowledge the needs and visions of these neighborhood people, for without their active support our dreams will fail or soon decay.

In conclusion, to quote from *The Greening of Boston* report:

A century ago citizens and professionals began planning for Boston's future. They dreamed of a system of connected parks, the first such system in the country, and created the Emerald Necklace. They had as vision of forest reserves and public beaches, at the edge of the city and beyond, and created the Metropolitan Park system. They heard the need for recreation articulated in every neighborhood and responded by creating dozens of playgrounds. They had visions of the Charles River dammed and lined with recreational facilities; they created the Charles River Basin and the Esplanade.

Though our dreams today reflect real community needs and the best of planning intentions, their full implementation is far from assured. Creation of grand new open spaces; revitalization of the Emerald Necklace, community parks, and Boston Common; preservation of community gardens and urban wilds; and the provision of new green links throughout the city and region: our visions will require sustained advocacy, political will, institutional mission, interagency cooperation, community support and involvement, and the participation from business, foundation, and non-profit sectors. Most of all, these visions will require bold leadership from our elected officials, from agency heads, and professional staffs, and from the citizens of the region. The concerted effort of all is the only guarantee that we will have as proud a legacy to leave our children as the nineteenth century left to us.

—MARK PRIMACK, *Executive Director*
Boston GreenSpace Alliance

The Changing Flora of the Boston Harbor Islands

Dale F. Levering, Jr.

After more than three and one-half centuries of vicissitude, the deciduous forest that once covered the Boston Harbor islands may have begun to return

Situated just to the north of the sandy, uplifted coastal plain of Cape Cod and just to the south of the rocky coastline of northern New England, the Boston Harbor islands constitute a unique maritime ecosystem. To the south of the Harbor, pines dominate the sandy, mineral-deficient soil where the land meets the sea; to the north, hemlock, white pine, spruce, and fir. Some twenty thousand years ago, when the Pleistocene ice sheet was at its maximum, the shoreline lay approximately thirty miles east of where it does now; when the glacier first began to recede, what are now the Boston Harbor islands were exposed as high spots on what was then the mainland. Alluvium from the Boston Basin deposited around the Boston Harbor islands by the Mystic, Charles, and Neponset rivers during this time created a mineral-rich substratum that plants would readily colonize after the glacier had melted away.

In particular, the alluvium was colonized by species of the Eastern Deciduous Forest, a narrow, species-rich strip of forest stretching northeastward from the mountains of Kentucky and West Virginia, reaching the ocean along the Massachusetts shoreline between Ipswich and Plymouth. (It corresponds to Zone 5 of the Arnold Arboretum's cold-hardiness map and to Zone 6 of the United States Department of Agriculture's map). Once dominated by chestnuts and oaks, it has been devastated by chestnut blight and by the Europeans who settled in it, who have used it as a source of construction timber and firewood. With its complement of nut-consum-

ing animals, the Eastern Deciduous Forest—which was dominated by broad-leaved, round-topped deciduous trees (as opposed to needle-leaved, spire-topped evergreens)—was a richer source of food for the colonists than the evergreen forests to the north and south. No doubt this was one reason the English settled northward, rather than southward, from Plymouth.

The present-day vegetation of Moswetuset Hummock, a small island situated at the northern end of Wollaston Beach in Quincy, is perhaps the closest indication we will ever have of what the Boston Harbor islands' vegetation looked like at the time of English settlement. Remains of dead American chestnut trees (*Castanea americana*) can still be seen on Thompson's Island, and young oak forest is reestablishing itself on Peddock's Island. For the most part, however, the Boston Harbor islands have been cut over, and the rich, climax deciduous forest that clothed them when the English arrived on these shores early in the seventeenth century is now in the early stages of biotic succession from old fields to climax forest.

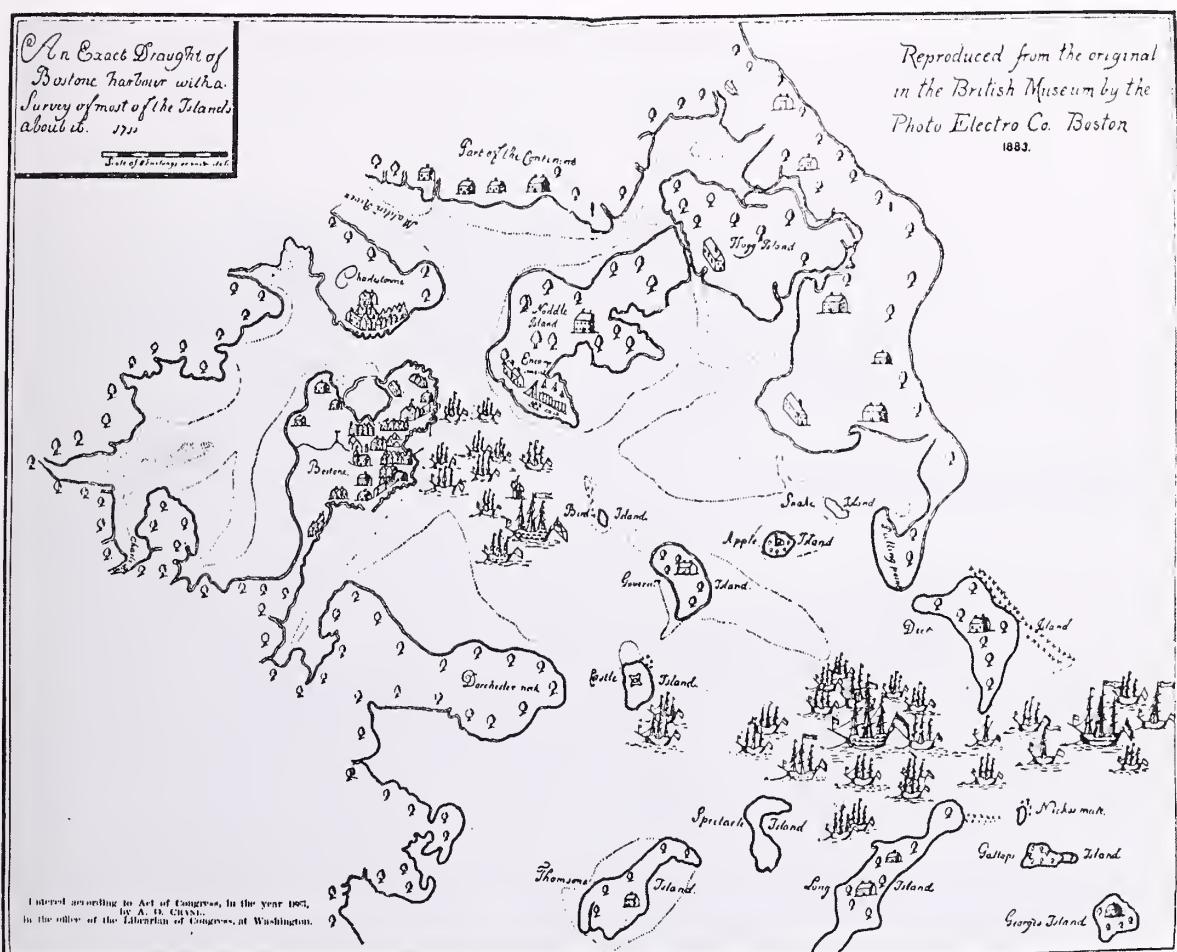
The Islands' Early History

In 1585—thirty-five years before Plymouth was settled—David Thompson established a trading post on the Boston Harbor island that now bears his name. During summer of 1621 Captain John Smith, who had landed at Plymouth in 1620, sailed into Boston Harbor. In the ship's log he wrote of "the groves of trees, the fields of corn, and the well proportioned

Indians" standing on the shore. Captain Smith and the crew set foot on the mainland at what is now Squaw Rock in the Squantum section of Quincy. Although there has been speculation that the corn fields he mentions were in reality marsh grasses, fragmentary remains of corn have been found in archaeo-

livestock pasture.

By 1634 the English settlers had recognized the value of the Boston Harbor islands as strategic lookout points for protecting the development of Boston and had begun to construct fortifications on Castle Island. Between 1850 and 1865, George's Island was extensively



Map of the Boston Harbor Islands in 1711.

logical digs on Calf Island. Evidence of cleared areas suggesting gardens has also been documented. Once the settlers had cleared them of trees, the islands became valuable pasture land free of predators. Some of them—Sheep, Calf, and Hog islands—reflect their use as

altered by the construction of Fort Warren. The world wars also significantly altered the island ecosystem. Massive fortifications were built on Peddock's, Gallop's, Lovell's, Great Brewster, Middle Brewster, and Outer Brewster islands. Until recent times, perhaps

as much as any use, the construction of fortifications has led to the destruction of the islands' native plants and animals.

As Boston grew into a prominent port and as urbanization spread, the islands' value became increasingly evident. (Sweetser's his-

Emerald Necklace, planned to extend his landscape through World's End in Hingham, into the Boston Harbor islands. Unfortunately, Olmsted's death brought to an end early realization of the special ecology of the Boston Harbor islands.

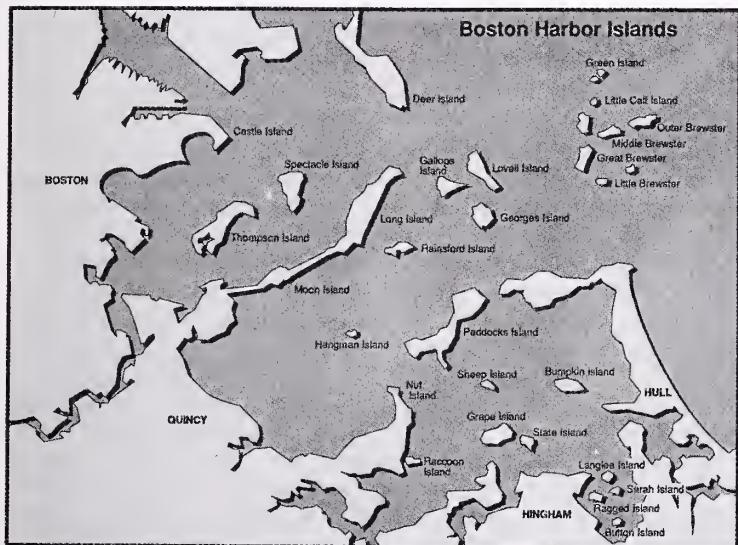


Aerial view of the Boston Harbor islands, looking southeast toward Hull. Thompson Island is in the foreground, Spectacle Island at the left center margin. The bridge connects Moon Island (right center) with Long Island. The peninsula at the right rear is the northern part of the town of Hull. Copyright © 1988 by Alex S. MacLean/Landslides.

tory of the Boston Harbor islands gives an early insight into their unique nature.) Frederick Law Olmsted, while creating the

The Boston Harbor Islands State Park
Because they were being used by the military, the Boston Harbors islands were largely off

limits to the general public for nearly two-thirds of the twentieth century. With the advent of nuclear weapons, however, islands lying only a few miles off a coast lost much of their strategic significance, and the Commonwealth of Massachusetts began acquiring the islands in Boston Harbor; in 1974, the Boston Harbor Islands State Park was established. Public visitation has been encouraged since then, and public campgrounds have been established on Lovell's, Grape, Bumpkin, and Peddock's islands. Ferry service from Long Wharf, Boston, to George's Island makes it possible for people to take advantage of the free-of-charge water-taxi service provided by the Commonwealth from May until October to several of the Boston Harbor islands. Interpret-



Map of the Boston Harbor islands. Copyright © 1987 by The Christian Science Publishing Society.

tion of the islands' natural history and ecology is now provided by island managers, who are coordinated through the Massachusetts Department of Environmental Management (DEM). Volunteer service in appreciation and interpretation of this unique state park has been provided by the Friends of the Boston Harbor Islands.

The Islands' Plants

The flora of the Boston Harbor islands reflects man's impact upon the landscape, and few undisturbed patches of native plants remain. The American Indians used to retreat to the

Boston Harbor Islands State Park

We want to create the best harbor park system in the world because it has the potential to be just that.

—Governor Michael S. Dukakis,
George's Island, 1986

The Boston Harbor islands are a remarkable resource, permitting recreational and educational opportunities rarely found in an urban setting. Though the Boston skyline is rarely out of view, the islands have a wild character, providing a resting spot for migrating birds and city residents alike. People can camp on the islands or visit for the day, experiencing the forces of the sea and the wilds. Easily accessible via inexpensive ferry boats from Long Wharf, connected to each other by a free water taxi, the islands are destinations for residents of every Boston neighborhood and the region, as well as tourists who venture out for picnics, school outings, and discovery.

Thirty-one islands are presently owned by public agencies; seven are staffed during the summer months as Boston Harbor State Park. The park is jointly managed by the Metropolitan District Commission (MDC), which owns George's, Lovell's, and Peddock's islands; and by the Department of Environmental Management, which owns Grape, Bumpkin, Gallop's, Great Brewster islands and many of the smaller islands. The City of Boston owns three islands which have yet to be included in the park: Long, Spectacle, and Rainsford islands. Each island in the park has its own history and its own present and potential uses—in sum, the islands are a unique

resource of national-park quality.

The islands are drumlins (glacial hills) and rock outcroppings ranging in size from less than one acre to over two hundred acres. Seasonally occupied by Native Americans, who harvested an abundance of shellfish, the islands were used by Puritan colonists as wood lots and pasture lands. Over the years, the islands were used for quarantine and chronic disease hospitals, farmlands and dumping sites, though it is military uses which have left the most visible traces on the islands. Starting before the Revolution and increasing before the Civil War and during the Spanish-American War, the islands became the site of a series of massive fortifications, leaving us such notable artifacts as forts Warren, Andrews, Strong, and Standish.

After World War II the islands were essentially abandoned by the military, but visionary citizens and legislators saw the possibilities for recreational, educational, and historic preservation activities. In 1958, the MDC acquired George's and Lovell's islands and began developing them as parks. In 1970 with the creation of the Boston Harbor Islands State Park, the Department of Natural Resources, now the Department of Environmental Management (DEM), also began acquiring and developing islands. Both agencies cleaned up their islands, repairing seawalls, building piers, cutting trails, and creating campsites; and both began providing staff during the summer months. Today the islands are visited by upwards of 200,000 people annually, and the season is expanding.

George's Island—ferry and

water-taxi hub and site of Fort Warren, a national Historic landmark—is by far the most heavily visited island, with its picnic grounds, concession stand, and running water. In recent years an intensive educational program has been developed on George's Island, providing programs to some 15,000 school children, including 2,000 Boston school children, and to over 15,000 summer visitors. In spite of the much-lauded improvements, the island has pressing needs for safety and visitor service improvements and there is a growing desire to restore crumbling Fort Warren.

Lovell's, Gallop's, Bumpkin, and Grape Islands are all quieter than George's Island and are primarily used by campers and others seeking tranquility. Accessible by free water taxi, they have a primitive quality with no electricity or running water. Staff provide tours during the summer, focusing on the natural history of the islands and the surrounding harbor. Great Brewster Island, which is far out in the harbor and primarily accessible by private boats, is the wildest and quietest of the staffed islands, home to nesting birds and seasonal resort for lovers of solitude.

Peddock's Island, the largest of the islands now in the park, has forty-five private cottages on it and twenty-eight buildings of Fort Andrews, in various stages of disrepair. Though open to the public, much of the park is not accessible because of safety problems and the presence of the private cottagers. Yet even in its current state, Peddock's is a fascinating place to explore.

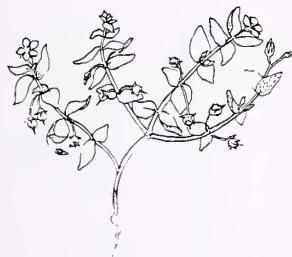
Long Island, the largest in the Harbor and the only one acces-

sible by automobile, is the site of the Long Island Hospital and the remnants of Fort Strong. Summer work crews have begun to clean up the island and it figures prominently in the dreams of many Boston environmentalists and Harbor-lovers, though it is not in the park or open to the public yet. Spectacle Island, a former dump site, also remains outside the park and is closed to the public. Thompson Island, privately owned by the Thompson Island Educational Center, is undergoing a change in management, though its focus will continue to be on youth development.

Working with groups like the Friends of the Boston Harbor Islands, MDC and DEM continue to expand these unique resources. But many problems remain: balancing the preservation of natural and cultural resources with the need to provide for increasing numbers of visitors; the huge costs of developing and maintaining island sites; bringing in fresh water and disposing of sewage and solid waste; and the need for interagency cooperation as well as cooperation with the City of Boston. Yet everyone agrees: the islands are beautiful and deserve continued development as natural, cultural, and recreational resources for the benefit of Bostonians, residents of the Commonwealth, and visitors. They hold vast educational and recreational potential for the young people of Boston and for us all.

—Excerpted from *The Greening of Boston: An Action Agenda*, pages 60, 62.

islands during the summer to fish and collect shellfish, but they did not strip the islands of their vegetation. The European settlers, however, clear-cut the islands' forests for firewood and lumber. Land so cleared often was suitable for agriculture, and most of the fertile sites on the islands have, over the past three and one half centuries, been used for subsistence farming. These attempts at farming are reflected in the occurrence of apples, pears, grapes, blackberries, raspberries, chives, garlic, asparagus, and horseradish in the islands' flora. Private landowners often landscaped their property with ornamental, mostly European species of plants, and the large number of weeds and grasses of Euro-

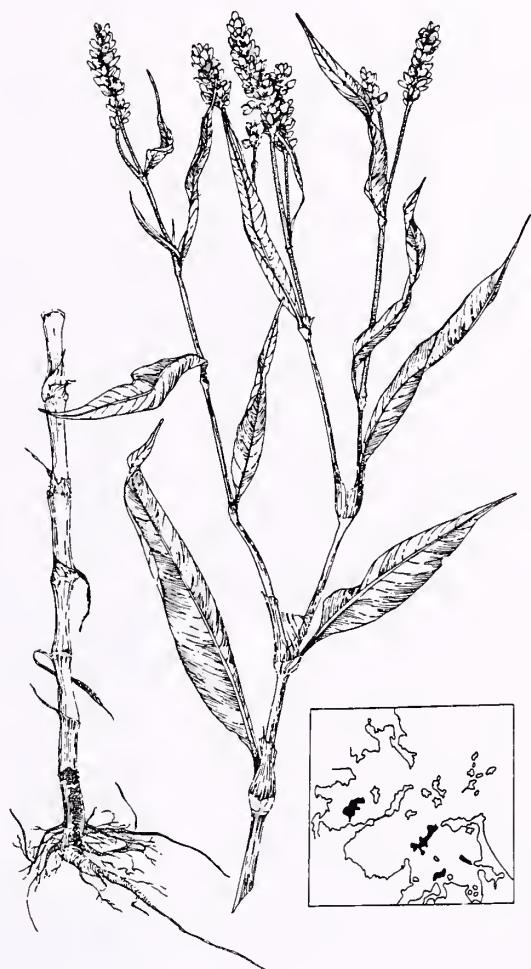


Anagallis arvensis, the scarlet pimpernel, is found on Calf and George's islands. Drawing by Olga Pastuchiv.

pean origin testify to Boston's importance as an international port.

In addition to supporting a unique Eastern Deciduous Forest ecosystem situated at the land-sea interface, the Boston Harbor islands possess several other noteworthy features that make them worthwhile stopping-off sites for people who are interested in horticulture specifically and botany in general. Seabeach dock (*Rumex pallidus*)—a threatened species in the Commonwealth of Massachusetts—was found on Peddock's Island in 1976. A northern species native to Greenland, seabeach dock's southernmost East Coast station occurs on Peddock's Island. Seabeach dock has since been found on Grape, Bumpkin, and Thompson's islands. Another north-

ern species, also found on Peddock's Island, is three-toothed cinquefoil (*Potentilla tridentata*), which has been described as a glacial-relict species.



Rumex pallidus, the seabeach dock. A threatened species in Massachusetts, it occurs on Peddock's, Thompson's, Grape, and Bumpkin islands. The drawing, by Olga Pastuchiv, is from An Illustrated Flora of the Boston Harbor Islands, by Dale F. Levering, Jr.

Two specimens of tamarisk, or salt cedar (*Tamarix gallica*), native to the Mediterranean region and the national tree of Israel, grow on Peddock's Island. On Gallop's

The Making of Boston Harbor

Irving B. Crosby

When the ice melted away from New England the land stood somewhat higher above the sea than it does now, and the sea was farther to the east. New rivers developed and eroded new valleys. Gradually the land sank and the sea came into the valleys, flooding them and forming long bays. Hills that were surrounded by the sea became islands, and ridges that projected out into the water-formed peninsulas. As there were many valleys, hills, and ridges along the New England coast, many bays, islands, and peninsulas were formed, making our coast very irregular.

The sea came into the valleys of the Charles, Neponset, and Mystic rivers and the other streams about Boston, thus making Boston Harbor and the other bays that indent our coast. These flooded river valleys are called drowned valleys. All the deep bays of the New England coast have been formed in this way. Drowned valleys are especially well developed on the coast of Maine.

Where the invading sea surrounded hills, islands were formed and the shape of the island depended on the shape of the hill. Drumlins have a regular outline and they produced islands of regular shape, but those formed from rock hills are usually very irregular and rugged. In this way the numerous islands of Boston Harbor were made. Most of them are drumlins and are quite different in appearance from the rugged rock islands of the coast of Maine.

The other islands of the New England coast have a similar origin, since they were formed by the sinking of the land and the surrounding of the hills by the sea. Drumlin islands are characteristic of Boston Harbor and rock islands of the coast of Maine.

When a hill was connected with higher land by a ridge and the sea came in about it, a peninsula was made. In this way Boston Neck, Charlestown Neck, Dorchester Neck, and the numerous peninsulas of the New England coast were given

their present aspect.

After the sea flooded a shallow valley the streams deposited mud and partly filled it, making a salt water marsh. There was much shallow water about Boston in which mud collected, and salt marshes are a frequent feature of our shores. A coast like ours with its numerous deep bays, islands, and peninsulas is made by the sinking under the sea or submergence of land topography. This is known as a *shore line of submergence*. If you look at the country about you anywhere near the coast in New England and imagine what would happen if the sea were to rise a hundred feet, you will see that the new shore line would greatly resemble the present shore line. It would have deep bays, long peninsulas, and numerous islands.

The New England coast is a typical shore line of submergence, and is in strong contrast to the shore line produced by the raising of the land and the uplifting of the sea bottom to form new land. The bottom of the sea is fairly smooth and level and when it is uplifted to form land, a straight shore with long beaches and no deep bays is produced. The east coast of Florida is typical of this kind of shore. It is called a *shore line of emergence*, since it is caused by the emergence of the sea bottom to become new land.

If you look at a map and see a very irregular shore you can be certain that it is a shore line of submergence and was the result of the sinking of the land under the sea. But if the map shows a straight shore with long beaches and few bays, then you know that it is a shore line of emergence, and that the ocean bottom has been lifted up out of the water.

When you sail down Boston Harbor or cruise along the coast of Maine, it is interesting to know that you are sailing over a drowned land on which animals and Indians probably roamed at one time. We know that the Indians lived here before the sea rose to its present level. In digging for the [Boston] subway a fish

weir was found far below the surface of [Boylston] street, eighteen feet below the level of the sea. This proves that men were living here several thousand years ago and that the shore was different then. The sea rose very slowly, so slowly that the Indians living here probably never knew that anything was happening.

Some think that the land is still slowly sinking, about a foot a century, and that eventually Boston will be covered by the sea. Geologists are not agreed as to whether it is sinking or not, and it is very difficult to prove because the movement is so extremely slow. If the city were several thousands of years old we could tell by noticing whether any old buildings had sunk under the water. At Pozzuoli in Italy is an old temple which was sunk thirteen feet under the sea, and has been raised up again in the last few centuries. On the New England coast are tree stumps which have sunk under the water, but we do not know how long they have been there.

Even if our land is sinking slowly there is no cause for alarm. It would be hundreds of years before we could notice any difference. Man is continually building up the land and, even if the sea is rising a foot a century, it will be a long time before there can be any serious trouble.

We have now traced the development of the Boston region up through the formation of the harbor, but some finishing touches were still to be applied before the white man appeared. Our beautiful beaches, Nantasket, Revere and Nahant, did not exist, and the harbor was partly open to storm waves because the protecting peninsulas of Nantasket and Point Shirley had not yet been formed.

—Excerpted from *Boston through the Ages: The Geological Story of Greater Boston*, by Irving B. Crosby. Boston: Marshall Jones Company [1928], pages 67 to 72.

Calendar Section

arnoldia

New England Horticultural and Botanical Calendar

(Early Autumn 1988)

Calendar Section

Horticultural and Botanical Calendar

Please be sure to mention Arnoldia whenever you attend an event that was listed in the New England Horticultural and Botanical Calendar

Through November 13

"The Hundred Flowers: Botanical Motifs in Chinese Art." Worcester Art Museum (WAM). Exhibit organized by the Asian Art Museum of San Francisco, together with objects from the Museum of Fine Arts, Springfield, and the George Walter Vincent Smith Museum. Admission charge. *Information:* WAM, 55 Salisbury Street, Worcester, MA 01609-3196.

October 3—November 19

"Fleurage." Arnold Arboretum (AA). Exhibition of collage by Harry R. White. 10 a.m.—4 p.m., Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA 02130-3519. Free. *Information:* (617)524-1718.

October 5

"To Spray or Not To Spray." Worcester County Horticultural Society (WCHS) and Massachusetts Audubon Society. Discussion of common lawn-care practices. 7–9 p.m., Town House, Boylston, MA. Registration fee. Preregistration required. *Information:* Programs Coordinator, WCHS, 30 Tower Hill Road, Boylston 01505; (508)869-6111.

October 6, 8, 11, 13, 15

"Landscaping with Perennials: New Concepts for North American Gardens." New York Botanical Garden (NYBG) (October 6), Arnold Arboretum (October 15), Chicago Botanic Garden (October 11), National Wildlife Federation (October 8), and Royal Botanical Gardens (Hamilton, Ontario) (October 13). Symposium and workshops for advanced amateur gardeners, landscape designers, nurserymen, and garden-center managers. Registration fees. *Information:* Education Department, NYBG, Bronx, NY 10458-5126; (212)220-8720.

October 14

"Introduction to Perennials" (HOR 371). Arnold Arboretum(AA). One-day lecture-workshop on the fundamentals of growing perennials. 9 a.m.—4 p.m., Case Estates, 135 Wellesley Street, Weston, MA. Course registration fee. Preregistration required. *Information:* AA, Arborway, Jamaica Plain, MA 02130-3519; (617)524-1718.

October 14–16

Gardens of Long Island's North Shore. Worcester County Horticultural Society (WCHS). Three-day trip to the Oyster Bay area of Long Island. Visits to seven public and private gardens. Registration fee. Preregistration required. *Information:* Programs Coordinator, WCHS, 30 Tower Hill Road, Boylston 01505; (508)869-6111.

October 21–23

"Passage." International Design Symposium, Ltd. (IDS). International flower show and design symposium; lecture-demonstrations, festival of flowers, tours. Salem, MA. Registration charge. Preregistration required. *Information:* IDS, Post Office Box 263, Westwood, MA 02090; (617)326-8906.

October 25

Perennials for the Landscape and Garden-Center Industries. Longwood Gardens. Symposium. Eight speakers. 8 a.m.–4:15 p.m., Scott Arboretum, Lang Music Building, Swarthmore College, Swarthmore, PA. Registration fee. *Information:* Pennsylvania Horticultural Society, 325 Walnut Street, Philadelphia 19106; (215)625-8299 (weekdays, 9 a.m.–4:30 p.m.).

October 29 and 30

Fall Meeting. American Rhododendron Society Eastern Regional Conference. Danbury Hilton, Danbury, CT. *Information:* Bob Murray, 21 Squire Terrace, Colts Neck, NJ; (201)946-8627.

November 14–17

"Natural Resources for the 21st Century." American Forestry Association (AFA) (and some two dozen other organizations and agencies). National conference on new directions in natural-resource policies and programs for conservation organizations and management agencies. Twin Bridges Marriott Hotel, Washington, DC. Fees. *Information:* AFA, (202)667-3300; (202)382-8744.

Calendar Section

November 21, 1988–January 21, 1989

"Sylvan Portraits." Arnold Arboretum (AA). Pages from *The Dendrological Atlas*: a selections of drawings prepared at the AA and photographs by members of the botanical department of the Natural History Museum of Budapest, Hungary. *The Dendrological Atlas* is a worldwide survey of hardy trees and shrubs from both the northern and southern hemispheres. 10 A.M.–4 P.M., Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA 02130–3519. Free. *Information:* (617)524-1718.

December 9–23, 26–30

Christmas at Blithewold. "Twelve Days of Christmas" theme accented by turn-of-the-century-style holiday decor, seasonal greenery and floral arrangements, etc. Admission charge. Noon–8 P.M. Blithewold Gardens and Arboretum, Ferry Road, Bristol, RI 02809–0417. *Information:* (401)253-2707.

January 24–26, 1989

Massachusetts Horticultural Congress. Best Western Royal Plaza Hotel and Trade Center, Route 20, Marlborough. *Information:* Massachusetts Horticultural Congress, 715 Boylston Street, Boston 02116; (617)266-6800.

January 27–March 4, 1989

"Where Dragons Touch the Earth." Arnold Arboretum (AA). Recent photographs of Chinese gardens by David Harris Engel. 10 A.M.–4 P.M., Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA 02130–3519. Free. *Information:* (617)524-1718.

February 2 and 3, 1989

Symposium on an Artistic Approach to Wildflower Cultivation. Arnold Arboretum (AA), New England Wild Flower Society, and New York Botanical Garden (NYBG). Use of wildflowers in an artistic and aesthetically pleasing manner. 8:30 A.M.–4 P.M. Jamaica Plain, MA (February 2); 8:30 A.M.–4 P.M., NYBG. *Information:* AA, Arborway, Jamaica Plain, MA 02130–3519; (617)524-1718; NYBG, Bronx, NY 10458–5126; (212)220-8720.

February 5, 1989

"Plants from China and Japan for the New England Garden." Arnold Arboretum (AA). Lecture by Dr. Stephen A. Spongberg. 2 P.M. Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA 02130–3519. Free. *Information:* (617)524-1718.

February 18 and 19, 1989

Camellia Show. The 160th annual show of the Massachusetts Camellia Society. 10 A.M.–4 P.M., Hunnewell Visitor Center, Arnold Arboretum, Arborway, Jamaica Plain, MA 02130–3519. Free. *Information:* (617)524-1718.

Copy deadlines for the New England Botanical and Horticultural Calendar are December 10, March 10, June 10, and September 10 for the Winter, Spring, Summer, and Fall issues, respectively. **Mailing address:** Calendar, *Arnoldia*, Arnold Arboretum, Jamaica Plain, MA 02130–3519.

NEWS FROM THE ARNOLD ARBORETUM

Number 5

Summer 1988

Volunteers in Children's Program Help Young Botanists Sprout

Over the last five years, volunteers in the Arnold Arboretum's School Programs have found the old saying, "One touch of nature makes the whole world kin," is a pretty good observation. The volunteers say it seemed especially true for this year's group of kids—nearly 3,000 of them—for the most part city dwellers, who participated in the Arboretum's nature adventures and discovered a new green space.

Third through sixth graders come with their classes to explore the Arboretum in one of four field-study experiences. Even scrappiness, indifference, and sleepiness are overcome in these magic explorations, and the kids return from their tours of the Arboretum absolutely glowing with the excitement of their new discoveries.

Each field study—"Seeds and Leaves," "Hemlock Hill," "Around the World with Trees," and "Flowers"—begins with a classroom-type period in the lecture hall. Then volunteers distribute hand lenses (inexpensive versions of those used by real botanists) and set out in small groups to discover that "nature passes art" in the Arboretum.

Volunteers help kids to see how well a flower advertises its presence, to swoop down on "helicopters" and "hitchhikers" (some names for travelling seeds), to explore for the (Benjamin) Franklin tree, or to be astonished by the cathedral-like

world under the hemlocks.

The program is made possible, in part, by contributions from the Junior League of Boston and the Junior League Garden Club. Project chairwoman for the Junior League Garden Club is Ruth Wilson of Wellesley, who has worked as a volunteer in the Arboretum's School Program for three years.

According to Diane Syverson, the Children's Program Coordinator, the Junior League funded for many years the Embankment Gardens, where inner-city kids learned about vegetable gardening. Now the Arboretum is the lucky recipient of the League's largesse. Mrs. Wilson

says, "The program helps city kids to explore aspects of nature—a whole new world right at their door."

Recently, Mrs. Wilson reflected that her grandmother was responsible for introducing her to gardening and nature. As a young girl, she had been asked to keep a notebook on wildflowers, pressing them between its pages as she found them and learned their names. When Mrs. Wilson is not helping young botanists to bloom at the Arboretum she is tending her own garden in Wellesley, learning

CHILDREN'S PROGRAM
Continued on page 2



"One touch of nature makes the whole world kin."—Shakespeare

CHILDREN'S PROGRAM*Continued from page 1*

about desert plants in Arizona, or watching her own grandchildren sprout.

Even though she is a flower enthusiast, she enjoys teaching the autumn field-study experience. "It's then," she says, "the children learn about the changes autumn brings to plants and animals—how living things are interconnected."

Learning about nature and why it is important are compelling components of the Children's Program, not only for its students but also for its volunteers, according to Barbara Balasa of Newton and Jane Paquet-Whall of Dorchester. They have been with the Children's Program since its beginning.

In 1981, Mrs. Balasa began work on a horticultural degree at Massachusetts Bay Community College, just after she had been introduced to the Arboretum by Eleanor Trowbridge, one of the Arboretum's long-term supporters. Because Mrs. Balasa believed a children's program could be a very necessary and vital experience for kids, she decided, in addition to starting up her own landscaping business, to find extra time to give to this program and to children. She has been volunteering every week since then.

Although volunteers seem reluctant to say they have a favorite field study, after some urging she did confess that "Around the World with Trees" is a favorite. "And then there's 'Hemlock Hill,'" she said. "That's a favorite also."

Last summer, she took the responsibility for reworking the script of "Around the World," which the volunteers use as a guide in teaching the indoor segment of this field study. At

that time, Diane Syverson also laid out new nature-adventure trails on Bussey Hill. This field-study experience introduces kids to plant hunting through their own explorations and to some of the fascinating personalities who have hunted plants for the Arboretum.

"There is a real need in the Boston Public Schools," Mrs. Balasa says, "for a resource like the Arboretum. When the students are here, we show them that this is a living tree museum and a wonderful resource in the city. Just think about Hemlock Hill, for instance. It's a natural woods, and it's right in the city. It's wonderful to see how enraptured the kids are when they first discover it."

Another "old" timer in the Children's Program (although she's a young mother with sons 5½ and 2½) is Jane Paquet-Whall. She also has been a volunteer in the program since its inception. Mrs. Paquet-Whall grew up in Jamaica Plain and remembers the grand old man in her neighborhood who'd bring all the kids on the block to the Arboretum. He would fill up his old Model-T with as many children and loaves of bread as it would hold and drive over to feed the ducks on the Arboretum's ponds. Mrs. Paquet-Whall has been coming to the Arboretum every week since.

Not only is she a loyal and devoted volunteer in the Children's Program, but she works with the Park Partners for the City of Boston rejuvenating Dorchester Park, a 26-acre park designed by Olmsted. Until she and a group of her neighbors began the project that breathed new life into it, the park was unkempt and sunk under tons of trash.

When youngsters come to the Arboretum, she believes it is not only a good time to teach them

about nature and show them a beautiful urban green space, but to teach a little history.

She likes to tell students about the white pines and their history. "I used to wonder why there weren't any tall pines here, as there are on the West Coast. I found out it's because of King George. Learning that he sent his scouts here to cut down the white pines for his navy, to be used as masts on his ships, seems to intrigue the kids, too," she says.

Looking forward to a full-time career teaching science and nature, Mrs. Paquet-Whall has taken many of the adult courses offered by the Arboretum. Evidence not only of boundless curiosity but also of her ability to appreciate how children can be led to see the world of nature as wonder-working, is this short vignette: She explained that recently she has been learning sign language so that she will be able to sign to a deaf child. But she had been unhappy with all of the texts and manuals—until she found one that taught the sign for dreams.

"None of the others had the sign for dreams, and dreams are really important, aren't they?" she said. While the Children's Program is teaching children about botany, its beautiful trees and green spaces are also widening the horizons of many city kids and providing them dreams. As she says, dreams are "really important."

Mrs. Paquet-Whall became an Arboretum volunteer after she read an article in the Boston Globe about volunteer opportunities. Readers of *Arnoldia* who would like to participate in the Children's Program as volunteers should call Diane Syverson at (617)524-1718.

This is the second in a series of three articles on volunteers in the Children's Program.

Arboretum's 1988 Lilac Poster Is Abloom

From more than 200 submitted artworks, a jury chose "Spring Lilacs" by Lincoln artist Shirley Mossman Nisbet for reproduction on the 1988 Lilac Poster.

Mrs. Nisbet, who has enjoyed tremendous success as an abstract artist, has only recently become interested in flowers as subjects for her work.

"Flowers began to emerge, unexpectedly, into my work," she said, "during the summer and autumn of 1985 and 1986. I became fascinated by the brilliance and translucence of flowers and the



Arnold Arboretum

power of their growth out of the dark soil, and I started to try to express those contradictory qualities in my paintings."

"Spring Lilacs" is more than a pretty picture of a lilac. As critic Joanna Shaw-Engle of Kensington, Maryland, wrote, "Shirley Nisbet's flowers literally explode from the canvas and paper holding them." The 1988 Lilac Poster is vibrant—its lilacs made lively by striking color contrasts of purple, blue, and raspberry.

Proceeds from the sale of the posters go to support the restoration of the Arboretum's famous Lilac Collection. The cost per poster is \$23, which includes postage and handling.

To order, please call The Shop at the Arboretum at (617)524-1718 or write to the Arboretum, Jamaica Plain, MA 02130. MasterCard, Visa, and American Express credit cards are accepted.

Arboretum's Horticultural Training Program Attracts a World-Class Group

During the summer the Arnold Arboretum offers students the opportunity to learn horticulture through hands-on training. The horticultural trainees work in a variety of jobs, either in grounds maintenance, greenhouse and nursery operations, or mapping and labelling of the plant collections.

As part of the program, trainees also enroll in two courses, an eight-week intensive horticultural maintenance program and a six-week woody-plant identification laboratory.

This year's trainees are:

James Blauth
Westford, MA

Jodi Bottoms
North Powder, OR

Gerald Brown
Boston, MA

Hugh Chapin
Cambridge, MA

Brett Christianson-Haas
Weston, MA

Chris Dowling
Chestnut Hill, MA

Russell Forbes
Balcombe, N.S.W., Australia

Stefan Helleckes
Neuenrade, West Germany

Brian Muchow
Charlottesville, VA

Paul Pfeifer
Sulfur Springs, TX

Bruce Rivers
South Hadley, MA

Catherine Rosenberg
Cambridge, MA

Morgan Schmidt
Belmont, MA

Stephanie Shapiro
Chicago, IL

Jaqueline Veal
New Cumberland, WV

Park Rangers Begin Fifth Year of Service at Arboretum

The Boston Park Rangers were formed in the nineteenth-century tradition of "park keepers" as conceived by Frederick Law Olmsted, the designer of the Boston Park System, and championed by Dr. Peter Ashton when he was director of the Arnold Arboretum. Along with some of Boston's downtown parks, the Arboretum was one of the original sites for the program.

Much of the impetus to make the Arboretum one of the pilot sites came from the Arboretum Committee, a nonprofit organization of loyal neighbors. As part of their effort to increase the overall safety in the Arboretum, they helped raise money for the Ranger Program. The Program began with 20 rangers, four of whom were assigned to the Arboretum.

With the Boston parks undergoing a broad renovation (\$489 million has been committed for capital improvements), the Ranger Program has expanded to 40 rangers. Gene Surillo has been their executive director from the Program's inception.

During the summer months, the Rangers not only keep the Arboretum safe but offer educational tours and classes. They are also available for guest lectures, slide presentations, and classroom programs. On-site program including birdwatching, orienteering, and guided public tours.

For a schedule of activities or more information, call (617) 522-2639.



Professors Carroll E. Wood, Jr. (left), and Richard A. Howard were photographed recently at the Harvard University Herbaria. Both men retired from the faculty in June but will continue working on their floras. Professor Howard is producing the *Flora of the Lesser Antilles*, and Wood is surveying the seed-bearing plants of the southeastern United States, compiling the *Generic Flora of the Southeastern United States*. Photograph by Laura Webb.

Got a Question? Arboretum's Plant Line Has the Answer

When Barbara Emeneau, of Winchester, asked about volunteer opportunities at the Arboretum in 1981, she said, "I really don't know what I can do for the Arboretum, but I'm willing to try. I'm pretty fair at pulling up ragweed, if that's useful to the staff." When you have a plant-related question, you'll find out that Barbara Emeneau is good at much more than pulling up ragweed!

She and C. J. Patterson, of Norwell, are the Arboretum's Answer-Women and Plant Doctors *par excellence*. They answer those questions that come in by phone or mail—such as, "What can I do about my hydrangea?" or "Can I grow an apple tree in Arizona?" or "I have a nice tree with red flowers. What is it?" From 1 to 3 p.m. on Mondays and Tuesdays, Mrs. Emeneau and Mrs. Patterson give sage advice to green thumbs and green horns alike.

Mrs. Patterson says, "It used to be quiet in the winter, and we could catch up on some of our filing, but business has gotten brisk even when gardens are under snow cover."

Now the two volunteers estimate they answer between 25 and 30 calls on a winter after-

noon, but 40 percent of all calls come during May and June! They also handle mail inquiries, which come from around the world. Often, the inquiries are for historical information and come from libraries and arboreta.

The most interesting question lately came from the *World Book Encyclopedia*, which had recently discovered a piece of conflicting information. Someone in California was claiming to have been the first to introduce the dawn redwood (*Metasequoia glyptostroboides*) into cultivation in the West. With the assistance of Sheila Connor, horticultural librarian, and Jennifer Quigley, curatorial assistant, the story of the dawn redwood's introduction by the Arnold Arboretum was xeroxed and sent off to *World Book*.

Members who have plant-related questions may call the Plant Line at (617) 524-1718 between 1 and 3 p.m. on Mondays and Tuesdays. The Answer-Women will also be available at the Annual Plant Bonus, Sale, and Auction on Sunday, September 18, from 9 a.m. to 4 p.m., at the Case Estates in Weston.

Organization Meetings

A Faithful Catalog of Horticultural and Botanical Meetings Scheduled for the New England Area

Some organizations hold meetings at regular intervals, others do not. All of the meetings listed below are open to the public. Organizations always welcome new and prospective members. *It is advisable to verify the information given below directly with the contact person listed. Please do not call the Arnold Arboretum.*

Meetings Held at Regular Intervals

AMERICAN RHODODENDRON SOCIETY (MASSACHUSETTS CHAPTER)

Third Wednesday (varies), beginning in September, 7:30 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham. *Contact:* Barbara Emeneau (617)729-0725.

BONSAI STUDY GROUP OF THE MASSACHUSETTS HORTICULTURAL SOCIETY

First Sunday, 2 p.m., Wellesley College Greenhouse, Wellesley. *Contact:* John Palmer (617)443-5084.

CONNECTICUT HORTICULTURAL SOCIETY

Third Thursday, 8 p.m., Hoadley Auditorium, Connecticut Historical Society, 1 Elizabeth Street, Hartford. Lecture followed by plant forum and plant auction. *Contact:* Connecticut Horticultural Society, 150 Main Street, Wethersfield 06109; (203)529-8713.

CONNECTICUT ORCHID SOCIETY

Second Wednesday, 7:30 p.m., at different locations. (June, members only; July, August, no meetings.) *Contact:* E. M. Wolf (203)456-1657.

GARDENERS AND FLORISTS CLUB

Third Tuesday, 7:30 p.m., Wellesley College Greenhouse, Wellesley, MA. *Contact:* Del Nickerson, Wellesley College Greenhouse.

GREEN INDUSTRY COUNCIL

First Wednesday, 12 noon-1:30 p.m., Case Estates, Weston, MA. *Information:* (617)435-6335.

HOBBY GREENHOUSE ASSOCIATION OF EASTERN MASSACHUSETTS

Second Saturday, alternate months (January, March, May, etc.), 1:30 p.m., Wellesley College Greenhouse, Wellesley. Members need not own greenhouses. *Contact:* Joseph Rajumas, 8 Davis Street, Holliston 01746.

INDOOR GARDENING SOCIETY OF AMERICA (CONNECTICUT CHAPTER)

Fourth Wednesday, 7:30 p.m., Cooperative Extension Service Building, 1280 Asylum Street, Hartford. *Contact:* Michael Archaski, 64 Rhodes Street, New Britain 06051; (203)225-5828.

MASSACHUSETTS ORCHID SOCIETY

Second Tuesday, 7:30 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham. Occasional special workshops at 7 p.m. *Contact:* D. Fye, (617)358-7547; C. Lee (617)443-6566; or M. A. Grigg, 38 Monadnock Road, Worcester 01609.

MOBY DICK AFRICAN VIOLET SOCIETY

Second Thursday, 7 p.m., Dartmouth Library, South Dartmouth, MA. *Contact:* Mrs. Ruth Warren (617)679-1189.

NEW ENGLAND BROMELIAD SOCIETY

Third Sunday, September-June, 1 p.m., Wellesley College Greenhouse, Wellesley, MA. *Contact:* Paul R. Carlberg (617)791-1533 or (617)757-5012; or DeeDee Bundy (617)526-1952.

NEW HAMPSHIRE ORCHID SOCIETY

Second Saturday, 1:30 p.m., Concord Public Library, Concord. Location may change. *Contact:* Paul Sawyer, RFD 2, Box 174, Canaan 03741; (603)523-7410 after 5 p.m.

Calendar Section

Meetings Held at Irregular Intervals

AMERICAN BEGONIA SOCIETY (BUXTON BRANCH)

Suburban Experiment Station, 241 Beaver Street, Waltham, MA: April 27, 1988, to be announced; May 11, 1988, 8 p.m.; June 8, 1988, 8 p.m. Contact: Wanda Macnair (617)876-1356.

AMERICAN FERN SOCIETY (SOUTHERN NEW ENGLAND CHAPTER)

Approximately monthly, changing locations. Contact: Peggy (617)799-5897.

AMERICAN GLOXINIA AND GESNERIAD SOCIETY (NEW ENGLAND CHAPTER)

Approximately monthly, 1 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. Contact: H. Friedberg (617)891-9164.

AMERICAN HEMEROCALLIS SOCIETY (NEW ENGLAND CHAPTER)

Second Saturday, 10:30 a.m.-4 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. Location subject to change. Contact: Suzanne Mahler (617)878-8039.

AMERICAN ROCK GARDEN SOCIETY (NEW ENGLAND CHAPTER)

Saturday or Sunday, February-October (approximately monthly, at changing locations). Contact: Helga Andrews (617)443-8994.

IRIS SOCIETY OF MASSACHUSETTS

September, November, January, and March. Contact: Mrs. John H. Burton, 188 Sagamore Street, South Hamilton 01982; (617)468-3646.

NEW ENGLAND HOSTA SOCIETY, INC.

Meetings irregular, usually Sunday, 10 a.m.-2 p.m., at changing locations. Contact: Mabel-Maria Herweg, 11 Puritan Lane, Dedham, MA 02026; (617)326-1939.

NORTHEAST HEATHER SOCIETY (CHAPTER OF THE NORTH AMERICAN HEATHER SOCIETY)

Meetings held at least four times a year on weekends, at various locations throughout New England. Contact: Walter K. Wornick, Post Office Box 101, Alstead, NH 03602; (603)835-6165.

Ongoing Activities

ARNOLD ARBORETUM (Area Code 617)

The Arborway, Jamaica Plain, MA 02130-3519. A 265-acre public park of hardy trees, shrubs, and vines from all over the world, many of them from China and Japan. Open daily, sunrise-sunset. No charge. Visitor Center at Main Entrance open Tuesday-Sunday, 10 a.m.-4 p.m. Closed on national holidays. Exhibits, slide show, public information, rest rooms. Arboretum Shop sells books, postcards, film, gift items, etc. Group van or guided walking tours available by appointment. Driving permits issued to elderly or handicapped, Monday-Friday, 9 a.m.-4 p.m. Information: 524-1718; recorded information on lectures, events: 524-1717.

• **Volunteers** are always needed to work in every area, with staff or on independent projects, on the Living Collections; in the library, gift shop, or herbarium; guiding tours; etc. Volunteers receive training and other benefits. Contact: Volunteer Coordinator, Arnold Arboretum, Jamaica Plain, MA 02130-3519; 524-1718.

• **Horticultural and Botanical Calendar.** Published in each issue of *Arnoldia*, the quarterly magazine of the Arnold Arboretum. The calendar serves organizations in the New England area, though events taking place elsewhere are often listed. Copy deadlines are December 10, March 10, June 10, and September 10 for the Winter, Spring, Summer, and Fall issues, respectively. Mailing address: Calendar, *Arnoldia*, Arnold Arboretum, Jamaica Plain, MA 02130-3519; information: 524-1718.

• **Certificate in Gardening Arts.** Arnold Arboretum. Botany and horticulture courses on theories and practices of good gardening (propagation, maintenance, design, plant selection, plant systematics, etc.). Work towards certificate may commence at any time during the year (some required courses may be entered only in spring). No time limit for fulfilling requirements, but final project (required) will usually be prepared within one year of completion of coursework. Details and catalog: 524-1718.

• **Plant Information Hotline.** Monday, Tuesday, 1-3 p.m. 524-1718.

• **Field Study Experiences.** School programs of the Arnold Arboretum for third- to sixth-grade classes. "Plants in Autumn: Seeds and Leaves" (September-November); "Hemlock Hill" (all seasons); "Around the World with Trees" (all seasons). Fee. Weekdays, 10 a.m.-12 noon (advance registration required).

Calendar Section

METROPOLITAN BOSTON (Area Code 617)

Mount Auburn Cemetery, 580 Mount Auburn Street, Cambridge 02138. America's oldest garden cemetery (established in 1831). One hundred seventy acres of naturalized and formal landscaped grounds with over 3,600 canopy trees (596 species) and many flowering shrubs. Burial place of many famous Americans. Hilly terrain, lakes, vistas, accessible by 12 miles of roads and many paved paths. Observation tower with outstanding views of Boston. Open daily, 8 A.M.-7 P.M., May-September; 7 A.M.-5 P.M., October-April. No charge. *Information:* 547-7105.

Margaret C. Ferguson Greenhouses, Wellesley College, Route 135, Wellesley 02181. Exhibits of desert and tropical plants, ferns, orchids. Seasonal displays. Open daily, 8 A.M.-4:30 P.M. Guided tours available by appointment. No charge. *Information:* 235-0320, extension 3094.

Frederick Law Olmsted National Historic Site ("Fairsted"), 99 Warren Street, Brookline 02146. Boston offices of F. L. Olmsted and his two sons, surrounded by landscaped grounds. Open Friday-Sunday, 10 A.M.-4:30 P.M. No charge. Group tours by appointment. *Information:* U. S. Department of the Interior, National Park Service, 99 Warren Street, Brookline 02146; 566-1689.

Gore Place, 52 Gore Street, Waltham 02154. Federal-period mansion and grounds offering a remarkable combination of architecture, landscape design, social history, and agricultural reform. Herb garden, cutting garden, grape arbor, orchard. Mansion open for guided tours Tuesday-Sunday, 10 A.M.-5 P.M.; grounds open year round during daylight hours. Admission charge. *Information:* 894-2798.

Lyman Estate and Greenhouses ("The Vale"), 185 Lyman Street, Waltham 02154. Thirty acres of pleasure grounds and lawns, wooded areas, garden beds, and a number of ornamental trees and shrubs, including a grand copper beech and magnificent rhododendrons, Camellia House (*circa* 1820) with 100-year-old camellias, Grape House (1804) with vines dating from 1870. Fine example of a Federal period country estate with the oldest greenhouses known to be in use in the United States. Greenhouses open year round, Thursday-Sunday, 10 A.M.-4 P.M., house open only by appointment for groups of ten or more. Admission charge. *Information:* 893-7232; 891-7095 (greenhouses), 893-7431 (house).

Barkley Begonia Collection, Northeastern University Greenhouses, 135 Cambridge Street (Route 3, 1 mile south of Route 128), Woburn 01801. Open Monday-Friday, 8 A.M.-12 noon, 1-5 P.M., other times by appointment. Group tours by arrangement. Closed weekends and holidays. No charge. *Information:* Wanda Macnair, 177 Hancock Street, Cambridge 02139; 876-1356.

NORTHEASTERN MASSACHUSETTS (Area Code 508)

Sedgwick Gardens at Long Hill, 572 Essex Street (Route 22), Beverly 01915. Collection of some 400 species of plants, including weeping Japanese cherries, azaleas, tree peonies, kochreuterias, oxydendrums, sophora, and stewartias, all identified and catalogued with their scientific names. Open daily, 8 A.M.-sunset. Admission charge. *Information:* The Trustees of Reservations, 572 Essex Street, Beverly 01915; (617) 922-1536, 921-1944.

The Stevens-Coolidge Place, 5 Wood Lane, North Andover 01845. House and carefully maintained grounds with expansive lawns, colorful gardens accented by formal hedges, specimen trees. A Trustees of Reservations property. House open Sundays 1-5 P.M. (admission charge); grounds open daily, 8 A.M.-sunset (no charge). *Information:* Superintendent, Stevens-Coolidge Place, North Andover; 682-3580.

Maudslay State Park (the former Moseley Estate), Curzon's Mill Road, Newburyport. Scenic and historic Nineteenth Century estate; 476 acres of gardens, rolling agricultural land, pine forest, and mountain laurel on the banks of the Merrimack River. Many of the ornamental plantings were introduced by Charles Sprague Sargent. Open daily, 8 A.M.-sunset. No admission charge. *Information:* Massachusetts Department of Environmental Management, Division of Forests and Parks, 817 Lowell Road, Post Office Box R, Carlisle 01741; 369-3350.

CAPE COD AND THE ISLANDS (Area Code 508)

Ashumet Holly Reservation and Wildlife Sanctuary of the Massachusetts Audubon Society, 286 Ashumet Road, East Falmouth 02536. Two trails meander amid hollies and past an Oriental lotus pond. Open Tuesday-Sunday, dawn-dusk. Admission charge. *Information:* 563-6390.

New Alchemy Institute, 237 Hatchville Road, East Falmouth 02536. Research institution founded to develop ecologically sound food systems through organic gardening, integrated pest management, solar ponds, solar greenhouse design and management, tree crops, energy conservation. Film, guided tours. Open 10 A.M.-4 P.M., Monday-Friday; 12 noon-4 P.M., Saturday, Sunday. Guided tours, Saturday, 1 P.M. Admission charge. *Information:* 563-2655.

Calendar Section

Lowell Holly Reservation, South Sandwich Road, Mashpee 02649. One hundred thirty-five acres with two miles of shoreline, stands of beeches and hollies, walking trails. Open daily, 10 A.M.–sunset, free on weekdays, parking and boat-landing fees on weekends. *Information:* 749-5780, 921-1944.

Mytoi Gardens, off Dike Road, Chappaquiddick Island, Marthas Vineyard 02539. Eleven-acre Japanese-style garden with small pond, azaleas and rhododendrons, Hanoki cypress, hollies, daffodils. Open daily, sunrise–sunset. No charge. *Information:* 794-5780, 921-1944.

CENTRAL MASSACHUSETTS (Area Code 508)

Garden in the Woods, Hemenway Road, Framingham 01701. A 45-acre botanical garden containing the largest landscaped collection of wildflowers and native plants in the Northeast. Informal walks (10 A.M., Tuesday). Group tours by reservation. Open Tuesday–Sunday, 9 A.M.–4 P.M. Admission charge. *Information:* 877-6574, -7630; 237-4924.

Tower Hill Botanical Garden, 30 Tower Hill Road (Route 70), Boylston 01505. Grounds open weekdays, 8:30 A.M.–5 P.M., weekends (May–October), 10 A.M.–4 P.M., closed holidays. *Information:* Worcester County Horticultural Society, 30 Tower Hill Road, Boylston; 869-6111.

Elliott Laurel Reservation, Route 101, Phillipston 01331. Thirty-three acres of open fields, hardwood forest, pine woods, and mountain laurel. A property of the Trustees of Reservations. Open daily, sunrise–sunset. No charge. *Information:* 921-1944, 537-2377.

WESTERN MASSACHUSETTS (Area Code 413)

Norcross Wildlife Sanctuary, Monson–Wales Road, Wales 01081. Three miles of trails through over 3,000 acres of woodlands. Open Monday–Saturday, 9 A.M.–5 P.M. No charge. *Information:* 267-9654.

Berkshire Garden Center (BGC), Routes 102 and 183, Stockbridge 01262. Fifteen-acre botanical garden with herb garden, display gardens, perennial borders, solar greenhouses. Open daily, 10 A.M.–5 P.M. Admission charge. *Information:* 298-3926.

RHODE ISLAND (Area Code 401)

Blithewold Gardens and Arboretum, 101 Ferry Road, Bristol. Historic English manor house and 33-acre estate overlooking Narragansett Bay. Rose garden, water and rock gardens. Collection of native and exotic plants. Grounds open Tuesday–Sunday, 10 A.M.–4 P.M. year round; mansion open mid-April–October, 10 A.M.–4 P.M. Closed holidays. Admission charge. *Information:* 253-2707.

NEW HAMPSHIRE (Area Code 603)

Fuller Gardens, Willow Avenue (200 yards north of the junction of Routes 101D and 1A), North Hampton 03862. Open daily, 10 A.M.–6 P.M., mid-May–October. Nominal admission charge. *Information:* 964-5414.

Rhododendron State Park, Fitzwilliam 03447 (off Route 119). Sixteen-acre park with wild rhododendrons that bloom in mid-July. Open daily, 8 A.M.–sunset. No charge. *Information:* 532-8862.

Maple Hill Farm, 117 Ridge Road (off Routes 122 and 133), Hollis 03049. Herb garden, reflecting pool, perennial beds, rock garden, arbor, drying-plant beds, 1,600 acres of water, woods, and meadows. Open all the time, year round. No charge. *Information:* Beaver Brook Association, 117 Ridge Road, Hollis; 465-7787 (9 A.M.–12 noon, Monday–Friday).

VERMONT (Area Code 802)

Botany and Woodland Trails, Southern Vermont Art Center, Mount Equinox, Manchester 05254. Botany Trail on slopes of mountain, with woods, wildflowers, ferns, pool, scenic vistas. Open Tuesday–Saturday, 10 A.M.–5 P.M. (admission charge), Sunday, noon–5 P.M. (free). *Information:* 362-1405.

CONNECTICUT (Area Code 203)

Bowen House, "Roseland Cottage," on the Common, Woodstock 06281. Colorful Gothic Revival cottage set in grounds designed to reflect the ideas of picturesque, or natural, landscaping of Andrew Jackson Downing. Open 12 noon–5 P.M., Wednesday–Sunday (May 24–September 15), 12 noon–5 P.M., Friday–Sunday (September 16–October 15). Admission charge. *Information:* 928-4074.

Champion Greenhouse, One Champion Plaza, Stamford 06921. Ongoing program of horticultural shows, exhibits, and displays. Open 11 A.M.–5 P.M., Tuesday–Saturday. Group tours by appointment. *Information:* 358-6688.

Island, one small population of this species is spreading along the high-tide line. Great Brewster Island is inhabited by Concord grapes (*Vitis labruscana*) and cut-leaved blackberries (*Rubus laciniatus*) with luscious fruit. There are cut-leaved blackberries on Peddock's and Long islands as well, and Grape Island has several native ferns, including the royal (*Osmunda regalis*), cinnamon (*Osmunda cinnamomea*), hay-scented *Dennstaedtia punctilobula*, and sensitive (*Onoclea sensibilis*) ferns. Langlee Island has two large European larches (*Larix decidua*). Calf Island has the scarlet pimpernel (*Anagallis arvensis*); Rainsford has English oak (*Quercus robur*), growing at the high-tide line, and oyster plant, or salsify (*Tragopogon porrifolius*). The southern end of Green Island is covered with horseradish (*Armoraceae lapa-*

thifolia).

As noted earlier, some English and European cultivars were introduced to the islands.

While their terrestrial plant communities are slowly succeeding to the original Eastern Deciduous Forest—the Boston Harbor islands are host to a dynamic flora. The combination of ornamentals, “weeds,” trees, native species, and alien species has created a unique botanical showcase that is now accessible to anyone interested in visiting the islands. Given time and a measure of protection, most species of the islands’ original flora and fauna may become reestablished there.

Dale F. Levering, Jr., Ph.D., teaches botany at Northeastern University. He is the author of *An Illustrated Flora of the Boston Harbor Islands*.

Reforesting the Boston Harbor Islands: A Proposal (1887)

Frederick Law Olmsted

A century ago, the great landscape architect proposed replanting the islands' forests to soften their bleakness and to check their deterioration

One hundred years ago the Boston Harbor islands were largely unwooded. Frederick Law Olmsted, in a report to the Boston Park Commissioners, recommended their reforestation. They are "generally hard-featured, bare, bleak, and inhospitable," he wrote. "Let any one, passing through the harbor, imagine them clothed with foliage of any kind, and it will be felt how much more agreeable its character would be if they were generally wooded." Today, the original Eastern Deciduous Forest has begun to reestablish itself.

Between the wharves of Boston and the sea, outside of Boston Bay, there are seventy-five islands and islets, fifty notable projections of the mainland with bays between them, some of which are the mouths of streams, and a great many shoals and reefs which are exposed, or upon which the sea breaks, at low water. Between all these there are innumerable sub-channels more or less navigable, according to the stage of the tide and the depth of any object to be floated through them. The aggregate area of the islands is a little more than 1,300 acres. Of this the city owns 439 acres; the United States, 241 acres; and, of the remainder, 500 acres have but five owners.

The rise and fall of the tide varies from eight to sixteen feet, according to the age of the moon and the condition of the weather, and the tidal currents are liable to be strong and complicated. These circumstances not only make the harbor interesting because of what meets the eye of those passing through it or along its shores, but they give fleet, nimbly-turning boats a more marked advantage than they would otherwise have, and make close calculations and tact in trimming and steering them of more obvious importance than they are in harbors with fewer elements of picturesque character.

Add to this the further consideration that from the time of the first settlers the people in Boston have been much engaged in fishing ventures, not only on the deep sea, but of a class to be pursued with boats of light burden, and the fact will be accounted for that there has always been an unusual interest among them in modelling, building, rigging, and seamanship of small craft, both for commercial and for recreative use.

The city government has recognized this interest, and, in an exceptionally systematic way, wisely fostered it by the institution of an annual regatta with prizes to winners from the public purse. Latterly, at the suggestion of your Department, it has begun the building of a promenade pier, providing a fair outlook on the harbor, and of a large basin especially as a mooring-place for pleasure-boats. With a possible exception in Venice, it is believed that the people of no other city in the world make as much or as good use of their harbor, otherwise than commercially, as those of Boston have long been accustomed to do, and that none take as much or as justifiable pride in the character of their small craft, and their dexterity in handling them. . . .

In what, then, it is to be asked, other

than the play of its large and lively fleet of fishing and pleasure craft, does the special attractiveness of the harbor consist? The special attractiveness of the harbor lies partly in the contrast of the intricate passages and vistas among these, with the unbroken expanse of the ocean upon which it opens, and partly in the varied forms of the bluffs, crags, bars, beaches, and fens that form its shores.

What are the drawbacks to these attractive circumstances?

Chief among them must be recognized the generally hard-featured, bare, bleak, and inhospitable aspect of the headlands and islands. Let anyone, passing through the harbor, imagine them clothed with foliage of any kind, and it will be felt how much more agreeable its character would be if they were generally wooded.

Stumps, that still remain upon the mostly exposed, the rockiest, and bleakest of the islands show that they formerly were wooded. Once cleared, a second growth has been prevented by cropping and pasturing. The land being then much more open than before to frost and drying heat, rains, gales, and salt spray, it has ever since been losing soil and the soil remaining has been losing fertility. Hence the scenery of the harbor has

been and is every year being despoiled more and more of its original beauty; its artificial features are becoming more and more disagreeably conspicuous relative to its natural features, and in these respects it is becoming less and less attractive.

The question whether the waste thus in progress can be arrested, and whether what has been lost can be recovered, is, happily, one to be answered by reference to the result of means used elsewhere for a similar purpose.

The difficulties to be overcome lie chiefly in the bleakness and dryness of much of the land most desirable to be planted; somewhat, also, at certain points, to its exposure to salt spray. They are such that trees of the sorts more commonly seen in the lawns, parks, cemeteries, and roadsides of the landward suburbs of the city could not be wisely planted. The suggestion offered by the Memorial Association is that the original forest may be restored. Should this be attempted no results are to be expected that can be brought in comparison with those which are, unfortunately, associated in most minds with the term landscape-gardening.

The beauty to be gained through such an operation is not the beauty of clusters, clumps, groups, or any artfully studied combination of trees; much less is it that of trees admirable for their beauty singly. It is the beauty of large compositions as these may be affected, to one looking in any direction across the harbor, by broad masses of foliage palpitating over the rigid structure of the islands and headlands; lifting their skylines; giving them some additional, but not excessive, variety of tint, greater play of light and shade, and completely overcoming the present hardness of outline of their loamy parts, without destroying the ruggedness of their rocky parts.

Having such an end in view, the trees to be planted will be of the same kinds with those formerly growing on the ground. That they may help one another to overcome the difficulties of the situation they will, when planted, be small, pliant and adaptable, offering little for the wind to tussle with; they will be low-branched, and will be set snugly together. A large proportion of all, intimately mingled with the others, will be of species the growth of which, like that of the little white birch of our rural roadsides, is rapid while young but not of long continuance. These, after a few years, will be overtapped and smothered by trees of slower and larger growth, greater constitutional vigor, and more lasting qualities. The former will have served as nurses to the latter while they are becoming established, and if timely thinning should be neglected, as it is so apt to be, they will gradually disappear by natural process before the permanent stock will be fatally injured by crowding.

Years must pass before the permanent growth can acquire a full-grown forest character, but almost at once the sapling plantations will give a pleasing softness and geniality to those elements of the scenery that are not contributive to its picturesque ruggedness. Three years after the planting is finished the harbor, as a whole, will have acquired a decidedly more good-natured, cheerful, and inviting character.

An impression is common that at most points of the harbor trees cannot be got to grow satisfactorily, and instances are referred to in which they have failed or, at the best, have grown very slowly and with distorted forms. So far as it has been practicable to ascertain, the trees, in these cases, have been ill-chosen and ill-planted, and the result has no bearing upon the proposition favored

by the Memorial Association.

Reasons for confidence that, under a course of management judiciously adapted to the special difficulties of the situation, an undertaking of the kind that has been outlined would be successful, are found in experiences of which those of Mr. Joseph Story Fay, at Wood's Holl, supply an example.

The outer part of the sea-beaten promontory of Wood's Holl, had probably been devastated in the same manner as the islands of Boston Harbor. Thirty years ago it was even more bare of trees, bleak and cheerless than they are. As the result of operations which have been carried on within that period by Mr. Fay, about two hundred acres of it is now covered with dense woods of well-grown trees. Mr. Fay, visiting Boston islands last summer with the Commissioners, could see no reason to doubt that by similar operations upon them equally satisfactory results would be secured.

There is a large tract of barren land in a most exposed situation on the west coast of Lake Michigan which, a few years ago, was covered with drifting sand. Because it was supposed to be worthless, and that any attempt to improve it would be regarded as a "Folly," Mr. Robert Douglass chose to take it as a place to demonstrate the practicability of establishing forests under such special difficulties as the situation presented. He has been entirely successful, the sand is fixed and sheltered, leaf mould is beginning to accumulate upon it, and the ground is becoming comparatively moist and productive. . . .

—Excerpted from: *Thirteenth Annual Report of the Board of Commissioners for the Year 1887*. Boston: Department of Parks, City of Boston, 1888, pages 52 to 62.

Islands of Tension

Edgar Anderson

Recalling a visit he made to the Boston Harbor Islands one raw April day during the 1930s, a master observer realized some three decades later that, far from being the "Green Isles of Romance" people said they were, they were in fact "islands of tension" whose harshness challenged plants and people alike

"Islands of Tension," an essay written by Professor Edgar Anderson, was published in Landscape magazine in 1966 (Volume 15, Number 3, pages 7 and 8) and again in Landscape Papers (Berkeley, California: Turtle Island Foundation, 1976), a collection of articles by Anderson.

A native of New York State, Edgar Anderson (1897–1969) grew up in Michigan, graduating from Michigan State College in 1918. He then came to Harvard University to work toward his master and doctor of science degrees, which he received in 1920 and 1922, respectively. From 1931 to 1935, he served as arborist on the staff of the Arnold Arboretum; thereafter, he was affiliated with the Missouri Botanical Garden and Washington University in Saint Louis, soon becoming the Engelmann Professor of Botany in the latter institution. While in Boston during the 1930s he helped found the Herb Society of America with—to use his phrase—"a small group of Boston Back Bay dowagers," whom he called his "herb ladies." In 1935 he became the Society's president.

Known for his sharp eye and unconventional ways, Anderson was a prolific author and a most unorthodox but effective teacher. Much of his research dealt with the genetics and taxonomy of maize. Details of his long and productive career are given in the Annals of the Missouri Botanical Garden, Volume 59, Number 3 (1972).

"Islands of Tension" is reprinted with the kind permission of Landscape.

If you are on the staff of a botanical garden or arboretum you never know when you answer the telephone what the call may lead to. With no warning a phone call one April afternoon began, "Dr. Anderson, this is the War Department calling. Can you report at the government wharf in South Boston at eight o'clock tomorrow morning for the committee's official visit to the islands in Boston Harbor?" Most of these islands were under the control of the War Department, the Coast Guard or the City of Boston and joint tours of inspection were made from time to time.

Since erosion was becoming a serious problem, a committee

had been set up to study it and to inspect tree plantings made some years before. As a staff member of the Arnold Arboretum I was one of the experts added to the group. Since I first saw these islands, fifteen years before, they had fascinated me. I'd ridden repeatedly on all the ferries or excursion boats which then plied across the harbor and climbed all those promontories along its margin which were accessible to the public. When I became a member of the Harvard faculty I looked into the possibility of visiting such spots as Governor's Island, but gave up the idea when I learned that one needed the blessing of the War Department.

The first week in April is not

the best time for planning a visit to Boston Harbor. The snow may be gone but the air is raw. Lawns are just beginning to green up; nothing much is in flower but pussy willows. The next morning brought us all that Boston can hope for at that time of year. Though cool, with a steady breeze, it was cloudless all day, pleasantly warm wherever you could get in the sun and out of the wind.

It was a mixed group of about thirty men who met at the wharf. A few of them were well informed about the islands. One of these, Patrick J. Connelly, president of the Dorchester Board of Trade, was an authority on the islands and their complex histo-

ries. He had recently published an attractive pamphlet, *Islands of Boston Harbor, 1639-1932, Green Isles of Romance.*

After winding in and out among the islands we landed on the largest, Long Island, to inspect tree plantings made in about 1910. They had not been well cared for and the choice of trees had evidently been made without technical advice. They were common European species, easy to grow in nurseries but not the most promising things for bare little islands swept by cold winter winds and salt spray. Some trees had died. Those that remained were English oaks, European white birches, Scots pines, and Austrian pines, of which only the latter were in fair health.

Although farther out in the Atlantic, other trials on Gallop's Island looked more promising. As the most prominent island in the outer harbor it has been a quarantine station since pre-revolutionary times. A doctor at the Quarantine Hospital had been trying out likely trees and shrubs since about 1927 and some of these seemed to be doing well: Manchurian ash, Carolina poplar, privet, sorbaria, and Amur cork tree.

I was disappointed that apparently nowhere in the harbor had the Japanese seaside pine, *Pinus thunbergii*, been given a trial. By the time of this harbor tour it was

beginning to look promising at exposed oceanside locations in southern New England. Since then it has done spectacularly well at Jones Beach, and its peculiar merits are widely known along the East Coast. Long Island had been a kind of dumping

more earnest and vigorous members by narrow paths along the low cliffs above the beaches.

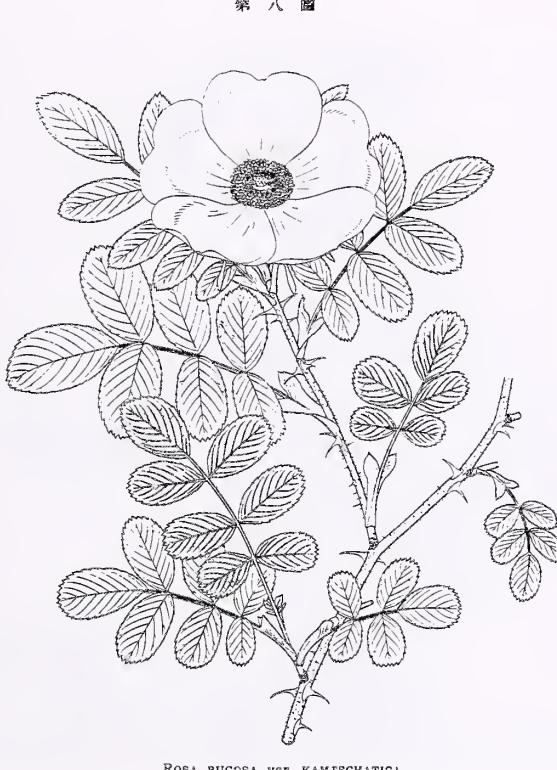
This route gave us an almost continuous view of the fore-shore. I was immediately struck by the great number of orange crates and unsightly rubbish in

the zone of driftwood.

Immediately above the orange crates were occasional low rosettes of an unusual rose, one of the [Arnold] Arboretum's Oriental introductions with which I was familiar, *Rosa rugosa* var. *kamtschatica*. It differs from the ordinary rugosas of our gardens by being generally smaller with a more spreading habit of growth. It had certainly not been planted there intentionally but was already of some importance in lessening erosion on the upper margin of the fore shores.* Its buoyant orange-red fruits had put down roots where they had been cast up by the high waves of winter storms.

A month later I saw more of them along the magnificent beaches on the outer arm of Cape Cod, as well as a single specimen of the ordinary bushy *Rosa rugosa*.

From the technical literature I learn that the



Rosa rugosa var. *kamtschatica*, which Edgar Anderson recognized growing on the Boston Harbor Islands. From *Flora Sylvatica Koreana* by Takenoshin Nakai.

ground for the poor of Boston since 1885, and the plantings we inspected were near a cluster of hospitals, administrative buildings, and a fine new recreation center on a high bluff at its northern end. The schedule called for a tour of the whole island. Two of the officers led a half dozen of the

*Anderson seems to suggest that the Arnold Arboretum introduced *Rosa rugosa* var. *kamtschatica* into cultivation, but the Arboretum's records do not confirm this apparent claim. The first plants of that variety came into the Arboretum's collections in 1900, from Paris. By 1905, the species—*Rosa rugosa*—had escaped from cultivation in New England; by the time of Anderson's visit to the Boston Harbor islands (about 1932), it ranged from Nova Scotia to Cape Cod.

Kamtchatca rose was originally native to the same upper beach zone in the northern Orient. Now and then from an intensive flora of some New England island or estuary, I have learned that it is apparently still spreading along the northern coast of New England.

These scattered bits of information have more significance now that the whole problem of evolution on beaches is being rigorously and comprehensively studied by my former student J. D. Sauer, jointly Professor of Botany and Professor of Geography at the University of Wisconsin. In his world-wide analysis of tropical beach vegetation he is demonstrating that life on beaches is so rigorous that precious few species of the world's flora can persist there. The few that can take it have little competition so, in general, on sea beaches many individuals of a few species are spread over wide areas. Furthermore, now that Sauer has pursued these studies in both the Old World and the New, he is demonstrating for an increasing number of beach plants that when they find their way from one hemisphere to the other they fit into the same kinds of situations in their new home as they left in the old.

Though it was the general problem of eroding sea cliffs and

foreshores that had taken me to these islands, as our trip continued I became more and more impressed by the sociologically specialized environments of the human communities which shared these islands. The local and national needs the islands served fell in a few widely diverse categories. They regulated and

effectively with city parkways.

On Long Island we came upon a beach with a protecting cliff above it, where some of the inmates had built themselves little "clubhouses" out of drift-wood and other scraps. They varied from crude hovels to weather-tight structures with chimneys and windows. What other reactions to the harbor's peculiar environments would one find if he made a real study of the whole problem? There is a little to be gleaned from Mr. Connelly's eloquent compilation. Those living on these islands were under increasing and varied stringencies in the three hundred years covered by the booklet. The lighthouses, the quarantine stations, the military installations, the public parks, the institutions for unfortunates, the garbage disposal plants, had not only taken increasing space, they operated through different offices. It is bad enough to have your fate in the hands of a government bureau; it

is worse to have it decided by bureaus which may be at odds with each other and whose certainty of public support varies with the times.

One of the changes I wonder about is the effect of mass-produced pleasure boats of all kinds. On other shores I have witnessed



*A one hundred-foot-tall specimen of *Pinus thunbergii* photographed in Japan by E. H. Wilson. Edgar Anderson "was disappointed" that this species had not been planted on the Boston Harbor islands, where, he thought, it would do well. From the Archives of the Arnold Arboretum.*

protected maritime traffic. They served to isolate contagious diseases and social misfits. Their potential for recreation had been realized only at Castle Island and even there only when its ancient forts became obsolete (as well as increasingly picturesque) and filled land connected the island

their increasing effects not only upon human existence along water-fronts but the chemical and biological changes they bring to the beaches and the very water itself, as well as to the plant and animal communities within and near it. Since World War II speed boats must have brought complex problems to Boston Harbor and its islands.

The overall effect of such various and shifting pressures on human existence is even more violent than the stringencies reported for the plant communities of sea beaches by J. D. Sauer. The urgent and conflicting demands of national defense, protection and control of maritime traffic, waste disposal, recreational needs of a crowded city, isolation of contagious diseases and of social misfits are reflected in the human population of the islands.

A few details are reported in Connelly's booklet: after the old fort on Governor's Island had

been abandoned a squatter made his home in the ruins and his body was found there after his death. During King Philip's War (1675-1676) whole villages of captured Indians were confined on Deer Island and hundreds died there from starvation and exposure. The boys' reform school on Rainsford Island was abandoned after the boys cornered the Keeper down on the beach and stoned him to death. During the Civil War a whole group of Southern generals were confined in the military prison on George's Island. For many years a hermit lived in a hut on the southern shore of Slate Island. Before modern hospitals were available, Bostonians ill with contagious diseases were buried in the little cemetery near the Quarantine Hospital.

Even the plant communities reflect the violence of these various tensions. Just as ordinary sea-beaches are limited to many individuals of a few species, so on

these islands they may be restricted to even fewer. At the time of our visit, Governor's Island was covered by the most rampant thickets of poison ivy I have ever seen. The watchman's dog had died from repeated exposure to it. It seemed to be growing in practically pure stands. On two islands where summer homes or hospitals had been abandoned there were thickets of Staghorn Sumac. These were not accompanied by other woody plants as in ordinary beachside communities, but were solid masses of sumac.

Before our tour the islands of Boston Harbor had appealed to me, to use the phrase of Mr. Connelly's title, as "Isles of Romance." Since that day I have increasingly come to think of them as islands of tension, tensions so violent and so various that their interactions might profitably be studied in some detail.

The Boston Public Garden, Showcase of the City

Mary M. B. Wakefield

Since 1970 the Friends of the Public Garden has worked closely with Boston's Department of Parks and Recreation to rehabilitate a uniquely beautiful parcel of urban open space

Every garden needs friends—in the case of a garden that is always open to the public, lots of friends—a cadre of knowledgeable, concerned people who understand its particular situation and character. For, once established, a garden begins to develop its own unique identity—its “Genius of Place,” if you will—and becomes the kind of garden visitors remember. Its qualities are subtle and fragile and well worth preserving. For a garden that must serve ever increasing numbers of visitors, the challenge is to preserve its unique qualities for the sake of future generations.

The Boston Public Garden has long since developed its true spirit, possessing Genius of Place to a remarkable degree. It has endured extraordinary vicissitudes yet is still the Public Garden. That it has survived at all is a tribute to its early planners, its official caretakers, and those generations of citizens who have been its champions since 1838.

The Garden has had hair's-breadth escapes from complete obliteration by buildings and streets. Greenhouses, statues, and trees have come and gone. It has conformed to successive fashions in planting and has survived the onslaughts of vandals, blizzards, droughts, floods, and hurricanes; the sweep of winds down drafty, building-lined streets; and the disintegration of its perimeter fence. It has even survived invasion by an incline entrance to the first subway in the United States. Yet here is the Boston Public Garden in the morning sunshine, peaceful and welcoming to all, its swanboats floating languidly about the La-

goon. A bevy of happy ducks follows, begging for a bite of food as if nothing untoward had ever befallen this urban paradise.

How can this be? How has the Garden been able to reach this point intact? Generations of dedicated friends—professionals, politicians, volunteers, visitors, and viewers, all of them appreciative, all of them on call to help it survive almost daily vicissitudes—generations of dedicated friends have guided it to this point.

In a few words, I will recount for you the history of the Boston Public Garden.

The Garden's Origins and Antecedents

Unlike Boston Common, which the early settlers had established on existing dry land for the use of all the town's people, the Public Garden was created on made land that originally was part of Round Marsh. All but one section of the site (Fox Hill) was inundated at each tide.

For untold centuries Round Marsh and the nearby flats had been favorite places of the Indians. Bostonians, too, enjoyed this proximity to the sea, and for many years huge clams and oysters were sold to the public in little covered booths on the Common. Fox Hill was fortified in times of danger, and from the shore nearby on April 19, 1775, the British troops rowed across the site of the Garden to Cambridge on their way to Lexington and Concord.

In 1794, a large part of the area was granted to private citizens for six ropewalks, because

it would be a safer location for such a fire-prone but essential industry than one near buildings. In 1821, a great dam was built by the Boston and Roxbury Milldam Corporation. Extending from the corner of the present Charles and Beacon streets to the present Brookline, with a branch to what is now called Kenmore Square, its main purpose was to provide waterpower for the mills and factories separating Round Marsh from the Charles River. The result was that Round Marsh became a vast mudflat of decaying matter and refuse of all kinds. Even in this condition the value of the land for development was apparent.

In 1824, the city purchased the ropewalks. Business and political leaders wanted the land to be filled and sold for houselots, but citizens' groups were opposed. To settle the matter, a citizens' meeting was held in July 1824; it appointed a committee to prepare a report. The report stated that for the sake of citizens' health it was public duty to keep the space open and clear of buildings, to allow for the free circulation of air from the west.

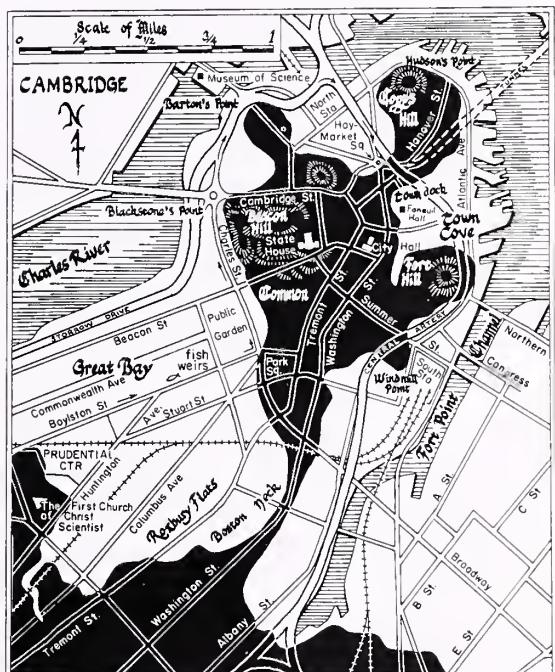
It took the city years to complete the filling of the entire area. Fox Hill itself was used for fill. Even land from as far away as Needham was used. (Along Beacon Street, a modern contractor encountered an unexpected problem: the old fence had been built on, not one sea wall, but on three resting one upon another. At the Commonwealth Avenue entrance to the Garden solid ground lay about eighteen feet beneath the present path.) The City Council made other attempts to sell the Public Garden, in 1842, 1843, 1849, and 1850, but all of them were defeated.

The Proprietors Establish a Garden

On February 1, 1838, seventeen Bostonians headed by Horace Gray (son of William Gray, one of the former owners of the ropewalks) obtained a lease from the city and became the Proprietors of the Botanic Garden in Boston. Each Proprietor paid one hundred dollars a year. Soon after they were granted the land by

the city, the Proprietors appointed Trustees to act for them, though the Proprietors actually ran the Garden. Once a year the Proprietors met to hear the report of the Trustees.

Although the filling in of the land was only partially complete, the Proprietors managed to lay out their garden along what is now Beacon Street (the level of the land was six feet below it). A fine, broad walk, bordered with ornamental trees, standard roses, shrubs, and herbaceous plants, led to the Charles Street entrance. Wherever the terrain allowed, there were beds of dahlias in excel-



A map of Boston showing the original extent of the Shawmut Peninsula (in black) superimposed upon the city's current area. The increase is due to the filling in of tidal flats and similar peripheral areas. As the map shows, the Boston Public Garden was established on filled-in tidal flats, as was the city's entire Back Bay neighborhood. The Commonwealth Avenue Mall, which will be the subject of Judith Leet's article in the next issue of Arnoldia, appears at the middle of the map's left-hand margin. Drawn by Russell H. Lenz, this map is used through the courtesy of The Christian Science Publishing Society and Mr. Lenz.

lent varieties. They even imported a complete bed of prize tulips for fifteen hundred dollars. The Garden was popular with the public.

Across the street from the Garden was an old circus building, which the Proprietors made into a conservatory filled with tropical plants and rare singing birds. All of the plants were botanically arranged and catalogued. Admission for nonsubscribers cost twelve and a half cents per person; ten admissions cost a dollar. A magnificent collection of over one thousand camellias was a great attraction.

The Proprietors imported an excellent English gardener to take charge, held periodic flower shows, and awarded generous prizes to the winners. The prize for the best display of roses on June 20, 1839, was twelve dollars, for example, that for the second best, seven dollars. One year, Joseph Breck supplied seeds and plants to the Garden for one hundred dollars. The noted landscape architect Andrew Jackson Downing even prepared a plan (which, unfortunately, is lost) of an enlarged garden and bordering arboretum.

All this was accomplished despite great difficulties. The soil was poor, and there were occasional inroads of the tide, which did great damage to the plants. Hopes were high nonetheless, and for years the Proprietors' efforts were unflagging—despite a fire that burned the Conservatory to the ground and the lack of a greenhouse.

The Years of Uncertainty and Transition

The Proprietors continued to operate the Botanical Garden until 1847, when Horace Gray went into bankruptcy; Gray's friends felt they could no longer continue to carry on the Garden, but their achievements provided a wonderful beginning and inspiration for their successors.

For the next twelve years the future of the Garden was uncertain. One of the former Trustees, the Reverend Charles Barnard, built a greenhouse in the Garden, where he

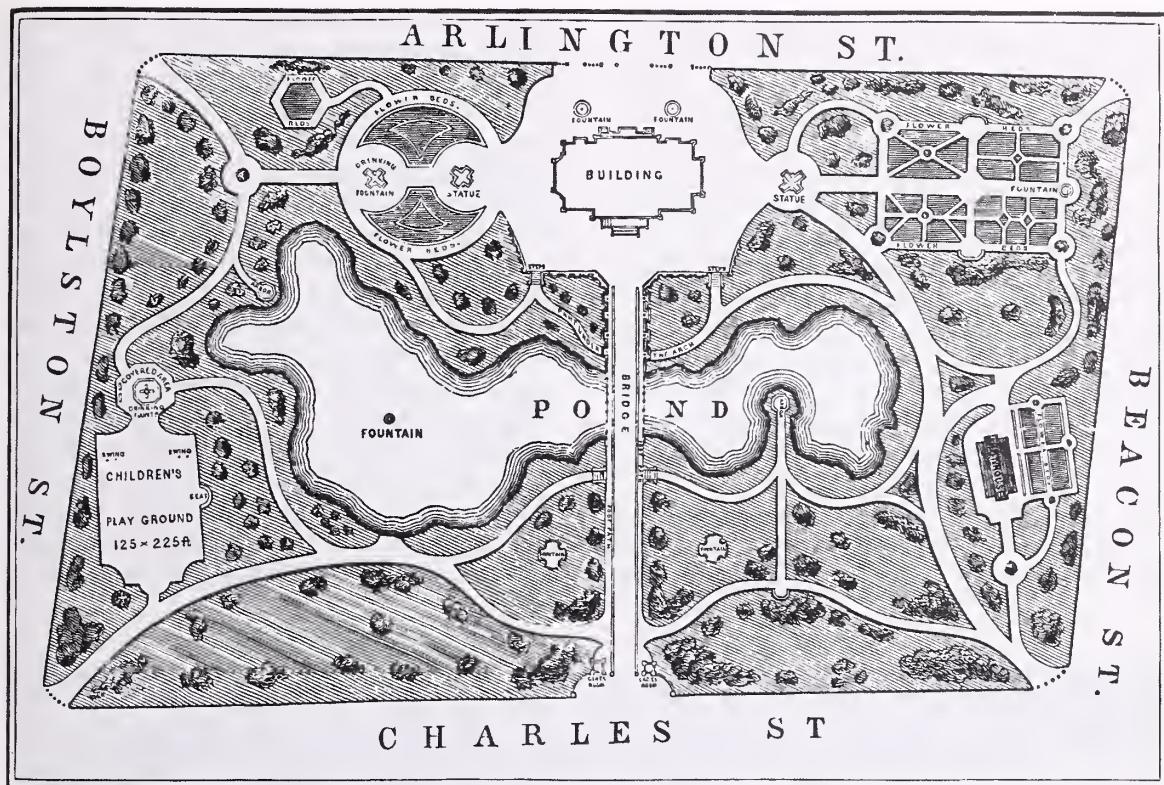
raised and sold flowers. He organized Fourth of July parades of children with bouquets of flowers, which became a popular Boston tradition. His writings kept the citizens accustomed to associating the area with flowers. Others worked, too. A small pond was created and a simple landscape treatment was maintained.

Finally, the State settled the matter. On April 6, 1859, the Governor signed the Public Garden Act establishing, among other things, the boundary line between Boston and Roxbury, authorizing the filling up of the Back Bay, and prohibiting the erection of buildings (other than a city hall or buildings used for horticultural purposes) between Arlington and Charles streets.

Until this time, private funds had sustained the Garden, while the City continued to fill in the land. Now, the press and the people wanted to have more of a Garden. The Committee on the Common and Public Squares was appointed by the Boston City Council to report on a plan for improving it. For this they held a blind contest, which was won by a young architect, George T. Meacham.

The Meacham Plan

Meacham's plan included space for a city hall, a greenhouse, children's playground, and geometrical flower beds, as well as statues, fountains, trees, shrubs, and grass. With its winding paths and irregular-shaped pond, it was said to resemble Birkenhead Park in England. It combined both formal and picturesque elements, but it was overcrowded with features. Under the superintendence of the City Engineer, James Slade, Meacham's plan was modified, eliminating most of the formal flowerbeds Meacham had proposed. City Forester John Galvin laid out flowerbeds and paths and brought in quantities of loam to grade, so that the Garden would not look too obviously manmade but a natural continuation of the slope of Beacon Hill. The greenhouse was built on Charles Street, but the



"Arlington," the winning design for the Public Garden, submitted by George T. Meacham of the architectural firm of Woodcock & Meacham.

pond and pathway system were retained with comparatively few changes until recent years, and changes were made only to conform.

One of the greatest perils facing a public garden or park is that interest in supporting it waxes and wanes according to the interest of political and municipal officials. In 1859, the special committee appointed by the Boston City Council included in its report on the Meacham Plan a description of the work in progress on Central Park, referred to Birkenhead and other European parks, and added:

While other cities are expending fabulous amounts in the improvements of parks, squares, gardens, and promenades, what should we do? To be behind in these mat-

ters would not only be discreditable to our city, but positively injurious to our commercial prosperity, and in direct opposition to the majority of our citizens. . . . The area of our city is too small to allow the laying out of large tracts of land for Public Parks, and it behooves us to improve the small portions that are left to us for such purposes.

Thoroughly interested, the city implemented the plan, filled in places that needed to be completed, excavated the pond, surrounded the Garden with a cast-iron fence, laid out acres of turf, and planted trees and shrubs. Gradually, the Garden took on a more established appearance.

From the first, newly established trees were identified and labelled by Dr. Augustus

Addison Gould, a famous botanical authority who had done the same on Boston Common. Every effort has been made to carry on the custom of labelling on a regular basis, insofar as it has been possible to do so.

The greenhouse called for in Meacham's plan was built along Charles Street instead of where he had indicated. For many years it supplied the Garden with plants, but when needs outgrew its capacity they were met by new greenhouses, first in Dorchester, then in Franklin Park. Not only were there regular greenhouses, but a high "Dome House" with curved roof designed expressly to house the palms and other tall tropical plants that graced the Garden each summer.

During the first years, John Galvin (the City Forester) and his crew faced enormous difficulties on account of the kind and

amount of fill that had been used. Portions would not drain properly while others would sink suddenly, and the gardeners would fill in the resulting hollows as well as they could. In those days, the staff of the Garden numbered over fifty men, all of whom were kept busy caring for the plantings in the new fashion, sometimes using exotic materials in pots and planters and scattered small beds. The hotter the colors the better. The public liked them, as did William Doogue, who succeeded Galvin in 1872 and maintained the plantings in the "Gardenesque Style" of J. C. Loudon of England. Others, such as Charles Sprague Sargent of the Arnold Arboretum—whom Doogue termed "that Blockhead from Harvard"—did not like them. However, Doogue ran the Garden with an efficient hand, and his plantings remained enormously popular.



An early view of boaters on the Lagoon in the Boston Public Garden. Courtesy of the Boston Globe.

In those days, vandalism was far less of a problem than it is today, and there was more labor to restore what damage was done, making it practical to have many attractive features that would be impossible today. The little peninsula with its tiny gazebo, which offered an intriguing view of the Garden from the middle of the Lagoon, had to be removed. It was too popular with the young, and its place was taken by a spectacular rock garden that rose high above the water, its stones almost completely hidden by drifts of flowering plants whose reflections multiplied in the waters of the Lagoon, a quaint and colorful landmark. Early pictures of the bridge over the Lagoon show containers of plants, and vines running along the railings, connecting the flowerbeds on either end of the bridge with ribbons of green.

Enter The Swanboats

In 1870 the City Fathers granted Robert Paget, a boat builder from England, the first boat-for-hire concession on the Lagoon in the new Public Garden. The concession employed rowboats with professional oarsmen. By 1877, Paget had launched the first of his new "Swanboats," which could carry four or eight passengers at a time. Designed after the *Schwanboot* in Wagner's "Lohengrin" and propelled on the bicycle principle, they were an instant success. Now even longer and operated by Paget's grandson, they continue to this day, a symbol of Boston and the Public Garden.

There was plenty of work for the Garden staff each spring, removing the boardwalks from all of the red-gravel paths, and each fall re-laying them. The swans of that day were



A swanboat, 1952. Courtesy of the Boston Globe.

sent back to Franklin Park to winter and reappeared each spring, again to follow the swan-boats on their way.

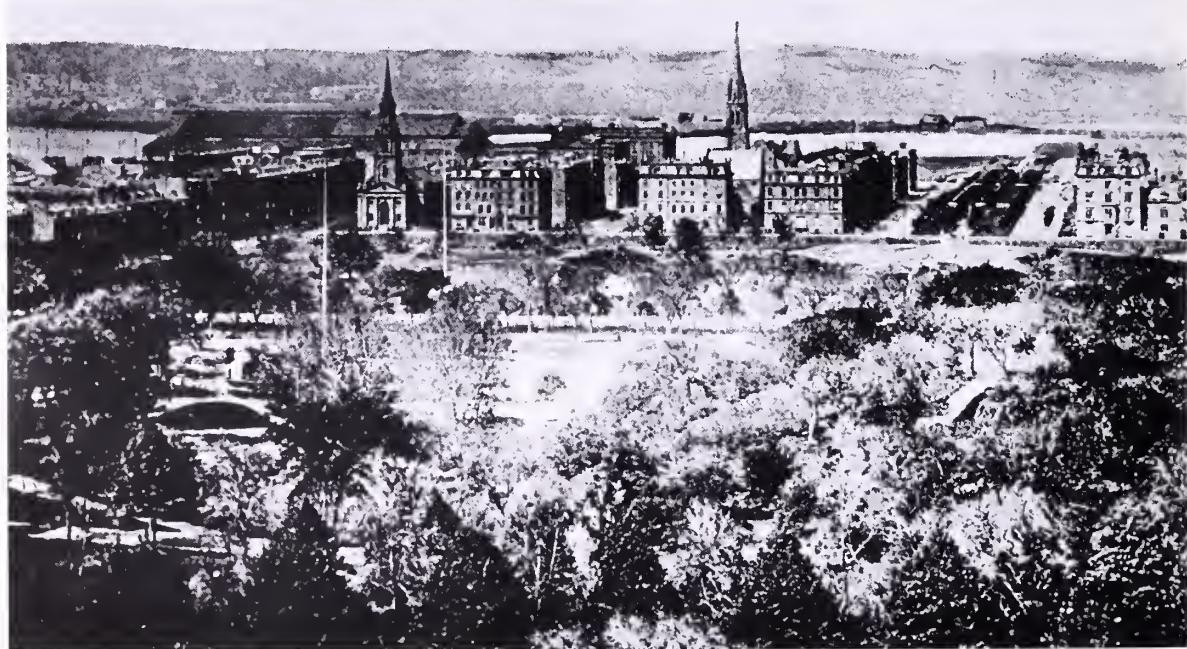
At that time, there were four hundred beds of tulips (containing over four hundred thousand bulbs) underplanted with English daisies and pansies and forget-me-nots. The roses followed in June, with twenty thousand to thirty thousand plants. Rhododendrons occupied small beds with *Lilium longiflorum*, followed by hydrangeas, tropical and subtropical plants, and holly beds with *Lilium lancifolium* in red, rose, or white, blooming until frost, and the garden, greenhouse, and storage areas were prepared for the next season's performance.

Nor was the collection of trees neglected. Six hundred trees of thirty kinds were carefully tended. Among them were two hundred elms (American, English, and Dutch), nearly one hundred maples, fifty magnolias and

willows, fourteen crabs and catalpas, eleven horsechestnuts, and seven varnish trees, and specimens of Kentucky coffee tree, locust, beech, larch, tree-of-heaven, cherry, plum, peach, laburnum, oak, and ash. The ground was found to be too marshy for evergreens other than rhododendrons, so the other shrubs used were deciduous lilacs, quinces, mock oranges, viburnums, and so on.

The Years of Decline

The Public Garden Act of 1860 had stipulated that no buildings were to be erected in the Garden except for horticultural purposes, but no one dreamed that by 1897 the Garden would be host to an entrance of America's first subway. This incursion cost the Garden its privacy, for part of its fence was removed, and many of its oldest trees were destroyed. When the subway was moved out to Boylston Street in 1914, a strip of the Garden forty feet



Looking southwest across the Public Garden from Boston Common in 1869. The partially filled-in Back Bay, including Commonwealth Avenue, appears in the near background. Near the middle left of the photograph is the Arlington Street Church. Courtesy of the Boston Globe.



Looking southwest across the Public Garden from Boston Common in 1975. The just completed John Hancock tower forms a dramatic backdrop for skaters on the Lagoon and dwarfs the historic Arlington Street Church, which can be seen just to the left of center. A light covering of snow contrasts with the dark pattern of the Garden's pathways. Commonwealth Avenue occupies the middle of the right edge of the photograph. Compare this view with that of 1869. Courtesy of the Boston Globe.



An 1870s view of the Public Garden. Courtesy of the Boston Globe.

wide went with it, reducing the Garden from its original twenty-four acres to twenty-two.

When did the Garden begin to decline? The Great Depression of the 1930s changed many city activities. World War Two and its successors changed the public's attitude toward parks and gardens. Keep-off-the-grass signs were little heeded; indeed, of what avail were they when art shows were held in tents in the Garden, and the public was supposed to walk on grass lawns to view the pictures? The gardeners were expected to produce new grass in the worn places with seed and no water, unless it was carried from distant locations. Evidence of the neglected maintenance of years began to be evident in iron fences so rusty they could be pulled apart with ease so that the young could walk through the new

openings and across the flowerbeds. Games of Frisbee were played, with disastrous effect on the tulips. Trees died, but no one seemed able to do anything to stop it.

The maintenance staff, which at the turn of the century had been fifty strong, had shrunk to twenty-five in 1940. By 1970, it was down to four. The wear and tear caused by hippies and others continued twenty-four hours a day. The bridge became known as a site for marijuana and other drugs. The Garden's irrigation system was out of order, seeding was not always funded, and the Tree Division was growing older and smaller. A helpful citizen-sponsored program allowed the planting of crabs, cherries, and maple trees, and many people responded, but the program's success resulted in trees being



The Public Garden, circa 1915. Courtesy of the Bostonian Society.

scattered throughout the Garden with little concern for their ultimate sizes and positions. Even the magnificent pagoda tree, which spreads ninety feet, was obscured by young maples (there were twenty-eight Norway maples in all), and three young katsuras had invaded the Washington parterre. In short, the Boston Public Garden was rapidly becoming an overcrowded mixture of good intentions!

A survey plan for the Public Garden dated 1911 listed eight hundred twelve trees. By 1942, four hundred five of them had died, and thirty-five others were in poor condition. The reduced staff had such poor equipment it is remarkable that they were able to do as much as they did. For economy, paths were paved, the number of flowerbeds reduced. Palm trees

no longer emerged for summers in the Garden (damage was feared). In addition, the bridge was unsafe, fountains broken and their figures stolen or falling into disrepair. It was these conditions, among others, that led to the formation late in 1970 of the Friends of the Public Garden.

The Friends of the Public Garden

The purpose of the new nonprofit organization was, and still is, to preserve and enhance the Public Garden (subsequently, Boston Common was included) and to assure its continuance as a place of quiet recreation, free from exploitation and encroachment. The Friends have joined with the Parks and Recreation Department in horticultural planning and capital improvements, have

provided a fund for the special planting of trees and shrubs, and have served as an important link between the public and responsible city agencies.

At first the Friends focused their efforts on assessing the situation and on determining what suggestions they could make toward its restoration and whether, and in what ways, the Friends could assist the Parks Department in accomplishing those goals. Among the Friends were people with many talents: architects, landscape architects, horticulturists, lawyers, financiers, writers—all ready to help the Park Commissioner in any way they could. Laura Dwight, who had coordinated the planting of magnolias along Commonwealth Avenue, was the first head of the Friends organization. She agreed to serve in that capacity “until the right man could be found” to take on the job. It was not long before he was found: the able and dedicated Henry Lee. As chairman, Lee has guided the Friends’ activities with skill and tact ever since.

It would be difficult for anyone to imagine what a discouraging prospect the Garden presented at that time and how each problem was tackled by the Friends and the Parks Department. Many solutions were found. The bridge over the Lagoon was made safe and restored, the fountains repaired and their basins renovated. New molds were made to duplicate the design of the perimeter fence, and it was recast, enclosing the Garden for the first time since 1897.

The installation of the underground irrigation system and new lighting required protection of the roots of individual trees. For months, the Garden was torn up in all directions, and many were the complaints that the rolled-out sod had no time to be watered before visitors to the Garden were sitting and lying upon it, so glad were they to return! Daffodils buried for months under bricks and mortar reappeared the following spring better than ever. Fifty-five new benches were installed and new frames and trash barrels were

placed throughout the Garden, their plastic liners easily removed when full and transported in the Garden’s own Cushman vehicle to the newly constructed storage yard by Charles Street, there to await removal by the big city trash trucks, which are too wide for the paths in the Garden.

Representatives of the Friends joined those of other civic groups to attend hearings and oppose the plan for the nearby Park Plaza development, on the grounds that it would dangerously impair life in the Garden with sixty-mile-an-hour winds and shadows across the Garden at all seasons. Fortunately, the State rejected the environmental impact study for the project and required a more reasonable development. It is of vital importance to have a civic group such as the Friends always on the watch and prepared to defend the Garden from similar dangers.

The Boston Park Rangers are now a permanent addition to the city staff. They help to guide and monitor visitors to the Garden and provide those who are interested with information about the plants.

The Committee on Horticultural Planning
The Committee on Horticultural Planning for the Public Garden was formed in the late summer of 1971, other committees being formed as the need arose. The Horticultural Committee’s duties were (and still are) to serve as an advisory body for the Commissioner of Parks and Recreation, reviewing proposed changes and projects within the Garden and making proposals of its own. Its membership includes representatives of the Parks and Recreation Department and members appointed by the Friends of the Public Garden.

In its first report the Committee stated that “the successful restoration and maintenance of the Public Garden requires as a first step certain basic improvements, including a new perimeter fence, proper equipment, storage facilities, an adequate number of trained gardeners, an underground sprinkling sys-

tem, means of controlling circulation, preventing vandalism and providing safety during all the hours the Garden is open to the public"—ambitions that have yet to be fully realized!

In 1971, Professor Clifford S. Chater of the Waltham Field Station surveyed all of the Garden's trees and shrubs. As a result of his recommendations a comprehensive program of spraying, pruning, and guying was carried out. Trees with Dutch elm disease and those deemed highly hazardous were removed. The Committee surveyed the remaining trees and recommended the removal of others injured by years of neglect and traffic. A further survey was carried out by Professor Chater and Dr. Francis Holmes using infrared aerial photography. When interpreted by an expert, such films can tell more about the health of trees than on-the-ground inspection. The aerial survey showed that growing conditions in the Garden varied greatly, probably because of the fill that had been used there.

Chater's report on the aerial survey stated, in part, that

It is . . . known that much of the original fill contained muck and other kinds of organic matter which continually release carbon dioxide to the soil atmosphere in addition to the normal amount released by plant roots. Examination of the top soil reveals that it is extremely compacted, which in turn prevents the high concentration of carbon dioxide gas from escaping and also prevents the entrance of oxygen to the soil which the roots require.

Not all of the Committee's recommendations or of the expert advice could be implemented promptly; they were simply guidelines for what ought to be done when and if city funds or private financing was available to provide it.

In the 1970s, some crises loomed large and immediate. There was the Dutch elm disease and the need to treat its victims. Several conflicting methods were recommended and



The equestrian statue of George Washington in the Public Garden. It faces Commonwealth Avenue through the Garden's Arlington Street gate. Photograph copyright © 1988 by Doug Mindell.

tried on individual trees, many of which died. The most beautiful of the surviving elms are still receiving regular annual injections of fungicide.

An unforeseen danger arose when the Boston City Council proposed giving up the city greenhouses at Franklin Park. The summer flowers are a spectacular and major feature of the Public Garden: for over a century people have visited the Garden expressly to see them, and the present display is so remarkable that people come from great distances. The skill and knowledge necessary to create such a display are found in few if any other public places. It requires having cli-

mate-controlled storage facilities and greenhouses available as needed, with experienced personnel to operate them, to produce not only herbaceous material but tropical and subtropical plants and summer and carpet bedding plants. They also plant the pansies and tulips in the Garden that exemplify spring to Bostonians.

At that time, members of the Horticultural Committee attended the hearing of the Budget Committee of the Boston City Council and explained it, and the greenhouses have continued to operate. Today, they are even more appreciated than they were before. Classes in horticulture have been given in them. New greenhouses, easier and more economical to run, are being built, and it is to be hoped that the picturesque Dome House will be reglazed and repaired some day.

One of the major programs of the Horticultural Planning Committee is the continuation of the Memorial Tree Planting Program initiated by its committee member Edward Weeks. The Committee chooses the variety of tree to be planted and selects the site for it.

People tend to think that a horticultural committee's only job is to provide horticultural embellishment. That is the fun, of course, but first the committee must look to the design of the area. With this fact in mind, the Horticultural Planning Committee recommended that several paths be changed in the Public Garden and others eliminated to facilitate traffic circulation and ease of maintenance. Where turf was subject to constant traffic, as at the edges of the Lagoon near the swanboat landing and at the end where skaters change their skates, paving was more



Recent view along the main walk of the Public Garden showing the bedding plants (Impatiens and Browallia) and standards (Lantana) and the post-and-chain fence. Photograph by the author.



A swanboat plies the waters of the Lagoon in this idyllic view of the Public Garden. Photograph by Paul G. Paget.

practical than turf. The flagpole had for many years been lost in a sea of grass and trees; to pave its surrounding base and develop a path to it with seats off the main route seemed practical and pleasant for visitors and reminiscent of little paths the Garden had once had. Later, memorial seats were added around the flagpole itself.

Four beds of roses, topiary yews (the present-day version of the potted plants of long ago, when people longed for evergreens), and the changes in the Garden's paths and beds are all attempts to adapt the present design to new conditions and to the multitudes of visitors without altering the Garden's character.

Until fifty years ago, a third of the trees in the Public Garden were elms, as had been the case for many years. Among them were magnificent specimens that had been there well over a century and gave the Garden a special character. In planting today, the Horticultural Planning Committee tries to choose the best of the ornamental varieties of trees that are available so that the traditions of the past will be continued and the image of a beautiful garden will be perpetuated while at the same time the service and information of a city botanic garden will be available to an interested public.

The Challenge for the Future

When the Proprietors of the Boston Public Garden began their work one hundred fifty years ago, their hopes and dreams for an arboretum or botanic garden were impossible to attain, for the soil in the Garden was poor, there were occasional inundations by the sea, and the many varieties of plant material existing today were not even imagined. Nonetheless, the Proprietors made an inspiring beginning, and ever since it has been the task of succeeding generations to carry on their work according to the advances of their own times. The Garden still suffers from the effects of filled land in its soil characteristics, stability, and levels. These conditions are

being taken care of as they appear, but they pose unexpected problems and expense.

The Garden is remarkable in that it successfully combines the concepts of botanic garden, park, and quiet retreat consistent with current use. Because it was originally conceived as a botanical collection, it is today a living demonstration of some of the varieties of trees and shrubs that will thrive in the heart of a city if only they are given suitable sites, care, protection, and all the space they will need to develop their ultimate sizes and mature characteristics. Generations of interested citizens have encouraged the planting of a broad variety of the best ornamental trees and shrubs available in their times, and the tradition has been carried on ever since. The image of a beautiful garden will be perpetuated while, at the same time, the service and information of a city botanic garden will be available to an interested public.

Until fifty years ago a third of the Garden's trees were elms. Among them were magnificent specimens that gave the Garden a special character, but Dutch elm disease, poor maintenance, and overuse have eliminated many of them. The palette of plants available to the present generation is far more extensive than it has ever been. Species of trees and shrubs have been imported from China, Japan, Korea, and other countries, and there are many new cultivars. Today, every effort is made to choose plants that are not only ornamental but well adapted to the existing growing conditions in the Garden. Harmony, not ostentation, is the predominant goal being sought.

Once the framework of trees is in place, companion shrubs, groundcovers, and permanent bulbs are planted wherever they are needed to add seasonal interest and color without materially increasing the need for maintenance. Wherever appropriate, special characteristics are developed in individual areas, among them the pinetum near Charles and Boylston streets, a group of deciduous

needle-leaved trees near Arlington Street, and a row of twenty-six hybrid shadblows (*Amelanchier* spp.) paralleling the Belgian elms.

The Public Garden is a showcase for the City of Boston, providing beauty for the casual visitor and broader knowledge for others. The biggest challenge is to assure that the Garden never again suffers the type of decline it did before the Friends of the Public Garden was formed. But there are other challenges.

A public garden is not static but alive and constantly in service, twenty-four hours a day. It is remarkable that this one has done so well for so long, but because it is now nearing its capacity, its protection and maintenance will have to be carefully coordinated with the type of use it will receive in the future. As more and more people visit the Garden, a balance must be struck between their activities and enjoyment, on the one hand, and the ability of the plants, which give the Garden

its special appeal, to withstand their impact, on the other. Expert maintenance can only help to mitigate the damage, but not even that can cure it, and all the carefully chosen trees and shrubs in the present collection should be given every chance of reaching their full potentials. The time has come to decide on permanent ways to protect the Garden so that it will continue to be a green and flowering oasis in the heart of a big city.

Mary M. B. Wakefield, known to everyone as Polly, is a former trustee of the Massachusetts Horticultural Society. She has worked with the Friends of the Public Garden since its inception and for twelve years served on the Visiting Committee of the Arnold Arboretum. The recipient of numerous horticultural awards, she views the Boston Public Garden as a "showcase" where people can learn about the pleasures and benefits of plants.



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A *Magnolia denudata* on the Sears estate, Commonwealth Avenue, Boston. From the Archives of the Arnold Arboretum.

TO BE CONTINUED

The Fall issue of *Arnoldia* will contain additional articles on parks and open space in the Boston area.





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Front cover: "Two Bunches of Grapes," woodblock print done in 1943 by Luigi Rist (#20 in an edition of one hundred). Courtesy New York Public Library, Astor, Lenox, and Tilden Foundations (Print Collection, Miriam and Ira D. Wallach Division of Art, Prints, and Photographs). (See page 4.) • *Inside front cover:* Photograph of Ephraim Wales Bull (1806-1895), originator of the 'Concord' grape, standing in front of the original 'Concord' grapevine in Concord, Massachusetts. Photograph by Alfred W. Hosmer (1890s). From the Archives of the Arnold Arboretum. (See page 4.) • *Inside back cover:* Plant of *Vitis coignetiae* in the Arnold Arboretum's shrub collection (1916). Photograph by G. R. King. From the Archives of the Arnold Arboretum. (See page 4.) • *Back cover:* Leaf of *Vitis davidii* (Romanet) Foëns var. *cyanocarpa* Sargent, showing its crimson autumnal color. Native to China, *Vitis davidii* has prickles on its stems and petioles and produces black fruit; the variety *cyanocarpa*, named by Charles Sprague Sargent, is less prickly than the species and produces bluish fruit. During the early 1900s the variety was sold commercially by James Veitch & Sons of Chelsea, England, as "*Vitis armata* var. *Veitchii*." Unfortunately, *Vitis davidii* is hardy only to Zone 7 (USDA). In New England it dies to the ground in severe winters and rarely produces fruit. From *Journal of the Royal Horticultural Society*, Volume 28, Numbers 3 and 4 (1904). (See page 4.)

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DR. ROBERT E. COOK IS NEW DIRECTOR OF THE ARNOLD ARBORETUM

Dr. Robert Edward Cook, a biologist with a special interest in plant population biology, has been appointed Director of the Arnold Arboretum. Dr. Cook is currently Associate Professor of Ecology and Systematics at Cornell Plantations, the university's arboretum and botanic garden.

"We were delighted to recruit someone of Bob Cook's caliber who combines outstanding managerial and leadership skills with a strong scientific background," said Sally Zeckhauser, Harvard University's Vice President for Administration and chair of the search committee.

Cornell Plantations receives about twenty percent of its operating budget from Cornell; the remainder must be raised from private and public sources. Under Dr. Cook's direction, Plantations has undergone a five-year period of growth, doubling its budget, its permanent staff, and its supporting membership. A successful fundraising program implemented among alumni and friends resulted in increased unrestricted giving to Cornell Plantations and a sixty percent rise in special gifts for capital projects.

Major capital projects undertaken during Dr. Cook's tenure included garden, trail, and landscape renovations as well as the acquisition of more than two

hundred fifty acres of ecologically important land. A new service building was designed, funded, and constructed.

Dr. Cook also initiated a series of research projects at Plantations with funding from outside organizations. Ecological research on endangered plant species and a review of national recovery plans, for example, were funded by the United States Fish and Wildlife Service, New York State, and the World Wildlife Fund. The National Science Foundation (NSF) is supporting ecological research on grasses, trees, fire, and grazing in the Kenyan savannah. Research on curriculum development for elementary-level science education (Project Leap—LEarning About Plants) is being jointly funded by NSF and New York State.

Dr. Cook's own research interests are in plant propagation biology in general and in the biology of clonal plants in particular. A native of Warwick, Rhode Island, and a 1968 graduate of Harvard College, he received his doctorate from Yale in 1973. He was a Cabot Fellow at Harvard in 1974 and 1975 and served as assistant professor in the Department of Biology from 1975 to 1980 and as associate professor from 1980 to 1982. Dr. has also been as program director in population biology and physiological ecology at NSF.

“He Sowed; Others Reaped”: Ephraim Wales Bull and the Origins of the ‘Concord’ Grape

Edmund A. Schofield

While Emerson and his colleagues were designing a philosophy for the unique needs of an expanding nation, one of their townsmen was quietly developing a grape to match the demands of its rigorous physical environment

The Origins and Spread of “The Vine”

In their peregrinations over the ages, the grape and mankind have crossed paths, have even trod the same path, many times. East and West, for millennia, they have followed similar routes of history, myth, and romance—first in the Northern Hemisphere, in Asia, in Europe, in North America, and then, within the last few centuries, in the Southern Hemisphere as well. Companion to mankind from dimmest antiquity, the grape has been one of mankind’s most important, most esteemed fruits.

In the West, the story of the grape has been largely the story of *Vitis vinifera* Linnæus—“the vine”—from which all cultivated varieties of grapes were derived before Europeans came to North America. Cultivation of the vine—called viticulture—is a very ancient art: from earliest times and in every country, wherever it would thrive, the vine has been cultivated with care, especially here in the West. What wheat is to other cereals the vine is to other fruits—the most important in Western eyes, as rice is in Eastern eyes. Asia Minor, somewhere between and south of the Black and Caspian seas, apparently is its home. From Asia Minor, its culture spread both west and east.

In early history viticulture was carried out largely to supply grapes for winemaking. Long before the beginning of the Christian

era, grapes and wine were of considerable importance to Middle Eastern and Mediterranean peoples. Thousands of years ago the Egyptians were well acquainted with the use and properties of wine, which their traditions say were revealed to them by Osiris. Their chief vineyards were planted on the banks of the Nile. Joseph’s dream, described in Genesis, gives evidence that the vine was cultivated in Egypt at least eighteen hundred years before Christ. Grape seeds have been found with mummies in Egyptian tombs that are at least three thousand years old, and details of grape growing appear in mosaics of the Fourth Dynasty of Egypt (2440 B.C.) and later.

Viticulture was practiced very early in Palestine (“And Noah began to be a husbandman, and planted a vineyard.”—Genesis 9:20). By 600 B.C., the Phoenicians probably had carried varieties of wine grapes to Greece, which were carried thence to Rome and on to southern France. Hundreds of varieties now are cultivated in the vineyards of the wine-growing country there. Ancient records show that the Chinese had vineyards of native grapes at least one thousand years before Christ. During the second century B.C., *Vitis vinifera* was introduced into China from western Asia, by way of Persia and India.

Viticulture flourished in Greece during Homer’s time. It was Dionysus, god of revelry and protector of the vine, who gave them the

vine, they say, and taught them viticulture. Viticulture must have been introduced very early into Italy also, by the Greeks. The Roman writers Virgil, Cato, the Plinys, Varro, and Columella describe numerous varieties of the vine, list many types of wine, and give directions for training and pruning vines and for making wine.

For a time the Romans seemed to prefer Grecian wines to their own; not until about the first century of the Christian era did Italian wines begin to find favor in their own land. In Virgil's time the varieties in cultivation seem to have been exceedingly numerous; and the varied methods of training and culture now in use in Italy are in many cases identical to those that Columella and other Roman writers described.

Because viticulture was so important in Roman life, it is often referred to in Roman poetry, such as Virgil's *Georgics*. Bacchus, god of the vine, whom the Romans identified with Dionysus, was enormously popular at Pompeii, which was destroyed in A.D. 79 by the eruption of Mount Vesuvius. Archæologists have found the sites of many vineyards at Pompeii, some of them surprisingly large. They have found also numerous wall paintings of the vine, countless wine shops, and innumerable amphoras. All of this archæological evidence attests to the importance of the grape as a staple of daily life in Pompeii and verifies the information on viticulture given in the writings of Pliny the Elder, Cato, Varro, and Columella.

During Roman times grape culture extended inland from the coast, moving up the Rhone River valley of France and as far north as the Rhine and Moselle valleys. By the second century A.D. the Romans had taken the vine to Germany.

Well before the second century, raisin and table grapes had spread around the eastern end of the Mediterranean Sea to the countries of North Africa. Because the customs and religions of North Africa differed from those of the northern coast of the Mediterranean, the raisin and table grapes on the one hand,

and the wine varieties, on the other, spread along different routes.

Centuries later, when Europeans colonized lands around the globe, the grape was always among the plants they took along. In the fifteenth century viticulture became established in Madeira and the Canary Islands. Later it spread to South Africa, Australia, and South America. The first wine grapes were brought to California from Mexico late in the eighteenth century. During the first half of the next century grape growing and wine-making became established in California and expanded rapidly between 1860 and 1900.

Grapes and Their Uses

Most grapes (*Vitis* spp.) are coarse, woody vines that cling to their supports by means of tendrils. Some species native to arid regions are almost-erect shrubs rather than vines. Grapes are members of the Vitaceæ, or Vitidaceæ (the Grape, or Vine, Family). The genus name *Vitis*, which is the classical Latin name for the grape, was conferred by Carolus Linnæus. Over the years *Vitis* has been variously defined to include or exclude the genera *Cissus* and *Ampelopsis*, from which it is distinguished on the basis of small differences in floral structure. (*Cissus* was the Greek name for the ivy, and *Ampelopsis*, the name created by Michaux, comes from the Greek *ampelos*, the vine—*i.e.*, the grape—and *opsis*, appearance.) *Vitis* is widespread in the Northern Hemisphere, especially in the temperate regions. Defined strictly, it includes around sixty species; when *Ampelopsis* and *Cissus* are included, it consists of some two hundred fifty species.

As noted, grapes may be cultivated for any of a number of purposes: for making wine, for example; for eating out of hand as "table grapes"; for drying as currants and raisins; for preserving as jams, jellies, and preserves or for nonalcoholic beverages; and, latterly—owing to the elegance and rich color of the leaves of some grapes or to the shade they afford—as ornamentals, perhaps one of their least known uses.

Several species recommend themselves as ornamentals:

Vitis coignetiae, known as the gloryvine, is a hardy, some, fast-growing, climbing vine. Its very large, heavy leaves reach ten inches in diameter and turn red in the fall. Probably the fastest growing of the grapes, gloryvine is ideal as a screen, its shoots increasing their length by as much as fifty feet in a single season, and a single plant of *Vitis coignetiae* can cover a thousand square feet of trellis in a few years. It produces inconspicuous and inedible fruits. Hardy to Zone 5, *Vitis coignetiae* was introduced into the United States from Japan by the Arnold Arboretum in 1875.

Vitis amurensis, the Amur grape, is a vigorous vine native to the Amur River region of eastern Asia. Hardy to Zone 4, it is grown as an ornamental. Producing black fruit, *Vitis amurensis* comes into its own in the fall, when its coarse foliage turns crimson to purplish. Introduced to horticulture around 1854, this species is harder than *Vitis coignetiae*.

Vitis californica, the California grape, is hardy to Zone 7. It is native to the West Coast, from Oregon to California and like *Vitis amurensis* is effective in the fall, its coarse leaves turning red at that season. Although rather dry, its glaucous-white fruits are, nonetheless, pleasant-tasting.

Vitis riparia, the riverbank grape, is a very hardy, high-climbing vine that is native to a large area of the United States. (It is hardy to Zone 2.) *Vitis riparia* produces purple-black fruit that are covered with a dense bloom, and it bears leaves with lustrous, bright-green undersides. Its staminate flowers are fragrant, but they are too small to be effective ornamentally.

Grapes of the New World

North America has been called a natural vineyard: the first record of the continent is also a record of its grapes, which grow wild in the greatest profusion in the wooded parts of the continent, from the Great Lakes to the Gulf of Mexico and from the Atlantic to the Pacific. When the early explorers visited North America, wild grapevines were so prominent that the region was repeatedly called "Vineland." Leif Ericson, for example, reached our northeastern shores in about the year 1000. "Farther south and westerly they went," says Justin Winsor's narrative, "and going up a river came to an expanse of water, where on the shores they built huts to lodge in for the winter, and sent out exploring parties.

In one of these . . . a native of that part of Europe where grapes grew . . . found vines hung with their fruit, which induced Leif to call the country Vineland." The English colonists found the coast of what is now New England to be profuse in grapes. In 1621, Edward Winslow wrote that in New England "are grapes, white and red, and very sweet and strong also."

Governor's Island, in Boston Harbor, was granted to Governor John Winthrop in 1632 on condition that he plant a vineyard or orchard on it. The island early became known as "The Governour's Garden." In the Middle Atlantic region, the native grapes also attracted the attention of colonists and travelers. In Virginia in 1607-09, for example, Captain John Smith saw "[o]f vines, great abundance in many parts, that climbe the toppes of the highest trees in some places, but these beare but fewe grapes. But by the rivers and Savage habitations where they are not overshadowed from the sunne, they are covered with fruit, though never pruined nor manured." The Spanish colonists of Florida and the French voyageurs were attracted by the abundance of grapes. Even as far north as Michigan the voyageurs found the banks of streams festooned with grapevines.

John Adlum's vineyard near Georgetown in the District of Columbia, which was planted in 1820, first successfully produced grapes on the Atlantic coast. His introduction of the 'Catawba' into general culture would eventually yield valuable new cultivars. In 1860, nine-tenths of the 5,600 acres of vineyard established east of the Rocky Mountains were 'Catawba' grapes.

The Mission Fathers in California were the first to grow successfully a variety ('Mission') of *Vitis vinifera* in what is now the United States; they brought it to San Diego in 1769. 'Mission' remained the leading variety grown until 1860, when European varieties were introduced. Between 1860 and 1870 in California there was a rapid increase in the acreage of varieties derived from native American grapes. It was during this time that the culti-

var 'Concord' became the leading commercially grown grape of American origin.

The vine of Europe and of history, *Vitis vinifera* has always led a precarious existence whenever it was introduced into the eastern United States. It has been supplanted there by derivatives of the native species—*Vitis labrusca* (the northern fox grape), *Vitis æstivalis* (the summer grape), and *Vitis rotundifolia* (the southern fox grape)—and by their hybrids with *Vitis vinifera*. Being essentially table fruits, the American grapes are quite different from their Old World counterpart, which, as has been said, is a wine fruit. Thus, European writings historically have dealt with "the vine," American writings with "grapes." But early American writings also dealt with the vine and with wine; it was not until the middle of the last century that the native grape began to be appreciated and understood as a table grape.

Each species, native or introduced, has many varieties, is best adapted to specific regions of the country, and is managed according to its own special requirements. The "vinifera grapes," or "European grapes," as they are sometimes called, are grown in California and other areas with mild climates and, as said, descend from *Vitis vinifera*. They are cultivated in vast quantities in all major grape-growing regions of the world except eastern North America. Some of the American varieties have been introduced into France and other countries that became infested with phylloxera in the latter half of the nineteenth century, to serve as stocks for the better kinds of European vines, because their roots suffer less injury from attacks of this insect than do European species.

Vitis labrusca produces purple-black fruit and has leaves that are dark green above. It is a rampant grower, ranging widely throughout the eastern United States, from New England to Georgia, Tennessee, and southern Indiana, and is hardy to Zone 5. *Vitis labrusca* is the parent of most of the American grapes now in cultivation and is the mainstay of grape-growing east of the Rocky Mountains, with

the most extensive plantings near the southern shores of the Great Lakes.

'Concord' may be the most famous American cultivar; it is certainly the most widely grown. Because of its wide adaptability it is produced in almost every grape-growing state of the Union. Although often considered as pure *Vitis labrusca*, it more likely is a hybrid of that species with another species. In fact, most of the older American grapes are thought to involve more than one species. Therefore, "*Vitis labruscana* L. H. Bailey," a name used in some horticultural literature, has been applied to American grape cultivars of *Vitis labrusca* parentage.

'Concord': A Hardy Grape for American Vineyards

The story of 'Concord' is one of the more interesting chapters in the history of North American viticulture. While not the first or only important cultivar developed in America, 'Concord' may well be the most noteworthy. It and Ephraim Wales Bull, its originator, are the protagonists of the account that follows. The past has been a long prologue to their story.

Ephraim Wales Bull came to serious grape-growing and to the town of Concord, Massachusetts—after which his cultivar was named—in a roundabout way. He was born in Boston on March 4, 1806, the day on which Thomas Jefferson was inaugurated for his second term as president. The farmhouse in which he was born stood in the area of Washington Street that would later become known as "Newspaper Row," around the corner and a mere five hundred feet from the house on Milk Street where Benjamin Franklin was born almost precisely a century before. Ephraim was the eldest son of Epaphras Bull, a silversmith who had left the hamlet of Bull's Pastures (now Bullsville), New York, for Boston. His family was descended from Captain Thomas Bull, who had come to America in 1635 on the ship *Hopewell*.

Boston was, in those days, a large, thriving town, and Washington Street, now one of the

principal and most congested thoroughfares in the "Hub," was a village highway. Cows grazed on Boston Common. Behind the Bulls' house was a large garden where young Ephraim indulged a love of horticulture, experimenting in grape growing, among other things.

A studious child, Ephraim received the Franklin medal at school in 1817, when he was only eleven years old. In 1821 he was apprenticed to Louis Lauriat in the trade of gold-beating—the beating of gold into leaf, then much in demand by bookbinders and gilders. At about this time his family moved to nearby Dorchester, Massachusetts. While pursuing his trade as goldbeater, young Bull devoted all his spare time to horticultural pursuits, particularly to small-scale grape growing, in his home garden. (Bull raised the varieties 'Isabella', 'Catawba', and 'Sweetwater'.) This was the period during which 'Isabella' was first grown in Boston.

In 1826 Bull acquired a shop of his own, and on September 10 of that year he married Mary Ellen Walker, a relative of President James Walker of Harvard College. After their marriage the Bulls moved back to Boston, taking a small house on Fayette Street, in the South End. Bull was by now a first-class gold-beater, working long hours in a hot, dusty shop on Cornhill (near modern Government Center). He continued to indulge his interest in horticulture during his off hours, in the small garden garden behind his house.

Eventually, Bull developed lung trouble, and his doctor advised him to live in fresh air and away from Boston's chill east winds. In August 1836, therefore, he quit Boston, buying seventeen acres of land in Concord, a town located some twenty miles northwest of Boston. There the Bulls lived in a little white house on the road to Lexington. Though he continued his trade as goldbeater in a tiny shop behind his home, Bull loved farming more. Whenever the gold business slumped he would have time to putter in his garden. His passion by now was the grape, and

the 'Isabella', 'Catawba', and 'Sweetwater' grapes he had cultivated in Boston had come with him to Concord. He was unable to ripen the grapes in open culture, however, even in favorable seasons. This was due, he said, to "the late spring and early autumn frosts, which we are liable to in this deep valley of Concord."

Bull had moved to an interesting town during an interesting period of American history. Concord was hardly a typical rural village. There, where "the shot heard 'round the world" was fired in 1775, the American Revolutionary War had begun. Decades later a social movement, American Transcendentalism, took root and flourished in Concord around the writer and philosopher Ralph Waldo Emerson. The land on which Ephraim Bull had settled made him next-door neighbor to the Bronson Alcotts and later to the writer Nathaniel Hawthorne, with whom he was soon on friendly terms. During the years of struggle before he discovered the famous grape, Bull was assisted and encouraged by these and other neighbors and townsmen, many of whom were members of the Emerson-Thoreau-Alcott Transcendentalist group. In strategic ways, many of which will never be known in full detail, Bull worked alongside his Transcendentalist friends when antislavery agitation reached its peak in Concord just before the Civil War.

Hawthorne's son, Julian, recalled Bull in his book, *Hawthorne and His Circle*. "Another neighbor of ours," he wrote,

hardly less known to fame [than the Transcendentalists], though in a widely different line of usefulness, makes a very distinct picture in my mind; this was Ephraim Wales Bull, the inventor of the Concord Grape. He was as eccentric as his name; but he was a genuine and substantial man, and my father took a great liking to him, which was reciprocated. He was short and powerful, with long arms, and a big head covered with bushy hair and a jungle beard, from which looked out a pair of eyes singularly brilliant and penetrating. He had brains to think with, as well as strong and skilful hands to work with.... He often came over

and sat with my father in the summer house on the hill, and there talked about politics, sociology (though under some other name, probably), morals, and human nature, with an occasional lecture on grape culture.

In 1841 Bull bought the Eben Dow farm, which adjoined his property, setting out many trees, shrubs, and vines. The farm's soil was sandy, and a south-facing slope suggested to Bull great possibilities for grape growing. Determined to develop an earlier-ripening grape that would be hardy in Massachusetts, he obtained from every available quarter vines having local reputations for excellence. (He knew about Jean Baptiste Van Mons' success in raising pears from seeds and concluded that the same process could be applied to grapes.) Again he was disappointed but persevered—eventually turning to wild vines he found growing nearby.

He had been watching carefully an early-ripening native of the northern fox grape, *Vitis labrusca*, growing in a distant part of his garden, noticing, when it fruited at the end of August 1843, that it possessed at least some of the essential qualities he sought. The grape was of good quality, and the idea immediately occurred to him that another generation would be a still greater improvement. He removed and planted it near his 'Catawba' vine, by which it was probably pollinated. Bull (he informs us) planted the resulting grapes from the wild vine "whole, into the ground, skin and all, at a depth of two inches, and covered the row with boards.

"I nursed these seedlings six years," he informs us further, "and of the large number obtained only one that proved worth keeping. On the tenth of September 1849, I was enabled to pick a bunch of grapes, and when I showed them to a neighbor who tasted them, he exclaimed, 'Why this is better than Isabella'!"

"I looked about to see what I could find among our wildings," Bull would reminisce later. "The next thing was to find the best and earliest grape for seed, and this I found in an



Ephraim Wales Bull in 1861. From Transactions of the Massachusetts Horticultural Society for the Year 1908.

accidental seedling at the foot of the hill. The crop was abundant, and of very good quality for a wild grape. I sowed the seed in the autumn of 1843. Among them the Concord was the only one worth saving."

The exact source of the accidental seedling is obscure. Bull had bought his house in Concord in 1836. That year, he told Liberty Hyde Bailey decades later, boys brought up from the Concord River some wild grapes and scattered them about the place. A seedling appeared in a corner of the garden, evidently the offspring of these truant grapes.

The stray seedling grew at the base of what is now called Revolutionary Ridge, an interesting landform so named for the key role it had played in the battle between the Americans and the British on April 19, 1775. Extending a mile or so eastward from the center

of Concord, this sandy, gravelly ridge is a kame delta that was deposited some ten to twenty thousand years ago in Glacial Lake Concord by meltwater rushing from the retreating continental ice sheet. British troops, advancing from Lexington to Concord North Bridge along the road that parallels the Ridge, passed Bull's cottage en route to the bridge, and passed it again during their ignominious retreat to Lexington and Boston. The Concordians, knowing their native terrain far better than did the alien British, who kept mainly to the public highway, travelled across lots, on the far (north and eastern) side of the Ridge, rushing from the Bridge to Meriam's Corner, a fork in the road located only three hundred yards east of Bull's cottage, at the eastern tip of Revolutionary Ridge. There the Americans ambushed the British troops. In one of his romance fragments, the posthumously published "Septimus Felton," Nathaniel Hawthorne makes Revolutionary Ridge the scene of a duel between Felton and a British soldier.

'Concord' Makes Its Debut

In 1849, Bull paid a visit to the editorial offices of the *Boston Cultivator*, telling its editor, Samuel W. Cole, that he had a new and promising seedling black grape that he wished to exchange for one of 'Diana', which the *Cultivator* had offered for sale to its readers. Cole, who owned a nursery in Chelsea, had his foreman set the cutting out. It soon fruited, but little was made of it. Bull had stipulated that it was not to be propagated for sale.

In the spring of 1853, Bull took the limited stock propagated at Cole's nursery, having decided that the best way to publicize the new cultivar would be to exhibit it at Horticultural Hall in Boston, during that fall's meeting of the Massachusetts Horticultural Society. Accordingly, 'Concord' was exhibited for the first time on September 3, 1853, three years after it had produced its first fruit.

It is said that, through some mixup, the 'Concord' originally was exhibited among the

vegetables and was nearly overlooked by the judges. In the perhaps embellished account of a journalist, when the show opened and Bull's new grape had not arrived,

two members of the Society went out to Concord and said, "Where are those grapes you promised to send in?"

Quite taken aback, Bull stammered, "I did send them in, by a neighbor. I was too sick to make the trip myself, but I sent them just as I said I would."

Very much puzzled, the committee went back to the horticultural show. They rummaged around and found the grapes hidden in a pile of squashes and turnips and other vegetables. One look and they knew they had something. They looked at the big round, juicy fruit that had ripened fully two weeks before any other grape and then snatched a couple to eat. They smacked their lips and said, "I'll bet he girdled the vines—we better make sure there's no trickery here."

So back to Concord they hastened, notebooks in hand, and gave poor Mr. Bull quite a going over. But he showed them the vines and some other clusters—far bigger and better than those he had sent to the show.

Once convinced, the committee announced to the world that, at last, a grape had been developed that would grow in New England—bigger and better than any grown before.

The next issue of Hovey's *Magazine of Horticulture* reported that, "Mr. Bull's new, early and delicious native variety, was exhibited before the Massachusetts Horticultural Society, on Saturday the third of September, fully ripe, being more than two weeks before the Diana was mature. It has not only proved by far the earliest grape we have, but also one of the most delicious, having in place of the musky flavor of Isabella, the rich aroma of the Catawba, with which, probably its parent was somewhat fertilized. Specimens were exhibited before the committee who say it fully maintains the high character heretofore given it."

"We are gratified to announce," Hovey's continued, "that Mr. Bull has decided to offer it for sale in April next, and has placed the entire stock in the hands of Messrs. Hovey & Co. for disposal. . . . It will be called the CONCORD grape, having been raised in the town of that name, very near the spot so

memorable in the annals of our history, and known as the Concord battle ground."

When Hovey & Company introduced it in the spring of 1854, it attracted considerable attention and was placed on the grape list of the American Pomological Society as one of the "new varieties which promise well." It attracted still more attention in 1855. The next few years found 'Concord' in the catalogs of every nursery in the country, and it spread rapidly throughout most of the eastern and midwestern states. Within the brief period of a year, 'Concord' was growing in the Middle West. One source, George Husmann, states that in the winter of 1855 he secured buds of 'Concord' at Hermann, Missouri, from James G. Soulard of Galena, Illinois—half way across the continent. In 1858 'Concord' was placed on the regular list of recommended varieties by the American Pomological Society, where it remains.

Bull himself took a hand in promoting 'Concord'. In August 1854, for example, he

corresponded with a Dr. J. C. Bennett of Great Falls, Iowa, who he hoped would market 'Concord' in Iowa. "The Charter Oak and the Concord are entirely different in all respects," Bull wrote.

The Charter Oak is very large in berry though small in bunch, coarse, foxy, and wild. The Concord is as handsome in the bunch as a black hamburg [the variety 'Black Hamburg'] and as large, delicate, full of juice, and has a rich aroma—and as unlike a wild grape as possible. It is hardy in wood and foliage and berry, which is not the case either with the Catawba ['Catawba'] or Isabella with me—both being infected by rot this very season, while the Concord is wholly free from any of these things.

By 1860, vineyards of 'Concord' had been planted in Chautauqua County, New York. In 1865 it was awarded the Greeley prize and called, prophetically, "the grape for the millions." During this period horticultural societies would maintain frequent contact with one another about new fruit varieties and cultural practices; by 1867 the Ohio Horticultural



The original "Concord" grape vine, still growing after nearly a century and a half. Photograph by the author.

tural Society was writing about the extensive plantings of the "noble Concord" in Ohio and Missouri. Within fifteen years of its introduction, thousands of acres of vineyards had been planted to 'Concord' all over the country. By the mid-1870s more 'Concord' had been planted in the Northeast than all other varieties put together. It had become the outstanding grape for both fresh and processed use. Fruit was shipped from the grape belts of the Lake Erie region to most of the major cities of the United States.

"The Greeley Affair"

In 1866, journalist Horace ("Go West, young man! Go West!") Greeley, editor of the New York *Tribune*, offered a prize of one hundred dollars "for the best grape for general cultivation." 'Concord' won. When the winner was announced before the Farmers' Club of the American Institute of New York City in October of that year, there was unanimous applause from the audience. Many members of the public later would express strong opposition, however, among them Horace Greeley himself! A Dr. E. Ware Sylvester described the controversy at a Farmers' Club meeting in March 1869 (Horace Greeley was in attendance), sparking a lively exchange:

An effort has been in progress to discover among our native grapes, one which in healthfulness, hardiness and productiveness, should be adapted to the wants of the million. To this end the prize of \$100 was, years ago, offered by Horace Greeley, and other prizes have since been awarded. You are well aware that the Greeley prize was given to the Concord. This brought out a torrent of abuse mainly from those interested in other vines, and even Dr. Greeley, with his usual kindly feelings, thought it best to apply a *Tribune* soothing plaster to the wounded head of Iona island. [The cultivar 'Iona' was developed by Dr. C. W. Grant of Iona Island, New York, which is situated in the Hudson River about forty miles north of New York City.] To the base insinuations which were made in the public prints, the members of the Greeley committee made no reply, and make none now; they were willing that time and experience, the great regulators of agricultural matters, should justify, as they were sure to do, the award of the committee.

Dr. Sylvester proceeded to cite a large number of authorities, statements of farmers, nurserymen, vineyardists, and vintners in all parts of the country, showing that 'Concord' was more successful and gave more satisfaction than any other grape. Horace Greeley then spoke:

As the prize I offered has been directly alluded to by Dr. Sylvester, I may say that with the award of that committee I had nothing at all to do. When they came to their decision I paid over the \$100. But the end I had in view was not attained by that investigation. I intended to stimulate the production of new and better vines, and hoped some grape would be brought out having the hardiness and adaptability to soils and climates of the Concord, good bearing qualities, and, what the Concord wants, high and delicate flavor. But the award was to the Concord, and I could never see what that man [not Bull, but William H. Goldsmith of Newark, New Jersey, who recently had exhibited the 'Concord' at a fruit show of the American Institute of the City of New York], whoever he was, did to deserve his \$100. The Concord was widely cultivated, and all my money did was to advertise a grape already known; thus improvement was not stimulated, but rather checked. I am a little discouraged by the result, and do not propose to offer another bank note for a plate of common grapes. To my taste the Concord has no quality superior to the wild wood grape of my boyhood. [Greeley grew up in New Hampshire.] I admit that it is hardy and prolific; but after all, is it much of a fruit? I hope others will take up this matter, and at length bring out a grape hardy, productive, adaptive and highly flavored.

P. T. Quinn responded to Greeley's remarks:

As a member of that committee, a word of explanation may be in order. There were two committees. The first decided on the Iona, and Dr. Grant claimed the award as the originator of the Iona. But there was a protest, a delay, a change in the personnel of the committee, and the feeling with those who made the final award was that a grape like the Iona, known only to a few amateurs, did not come up to the requirements of Mr. Greeley, and should not receive the money.

Greeley responded that

What I complain of is the eagerness of the committee. I did not care if they waited five years, and thus gave grape culturists a chance to enter new varieties. How do we know but Caywood's grape,

for instance, the Walter, is as hardy and well suited to different soils as the Concord? If the prize were now open the Walter might take it for aught I know.

Dr. Sylvester countered that

Two years or more have elapsed since that award, and has any grape risen up that could contest the palm with the Concord? This last fall, did not Concord receive the silver cup at Cincinnati for being the best wine grape, and the best table grape?

A Mr. Fuller assured Greeley that his money had not been wasted:

While I agree with Mr. Greeley as to the qualities of the Concord, yet I must say that he never put out \$100 that has done more good to the farmers of this country. It arrested attention everywhere, and people began to buy Concord vines who never bought before. It has been the means of planting a vine in 10,000, yes, 100,000 yards and gardens. Of course we are not to rest in the Concord; but it is so much better than no grape, besides it affords the best sort of a stepping-stone to something superior.

Despite his harsh remarks, Greeley is said to have relented, calling the 'Concord' "a grape for the millions."

Life after 'Concord'

Bull's success with 'Concord' did not end his experimenting. On the contrary, it led him to grow twenty-two thousand seedlings over a period of thirty-seven years, of which he selected twenty-one for introduction. A white grape, which he believed to be the most beautiful he could produce, he named 'Esther' in honor of his mother, for example; another, later production he named 'Cottage', out of love for his home, the little house which survives to this day as "The Grapevine Cottage"; yet another, 'Rockwood', he named after his lifelong friend, Judge Ebenezer Rockwood Hoar. 'Iona' and 'August Rose' were among his later introductions. Many seedlings he left unnamed. At one time he had one hundred twenty-five vines that he thought

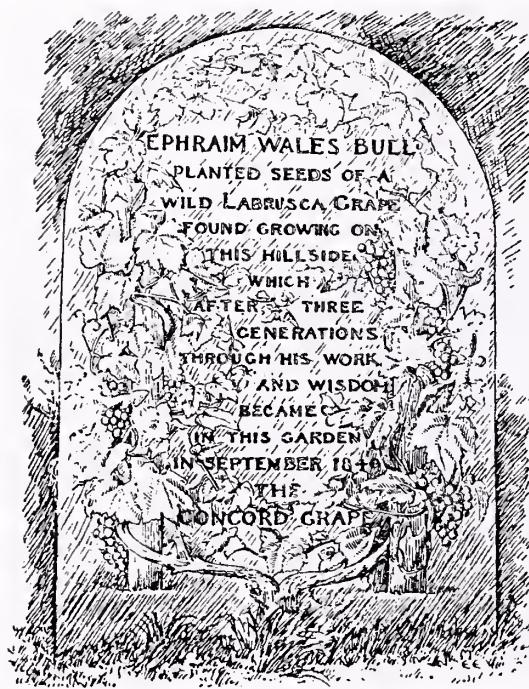
were worth saving; but, growing more critical, he discarded most of them.

Marshall P. Wilder, a noted nineteenth century horticulturist, stated that, "Had Mr. Bull done nothing else for the benefit of mankind, than originate the Concord grape, his name would be held in grateful remembrance, while the fruit of the vine shall cool the parched tongue, or the juice make glad the heart of man." Judge Hoar asserted that "had Bull conferred such a public benefit as originating the Concord grape in the Old World, the government would have conferred its recognition upon him, whereas in his own country what he had given years of patient study and toil to attain, was accepted as a mere matter of course."

Ephraim Wales Bull received scant pecuniary reward for his work after selling stock to Hovey & Company. He had sold 'Concord' vines directly at five dollars apiece during the first year, receiving a total of \$3,200 in net income, but almost nothing thereafter because the commercial nurseries were propagating and selling it to the public in vast quantities and paying no royalties to Bull. He did garner many honors nonetheless: he was invited to lecture at Harvard on grape



A corner of Ephraim Wales Bull's house, showing Bull's workshop. Courtesy of the Concord Free Public Library.



Monument to the 'Concord' grape and Ephraim Wales Bull erected in front of the Grapevine Cottage and the original 'Concord' grapevine by the town of Concord.

growing, for example; he was elected a member of the Massachusetts House of Representatives from Concord and was chairman of the committee on agriculture; he later held the same position in the Massachusetts Senate; and he was appointed to the Massachusetts State Board of Agriculture.

The Massachusetts Horticultural Society awarded him three medals for the production of the 'Concord' grape and the best seedling grapes, including, in December 1873, a gold medal "for the production of the best hardy seedling grape, the Concord, which has proved, after a thorough trial, so universally adapted to general cultivation throughout the United States, and the most reliable grape for vineyard cultivation in Massachusetts." Later, he became an honorary member of the Society.

Bull deserved to benefit handsomely from his dedicated and painstaking work in developing 'Concord', but nearly all profits from it went to the commercial nurseries. Had his later cultivars been properly introduced they might have brought him wealth, but because 'Concord' had failed to be profitable, he hated commercial grape culture and, refusing to put them on the market properly, grew disappointed and embittered.

Thus, Bull had to be content with less tangible rewards: much respect and affection at home and a modest fame abroad. He saw his 'Concord' spread over the continent, leaving great wealth in its wake, while he, its originator, grew more and more impoverished. From a simple, frank, neighborly man he became a suspicious recluse, spending his days tending plants in a small greenhouse behind his cottage. This became the chief solace of his lonely later life.

Ephraim Wales Bull died on September 26, 1895. The epitaph on his grave is an apt description of his life: "HE SOWED; OTHERS REAPED."

The True Place of 'Concord'

Today, a century and a half after it was developed, 'Concord' remains the preeminent grape of the eastern United States. It is well adapted to conditions in that part of the country, whereas the European varieties are not. According to a recent survey, more than seventy percent of the grapes produced in the northeastern, north central, and northwestern states are of this cultivar. As a progenitor of many other cultivars 'Concord' has an even greater claim to fame. Among the more familiar cultivars of 'Concord' parentage are 'Worden', 'Martha', 'Cottage', 'Niagara', 'Diamond', 'Moore's Early', 'Highland', 'Cole-rain', 'Brighton', and 'Black Eagle'. A score of others are either directly or indirectly linked to the family tree of 'Concord'.

Other claims have been made for the 'Concord', some of them patently false or exaggerated—although no doubt made in

good faith—some of them true. Local folklore, for example, claims that 'Concord' and varieties derived from it "saved the vineyards of Europe":

Cuttings of 'Concord' went to Europe directly from Ephraim Wales Bull's own vineyard in the late 1870s or early 1880s, when the phylloxera was devastating the vineyards of France. An agent of the Emperor Napoleon came to America to investigate American grapes. The agent visited Bull in Concord and was presented with a bunch of 'Concord' cuttings.

The phylloxera is an insect, *Phylloxera vitifoliæ* Fitch, that is indigenous to the eastern and central United States. Imported into Europe between 1858 and 1863 on American vines taken there for grafting purposes, it has since reached almost every vine-growing country in the world. The first definite record that the phylloxera had reached Europe was made in 1863, in England; soon thereafter it was identified in France, through whose vineyards it spread rapidly. Within twenty-five years it had destroyed nearly one-third of France's vineyards—in all, more than two and one-half million acres. By 1885 the phylloxera had extended to most other grape-producing countries of Europe and had reached Algeria, Australia, and southern Africa. It was first discovered in California in 1880, but there is evidence it had reached that state more than twenty years earlier, having been introduced along with American vines from east of the Rocky Mountains.

The truth is that 'Concord'—like *Vitis labrusca* in general—is only slightly resistant to the phylloxera. Other American species and cultivars derived from them are notably resistant to the phylloxera, however; it is

these that provided stocks for susceptible vines in Europe and elsewhere, not 'Concord' or its descendants. In any event, the folklore is in error on at least one other score: "the Emperor Napoleon" died decades before his agent is alleged to have visited Bull, and there is no evidence that the French government of the time dispatched an agent or agents to obtain 'Concord' from Ephraim Wales Bull. Representatives of the French government, led by Pierre Viala, did visit other Americans during those bleak years for French viticulture, however, even visiting William Gilson Farlow of Harvard University, who was a cryptogamic botanist, but they would have had little or no reason to visit Bull.

Nevertheless, 'Concord' holds a venerable place in American viticulture. After nearly one hundred fifty years, it is still propagated and planted from coast to coast, and its end in nowhere near. Until 'Concord' appeared, grape growing in eastern North America had been difficult at best. Bull, by developing 'Concord', proved that native species could be employed in viticulture, and that viticulture could be made profitable in eastern North America. 'Concord' was only one step toward the improvement of the grape, but it was a crucial step. Bull's success prompted many further efforts to adapt viticulture to the trying demands of the New World.

Note

Because this article is an early version of part of a larger, ongoing project centered on the history of the 'Concord' grape, some of the interpretations and conclusions must remain tentative.

Edmund A. Schofield is editor of *Arnoldia*.



Laura Dwight's Magnolias

Judith Leet

Determined to halt the decline of her beloved Back Bay neighborhood, civic activist Laura Dwight launched a community-wide drive to plant hundreds of saucer magnolias along Boston's elegant Commonwealth Avenue during the early 1960s

Laura Dwight's idea was to make Boston's Back Bay, particularly Commonwealth Avenue, look as beautiful in spring as Washington's Tidal Basin—a great public welcome to the new season. She foresaw the effect of having the whole avenue bloom at once with a row of the most floriferous of trees, the saucer magnolia—its showy flowers a rich pink at the base and a creamy white at the petal tips. And the trees were to be democratically planted in the front yard of everyone's nineteenth century Victorian brownstone.

In the 1960s, Miss Dwight, a resident of the Back Bay who was then in her sixties, conceived of such a scheme for beautifying Commonwealth Avenue and had the energy and persuasiveness to carry it out. One contemporary who knew Dwight in gardening and horticultural circles describes her as a very appealing person: "It was like being pushed by a fairy or an elf; you couldn't say no to her. I'm sure that's why there are so many magnolias on Commonwealth Avenue." A younger friend remembers her as "forceful, even pushy—but pushy in the right direction."

From her apartment on Commonwealth Avenue, Laura Dwight observed the once-

elegant Back Bay section of Boston deteriorating all around her, and she became aroused, even irate at the apathy and detachment of local residents. Hoping to help reverse this downward trend, she devoted her considerable energies to neighborhood-improvement projects and became an early member and later an officer of the Neighborhood Association of the Back Bay (NABB), a group working to restore stability to the area.

An activist by nature, she first involved herself in small-scale beautification projects—organizing house tours and garden tours, and front- and back-yard contests to award prizes to those who had created the most appealing city gardens (often judged by officials from the Massachusetts Horticultural Society). Such events encouraged residents to clean up, plant, and care for their often overlooked yards. Although she at this point had no garden of her own, she sponsored most of these events and signed up other sponsors, inviting them to a formal tea, often catered, at her comfortable apartment, filled with paintings, antiques, and mementoes of her forebears.

With the hearty approval of the NABB, Laura Dwight carried out her first large-scale street-planting project in the fall of 1963. She personally rang doorbells and convinced owners—some of them friends, others total strangers—that it was a good idea to plant one or several magnolia trees in their front yards

*Portrait of Laura Dwight by Bradford Bachrach.
Courtesy of Anne H. Jennings.*

and to participate in a collective, street-long display. She offered to provide free labor to plant the trees on a designated weekend, the material to enrich the soil, and a young tree, which would be delivered to the door. The resident only had to agree to the idea in principle and to pay a nominal sum for the young tree.

Although some absentee landlords could not be located, a majority of those approached agreed to participate. The residents at that time were far from a homogeneous group—students, young married couples, transients in rooming houses, administrators of junior colleges, and small-business people. But the idea had a logic and appeal of its own, and Laura Dwight motivated many to participate. One supporter of the planting, for example, was Emil "Sax" Rohmer, involved in real estate in the Back Bay, who donated two magnolias to be planted at 3 Commonwealth Avenue, a building rented by the French consulate and owned by Oliver S. Ames. Esther Ames, Oliver's wife, recalls planting a magnolia at 20 Gloucester Street and remembers that everyone in the neighborhood had heard about the street planting, either through the NABB or by word of mouth.

Much discussion took place in meetings over the merits of *Magnolia ×soulangiana* versus those of *Magnolia stellata* for the Boston climate; some argued against the early magnolias altogether, nominating other species that would be less susceptible to an early-spring frost (the white magnolia petals quickly turning a dismal brown); some favored later-blooming native dogwoods (*Cornus florida*); others debated which species would be better for sunny and which for shady locations. A compromise was reached, but Laura Dwight's idea of the uniform planting of the colorful, large-petaled saucer magnolia (*Magnolia ×soulangiana*) prevailed for the sunny (north) side of Commonwealth.

Eyewitnesses recall two successive years of planting between 1963 and 1965: the first

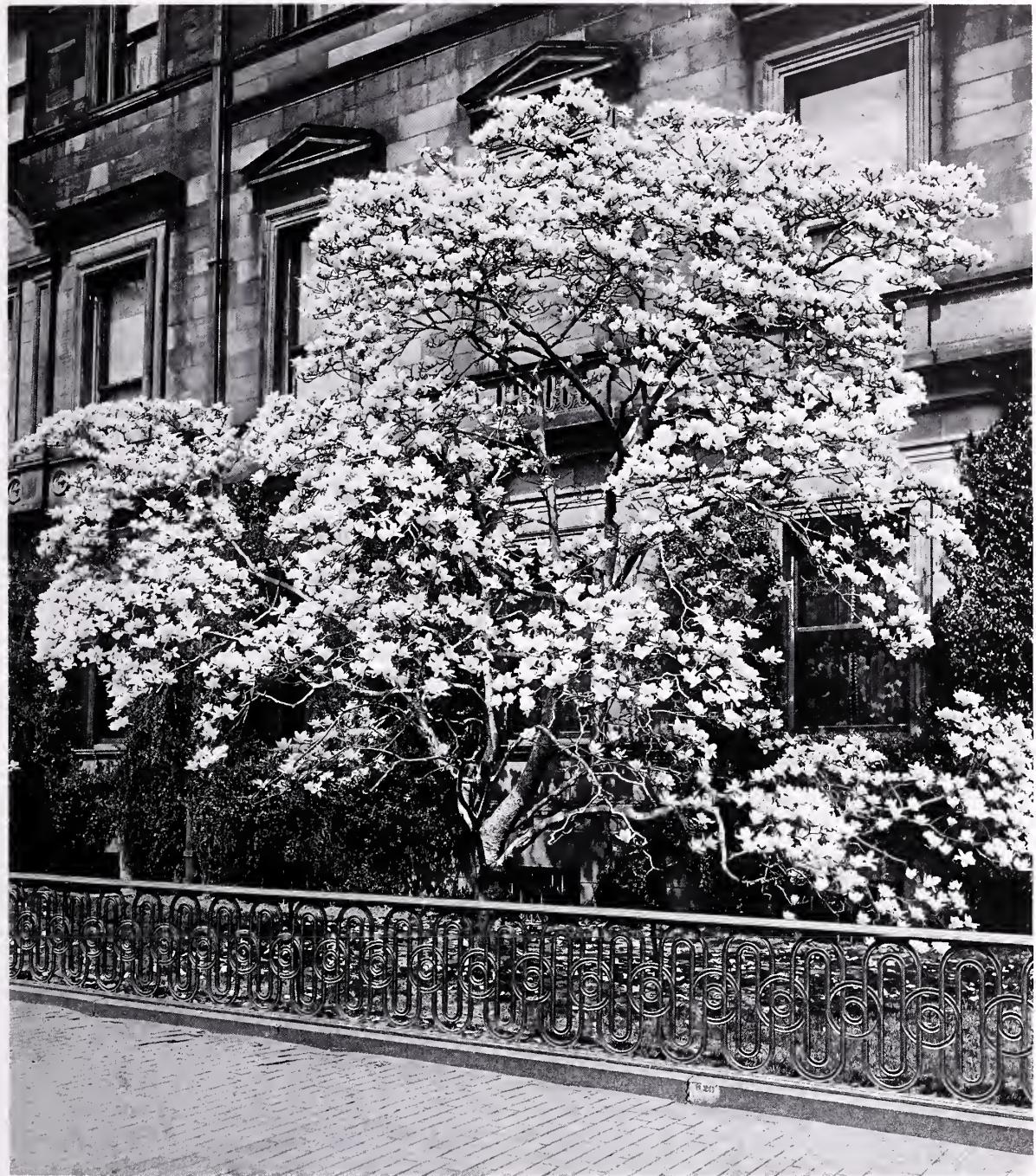
year saw the saucer magnolias installed on the sunny side of the street along with a few *Magnolia stellata*, the second year, dogwoods (*Cornus florida*) planted on the shady side. And, in retrospect, many would argue that the basic decision was correct: *Magnolia ×soulangiana* is a neater, more compact tree than the dogwoods, which have a looser, lighter habit and often a less exuberant display.

When asked about the project in 1981, Laura's sister, Frances Dwight, then in her eighties, wrote: "Laura had read somewhere that Boston was about as far north as the magnolias could be expected to pull through the winter." Laura Dwight had also admired the magnolias already well established and blooming profusely in front of a few Back Bay townhouses, such as the *Magnolia denudata* at 6 Commonwealth, the residence of Mrs. Montgomery Sears (now the Boston Center for Adult Education).

There was, in fact, even before Laura Dwight's campaign something of a tradition of planting trees in the Back Bay. A long-term resident recalls that the original owners, in early summer, would place white dust covers over the furniture and depart for their country homes. Therefore, they deliberately planted in the small front yards of their city houses a tree that would come into flower while they were still at home to benefit from it.

Witnesses of the street plantings in the 1960s give Laura Dwight full credit as the moving force behind the project: she was the one who made arrangements with nurseries to truck in plants; she arranged for MIT students living in a fraternity house on Commonwealth Avenue to donate manpower; she made sure that seedling trees were given a proper start with loam, peat moss, mulch, watering (since the Back Bay was gravel-filled land, this improvement of the soil was prudent to ensure long-term success).

An attractive price was set: eight dollars bought a smallish tree for those who were willing to wait for results (and even a young



The magnolias planted on Commonwealth Avenue as a result of Laura Dwight's campaign were by no means the first to be planted there. This Magnolia *denudata*, which stood on the Sarah G. Sears estate, was photographed in 1933 by John C. Marr. From the Archives of the Arnold Arboretum.

saucer magnolia produces a few choice blooms}; those who wanted quicker results bought a larger tree at twenty dollars. According to Frances Dwight, "residents' gardeners were brought from as far away as Beverly and Duxbury to help the student workers. Laura found it very time-consuming, a great deal of detail with owners and nurserymen was involved."

The late Mrs. Edwin Webster, a venerable resident of Back Bay, with a townhouse on the corner of Commonwealth and Dartmouth, who always kept a colorful display of freshly blooming flowers in her conservatory for passersby to enjoy, also agreed to participate in the collective street planting. Her gardeners, imported from her estate in Chestnut Hill, planted three sizeable specimens of *Magnolia ×soulangiana* that now take their place with the others planted by Laura Dwight—all now forming a long row of thriving, mature trees on Commonwealth Avenue.

Although many people have the impression that "hundreds" of trees make up the display, a recent survey shows that there are roughly as few as five and as many as fifteen magnolias on the sunny side of each long block of Commonwealth Avenue. In thrifty Boston fashion, the planting uses rather limited resources to make an effective, even dazzling, display. And twenty-five years after the planting, the late-April appearance of the pure-white and rich-pink blooms is one of the memorable spring sights in Boston—especially recommended for a leisurely walk on a balmy spring evening.

The Dwight Family

Although many committee members assumed she was a native Bostonian because she participated so actively in many community projects, Laura Dwight was neither born nor raised in Boston and lived in the Back Bay only during her later years. Her roots did extend back nine generations in Massachusetts, however, to John Dwight, who settled

in Dedham in 1634. (Twenty-eight of John Dwight's descendants had attended Yale by 1860, and one of these, Timothy Dwight, became president of Yale in 1795.)

Laura Dwight was born in Detroit, Michigan, in 1899, one of two daughters of Percy Dwight and Grace Buel Dwight. Colonel Percy Dwight was at one time president of Wilson Body Company, makers of wagon and carriage bodies, a prosperous company founded by his father, who owned considerable real estate in Detroit and Jackson, Michigan. (The two eldest Fisher brothers, who later founded the Fisher Body Company and became principal stockholders in General Motors, worked as young men for Percy Dwight.) The family summered in Williams-town, Massachusetts, on a large estate called Hillside House (now torn down), with well groomed gardens, memorable roses, riding stables, and dogs—including a decorated German shepherd who had served his country as a message dispatcher in World War I.

The two daughters, Laura and Frances, were educated by a German governess (both sisters could recite German poetry—Schiller, Goethe, Heine—all their lives) and traveled extensively in Europe, a then common educational path for daughters of prominent families. Neither sister married, and they were referred to, in the polite phrase of the period, as "maiden ladies." Both of independent means, Laura devoted herself as a volunteer to Republican politics and women's clubs; Frances was an accomplished horsewoman, amateur painter, and supporter of animal welfare, particularly interested in saving whales and seals.

Accustomed to many servants, two or three in help, the Dwight sisters never learned the practical survival skills of cooking or homemaking. Visitors to their Boston apartment noted that neither sister was able to make their meals, and that even making a simple sandwich posed a challenge. A much younger friend recalled that the Dwights' teas were legendary, especially when the sisters

were advancing in years. "Usually when you are invited to tea, especially in a proper Boston home, you expect tea and something in it. At Laura's, you might or might not get something to eat—and you might not even get the tea." Members of her garden club agree that Laura was clearly accustomed to someone else's making the tea for her. The many Boston ladies whom she mobilized respected her ability to get results—while shaking their heads in fond disbelief at her minimal skills at entertaining.

Encouraged by the enthusiasm generated by the street plantings, and planning to do more such projects, Laura Dwight organized and became first president of the Back Bay Garden Club in 1967. The fledgling club was soon asked to exhibit at the prestigious annual flower show of the Massachusetts Horticultural Society—to face the stiff competition of long-established clubs. The new group developed plans for a small urban garden, incorporating a real, albeit tiny, Japanese car into the exhibit, displayed behind a trellised carport, with many apricot tulips, grape hya-

cinths, a flowering dogwood, and brickwork to enhance the setting. After some very active disagreements among members about how to carry out the plans—some threatened to resign on the spot—Laura Dwight diplomatically calmed everyone. To the members' unfeigned surprise, the exhibit was judged a skillful solution to the design problem, was photographed for the *Boston Globe*, and won a blue ribbon.

Some of her motivation for neighborhood improvement might have come from personal experience. After tripping on the broken bricks of a Boston sidewalk and breaking her leg, she sued the City of Boston for damages. "She was a gutsy lady to fight City Hall," her cousin Douglas Campbell remarked, "but she won the \$4,000 she sued for."

Her sense of community involved her, as a founding member, in the Friends of the Public Garden—to aid in the rescue of the once well manicured Boston park that had fallen into weedy neglect. And her early interest in the environment—at a time when very few people had even heard of "ecology"—led her to found the "Order of Preservation of Clean Air," or, as members called it, "Citizens for Clean Air," one of her less successful ventures. When the group decided to disband, a surplus of \$300 in the treasury caused some amused consternation among the members: no one knew how to dispose of the surplus in a way that would contribute to cleaning the air. One of the members and a close friend, Irene Pitz, remembers Laura Dwight fondly: "Laura was always interested in 'good works.'"

Among these good works, she was Program Chairman for the Women's City Club, arranging for guest speakers; a director of the Gibson House, a Victorian museum on Beacon Street; and a member of the Colonial Dames and of the Junior League. Like all other Boston ladies, Laura Dwight devotedly attended the Boston Symphony Orchestra's Friday afternoon concerts.



Laura Dwight photographed in the Back Bay during a neighborhood backyard-garden contest.

In addition to their distinguished Dwight lineage, Laura and Frances Dwight were also ninth in descent from one John Mason, born in England in 1601, who settled in Dorchester, Massachusetts, in the early seventeenth century. The two sisters were the last surviving members of their immediate family. Toward the end of their lives, each sister expressed in private, to the same family advisor, her worry about dying and leaving the other sister to cope alone. The two elderly sisters died within five days of each other, in 1983.

The Species Selected

Laura Dwight and her committee selected *Magnolia ×soulangiana* for their street planting, the first magnolia hybrid and one that became immediately popular after its development in the 1820s, the result of a cross between two long-cultivated Asian species. Experts believe that the oldest magnolia fossils are on the order of one hundred million years old, making *Magnolia* one of the oldest genera of flowering plants. Since these fossils are very similar to species still in existence, the plant is thought to have undergone only relatively minor evolutionary change over the millennia; magnolias exhibit one of the simplest types of flowering structures, with sepals and petals that are similar, overlapping in whorls of three; with stamens arranged in spirals; and with single, unfused pistils.

Over the ages, magnolias were mainly pollinated by beetles (*Nitidulidæ* spp.), which also underwent little adaptation over inconceivably large spans of time. Together, the magnolia and its beetle pollinators have survived the ages. The beetle is thought to penetrate the closed bud, crawling between the tight petals and entering the flower chamber to pollinate the receptive stigma—the stamens shedding their pollen after the flower bud opens and the stigmas have been fertilized. This sequential ripening of the male and female parts of a flower prevents self-fertilization from taking place.

Producing the largest flowers of any woody plants in the Temperate Zone (*Magnolia macrophylla*), magnolias have undoubtedly been admired by human beings since prehistory. Evidence suggests that the Chinese cultivated flowering magnolias at least as early as A.D. 600—or fourteen hundred years ago; by the fourteenth century, Chinese artists were decorating porcelain ware and other art objects with accurate and aesthetic renderings of the magnolia.

The Asian magnolias have the attribute of blooming in earliest spring on bare branches—before any leaves cover or compete with the blooms. Known to be among the most skillful of gardeners, the Chinese, and later the Japanese, learned how to graft, propagate, and force magnolias, selecting the aesthetically most desirable plants for temple and palace gardens. The Asian species introduced into cultivation were selected and improved over the centuries, while the plants remaining in the wild became increasingly scarce and limited in their range.

By contrast, the American magnolias were uncultivated trees surviving without human assistance in the wilderness. The flowers of some species, such as *Magnolia tripetala*, appear more disheveled and less elegantly formed than their more pampered and highly selected Asian relatives. And even more significantly, the American species bloom later—after the leaves have sprouted—and so the flowers are less conspicuous than those of the precocious Asian magnolias, which bloom on bare branches.

Europeans, lacking any native species of magnolia (all were wiped out by the last ice age), were delighted with their first magnolias, introduced from the New World (*Magnolia virginiana* in 1688, and later *Magnolia grandiflora*) but quickly lost interest in the American species after the first Asian magnolias were imported in the 1790s (*Magnolia liliiflora* and *Magnolia denudata*). Thirty years after these Asian introductions, a cavalry officer returning from the Napoleonic

wars conceived the idea of developing hybrids from them, trying to achieve the best qualities of each parent.

After Waterloo in 1815, Etienne Soulange-Bodin concluded that fighting wars was a worthless task, that both he and his opponents would have done better to have cultivated their own gardens rather than to have destroyed those of others. He vowed to devote his remaining energies to horticulture, and in the 1820s crossed two of the Asian magnolias, the white, tree-like *Magnolia denudata*, with the purple, shrubbier, later-flowering *Magnolia liliiflora*, to achieve an extravagantly beautiful hybrid, the *Magnolia ×soulangiana*, an immediate success and now one of the most popular magnolias planted in the United States. The great French botanical artist, Pierre-Joseph Redouté, speedily painted a single closed bloom for his *Choix des plus belles fleurs* (1827–1833).

The Siting on Commonwealth Avenue

Before Commonwealth Avenue was first planned as a major city avenue in the 1850s, the land west of the Public Garden (from what is now Arlington Street to Massachusetts Avenue and beyond to Kenmore Square) was a mudflat, filled and drained by each salty ocean tide moving up the Charles River. In the 1820s the Boston and Roxbury Corporation attempted to supply power to various proposed commercial mills by constructing a dam across the Back Bay a mile and a half long, built along what is now Beacon Street and running parallel to the Charles River. But the Back Bay, when completely drained, produced unpleasant natural odors on the mudflats that were exacerbated by the odors from city sewerage also funneled into the area. Many of the proposed mills were built along the Merrimack rather than beside the Charles.

As complaints about health and sanitation grew—as well as the need for more residential property close to the city—the city fathers agreed, in a merger of state, city, and private

interests, to begin the task of filling in the Back Bay, a major engineering project of the period. Since no funds had been allotted for payments for the work, the wily fathers agreed to pay the construction engineers, Goss and Munson, with some of the valuable houselots they would produce with their fill. Utilizing the recently invented steam shovel and railroad, engineers excavated gravel from a site in nearby Needham and brought it nine miles by rail to the Back Bay. In the initial phase starting in 1859, land was filled on average at a rate of almost two large houselots a day; four thirty-five-car trains made twenty-five trips a day. Although filling went on through the late 1860s and 1870s, the final phase was not completed until 1882.

Planners had laid out the area in what was, compared to jumbled colonial Boston, an orderly geometric grid, with five streets to run parallel to the Charles River and smaller cross streets to bear names in alphabetical sequence (Arlington, Berkeley, Clarendon, Dartmouth, and so on). The centerpiece of the scheme, Commonwealth Avenue, was to be two hundred feet wide, with a center mall, or park, one hundred feet in width, for strolling, and each house was to be set back twenty feet from the sidewalk, allowing for small front yards.¹ Arthur Gilman, architect of the Arlington Street Church, is credited with the overall planning of the grid of the Back Bay, modeled on a smaller scale after the Parisian taste for grand boulevards; George Snell and landscape designers Copeland and Cleveland probably contributed to the plans for Commonwealth Avenue.

In the early years of Commonwealth Avenue, private townhouses were built at rather random intervals; historical photographs reveal clusters of brownstones separated at irregular intervals by vacant lots. In one photograph, taken around 1875, Commonwealth Avenue remains incomplete between Clarendon and Dartmouth streets: several lots toward Dartmouth and one in mid-block await houses. And the generally bleak



Commonwealth Avenue between Exeter and Dartmouth streets during the 1880s. Photograph courtesy of the Bostonian Society.

appearance of the street is primarily due to the absence of trees and shrubs. Over several decades all the vacant lots—through to Massachusetts Avenue—were slowly filled in—more attractively by private owners and less so by developers. During the 1880s, Frederick Law Olmsted laid plans for diverting and draining the Muddy River, a scheme that allowed the filling in of Commonwealth Avenue to continue toward Kenmore Square and Brookline Village. By the 1880s, Dartmouth and Exeter streets' empty lots were completely filled in by adjoining brownstones, each varied but sharing many common architectural details. Gradually, these private residences emerged as an American interpretation of French-inspired (Second

Empire) townhouses—but overall a relatively homogeneous architectural composition. To Walter Muir Whitehill's eye, "the Back Bay is still the handsomest and most consistent example of American architecture of the second half of the nineteenth century now existing in the United States."

Those Bostonians who first bought lots and built imposing five-story townhouses were from among the most distinguished of local families—and lived in a now-lost style of many servants, much leisure, and a close-knit social community. As more of the Back Bay was filled in, these citizens surrounded themselves with the monuments to their way of life: Symphony Hall, Horticultural Hall, the Museum of Fine Arts, Harvard Medical

School, the Museum of Natural History, and numerous churches, private clubs, and schools.

But beginning in the Depression, and certainly by the end of World War Two, the Back Bay had lost its fashionable cachet; most of the original families had sold the brownstones and moved out of the city—to properties with more land and fresh air. Many small colleges acquired the former private residences for dormitories and classrooms; the Back Bay streets were overrun with students. The now too large, elaborately paneled houses, already broken up into apartments, were further divided into rooms for transients. The once tidy Public Garden was no longer kept up but was marred by broken benches, trash, unkempt flower beds. It was during the 1960s, a low point in the life of the area, that public-spirited Bostonians pulled together to resuscitate the Back Bay with an array of new, private organizations whose purpose was to improve and beautify the city. Among them, on the front lines, serving on many of the boards as a volunteer, was Laura Dwight. The magnolias on Commonwealth Avenue were just one of her many projects—but one that remains a living memorial to her and one that will continue to bring refreshment and pleasure to Bostonians for many springs to come.

Endnote

1 It was this small, front-yard space that allowed Laura Dwight's planting project to be successful. Peter Del Tredici of the Arnold Arboretum ascribes the survival of the magnolias to the fact that they were not planted

directly on the street but were enclosed in their protected fenced-in gardens. Magnolias, once they have been established for a year or two, are tough and hardy and require little care, not even pruning, except for the removing of dead branches—qualities that make them appealing to the busy city dweller, who often knows little about pruning.

Acknowledgments

Esther Heins began researching this article in 1981, when Frances Dwight was still living at 250 Beacon Street and Laura Dwight was in Sherrill House, a nursing home in Boston, after having suffered a severe stroke. She also spoke to Mrs. Charles Howard, whose late husband was president of the Neighborhood Association of the Back Bay when the street plantings took place.

I am most grateful to and would like to thank those who willingly spent time stirring their memories over events that occurred over twenty-five years ago: Irene Pitz, Mrs. R. A. Sawyer, Esther and Oliver Ames, Elizabeth Lay, Ann Twaddle, Sally Mead, Douglas Campbell, Liz Ann Chapin, Patsy Boyce Sidlowsky, Anne Jennings, Laura Dwight Lewis, Donald Dwight, Henry Flynt, Lyman Parsons, Daniel Needham, Polly Wakefield, and the Reverend Schuyler Jenkins.

I would be pleased to hear from anyone who recalls additional information about the plantings or about Laura Dwight.

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The Arnold Arboretum: An Historic Park Partnership

Sheila Connor

Just over a century ago—through sheer force of willpower—Charles Sprague Sargent clinched a unique partnership that for the next 895 years secures the Arnold Arboretum to all the people of Boston

How often is a stroll through a beautiful city park also a tour of a university research facility? Not often, but if one is strolling through the Arnold Arboretum, it is. Designed for use by scientists and laity for the study and enjoyment of botany and horticulture and created with private funds, the Arnold Arboretum broke with tradition. For, although the late nineteenth century was a harvest time for museums, no university botanic garden or arboretum had yet been planned with the public in mind.

Following tradition, too, was the design of public pleasure grounds: the prevailing “picturesque theory” stressed naturalistic design, avoiding the use of specimen trees or plantings. No tree was selected to display the details of its bark, leaves, flowers, or fruit. The botanist, however, needed to focus on just these specifics for study and comparison. The challenge of meeting, in a single setting, the divergent needs and expectations of botanists and the general public alike required both an exceptional designer and “creative financing.”

Charles Sprague Sargent, a well connected Boston Brahmin and the Arboretum’s first director, was just the man to find both. He convinced Frederick Law Olmsted, America’s leading landscape architect, to create a design that would be naturalistic and that yet would arrange plants according to a specific taxonomic scheme. Then, in order to serve

the dual purpose he believed the Arboretum would have, Sargent had to persuade the City of Boston and Harvard College to undertake a joint financial venture. His motives were not entirely altruistic: he needed additional money to build and maintain the Arboretum.

The idea of shared financing occurred to Sargent as early as 1874, when the city began to hold hearings on a public park system. Although this was four years before Olmsted agreed to work on either the Arboretum or the park system, Sargent outlined his ideas: “It has occurred to me that an arrangement could be made by which the ground could be handed over to the City of Boston,” he wrote, “on the condition that the City spend a certain sum of money laying out the grounds and agree to leave the plantings in my hands. . . .” Evidently, Olmsted liked the idea, for he adopted and championed it.

By 1880 he would write to Charles Eliot Norton, professor of fine arts at Harvard, about his frustration with the Arboretum project. “The scheme is that the city shall lease the condemned . . . land to the college at a nominal rent for a thousand years and the college shall establish and maintain the arboretum. . . . This is the whole of the scheme as I would have it. I am sure that it is a capital bargain for both parties. . . . The sole difficulty is that nobody (feeling free to act) is alive to the opportunity. I have been shaking Dalton [chairman of the Park Commission] and



A view of Bussey Brook in the Arnold Arboretum, taken in 1949 by Professor Karl Sax, who was the Arboretum's Director at the time. Photograph from the Archives of the Arnold Arboretum.

Sargent and have tried to stir up Mr. Pulsifer at the *Herald*. . . ." Perhaps Sargent and Olmsted recognized a political advantage in its being Olmsted's idea, for Sargent's annual report for 1881 credits Olmsted with the plan.

The negotiations lasted four years. The Arboretum's nurseries were bursting at the seams. Sargent could not begin to implement Olmsted's design without commitment from the city. The proposition finally came to a vote by the City Council on October 13, 1882, after lengthy debate, but it failed to pass, receiving only 36 of the required 59 votes.

Proponents of the Arboretum on the Council quickly moved to set up an Arboretum Committee, and Sargent and Olmsted stepped up their efforts to rally support. A public-relations drive was launched that had the "Arboretum Question" debated in the city's newspapers. November's headlines read: "**"VOICES OF THE PEOPLE IN ITS FAVOR—THROWING AWAY A BARGAIN," "THE ARBORETUM'S VALUE TO BOSTON," "AN EDUCATIONAL PARK AT A BARGAIN.**" Sargent pulled out all stops with the circulation of a petition, to which 1,305 of the

most powerful people added their signatures. If Olmsted had failed to shake up someone at the *Herald*, the petition certainly succeeded. A story in its issue of December 1 read, in part:

The petition to the city council in favor of the Arnold Arboretum is probably the most influential ever received by that body. It includes almost all of the large taxpayers of Boston.... Nearly all of the prominent citizens are there, including ex-mayors and ex-governors.... The petition would be a prize to a collector of autographs.

The campaign worked. On December 27, 1882, terms similar to those Sargent had proposed eight years earlier were agreed upon. It took another year to work out the details, but on December 20, 1883, a thousand-year lease was signed, and an unprecedented agreement between the City of Boston and Harvard College began. As the earliest of Boston's "Park Partners," the Arboretum has had a long and celebrated history, and both the City of Boston and Harvard recognize the wisdom of this early arrangement, which is now in its 106th year.

Under the terms of the agreement, the Arboretum became part of the City of Boston's park system. The city was to be responsible for the construction and ongoing maintenance of the driveways and boundary fences throughout the Arboretum. Harvard Univer-

sity was to collect the plants, design the Arboretum, and maintain the collections and programs.

The Arboretum has been consistently well maintained since its beginning, and it stands out as the centerpiece of the famed Emerald Necklace. Its original master plan has been maintained to this day, although there is substantial restoration work to be done on the Arboretum's roads, walkways, drinking fountains, and benches. Happily, the Parks and Recreation Department is beginning a long-term program of capital repairs that one day will return the Arboretum to its former pristine state. Funds from the Olmsted Restoration Project will also contribute substantially to this effort when they become available.

The Arnold Arboretum's fame as a botanical garden has spread worldwide, attracting scientists and students from around the globe to study its vast collections. At the same time, hundreds of thousands of people enjoy the Arboretum as a scenic and restful escape from the ever-increasing congestion of Boston. It is a rare jewel created through the inspired vision of people who believed in the value of urban open space, and who understand the ever more valuable role of botany in modern life.

Sheila Connor is Horticultural Research Archivist at the Arnold Arboretum in Jamaica Plain.

Franklin Park, Boston's "Central" Park¹

Richard Heath

The embodiment of Frederick Law Olmsted's agrarian ideal, Franklin Park vies with the Arnold Arboretum as the centerpiece of the Boston park system

Since the 1890s, Franklin Park has been Boston's central park, the hub of an enormous system of parks stretching from the Back Bay to the newly annexed towns of Dorchester, Roxbury, and Jamaica Plain. Frederick Law Olmsted, advising the Boston Park Commissioners, recognized that Boston's growth would require large open spaces in which citizens could relax and engage in recreation. In his *Notes on the Plan of Franklin Park* (1886), Olmsted described Franklin Park as having a square mile of relaxing scenery that would ease the harried city dweller.

Because it was intended to be an ample country park, it was placed, not in the middle of the city, but southwest of City Hall, approximately four miles from Boston Common, in what was then an undeveloped part of the city. Indeed, all of the sites considered for the Park lay four to five miles from the central-business, government, and residential core of Boston, which had long been built up. Placing the new park outside of the center city would perfect Olmsted's theory that the "agrarian ideal" should be brought to the city.

The new park was to be—or appear to be—as little built-up as possible, with many convenient footpaths meandering through it. (Of Olmsted's parks, only the Arnold Arboretum and Mont Royal Park, in Montreal, have fewer structures than Franklin Park.) A circuit drive for carriages would lead into the

parkway, which would connect the other parks in the Olmsted system and, by a meandering parkway, lead to the inner city.



A bucolic view across Scarborough Pond in Franklin Park. This and the following two scenes of Franklin Park by Richard Howard are used through the courtesy of the Boston Foundation and the Boston GreenSpace Alliance.

¹Excerpted and adapted from the first chapter of *Franklin Park: A Century's Appraisal*. Franklin Park Coalition Bulletin (1985).

Thus, even while driving to the park, one would never have to leave parkland.

The 500 acres of Franklin Park (originally there were 527 acres) were purchased between 1881 and 1883, and construction began early in the summer of 1885. Streetcar lines were just beginning to move out to the edge of the park, and subdivisions were begun in adjacent blocks even as the park was being constructed. The principal reason for annexing whole towns, such as Dorchester, Roxbury, and West Roxbury, had been to provide living space for the center city.

Franklin Park's boundaries were drawn so as to lie along main thoroughfares, near exist-

ing transportation lines; its entrances, carefully planned to open the park to as many people as possible, as conveniently as possible, were built to coincide with transportation. Two thoroughfares today are major routes into the city, and the transportation lines are important trunk lines for the metropolitan Boston public-transit system.

Franklin Park was designed for many uses, with five distinct landscaping features: a 100-acre woodland, a 200-acre meadow, a 7-acre artificial pond, a formal entranceway, and a 30-acre playing field, all interconnected by walks and drives, with three overlooks. Although primarily designed for passive relaxation—in keeping with the times—it had a carefully landscaped playing field in recognition that active sports were becoming more important in Americans' leisure life. The playing field was segregated from the passive parks by landscaping techniques so that the two groups of people—those engaged in sports and those engaged in less vigorous activities—would not interfere with one another. To shut out the city completely, a thick screen of trees, some on earthen berms, framed the entire square-mile park.

Structures were limited to one wood and three stone shelters, three stone bridges, a stone arch that carried foot traffic under Circuit Drive, and several flights of stone-slab steps. This left the park completely open to the imagination of the visitors. There were no restrictions on the spaces within the park except for the playing field and the acre or two set aside for lawn tennis in Ellicott Dale (which today is a baseball diamond). In no other park had Olmsted been able to create a truly *country* effect. Fortunately, Franklin Park remains to this day uncluttered, especially the lovely broad meadow.

Learning from Central Park—where from almost the first day people had begun putting up statues—Olmsted planned a space for just this type of commemorative sculpture in the Greeting, the formal entranceway. The Mall in Central Park and the Concert Grove in Brooklyn's Prospect Park were Olmsted's



A Boston Park Ranger teaches the basics of fishing to a youngster in Franklin Park. The park's square mile of natural landscape brings Olmsted's agrarian ideal to city children and adults alike.



Catching leaves in Franklin Park.

earliest responses to this impulse, but Franklin Park had far more space for statuary, concerts, and large group activities than either of them, and that was exactly the original purpose of the Greeting. A long, broad berm to the south was thickly planted with oaks and beeches to separate the Greeting from the rest of the more passive parkland. Even while Franklin Park was under construction, public pressure had caused the landscape architects to revise their design by adding a pond, which they placed at the southwestern corner of the Park.

Franklin Park was the last urban park that Frederick Law Olmsted designed (he retired in 1895, when the park was nearly finished). It completes the theories of landscape design first put into practice in Central Park in 1858 and in some ways perfects them, particularly in the careful use of the site for the enjoyment of thousands of people, at the same time providing solitude for two or three.

Richard Heath is the former director of the Franklin Park Coalition.

“Full Foliage and Fine Growth”: An Overview of Street-Tree Planting in Boston

Phyllis Andersen

With the benefit of the experience it has gained over the past century and a half, Boston is well poised now to exploit the aesthetic and community-unifying qualities of street-tree plantings

Boston is a green city. The great Olmsted park system, its parkways, and its neighborhood parks and squares are the legacy of enlightened nineteenth century planners and city officials. Despite inappropriate intrusions, changing physical conditions, different patterns of use, damage, and neglect, the integrity of the system, if not its details, remains reasonably intact. Both the Commonwealth of Massachusetts and the City of Boston have recognized the value of this unique system of open space and have created programs to finance restoration of the parks, to reestablish them as a major component of the special quality of life in Boston. But a vital link in the green-space network—the planting of trees along the city's streets—has not withstood the complex forces of growth and change. The continuous avenue plantings of earlier days are now fragmented, and the strong visual impact of tree-lined streets has been lost in many parts of the city. What remains of earlier plantings are individual specimens of great horticultural and historic interest, but these are disconnected from one another and are often isolated from the community as a whole. As we reclaim park spaces it is important also to recognize the value of street-tree plantings for their environmental benefits, for their aesthetic and humanizing appeal,

and for their unique ability to define and link neighborhoods across the city.

Tree-lined streets scaled to human activity persist as a standard for urban life. While this image may derive from small-town ideals, it now serves as a protective device against the overwhelming scale and continuous change of modern urban life. The streets of Boston's early Shawmut Peninsula were not lined with trees. The narrow street pattern was based on topographic limitations and on the English rural village model known to the first residents.

The street planting as we know it today originated during the great land-filling and building period of the mid- to late nineteenth century. The major impetus for that period of planting came from the grid, that traditional urban-planning device. The laying out of streets at right angles to one another created long, uninterrupted vistas and gave designers the opportunity to soften and enrich those vistas with continuous, regularly spaced tree plantings.

Commonwealth Avenue and the Back Bay
The full flowering of the grid format is seen best in Arthur Gilman's plan for Boston's Back Bay and its axial boulevard, Commonwealth Avenue. Based on the new boulevard

schemes resulting from Haussmann's redesign of Paris in the mid-1800s, Commonwealth Avenue is now a street defined both by its formal tree planting and by its controlled building façades. To the credit of its early supporters and, perhaps, to the bemusement of its current protectors, Commonwealth Avenue has become a paradigm of elegant, sophisticated urban life.

In 1880 Charles Dalton, Chairman of the Board of Park Commissioners, asked Frederick Law Olmsted and Charles Sprague Sargent to develop a planting plan for Gilman's boulevard. Their plan, based on the need for a dignified vista and for responsible planting standards, recommended a double row of a single species. City officials overruled them, however, basing their decision on the need for short-term effect, and the Commonwealth Avenue Mall was planted with a row of four trees and a mixed planting of American, English, and European elms. The crowded conditions predicted by Olmsted and Sargent quickly prevailed, but unforeseen and more devastating was Dutch elm disease, which has progressively killed most of the original planting.

To break the monoculture that exacerbated this problem, a dedicated private group has replanted Commonwealth Avenue with a variety of species. Elm varieties thought to be disease resistant were used first; when these proved unreliable, zelkovas, maples, sweet gums, and green ashes were introduced. The resulting mixed planting may be more horticulturally responsible, but it is not as aesthetically satisfying, failing as it does to provide the dignified vista so valued by Sargent and Olmsted. After years of being viewed as a neighborhood street, the Commonwealth Avenue Mall has become a focal point for visitors to the city. There is now a clear need for the city to develop a visual policy to guide future planting on the Mall. In the last few years there has been an enormous resurgence



Commonwealth Avenue between Exeter and Dartmouth streets during the 1880s. Photograph courtesy of the Bostonian Society.

of interest in boulevard restoration and design that has, in turn, stimulated interest in formal tree-planting techniques. Commonwealth Avenue is looked to as a model for both urban designers and developers who seek to impart a sophisticated, expansive image to their projects.

Despite the problems of disease and overcrowding, the one hundred-foot-wide planting strip of the Commonwealth Avenue Mall has sustained tree growth for over a century. Other street plantings in the Back Bay relegated to tree pits have not fared so well. Lower Beacon Street, for example, had a major planting of little-leaf lindens early this century. Very few specimens remain. On the other hand, Beacon Street, as it enters Brookline, still benefits from the road layout designed by Olmsted, which includes a deep planting strip that still supports mature shade trees. Many of the London plane trees planted some years ago on Boylston Street have been destroyed or seriously damaged. Current plans

to transform this important commercial street into a Champs Élysées type of boulevard offer the possibility for a very significant tree-planting project for the city. The wide sidewalks offer a unique opportunity to plant a double row of trees in some locations, to install continuous tree pits in others.

The layout of the South End followed that of the Back Bay, and planners for the city used the grid here as well, albeit more modestly. Differing in a number of ways from the layout of Back Bay, that for the South End introduced the English device of laying out streets around a residential square, or park, and of eliminating street-side planting so as not to obscure views of the square from inside the houses. These small parks are still viable and can best be seen at Union Park and Rutland Square. They hold to the English tradition of the informal grouping of horticulturally interesting trees and shrubs.

Several years ago Columbus Avenue, designed as one of the major axial streets of the South End, underwent a major streetscape-improvement program by the Boston Redevelopment Authority that included a major planting of red oaks to add dignity and scale to this mixed commercial and residential street.

Formal street planting moved into Boston neighborhoods first along commercial streets, then adjacent to institutions, and eventually to the smaller residential streets. Of perhaps some solace to municipal officials today, the care of the existing population has always been a frustrating and little-appreciated process.

Past Frustrations and Successes

In 1887 there were about 30,000 street trees in Boston, but their condition evoked the dismay of William Doogue, Superintendent of the Common and Public Grounds and newly appointed guardian of the street trees. Doogue commented that summer work crews sent out in 1887 to work on the street trees did little to improve and a great deal to

harm them, cutting off the trees' roots and damaging their "nutritive apparatus." In those days trees were also damaged by underground coal-gas leaks and, most especially, by the gnawing habits of horses, who showed little respect for young plants. Doogue went on to note that at least one-sixth of the tree population was either dead or dying because of the neglect, and that time, money, and careful training would be required to replace them in "full foliage and fine growth."

The American elm was deemed by many in the nineteenth and early twentieth century to be the perfect city tree because of its unique arching habit and tolerance of urban conditions. It was heavily planted in Boston and most other major cities, and we are still suffering the loss of that magnificent tree. Other species were planted as well and were quite successful. Asa Gray, writing in 1881 on the native vegetation of the Boston peninsula, commented that a number of species imported from Europe had quickly adapted to conditions on Boston's streets. Gray makes special note of the Norway maple, the little-leaf linden, and the horsechestnut.

Tracing the types of professionals responsible for planting street trees reveals the shifting roles of professionals in urban planning. The great avenues of Europe were laid out and supervised by architects and engineers—Baron Haussmann, Jean Charles Alphand, John Nash. They participated in very specific ways in the placement of trees and the selection of species. The highest value in this process was the artistic arrangement of the plantings. In Boston, after architects and engineers had laid out streets and prescribed planting areas, municipal employees with a variety of backgrounds and skills would be called upon to maintain plantings. At the turn of the century a very significant state law organized shade-tree care on a municipal level. In 1899, the Massachusetts legislature passed an "act to codify and amend the laws relative to the preservation of trees." It man-

arnoldia

New England
Horticultural
and Botanical
Calendar

(Winter 1988)



sylvan portraits

An exhibit mounted for the Arnold Arboretum by a team of Hungarians working on the *Dendrological Atlas* (Drs. Zsolt Debreczy, Gyöngyvér Biró, István Rácz, and Nóra G. Nagy). Hunnewell Visitor Center, Arnold Arboretum, Arborway, Jamaica Plain, Massachusetts. Open to the public free of charge.

Horticultural and Botanical Calendar

Please be sure to mention Arnoldia whenever you attend an event that was listed in the New England Horticultural and Botanical Calendar

Through January 21, 1989

"Sylvan Portraits." Arnold Arboretum (AA). Pages from *The Dendrological Atlas*: a selections of drawings prepared at the AA and photographs by members of the botanical department of the Natural History Museum of Budapest, Hungary. *The Dendrological Atlas* is a worldwide survey of hardy trees and shrubs from both the northern and southern hemispheres. 10 A.M.-4 P.M., Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA 02130-3519. Free. Information: (617)524-1718.

December 9-23, 26-30

Christmas at Blithewold. "Twelve Days of Christmas" theme accented by turn-of-the-century-style holiday decor, seasonal greenery and floral arrangements, etc. Admission charge. Noon-8 P.M. Blithewold Gardens and Arboretum, Ferry Road, Bristol, RI 02809-0417. Information: (401) 253-2707.

January 24-26, 1989

Massachusetts Horticultural Congress. Best Western Royal Plaza Hotel and Trade Center, Route 20, Marlborough. Information: Massachusetts Horticultural Congress, 715 Boylston Street, Boston 02116; (617)266-6800.

January 26 and 27, 1989

Xeriscope '89. Cuyamaca College Botanical Society. "Seeing Is Believing: Water Conservation through Creative Landscaping." Conference. Balboa Park, Casa del Prado, San Diego, CA. Information: Jan Tubiolo, (619)670-3544.

January 27-March 4, 1989

"Where Dragons Touch the Earth." Arnold Arboretum (AA). Recent photographs of Chinese gardens by David Harris Engel. 10 A.M.-4 P.M., Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA 02130-3519. Free. Information: (617)524-1718.

February 1, 1989

Horticultural Training Program 1989. Arnold Arboretum (AA). Completed forms due. Ten- to sixteen-week horticultural program for students (beginning April 15 -June 1. Grounds maintenance, greenhouse and nursery operations, mapping and labelling. Stipend provided. Applications for admittance: Horticultural Training Program 1989, AA, Arborway, Jamaica Plain, MA 02130-3519.

February 2 and 3, 1989

Symposium on an Artistic Approach to Wildflower Cultivation. Arnold Arboretum (AA), New England Wild Flower Society, and New York Botanical Garden (NYBG). Use of wildflowers in an artistic and aesthetically pleasing manner. 8:30 A.M.-4 P.M. Jamaica Plain, MA (February 2); 8:30 A.M.-4 P.M., NYBG. Information: AA, Arborway, Jamaica Plain, MA 02130-3519; (617) 524-1718; NYBG, Bronx, NY 10458-5126; (212)220-8720.

February 5, 1989

"Plants from China and Japan for the New England Garden." Arnold Arboretum (AA). Lecture by Dr. Stephen A. Spongberg. 2 P.M. Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA 02130-3519. Free. Information: (617)524-1718.

February 8 and 9, 1989

Massachusetts Landscape Conference. Associated Landscape Contractors of Massachusetts. Sheraton Inn and Conference Center, Boxborough, MA. 8 A.M.-6 P.M. (February 8), 8 A.M.-4 P.M. (February 9). Registration fee.

February 17, 1989

"The Ecology of Landscape Design." Arnold Arboretum (AA) and University of Massachusetts Cooperative Extension. Day-long professional symposium for landscape designers, planners, and environmentally concerned gardeners. Landscape design and the ecological factors that influence the design process. Registration charge. Preregistration required. 8:30 A.M.-4 P.M., Alfred L. Frechette Conference Center, State Laboratory, 305 South Street, Jamaica Plain, MA. Information brochure: (617)524-1718.

Calendar Section

February 18 and 19, 1989

Camellia Show. The 160th annual show of the Massachusetts Camellia Society. 10 A.M.-4 P.M., Hunnewell Visitor Center, Arnold Arboretum, Arborway, Jamaica Plain, MA 02130-3519. Free. *Information:* (617)524-1718.

February 23, February 24, 1989

"Bamboos." Arnold Arboretum (AA) and New York Botanical Garden (NYBG). Symposium for amateur and professional gardeners, landscape designers and architects. Bamboo biology and cultivation; plant selection, landscape use. Registration charge. Preregistration required. 8:30 A.M.-4:30 P.M., NYBG, Bronx (February 23); Alfred L. Frechette Conference Center, State Laboratory of Massachusetts, 305 South Street, Jamaica Plain, MA (February 24). *Information:* (617)524-1718, (212)220-8720.

March 1, 1989

Lilac Sunday poster artwork due. Arnold Arboretum (AA). Submission of artwork for Lilac Sunday poster competition. 8 A.M.-8 P.M., Receptionist, Hunnewell Visitor Center, AA, Arborway, Jamaica Plain, MA. For competition guidelines, write or call Jo Procter, Public Affairs Officer, AA, Jamaica Plain 02130-3519; (617)524-1718.

March 2-5, 1989

Spring Flower Show. "Opening New Doors." Worcester County Horticultural Society (WCHS). Centrum, Worcester, MA. Admission charge. *Information, exhibition schedule:* WCHS, 30 Tower Hill Road, Boylston, MA 01505; (508)869-6111.

April 3, 1989

"Tropical Gardens of Brazil." Worcester County Horticultural Society (WCHS). Illustrated lecture by Sandi Elsik, botanist and Curatorial Associate, Arnold Arboretum. Tropical rain forests; home of landscape architect Roberto Burle Marx. Garden Lecture Series, WCHS. Admission charge. 7-8 P.M., Tower Hill Botanical Garden, 30 Tower Hill, Boylston, MA. *Information:* WCHS, 30 Tower Hill Road, Boylston 01505; (508)869-6111.

April 17-June 1, 1989

"Reflected Spring." Arnold Arboretum (AA). Art show. Exhibition of jury-selected artwork entered in second annual art competition for the Arboretum's Lilac Sunday poster. *Information:* Jo Procter, Public Affairs Officer, AA, Jamaica Plain, MA 02130-3519; (617)524-1718.

April 22-30, 1989

Historic Garden Week in Virginia. Garden Club of Virginia (GCV). Thirty-four homes, gardens, and historic landmarks, restored by GCV, open to the public. *Guidebook:* Historic Garden Week Headquarters, 12 East Franklin Street, Richmond 23219 (\$1.00; available after March 1, 1989). *Information:* (804)664-7776; 643-7141.

April 28-30, 1989

Eleventh Annual Show. Massachusetts Orchid Society. Hundreds of flowering plants on display, workshops on home orchid growing, films, sales. Lexington Armory, 459 Bedford Street (Routes 4 and 225), Lexington (Exit 31B of Route 128). 9 A.M.-6 P.M. (April 28 and 29); 10 A.M.-5 P.M. (April 30). Admission charge. *Information:* (617)272-8391.

May 4-14, 1989

Spring Workshop. La Napoule Art Foundation (LNAF). Landscape design programs at the Château de La Napoule on the French Riviera. Lectures (conducted in English), supervised studio, field trips to renowned gardens in the south of France. Living accommodations at a *monument historique* on the Mediterranean. *Information:* LNAF, 217 East 85th Street, Suite 411L, New York, NY 10028; Heather Steliga Chen, (212)628-2996.

May 5 and 6, 1989

Daffodil Show. Northern New England Daffodil Society. Town Hall, Dublin, NH. *Schedule:* Mrs. Philip H. Faulkner, 24 School Street, Keene, NH 03431.

Copy deadlines for the New England Botanical and Horticultural Calendar are December 10, March 10, June 10, and September 10 for the Winter, Spring, Summer, and Fall issues, respectively. *Mailing address:* Calendar, *Arnoldia*, Arnold Arboretum, Jamaica Plain, MA 02130-3519.

Organization Meetings

A Faithful Catalog of Horticultural and Botanical Meetings Scheduled for the New England Area

Some organizations hold meetings at regular intervals, others do not. All of the meetings listed below are open to the public. Organizations always welcome new and prospective members. *It is advisable to verify the information given below directly with the contact person listed. Please do not call the Arnold Arboretum.*

Meetings Held at Regular Intervals

AMERICAN RHODODENDRON SOCIETY (MASSACHUSETTS CHAPTER)

Third Wednesday (varies), beginning in September, 7:30 P.M., Suburban Experiment Station, 241 Beaver Street, Waltham. *Contact:* Barbara Emeneau (617)729-0725.

BONSAI STUDY GROUP OF THE MASSACHUSETTS HORTICULTURAL SOCIETY

First Sunday, 2 P.M., Wellesley College Greenhouse, Wellesley. *Contact:* John Palmer (617)443-5084.

CONNECTICUT HORTICULTURAL SOCIETY

Third Thursday, 8 P.M., Hoadley Auditorium, Connecticut Historical Society, 1 Elizabeth Street, Hartford. Lecture followed by plant forum and plant auction. *Contact:* Connecticut Horticultural Society, 150 Main Street, Wethersfield 06109; (203)529-8713.

CONNECTICUT ORCHID SOCIETY

Second Wednesday, 7:30 P.M., at different locations. (June, members only; July, August, no meetings.) *Contact:* E. M. Wolf (203)456-1657.

GARDENERS AND FLORISTS CLUB

Third Tuesday, 7:30 P.M., Wellesley College Greenhouse, Wellesley, MA. *Contact:* Del Nickerson, Wellesley College Greenhouse.

GREEN INDUSTRY COUNCIL

First Wednesday, 12 noon-1:30 P.M., Case Estates, Weston, MA. *Information:* (617)435-6335.

HOBBY GREENHOUSE ASSOCIATION OF EASTERN MASSACHUSETTS

Second Saturday, alternate months (January, March, May, etc.), 1:30 P.M., Wellesley College Greenhouse, Wellesley. Members need not own greenhouses. *Contact:* Joseph Rajumas, 8 Davis Street, Holliston 01746.

INDOOR GARDENING SOCIETY OF AMERICA (CONNECTICUT CHAPTER)

Fourth Wednesday, 7:30 P.M., Cooperative Extension Service Building, 1280 Asylum Street, Hartford. *Contact:* Michael Archaski, 64 Rhodes Street, New Britain 06051; (203)225-5828.

MASSACHUSETTS ORCHID SOCIETY

Second Tuesday, 7:30 P.M., Suburban Experiment Station, 241 Beaver Street, Waltham. Occasional special workshops at 7 P.M. *Contact:* D. Fye, (617)358-7547; C. Lee (617)443-6566; or M. A. Grigg, 38 Monadnock Road, Worcester 01609.

MOBY DICK AFRICAN VIOLET SOCIETY

Second Thursday, 7 P.M., Dartmouth Library, South Dartmouth, MA. *Contact:* Mrs. Ruth Warren (617)679-1189.

NEW ENGLAND BROMELIAD SOCIETY

Third Sunday, September-June, 1 P.M., Wellesley College Greenhouse, Wellesley, MA. *Contact:* Paul R. Carlberg (617)791-1533 or (617)757-5012; or DeeDee Bundy (617)526-1952.

NEW HAMPSHIRE ORCHID SOCIETY

Second Saturday, 1:30 P.M., Concord Public Library, Concord. Location may change. *Contact:* Paul Sawyer, RFD 2, Box 174, Canaan 03741; (603)523-7410 after 5 P.M.

Calendar Section

Meetings Held at Irregular Intervals

AMERICAN BEGONIA SOCIETY (BUXTON BRANCH)

Suburban Experiment Station, 241 Beaver Street, Waltham, MA: April 27, 1988, to be announced; May 11, 1988, 8 p.m.; June 8, 1988, 8 p.m. *Contact:* Wanda Macnair (617)876-1356.

AMERICAN FERN SOCIETY (SOUTHERN NEW ENGLAND CHAPTER)

Approximately monthly, changing locations. *Contact:* Peggy (617)799-5897.

AMERICAN GLOXINIA AND GESNERIAD SOCIETY (NEW ENGLAND CHAPTER)

Approximately monthly, 1 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. *Contact:* H. Friedberg (617)891-9164.

AMERICAN HEMEROCALLIS SOCIETY (NEW ENGLAND CHAPTER)

Second Saturday, 10:30 a.m.-4 p.m., Suburban Experiment Station, 241 Beaver Street, Waltham, MA. Location subject to change. *Contact:* Suzanne Mahler (617)878-8039.

AMERICAN ROCK GARDEN SOCIETY (NEW ENGLAND CHAPTER)

Saturday or Sunday, February-October (approximately monthly, at changing locations). *Contact:* Helga Andrews (617)443-8994.

IRIS SOCIETY OF MASSACHUSETTS

September, November, January, and March. *Contact:* Mrs. John H. Burton, 188 Sagamore Street, South Hamilton 01982; (617)468-3646.

NEW ENGLAND HOSTA SOCIETY, INC.

Meetings irregular, usually Sunday, 10 a.m.-2 p.m., at changing locations. *Contact:* Mabel-Maria Herweg, 11 Puritan Lane, Dedham, MA 02026; (617)326-1939.

NORTHEAST HEATHER SOCIETY (CHAPTER OF THE NORTH AMERICAN HEATHER SOCIETY)

Meetings held at least four times a year on weekends, at various locations throughout New England. *Contact:* Walter K. Wornick, Post Office Box 101, Alstead, NH 03602; (603)835-6165.

Ongoing Activities

ARNOLD ARBORETUM (Area Code 617)

The Arborway, Jamaica Plain, MA 02130-3519. A 265-acre public park of hardy trees, shrubs, and vines from all over the world, many of them from China and Japan. Open daily, sunrise-sunset. No charge. Visitor Center at Main Entrance open Tuesday-Sunday, 10 a.m.-4 p.m. Closed on national holidays. Exhibits, slide show, public information, rest rooms. Arboretum Shop sells books, postcards, film, gift items, etc. Group van or guided walking tours available by appointment. Driving permits issued to elderly or handicapped, Monday-Friday, 9 a.m.-4 p.m. *Information:* 524-1718; *recorded information on lectures, events:* 524-1717.

• **Volunteers** are always needed to work in every area, with staff or on independent projects, on the Living Collections, in the library, gift shop, or herbarium, guiding tours, etc. Volunteers receive training and other benefits. *Contact:* Volunteer Coordinator, Arnold Arboretum, Jamaica Plain, MA 02130-3519; 524-1718.

• **Horticultural and Botanical Calendar.** Published in each issue of *Arnoldia*, the quarterly magazine of the Arnold Arboretum. The calendar serves organizations in the New England area, though events taking place elsewhere are often listed. Copy deadlines are December 10, March 10, June 10, and September 10 for the Winter, Spring, Summer, and Fall issues, respectively. *Mailing address:* Calendar, *Arnoldia*, Arnold Arboretum, Jamaica Plain, MA 02130-3519; *information:* 524-1718.

• **Certificate in Gardening Arts.** Arnold Arboretum. Botany and horticulture courses on theories and practices of good gardening (propagation, maintenance, design, plant selection, plant systematics, etc.). Work towards certificate may commence at any time during the year (some required courses may be entered only in spring). No time limit for fulfilling requirements, but final project (required) will usually be prepared within one year of completion of coursework. *Details and catalog:* 524-1718.

• **Plant Information Hotline.** Monday, Tuesday, 1-3 p.m. 524-1718.

• **Field Study Experiences.** School programs of the Arnold Arboretum for third- to sixth-grade classes. "Plants in Autumn: Seeds and Leaves" (September-November); "Hemlock Hill" (all seasons); "Around the World with Trees" (all seasons). Fee. Weekdays, 10 a.m.-12 noon (advance registration required).

METROPOLITAN BOSTON (Area Code 617)

Mount Auburn Cemetery, 580 Mount Auburn Street, Cambridge 02138. America's oldest garden cemetery (established in 1831). One hundred seventy acres of naturalized and formal landscaped grounds with over 3,600 canopy trees (596 species) and many flowering shrubs. Burial place of many famous Americans. Hilly terrain, lakes, vistas, accessible by 12 miles of roads and many paved paths. Observation tower with outstanding views of Boston. Open daily, 8 A.M.-7 P.M., May-September; 7 A.M.-5 P.M., October-April. No charge. *Information:* 547-7105.

Margaret C. Ferguson Greenhouses, Wellesley College, Route 135, Wellesley 02181. Exhibits of desert and tropical plants, ferns, orchids. Seasonal displays. Open daily, 8 A.M.-4:30 P.M. Guided tours available by appointment. No charge. *Information:* 235-0320, extension 3094.

Frederick Law Olmsted National Historic Site ("Fairsted"), 99 Warren Street, Brookline 02146. Boston offices of F. L. Olmsted and his two sons, surrounded by landscaped grounds. Open Friday-Sunday, 10 A.M.-4:30 P.M. No charge. Group tours by appointment. *Information:* U. S. Department of the Interior, National Park Service, 99 Warren Street, Brookline 02146; 566-1689.

Gore Place, 52 Gore Street, Waltham 02154. Federal-period mansion and grounds offering a remarkable combination of architecture, landscape design, social history, and agricultural reform. Herb garden, cutting garden, grape arbor, orchard. Mansion open for guided tours Tuesday-Sunday, 10 A.M.-5 P.M.; grounds open year round during daylight hours. Admission charge. *Information:* 894-2798.

Lyman Estate and Greenhouses ("The Vale"), 185 Lyman Street, Waltham 02154. Thirty acres of pleasure grounds and lawns, wooded areas, garden beds, and a number of ornamental trees and shrubs, including a grand copper beech and magnificent rhododendrons, Camellia House (*circa* 1820) with 100-year-old camellias, Grape House (1804) with vines dating from 1870. Fine example of a Federal period country estate with the oldest greenhouses known to be in use in the United States. Greenhouses open year round, Thursday-Sunday, 10 A.M.-4 P.M., house open only by appointment for groups of ten or more. Admission charge. *Information:* 893-7232; 891-7095 (greenhouses), 893-7431 (house).

Barkley Begonia Collection, Northeastern University Greenhouses, 135 Cambridge Street (Route 3, 1 mile south of Route 128), Woburn 01801. Open Monday-Friday, 8 A.M.-12 noon, 1-5 P.M., other times by appointment. Group tours by arrangement. Closed weekends and holidays. No charge. *Information:* Wanda Macnair, 177 Hancock Street, Cambridge 02139; 876-1356.

NORTHEASTERN MASSACHUSETTS (Area Code 508)

Sedgwick Gardens at Long Hill, 572 Essex Street (Route 22), Beverly 01915. Collection of some 400 species of plants, including weeping Japanese cherries, azaleas, tree peonies, koelreuterias, oxydendrums, sophora, and stewartias, all identified and catalogued with their scientific names. Open daily, 8 A.M.-sunset. Admission charge. *Information:* The Trustees of Reservations, 572 Essex Street, Beverly 01915; (617) 922-1536, 921-1944.

The Stevens-Coolidge Place, 5 Wood Lane, North Andover 01845. House and carefully maintained grounds with expansive lawns, colorful gardens accented by formal hedges, specimen trees. A Trustees of Reservations property. House open Sundays 1-5 P.M. (admission charge); grounds open daily, 8 A.M.-sunset (no charge). *Information:* Superintendent, Stevens-Coolidge Place, North Andover; 682-3580.

Maudslay State Park (the former Moseley Estate), Curzon's Mill Road, Newburyport. Scenic and historic Nineteenth Century estate; 476 acres of gardens, rolling agricultural land, pine forest, and mountain laurel on the banks of the Merrimack River. Many of the ornamental plantings were introduced by Charles Sprague Sargent. Open daily, 8 A.M.-sunset. No admission charge. *Information:* Massachusetts Department of Environmental Management, Division of Forests and Parks, 817 Lowell Road, Post Office Box R, Carlisle 01741; 369-3350.

CAPE COD AND THE ISLANDS (Area Code 508)

Ashumet Holly Reservation and Wildlife Sanctuary of the Massachusetts Audubon Society, 286 Ashumet Road, East Falmouth 02536. Two trails meander amid hollies and past an Oriental lotus pond. Open Tuesday-Sunday, dawn-dusk. Admission charge. *Information:* 563-6390.

New Alchemy Institute, 237 Hatchville Road, East Falmouth 02536. Research institution founded to develop ecologically sound food systems through organic gardening, integrated pest management, solar ponds, solar greenhouse design and management, tree crops, energy conservation. Film, guided tours. Open 10 A.M.-4 P.M., Monday-Friday; 12 noon-4 P.M., Saturday, Sunday. Guided tours, Saturday, 1 P.M. Admission charge. *Information:* 563-2655.

Calendar Section

Lowell Holly Reservation, South Sandwich Road, Mashpee 02649. One hundred thirty-five acres with two miles of shoreline, stands of beeches and hollies, walking trails. Open daily, 10 A.M.–sunset, free on weekdays, parking and boat-landing fees on weekends. *Information:* 749-5780, 921-1944.

Mytoi Gardens, off Dike Road, Chappaquiddick Island, Marthas Vineyard 02539. Eleven-acre Japanese-style garden with small pond, azaleas and rhododendrons, Hanoki cypress, hollies, daffodils. Open daily, sunrise–sunset. No charge. *Information:* 794-5780, 921-1944.

CENTRAL MASSACHUSETTS (Area Code 508)

Garden in the Woods, Hemenway Road, Framingham 01701. A 45-acre botanical garden containing the largest landscaped collection of wildflowers and native plants in the Northeast. Informal walks (10 A.M., Tuesday). Group tours by reservation. Open Tuesday–Sunday, 9 A.M.–4 P.M. Admission charge. *Information:* 877-6574, -7630; 237-4924.

Tower Hill Botanical Garden, 30 Tower Hill Road (Route 70), Boylston 01505. Grounds open weekdays, 8:30 A.M.–5 P.M., weekends (May–October), 10 A.M.–4 P.M., closed holidays. *Information:* Worcester County Horticultural Society, 30 Tower Hill Road, Boylston; 869-6111.

Elliott Laurel Reservation, Route 101, Phillipston 01331. Thirty-three acres of open fields, hardwood forest, pine woods, and mountain laurel. A property of the Trustees of Reservations. Open daily, sunrise–sunset. No charge. *Information:* 921-1944, 537-2377.

WESTERN MASSACHUSETTS (Area Code 413)

Norcross Wildlife Sanctuary, Monson–Wales Road, Wales 01081. Three miles of trails through over 3,000 acres of woodlands. Open Monday–Saturday, 9 A.M.–5 P.M. No charge. *Information:* 267-9654.

Berkshire Garden Center (BGC), Routes 102 and 183, Stockbridge 01262. Fifteen-acre botanical garden with herb garden, display gardens, perennial borders, solar greenhouses. Open daily, 10 A.M.–5 P.M. Admission charge. *Information:* 298-3926.

RHODE ISLAND (Area Code 401)

Blithewold Gardens and Arboretum, 101 Ferry Road, Bristol. Historic English manor house and 33-acre estate overlooking Narragansett Bay. Rose garden, water and rock gardens. Collection of native and exotic plants. Grounds open Tuesday–Sunday, 10 A.M.–4 P.M. year round; mansion open mid-April–October, 10 A.M.–4 P.M. Closed holidays. Admission charge. *Information:* 253-2707.

NEW HAMPSHIRE (Area Code 603)

Fuller Gardens, Willow Avenue (200 yards north of the junction of Routes 101D and 1A), North Hampton 03862. Open daily, 10 A.M.–6 P.M., mid-May–October. Nominal admission charge. *Information:* 964-5414.

Rhododendron State Park, Fitzwilliam 03447 (off Route 119). Sixteen-acre park with wild rhododendrons that bloom in mid-July. Open daily, 8 A.M.–sunset. No charge. *Information:* 532-8862.

Maple Hill Farm, 117 Ridge Road (off Routes 122 and 133), Hollis 03049. Herb garden, reflecting pool, perennial beds, rock garden, arbor, drying-plant beds, 1,600 acres of water, woods, and meadows. Open all the time, year round. No charge. *Information:* Beaver Brook Association, 117 Ridge Road, Hollis; 465-7787 (9 A.M.–12 noon, Monday–Friday).

Knights Hill Nature Park, County Road, New London. Sixty acres of fields and forest; geology and fern gardens; pond, marsh, stream; trails. Open daily, 10 A.M.–5 P.M. *Information:* New London Outing Club, care of Lamont Moore, Post Office Box 113, New London 03257.

VERMONT (Area Code 802)

Botany and Woodland Trails, Southern Vermont Art Center, Mount Equinox, Manchester 05254. Botany Trail on slopes of mountain, with woods, wildflowers, ferns, pool, scenic vistas. Open Tuesday–Saturday, 10 A.M.–5 P.M. (admission charge), Sunday, noon–5 P.M. (free). *Information:* 362-1405.

CONNECTICUT (Area Code 203)

Bowen House, "Roseland Cottage," on the Common, Woodstock 06281. Colorful Gothic Revival cottage set in grounds designed to reflect the ideas of picturesque, or natural, landscaping of Andrew Jackson Downing. Open 12 noon–5 P.M., Wednesday–Sunday (May 24–September 15), 12 noon–5 P.M., Friday–Sunday (September 16–October 15). Admission charge. *Information:* 928-4074.

Champion Greenhouse, One Champion Plaza, Stamford 06921. Ongoing program of horticultural shows, exhibits, and displays. Open 11 A.M.–5 P.M., Tuesday–Saturday. Group tours by appointment. *Information:* 358-6688.

dated the appointment of a tree warden for every city and town in the Commonwealth. The first law of its kind in the country, it indicated the high value that the Commonwealth of Massachusetts placed on its shade trees. Today, the complexity of planting and maintaining trees requires a team: a landscape architect, an arborist-horticulturist, a soil specialist, and, perhaps, an engineer.

Planting for the Future

As we look to the future, several issues need to be fully and thoughtfully addressed as we seek to restore, enhance, and rethink our street plantings. The most visible issues to residents, aside from maintenance, are species selection and planting method. Some species, such as Norway maple and little-leaf linden, have been overplanted in Boston. As a result, their faults and limitations have been magnified. As Ernest Wilson, Keeper of the Arnold Arboretum, said of trees for street planting, "they must be veritable angels among trees." Like cornices and window mullions, trees become fashionable, and their use is dictated more by out-of-context taste than by an integration of design and horticultural requirements.

The honey locust, so admired by architects for its light, transparent foliage and by arborists for its resistance to urban stress, has had tremendous popularity over the past fifteen years. In addition to its extensive use as a street tree, it has become the ubiquitous urban-plaza tree. A number of South End streets have benefited from the planting of the honey locust, which creates a wonderful quality of dappled sunlight and does not obscure the details of the Victorian townhouses. The Callery pear, a favorite of arborists and utility-line companies because of its small, compact size, is being appropriately planted on many narrow streets of the city, including those of Beacon Hill. In other locations it cannot rival the mature effect of oaks, maples, or lindens. The green ash, another



Tremont Street in the mid-1870s. Top: Looking eastward near Massachusetts Avenue, from top of the Chickering Building. Bottom: Looking westward from Dwight Street toward Montgomery Street and Montgomery Square. Photographs courtesy of the Massachusetts Historical Society.

current favorite, is tough and dependable but essentially undistinguished as a specimen tree and looks best when planted in close groups. Other, more exotic species are doing well and should be used more often. The mature ginkgos on Tonawanda Street in Dorchester, native to China and remnants of a much larger planting, are horticulturally very significant and should have much needed preservation work. Young ginkgo plantings on Appleton Street in the South End and on Bowker Street in Government Center are very successful. The katsura, a very beautiful tree and also native to China, could also be used more widely in Boston. Investigations must also be made into enlarging the number of small, upright growing species used in Boston. The North End, Charlestown, and Beacon Hill all have very narrow streets where tree growth is severely restricted.

Street trees in Boston, as in every other major city, are traditionally planted in tree pits cut into the sidewalk. Continuing this tradition is important, but too many tree-pit plantings are failing to rely on this method exclusively. Restricted planting area, poor soil and drainage, lack of water, and excessive damage from cars and trucks have been repeatedly enumerated as the causes of poor survival rates. New methods of public tree planting must be used. Continuous planting strips—long, streetside planting areas where tree roots have room to spread in larger areas of soil are one solution. Off-street grove planting is another option. Many areas of this city are too narrow for planting. They create pedestrian hazards and impossible survival conditions for the trees. Tree planting on very narrow streets can only be reasonably viewed as temporary planting and probably should be done with private funds.

There is a whole body of state and municipal laws concerning the ownership and stewardship of public trees. Legally, the City of Boston and its designated agency, the Department of Parks and Recreation, has jurisdiction over street trees on public property. The Boston Parks Department has made a firm commitment to improve both the street-tree population of the city and the professional management of that population. But no major city in this country relies exclusively on city funding and city labor to plant and maintain public trees. Many private nonprofit and volunteer groups devoted to public street-tree planting and care have been organized and developed over the past twenty years. Friends of the Urban Forest in San Francisco and the New York City Street Tree Consortium have done significant work in those cities as cooperative partners with city government to fund and maintain new plantings and, most importantly, to highlight the value of trees to the city.

Trees are often seen as an end product of gentrification. Yet many cities have shown that community feeling and action can be initiated around tree planting as the beginning of a neighborhood-improvement process. Trees in Boston have a long tradition, but, as we have seen, tradition alone does not sustain trees. Trees must be valued, and their needs and idiosyncrasies must be understood. The maintenance and replenishment of our street trees must be accepted as a continuous process.

Phyllis Andersen, a landscape design consultant, is executive director of the Shade Tree Advisory Committee for the City of Boston.

“So Near the Metropolis”—Lynn Woods, a Sylvan Gem in an Urban Setting

Elizabeth Hope Cushing

Having slowly and inexorably declined for the better part of a century, the City of Lynn’s 2,300-acre Lynn Woods Reservation now seems due for a dramatic reversal of fortunes



Lynn Woods has served as an important source for municipal water and as a community recreation area for more than a century. But the woodland and water reservation of more than 2,000 acres has significance well beyond its value for the City of Lynn, Massachusetts. The story of the creation of this forest park and its reservoirs is intimately tied to the emergence of national trends in natural area conservation, regional landscape planning, recreation and American attitudes towards the wilderness. While the Woods have been neglected or abused for many years, the qualities that inspired the late nineteenth century citizens of Lynn to create this progressive municipal park still exist and merit careful nurture for future generations.

—From *Historic Landscape Report, Lynn Woods, Lynn, Massachusetts*. Prepared for the Olmsted Historic Landscape Preservation Program, Department of Environmental Management, Commonwealth of Massachusetts. Boston: American and New England Studies Program, Boston University, 1986.

In 1985 the Massachusetts Legislature appropriated thirteen million dollars toward the restoration of twelve parks in Massachusetts that Frederick Law Olmsted designed. In doing so, the Legislature set in motion an ambitious and farsighted course of action intended, in part, to set a precedent for other states with Olmsted-designed parks, as well as to create a structure—the Olmsted Historic Landscape Preservation Program (a part of the Massachusetts Department of Environmental Management)—that would facilitate further restoration of Olmstedian and other important open spaces in Massachusetts. Among the cities chosen to receive funds, Lynn, Massachusetts, was awarded over two million dollars to restore two areas: High Rock, a three-acre park in the middle of the city, and the Lynn Woods Reservation, a tract of land at the outskirts of the metropolis covering approximately twenty-three hundred acres of undulating woodland and containing four bodies of water used as reservoirs by the City of Lynn.

Enormous historical significance is invariably attached to the early settlement of such Massachusetts towns as Hingham and Ipswich, Cambridge and Boston. Yet many towns, founded at very nearly the same time as they, have meandered into the twentieth century all but unknown beyond their own boundaries. Such a town is Lynn, Massachusetts. Situated some eleven miles northeast of the State House in Boston, Lynn nestles in a curve of the North Shore. Originally it stretched six miles along the shore and five miles inland, into a rich, undulating woodland known as the Lynn Woods.

The written history of the Lynn Woods dates back to records of the Pawtucket Indians' using the area as a hunting ground and the settling of the Lynn area by Europeans in 1629. The forest lands were held in common at that time for the use of the entire community for the gathering of timber and fuel. Fortunately for posterity an early resident of Lynn, William Wood, returned to England and published a book in 1634 entitled *New*

Englands Prospect. In it he describes the waters in the forest streams of Lynn as "far different from the waters of England, being not so sharp but of a fatter substance, and a more jettie color, it is thought there can be no better water in the world."¹ Wood went on to describe in detail the kinds of wood that were garnered from the forest and the uses to which the wood was put, resorting even to verse:

*Trees both in hills and plaines, in plenty be,
The long liv'd Oake, and mournefull Cypris tree,
Skie towring pines, and Chestnuts coated rough,
The lafting Cedar, with the Walnut tough:
The rozin dropping Firre for mafts in ufe,
The boatmen feele for Oares light, neate growne
fprewse,
The brittle Ash, the ever trembling Afpes,
The broad-fpread Elme, whofe concave harbours
wafpes,
The water fpungie Alder good for nought,
Small Elderne by th' Indian Fletchers fought,
The knottie Maple, pallid Birtch, Hawthornes,
The Horne bound tree that to be cloven fcornes;
Which from the tender Vine oft takes his fpoufe,
Who twinds imbracing armes about his boughes.
Within this Indian Orchard fruities be fome,
The ruddie Cherrie, and the jettie Plumbe,
Snake murthering Hazell, with sweet
Saxaphrage,
Whofe fpurnes in beere allayes hot fevers rage.
The Diars Shumach, with more trees there be,
That are both good to ufe, and rare to fee.*

One of the earliest structures in Lynn Woods was a stone bridge built over one of the streams. The bridge became known as Penny Bridge and the stream as Penny Brook—for each man who used this convenient access to the Woods for fuel gathering was charged one penny until the bridge was paid for.

Wolves and Pirates Prowl Lynn Woods

In 1686 the white inhabitants of Lynn officially purchased the land they had settled on and the surrounding woodlands from the Native Americans for seventy-five dollars.

Agitation for the division of all common lands began in 1693, but it was not until 1706 that the Town Meeting voted to divide them among the landholders of the town.

Certain universal menaces drew the townspeople together in the Woods nonetheless: wolf pits, which exist to this day, although the authenticity of their use has been called into question, were supposedly dug in the early seventeenth century to confront the danger presented to livestock. As late as 1735 there are town records of two days in August

being set aside for a general killing of wolves in Lynn Woods.

Probably the most significant remnant from the seventeenth-century period of the Woods involves their link with pirate lore and pirate treasure. The tale was often told of a ship anchoring near Lynn Harbor. Four pirates rowed ashore and left silver in exchange for handcuffs and leg irons made for them at the nearby Saugus Iron Works (Saugus was part of Lynn at that time). They then disappeared, only to return, purportedly depositing

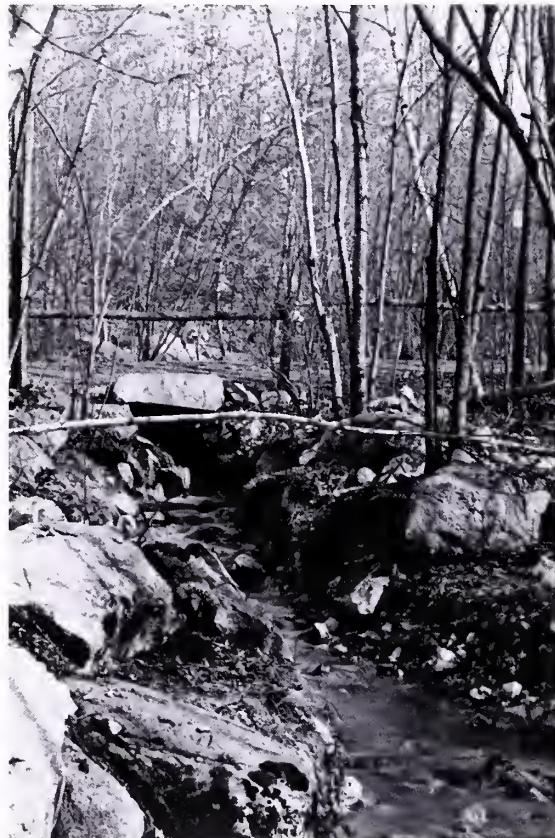


An early map of Lynn, Massachusetts. Saugus was set off from Lynn in 1815. Naumkeag is now called Salem, and Winnisimet is Chelsea.

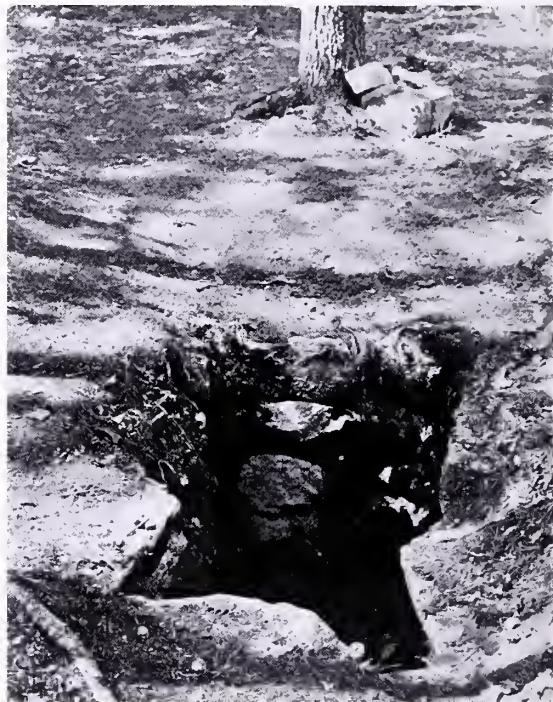
a treasure of great magnitude within a natural cave in a rocky portion of Lynn Woods. When they once again appeared, three of them were captured, tried, and hanged. The fourth, a man named Thomas Veal, escaped and hid in the natural cave where the treasure was buried. There he dwelt, periodically mending shoes for the people of the town in order to buy supplies, but chiefly secluding himself at his hideout. Several different versions of the pirate's life have been told, but in one respect they all concur. In the year 1658 there was an earthquake that shook Lynn severely. Tho-

mas Veal was in his treasure cave at the time. The rock above splintered and fell in upon him, entombing Veal forever with his ill-gotten hoard. From that time onward the spot has been called Dungeon Rock. News of the buried treasure continued to echo through the years, creating a never-ending interest in the site.

The Woods continued to be used throughout the eighteenth and early nineteenth century as it had always been—for fuel. A growing number of people, however, came to appreciate the forest for its sylvan beauty. Chief



Penny Brook in Lynn Woods, so named because it cost the early English settlers a penny to use a stone bridge that was built over the brook as a more convenient means of access to the Woods' supply of timber. The one-penny tolls financed construction of the bridge.



Wolf pits in the Ox Pasture of Lynn Woods, reminders of New England's primeval wilderness. These were baited, stone-lined traps designed to catch wolves, which in colonial times were a common threat to people and livestock alike. One age-old tale tells of an Indian woman who fell into one of these traps and found herself face to face with an incarcerated wolf. According to the tale, the two spent the night in terror, cowering in their respective corners, until help arrived the next morning.

among these enthusiasts was a self-educated botanist by the name of Cyrus M. Tracy. A Lynn resident from his early youth, Tracy roamed the wooded areas of Essex County and recorded specimens of botanical and geological interest that he observed in his travels. In 1850 he formed the Exploring Circle with four other Lynn residents, a group dedicated to the exploration and recording of the plants, animals, and geological phenomena of the area. They made frequent field trips to the Woods to gather information, and each member was required to present papers and reports

monthly to the Circle. Part of their charter included the measurement, exploration, and recording of areas of Lynn Woods previously little known to local residents.

The Spiritualists Take Up the Search

In 1851 another chapter in the history of the Woods opened as well. Lynn had become a gathering place for Spiritualists, an increasing force in the mid-nineteenth century. A man named Hiram Marble from Charlton, Massachusetts, felt himself called to the Lynn Woods to follow up on the legend of



At the end of a circuitous cart path leading from the town of Lynn to Dungeon Rock [in background], Hiram Marble and his son Edwin built a "prim little cottage... cozily situated on a sort of shelf." They soon made a garden and transformed the cart path into a carriage road.

Dungeon Rock and its buried treasure. He purchased the Rock and five acres surrounding it, and fell to the task which was to consume all of his resources and the rest of his life: finding Thomas Veal's hoard. There is little doubt that it was his deep belief in Spiritualism that motivated him, for there was no reward and little gratification for this particular life's work. Marble consulted frequently with mediums, who would make contact with the spirits. The spirits, in turn, would guide him where to go next. For the first few months he lived alone at the site, digging straight into the hillside. Six months later fear of collapse made him discontinue that route and begin in a more circuitous manner. The bits of stone to be seen on the hillside to this day date from the blasting of that period.

Marble brought his family to join him, in particular Edwin Marble, his son, who worked all of his life as well to find the treasure. Together they built a house for the Marble family to dwell in. In the summer of 1855 they laid out a carriage way from the Rock to the town of Lynn. This road, according to the reminiscences of Charles O. Stickney, who visited the site in his youth, was a "rude, newly made road, now down a sudden and almost breakneck descent, now around the base of a hill, the sharp curve so narrow and sidelong as to threaten an upset, with partial openings affording glimpses of wild ravines and lovely dells."² Stickney was in a horse and wagon, but today the road to the site remains steep and winding. Stickney and his friend saw a "prim little cottage . . . cozily situated on a sort of shelf,"³ with Hiram Marble himself on the roof building a chimney. The Marbles opened the tunnel they were excavating to tourists in order to raise money for the project. A later visitor observed that above the grated door to the tunnel was a sign which read, "Ye who enter here leave twenty five cents behind."⁴ Edwin Marble himself took Stickney and his friend around, first inviting them into the house to view the museum, which incorporated the various products of the excavation, including a dirk,

the hilt of a sword, and an ancient pair of scissors. Two pencil sketches of the pirate's cave, one with Veal's bones in full view, had been drawn by an invisible artist during a Spiritualist sitting at the house.

The Marbles worked on. In 1856 a woman medium, Nanette Snow Emerson, spent six weeks writing a book called *The History of Dungeon Rock* in order to raise funds for Marble's work. An intricate and fanciful version of the pirate's tale is woven. In describing the area around Dungeon Rock the medium gives an idea of the ancient, wild beauty of the spot. She also indicates Hiram Marble's intention for the site after he had recovered the treasure: "All this is to be revived again; the woodland to be laid out in groves, and parks and forest. . . ."⁵ In light of the fact that this was literally the naissance of the era of public parks in America, within two years of the competition for Central Park in New York City, this seems a generous and enlightened view for the space.

On November 10, Hiram Marble died, and Edwin Marble took over full responsibility for the excavation, which he continued until his own death in 1880. Hiram was buried in Charlton with his family, but Edwin chose to remain on the southwestern slope of the Rock. Because of the burial laws a mound of earth had to be placed above him. A large boulder serves as his headstone and fragments of rock, blown out by Edwin and his father, encircle his grave. After digging and blasting one hundred and seventy-four circuitous feet into the solid rock, neither man succeeded in his mission, and eventually the Rock was left abandoned by the Marble family. Another well known Lynn resident, the singer John Hutchinson, wrote of the Marbles' endeavor:

Hiram Marble told me he would either prove the truth of Spiritualism or dig its grave. So for many decades those earnest, honest men, whom the world may call mistaken, drilled and dug and tunnelled. . . . There [the tunnel] remains, an eloquent evidence of what men will do to prove their faith.⁶

The Exploring Circle Digs In

During the period of the Marble residency the Woods were visited by the curious but also by nature enthusiasts. The Exploring Circle spent a great deal of time charting and investigating the area. In 1858 Cyrus Tracy published a book entitled *Studies of the Essex Flora*. In it he describes several spots in the large county of Essex, but he dwells lovingly upon the area of the Lynn Woods. He considered them botanically undiscovered: "Those who love pleasant and finely toned scenery have often found much satisfaction in this vicinity, and the culler of choice old histories and romantic legends has long esteemed it a productive field," but the botanist seemed to have overlooked it, being unable to believe "that a district so near the metropolis might contain some things worth looking for."⁷ Here Tracy hits upon one of the unique and valuable features of the Lynn Woods, both

then and now. "So near the metropolis" is a theme that the reader must bear in mind, for it is one of the essential reasons that the Woods are so important to this day.

The Exploring Circle recorded the various botanical wonders they came across in their travels and kept watch for the biggest threat to the forest: fire. The people of Lynn from early days learned to dread the uncontrollable conflagrations which raced through the Woods, destroying acres of timber.

The Circle was interested in geology as well as botany. In 1858 a "Committee on Bowlders and Erratic Rocks" was formed. Because of ancient glacial paths Lynn Woods are strewn with gigantic boulders. Once again, thorough descriptions were given of unusual formations, frequently accompanied by Ruskin-esque drawings of them. By the time of the Circle's peregrinations of the early 1860s, the original town of Lynn had been



*Rocking Stone in Lynn Woods:
Examined Oct. 5, 1854.*

"Ruskin-esque" sketch of a glacial erratic, a "rocking stone," in Lynn Woods. The Exploring Circle was interested in geology as well as botany, and in 1858 formed a "Committee on Bowlders and Erratic Rocks." This drawing was made by Stephen Decatur Pool in 1854.



Sketch of the "Big Cedar," which once grew on Cedar Hill in Lynn Woods. The sketch, which is preserved in the records of the Exploring Circle, was probably made by Stephen Decatur Pool in 1855.

divided into three communities: Lynn, Lynnfield, and Saugus. The vast woodland where they roamed remained primarily in Lynn, with sections in both of the other communities.

In 1869 Lynn suffered a trauma that had reverberating effects upon the community. A ferocious fire consumed a section of the factory district of the town. Officials felt it was time that Lynn faced the necessity of providing a better water supply, for the fire department had been hopelessly inadequate in the face of the disaster. Their first purchase of a water supply was in 1870—an abandoned mill pond in Lynn Woods known as Breed's Pond. A Public Water Board was formed.

Water and the Floodgates of Development

The development of the water sources of Lynn is of primary importance to the fate of the Lynn Woods for two reasons. By 1872 the Water Board was assuming the role of supplying all of Lynn's water. This meant that there was a rapidly growing need for water sources and water-storage facilities. The Lynn Woods had the pure streams so glowingly acclaimed

by William Wood in 1634. It was a natural spot for damming and establishing storage basins, and the Water Board looked to four brooks in the Woods, Hawkes, Penny, Birch, and Beaver, to meet the demand. They wished to create four artificial ponds, or storage basins, for fire and for a general water supply. With this step the Public Water Board had to make roads in order to reach, establish, and maintain the new water sources. By 1873 a drive fifty feet wide and one and one-half miles long had been created around the Breed's Pond Reservoir. For the first time since white men had established the ancient cart paths, an inner section of the Woods had made more easily accessible to people.

The effect on the Lynn Woods was obvious. Suddenly land that had always been treated as too rocky and barren to be used was open to development. The alarm was raised for people who wished to preserve the sylvan setting so close to a growing town. A later park report states, "The Water Board's ponds and girdling roads punctured the Woods and exposed them to undesirable occupation."⁸

It is not surprising that Cyrus Tracy was the first person to recognize the threat to this unspoiled environment. The 1891 Lynn Park Commission report states:

His call, his inner inspiration was to teach the people of Lynn that they had in the Woods "an asylum of inexhaustible pleasures." . . . He led parties of enthusiastic naturalists to scenes of beauty and grandeur hitherto unseen, save by his eyes. He dedicated hilltops and glens with mystic rites.⁹

And that is exactly what he did. He established "Camp Days" in the forest and published notices in the local papers encouraging the citizens of Lynn to join the Exploring Circle in naming and dedicating various sites in the Woods with elaborate ritual, speeches, poems, and songs. Tracy himself would lead tours for the sake of "rambling, studying the splendid views, botanizing and the like," as an 1881 Lynn *Transcript* article describes it. Throughout the 1870s he endeavored to en-

gender interest in the preservation of the Woods. In 1880 the *Lynn Transcript* had editorialized: "Foremost among the public wants in our city is the need of public parks, where the denizens of the hot and dusty city may get a sight of the green grass."¹⁰

By 1881 Tracy felt the threat to the Woods so intensely that he guided the Exploring Circle to the decision to insure the preservation of the Lynn Woods for posterity. After a great deal of consultation with the city government, on December 6, 1881, the "Indenture Adopted for the Purpose of Constituting the Free Public Forest of Lynn" was adopted. Tracy describes in the Records of the Trustees of the Free Public Forest the method used to establish the Indenture. He insisted that the current mayor sign the Trustees into acceptance as an official body connected with the town government. He felt, correctly, that without official status the Trustees of the Free Public Forest would never have been established as a permanent institution:

By [the mayor's] compliance, the measure was invested with the character of great public benevolence, and thus admissible, under the statutes, to become a perpetuity. And thus was secured the most important point of all; for if any plan for the preservation of a forest cannot be in its nature perpetual, it is at once liable to every kind of change and derangement, and simply remains a failure.¹¹

Tracy considered the Lynn Forest the "ancient legitimate inheritance of the people of Lynn," a reference to its many years as common land, and he set about gathering land for the enterprise with unbounded zeal.

The Tide Begins To Turn

The nationwide park movement by this time was an established fact of American life. New York landscape architect Frederick Law Olmsted was the reigning champion of urban open spaces—for the sake of aesthetic considerations to be sure, but also because he keenly observed that with the growth of cities, and the consolidated living arrangements which

ensued, it would be psychologically necessary to ensure open spaces for the working people who could not otherwise escape from the dust and noise of the city. "Breathing room" became a ubiquitous cry, and by the 1870s the enlightened elements of society and politics were gathering forces to create a permanent park system for Boston. After numerous struggles the Park Act of 1875 was passed by the Boston City Council. That June, the voters of Boston gave the plan their approval. The first person the newly formed Park Commission called to advise them was Frederick Law Olmsted. Thus began a long association between Boston and the famous landscape architect and with his firm. In 1882 the Massachusetts Legislature passed a bill known as the Park Act which allowed municipalities of the Commonwealth to condemn and purchase lands within their boundaries for the purpose of establishing public parks. This act was to be used by many cities and towns of Massachusetts as the basis for their park program.

By 1882 the Trustees of the Free Public Forest were setting up their program in earnest. It is clear that they considered themselves to be pioneers in the effort to preserve forest lands in the tradition espoused by Elizur Wright, a Massachusetts man in the vanguard of forest preservation. Wright actually participated in one of the Camp Day rituals in the Lynn Woods. The Trustees published the Indenture in the newspaper and solicited donations of land and money. "The Trustees will come to you and urge you to act as benefactors to that which is, after all, only your own interest."¹²

Subscriptions slowly began to come in as the Trustees embarked upon their program for the betterment of the forest. During the 1880s they improved the roads and paths left from the days of fuel gathering and livestock holding. They made efforts to clear out underbrush and thicket, both for fire control and for better access to the forest. Signs, seats, and shelters were provided, but vandalism reared its ugly head, raising the need for a forest

patrol. By donation and purchase the Trustees acquired acreage in small bits.

By 1887 a prominent and wealthy citizen of the town, Philip A. Chase, had become involved in the forest's preservation. It was a fortunate day for the Lynn Woods when he did, for he was a tireless and enthusiastic supporter all his life. When the thirteen acres of the incomparably beautiful Penny Brook Glen, with its brook, rare and wonderful wild-flowers, and seventeenth-century bridge, were about to fall into the hands of lumbermen it was Chase who rallied support to save it and raised the necessary money to buy it and the surrounding land. Next, he aided in purchasing Dungeon Rock and the area around it from the Marble heirs.

In 1888 the City Council of Lynn authorized the construction of a new reservoir, to be achieved by the damming of Hawkes and Penny Brooks. The new basin, a large one, was to be established in the center of the Woods, in an area known as Blood Swamp. The construction began at once and with it came a more serious threat to the sanctity of the Woods. The swamp was set much deeper into the Woods than Breed's Pond. A park report stated, "The construction of the water basin in Blood Swamp, and the road around it, made Lynn Woods more accessible and liable to human occupation. The gifts of land and money ceased."¹³

In November of 1888 the voters of Lynn were asked to exercise their franchise on the question of the 1882 Park Act. The resulting tally was in the affirmative, a resounding vote of confidence in the work already being done by the Trustees and a confirmation of commitment to the idea of public parks. This was the impetus needed for the park movement in Lynn. The *Lynn Transcript* of June 1889 argued strongly for the protection that only a public park could offer to the Woods:

The Park Act passed by the Legislature a few years ago,—and accepted by our city—was the beginning of a movement which if completed will secure results that are incalculable for the public

good. The public parks are the breathing places of our great cities,—near and inexpensive retreats, where the tired worker can find rest and recreation. . . . We have within our forest domain a territory . . . capable of bringing benefits to future generations that can not be measured in money. For who can measure that social and moral education of communities, which is the outcome of a line of influences where nature and art unite in appealing to every sense of beauty, and where the moral instincts are quickened by the presence of every uplifting emotion, and by the absence of every debasing or sordid suggestion.¹⁴

Mr. Chase Makes His Move

Once again Philip A. Chase moved forward to a leadership role. He invited the Mayor and the City Council, the Water Board, park preservationists, and prominent citizens to the Woods, ostensibly to see the site of the new storage basin but actually to inspire enthusiasm for making Lynn Woods a public park. Among the speakers of the day was the Water Board chairman, who enunciated a theme that was to thread throughout the history of the Woods: the Lynn Woods' "beauty consists in its naturalness; leave it as nature has made it and we shall have a rustic resort, so unique in its character that Lynn will acquire a reputation from its Forest Park as it now has from its unrivaled shore and magnificent beaches."¹⁵ The mayor of the city was enthusiastic as well: "It is impossible to estimate the benefits to posterity that will accrue from this great enterprise. . . . [I]t behooves us to make further provision for the prosecution of this work by an annual appropriation for improvements."¹⁶ And make further provisions they did, for in July of 1889 city bonds worth thirty thousand dollars were issued to facilitate the implementation of the Park Act.

The Board of Park Commissioners was appointed in October of that year, with Chase serving as chairman. The first two acts of the Commission were to hire a surveyor and to establish a "Citizens Fund" for the Reservation. This fund eventually swelled to over twenty thousand dollars, thanks to the solicitation and enthusiasm of Philip Chase.

Chase, who later served as a commissioner on the Metropolitan Park Commission, had written earlier to Frederick Law Olmsted to seek his advice about how the Park Commission should best superintend the Lynn Forest. Olmsted visited the Woods in August, and wrote a few days later to Malden journalist and park advocate Sylvester Baxter. The two men were clearly working on methods to promote interest in the park movement and seeking ways to further their cause. This letter, with its promotional advice for Baxter, may well have been the inspiration for Baxter's 1891 *Lynn's Public Forest: A Handbook Guide to the Great Woods Park in the City of Lynn*.

In the letter the essence of Olmsted's philosophy for the park is distilled, and Olmsted allows himself a certain candor reserved for personal observation. He thought the forest "a continuation of the Middlesex Fells" and "a roving ground not for Lynn and the northern suburbs only but for the people of Boston"—important concepts to bear in mind considering how hard Charles Eliot later attempted to incorporate the park into the metropolitan system he created. Of primary importance to Olmsted was the question of maintaining the Woods in their present natural state:

It should be to Boston something like Fontainebleau to Paris and Richmond & Windsor to London. The townspeople of Lynn do not appreciate it, I judge. Probably want a park or public garden. It is, what is so much better, a real forest.

In November of the same year Philip Chase, in his capacity as chairman of the Lynn Park Commission, received Olmsted's formal recommendation for the forest. Olmsted first gave a brief definition of the principal elements of a park and stated:

The most striking circumstance of your property is that although near by populous and flourishing communities, much of it is in a state of undisturbed nature and as a whole it is in a singularly

wild, rugged and rude condition. . . . The reason it has been allowed to remain of such a character is found in the outcropping ledges and boulders and gravel with which its surface is strewn.

Olmsted's Recommendations

Those very qualities that had saved the site from development, however, made it impossible for Olmsted to envision a "park-like" character for Lynn Woods. He felt that "decorative features commonly seen in parks would appear fussy and impertinent, every where jarring upon the natural scenery." Olmsted's fear was that the impossibility of creating a traditional, formal park might prevent people from understanding Lynn Woods' value as a place for public recreation. He stressed that most communities did not have such a situation offered to them, for the wild parcels of land were usually taken up with industrial development or domestic architecture that were incompatible with wild areas. The advantage of the setting of the Woods was that, being slightly outside the city, it could maintain its sylvan qualities, containing many points from which the city could not even be seen, "supplying a place of refreshing, and restful relief from scenery associated with the more wearing part of the life of the towns-people."

Olmsted felt that a relatively inexpensive program of management could be arranged. "What is mainly required is that a method of improvement shall be pursued steadily, systematically, continuously, for a series of years." Three main areas stood out for the process: to gradually thin the forest, allowing the most promising trees to grow properly; to introduce new vegetation at particular points, both to cover barren areas and to replace unhealthy plants growing in moist areas with plants better suited to such sites; and, lastly, to "enlarge, strengthen and emphasize a local character" by planting vegetation that increased that character and removing vegetation that detracted from it.

The Park Commission set to work at once to accumulate land and to put into effect the

wise counsel of Olmsted. By 1890 they had acquired nine hundred and ninety-six acres and by 1891 the total acreage was up to sixteen hundred. This rapid expansion of the public holdings in part resulted from the fact that the Park Commission often pooled its resources with those of the Water Board as the reservoirs required large areas of undeveloped land as watershed protection.

as providing protection for the visitors. Horse sheds were built at Dungeon Rock (one of the great favorites of tourists), carriage turnabouts were provided at important vistas, and wells were dug at various intervals.

The Park Commissioners took their responsibility to the Woods seriously, and the members were able to take a long view of the process of preservation. The foresight and

Whatever this city can do for the preservation of the forests, it is bound to do, not for the enjoyment of the living only, but for the generations that succeed us. Fifty years hence the population within a radius of ten miles of Boston, if the present rate of increase of large towns continues, will number not less than 3,000,000. These forest spaces for air and exercise, which can be provided today at such a trifling cost, will be of inestimable value to the large population which will seek relaxation and rest in Lynn Woods.

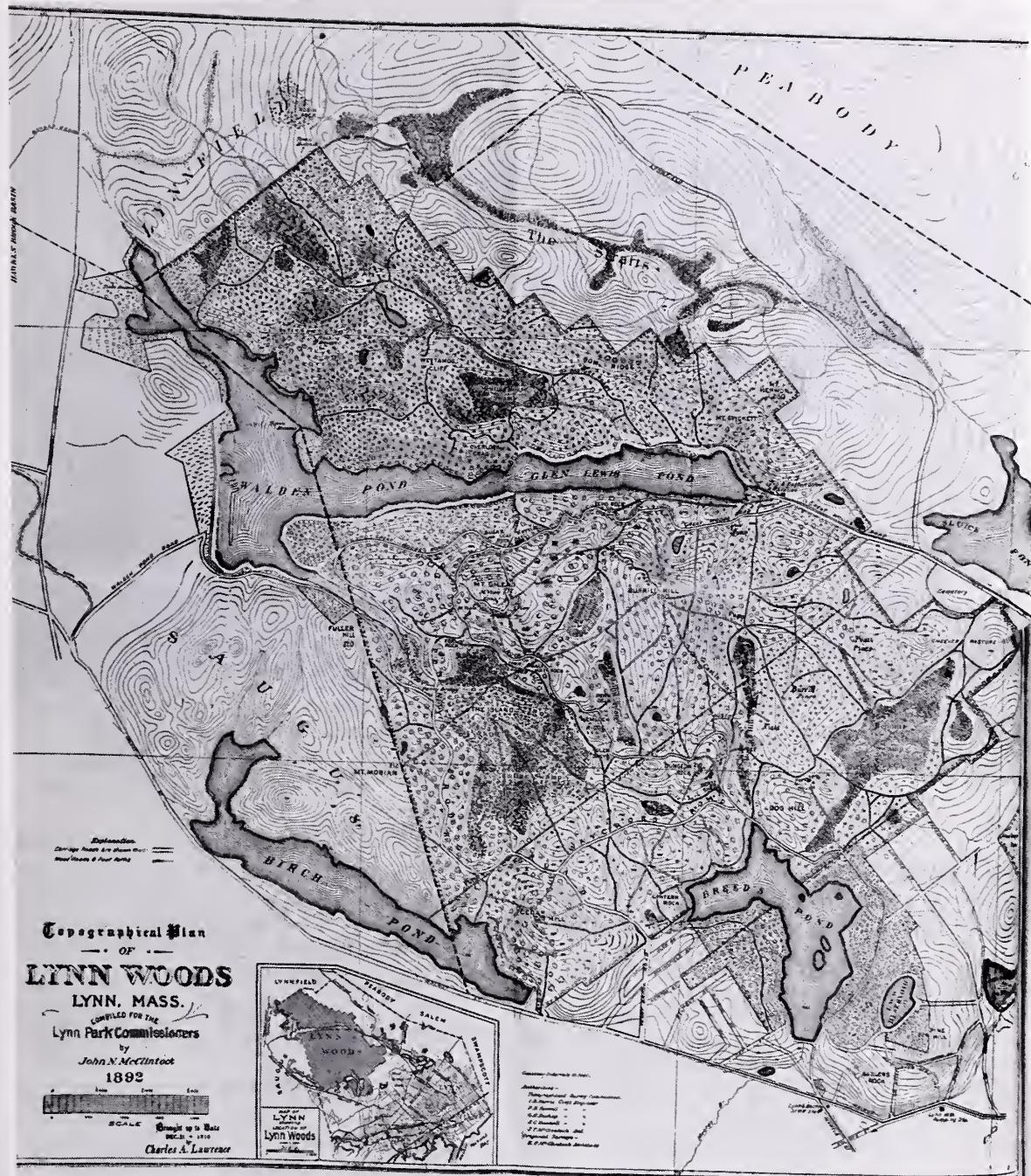
—*Park Commissioners, Lynn,
Massachusetts, 1890*

Roads and paths were cleared or built, thinning, lopping, and clearing of trees was an on-going process, partly to establish the incredible vistas for which the Reservation was famous. The views from high Lynn Woods hills extend for miles and drew visitors from miles around. Eventually towers for fire spotting were added to three of the hills which increased visitor interest in the spot. Public transportation in the form of trolleys were brought from the center of Lynn to ensure access to the park for everyone.

Special features of interest such as Dungeon Rock, the wolf pits, Penny Bridge, and the bodies of water had to be protected as well

wisdom of the following statement from the 1890 report of the Park Commission reflects a deep commitment to the park and to the community:

Whatever this city can do for the preservation of the forests, it is bound to do, not for the enjoyment of the living only, but for the generations that succeed us. Fifty years hence the population within a radius of ten miles of Boston, if the present rate of increase of large towns continues, will number not less than 3,000,000. These forest places for air and exercise which can be provided today at such a trifling cost, will be of inestimable value to the large population which will seek relaxation and rest in the Lynn Woods.¹⁷



A topographic map of the Lynn Woods Reservation, compiled for the Lynn Park Commissioners in 1892 and revised in 1910. The original map accompanied the Commissioners' report for 1892, which was the first report to contain a list of the Woods' animals and plants.



Philip Chase sawing wood at Bassett Camp, Lynn Woods. Bassett Camp was a small cabin built by William Bassett. The cabin contained a stove, dishes, and other niceties for both day excursions and overnight stays in the Woods.

Because of their obvious and unusual farsightedness, the Commissioners saw themselves as playing an important role in the forest-preservation movement:

The preservation of forests is becoming a question of vital interest to the whole country. The destruction of timber in the mountainous regions that make the watershed of our great rivers, has aroused the public mind to consider the consequences. In our small field we may show a public spirit, and bestow a care upon the forest around us, that may be a healthful example.¹⁸

The Lynn Woods Today—And Tomorrow
And so the great forest tract of Lynn Woods was established. I wish I could report that the initial support received by the Park Commis-

sion had continued unabated. Alas, as in the case of most public spaces, support diminished as the years went by, despite heavy use by the public and valiant efforts on the part of the Park Commission and Park Department to maintain the forest through the years. Eventually, this valuable tract of public open space reached the state of degradation it has come to today. It is fortunate that the Olmsted Historic Landscape Preservation Program chose Lynn Woods among its projects. All of the elements that made this Reservation such a treasure in the past still exist.

The restoration project is a fine beginning, but maintenance and—more importantly—a resurgence of interest from the public will be required to reinvigorate the site and bring it

back to the position of prominence it deserves. As the Boston area becomes more and more populated, the words of the 1890 Park Commissioners' report will become even more prophetic. It is time that the Reservation again be a place of "inestimable value to the large population which will seek relaxation and rest in Lynn Woods."

If You Visit

It is important to realize that the present condition of the Lynn Woods Reservation bears little resemblance to that of its heyday in the nineteenth and early twentieth centuries. Budget cuts and a general lack of interest have created the inevitable problems of overgrown vegetation, trash, and neglect. Vandalsim and neglect are among the many issues that the City of Lynn and the Department of Environmental Management are working to eliminate so that the work of restoring the park to its original beauty, and the process of building an enthusiastic and committed constituency can begin. Even in its present condition the Lynn Woods Reservation is an unusually lovely place in which to walk (cars are not allowed because the roads are badly washed out in several places), but, as with any large tract of unsupervised land, it is wise to visit with a friend or small group.

Endnotes

- 1 Alonzo Lewis and James R. Newhall, *History of Lynn: 1629-1864*. Lynn: George C. Herbert, 1890, page 70.
- 2 Charles O. Stickney, "'Pirates Home' in Lynn Woods:

"A Maine Man Gets Reminiscent." *Daily Evening Item*, 22 July 1905, page 5.

3 *Ibid.*

4 Kip Whitson, editor, *Massachusetts 100 Years Ago*. Albuquerque: Sun Books, 1976, page 12.

5 Ennesee [Nanette Snow Emerson], *The History of Dungeon Rock*. Boston: Bela Marsh, 1856, page 67.

6 John Wallace Hutchinson, *The Story of the Hutchinsons*. Volume 2, Boston: Lee and Shepard, 1896, page 273.

7 Cyrus Mason Tracy, *Studies of the Essex Flora*. Lynn: Stevenson & Nichols, 1858, pages 5 and 6.

8 *Third Annual Report of the Park Commissioners of the City of Lynn*, 1891. Lynn: Whitten & Cass, 1892, page 16.

9 *Ibid.*

10 *Lynn Transcript*, 22 June 1880, page 2.

11 "Records of the Trustees of the Free Public Forest," 12 January 1882, page 7. The "Records" are located at the Lynn Historical Society.

12 "The Forest Movement," *Lynn Transcript*, 21 January 1882, page 2.

13 *First Annual Report of the Park Commissioners of the City of Lynn* 1889. Lynn: Whittier & Cass, 1890, page 6.

14 "Our Public Park," *Lynn Transcript*, 7 June 1889, page 2.

15 "The Lynn Free Park," *Lynn Transcript*, 28 June 1889, page 2.

16 Asa T. Newhall, "Mayor's Address." *City Documents for the City of Lynn* 1889. Lynn: Whitten & Cass, 1890, page 8.

17 *Second Annual Report of the Park Commissioners of the City of Lynn* 1890. Lynn: Whitten & Cass, 1891, page 7.

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CORRECTION

The second sentence of the third paragraph of Mark Primack's article, "Twenty Years After: The Revival of Boston's Parks and Open Spaces," in the Summer 1988 issue of *Arnoldia* (Volume 48, Number 3, page 10, text lines 25 and 26), should read: "Now, a century later, some sixty-eight percent of Boston's housing units are rented; most have no backyards. Twenty percent of the city's population lives in public or subsidized housing."

The Introduction of Black Locust (*Robinia pseudoacacia* L.) to Massachusetts

David C. Michener

Though it is a firmly entrenched member of the Commonwealth's flora, the black locust is not native to Massachusetts

Our common black locust (*Robinia pseudoacacia* L.) is not native to Massachusetts but is an escaped and naturalized tree native to the central and southern Appalachian Mountains. Nonetheless, many people believe that it was present in the original forests of the state. When was black locust introduced to Massachusetts? How did it become such a common tree in a region far to the north of its original range? The answers to these deceptively simple questions are shrouded in myth and obscured by the inaccuracies and incompleteness of the historical record. Indeed, the ubiquity of black locust in such areas as Cape Cod reflects significant aspects of our region's history. My questions thus shift for their answers to the cultural forces that led to the black locust's introduction to Massachusetts and its subsequent spread throughout our area. I hope here to clarify the historical record and to correct several commonly held misconceptions about the species' introduction and spread.

Robinia pseudoacacia is one of the few arboreal species of the Pea Family (Fabaceae) found in Massachusetts. Here it grows to be a tree of medium height, usually less than fifty feet (15 m) tall; I have seen trees over eighty feet (25 m) high in its native range in the Great Smoky Mountains of North Carolina and Tennessee. Its leaves are compound, usually consisting of seven to nineteen leaflets. Its flowers, borne in June in the Boston area, are

heavily fragrant. The woody pods mature by late summer and remove any doubt a nonbotanist might have that this species is indeed a member of the Pea Family.

The black locust is noted not only for its vigorous growth—young trees can reach twenty feet in just a few years—but also for its aggressive suckering. Early travelers and naturalists found this vegetative fecundity astounding. Jean Hector Saint-Jean de Crève Cœur's account of his travels in North America (1786) typifies the impression made by suckering black locusts: "An acacia [*Robinia*], that was planted twenty feet from the parsonage house . . . sent a root across the cellar of the house, which penetrated the side of a well 17 feet beyond, and to the depth of 15 feet below the surface of the ground, insinuating itself among the stones of the well. . . . [I]t then . . . threw up a small tree." Lest his contemporary readers should find this incredible, Saint-Jean de Crève Cœur provided his own observation from a small church along the Hudson River in New York:

On the 17th of June, 1769, I attended the service at this church, and being obliged to remain for a short time in the neighborhood, it so occurred that two Sundays afterwards I again repaired to this place of worship; and I never was more astonished, than when, on opening the door, I perceived a young acacia [*Robinia*], which, in this short interval, had forced its way through the floor and had grown to the height of four feet. This tree was the sucker from a root . . . 49 feet long.

Modern black locusts are no less vigorous; the asphalt sidewalk in front of my Arboretum residence is plagued by *Robinia* suckers from a tree situated a good thirty feet away.

Resistance to Decay

Of great importance to colonists to the south of Massachusetts was the soon-discovered resistance of *Robinia pseudoacacia* wood to decay. The naturalist Mark Catesby (1767), as well as Saint-Jean de Crève Cœur (1786), comments on the high esteem in which the wood was held by Americans farmers for this reason. *Robinia* wood was prized for fence-posts and construction timber in contact with the ground. It was also noticed that *Robinia* plants would colonize poor, dry soils, thus giving farmers marketable timber from otherwise marginal land. [This is due in part to the nitrogen-fixing ability of symbiotic bacteria in the root nodules of *Robinia*, a symbiosis common in the Pea family.] The value of *Robinia* wood in the early 1800s was demonstrated by Michaux, who noted (quoted in Withers, 1842) that "[*Robinia* is] allowed to remain standing in the newly cleared lands, because the inhabitants can never have enough of the wood. . . ."

Agricultural use turned out to be only one facet in the development of a market for *Robinia* wood. Withers' friend Joseph Harrison, in a letter of 1782 (printed in Withers, 1842), recalled from firsthand experience the trials of *Robinia* in American shipbuilding "about 1733." *Robinia* wood was used for trenails (pegs used to fasten planks to a ship's frame), instead of iron, with great success. "When unloaded she [the ship] was hauled ashore upon the bank in order to be searched both outside and inside, when, on the strictest examination, it was found the locust tree-nails, that had been substituted instead of iron bolts, seemed, to all appearance, to have effectually answered the purpose intended. . . ." This development did not, according to Harrison, spread quickly in shipbuilding. "I

frequently recommended it [*Robinia* trenails] . . . but all to no purpose, till about 20 years ago [the 1760s] when I was settled in trade at Rhode Island, I persuaded some ship-builders to try the experiment: but, notwithstanding all my endeavours, the use of locust tree-nails still continued to be little practiced or known, till it happened to be adopted by a builder of some eminence at New York, and of late years has been introduced into general use there, and in some parts of New England: but, as yet, the use of the locust-tree in ship-building is confined to the article of tree-nails on account of its scarcity. . . ." The major use



Robinia pseudoacacia in winter. This tree (growing in Czechoslovakia) was sixty-three feet tall; its trunk was nearly fifteen feet in circumference. Photograph (dating from 1905) from the Archives of the Arnold Arboretum.

of *Robinia* trenails in shipbuilding produced a significant market. By 1819, Philadelphia alone annually exported over one hundred thousand *Robinia* trenails for ship construction.

Several clues have about the introduction and naturalization of *Robinia pseudoacacia* in New England have come to light: durable wood useful in shipbuilding and agriculture, rapid growth of young trees even on poor soils, and clonal growth of groves from initial plantings. Include the aesthetic attraction of fragrant blooms and one has the makings of a tree popular in a rural, maritime economy.

The first myth (and an entrenched one at that) concerns the initial source of *Robinia pseudoacacia*. Linnaeus, the great Swedish botanist, named the genus *Robinia* in honor of Jean Robin (1550–1629), a major botanist at the Jardin des Plantes in Paris. Robin is usually credited with introducing seeds of *Robinia* to France from Canada in 1600 or 1601. A Canadian seed source at this time would certainly imply that *Robinia* could well have been native in New England, too. However, Charles Sprague Sargent (1892) reiterated the claim that it was the son of Jean Robin, the botanist Vespasian Robin (1579–1662), who introduced the plant to Paris in 1636, and this without a definite source. In this case, which I take to be correct (remember that Linnaeus was writing over a century after the latter date), the error in citing a Canadian source for the original French introduction has little bearing on our quest.

Early American records can be divided into two groups: those that note a peculiar new tree that can be identified as *Robinia* and those that make no note of a tree with any combination of its distinguishing characteristics (floral fragrance, woody pods, durable lumber, rapid growth, and clonal habit). William Strachey (quoted in Sargent, 1892) saw during his journey into Virginia in 1610 "a kynd of low tree, which beares a cod like to

the peas, but nothing so big," and he observed that the Indians used it to make bows. Strachey's observation has been taken to be one of the earliest records of black locust (Sargent, 1892), but it could also refer to the redbud, *Cercis canadensis* L. While *Robinia* was found at the time of the establishment of the southern colonies, what of Massachusetts? Here we come to the second myth.

Apparent Source of the Error

A statement in the seventh edition of Philip Miller's authoritative *Gardeners Dictionary* (1756–1759) appears to be the original incorrect citation of the "fact" that *Robinia* wood was used in the first buildings of Boston, a "fact" that quickly found its way into the European botanical literature. (See, for example, the citation of José Quer, 1762, in Austrich, 1987.) The statement in the *Gardener's Dictionary* is:

This Sort grows to a very large Size in America, where the Wood is much valued for its Duration; most of the Houses which were built in Boston in New England, upon the first Settling of the English, was with this Timber, which continues very found at this Time.

As this is the only reference I have found to an original presence of *Robinia* in Massachusetts at the time of settlement (other than the possibility that it could have been here if the species had been introduced from Canada around 1601), the veracity of this "fact" (written over a century after the settlement of Boston) must be evaluated critically. I have found no evidence to support the statement but have found numerous cases that cast severe doubt upon it.

Massachusetts is fortunate that its early settlers were literate and left written records, including notes of new plants. John Josselyn's *New England's Rarities Discovered in Birds, Beasts, Fishes, Serpents, and Plants of that Country* (1672) has sections on "Plants as are proper to the Country" and "Of such plants as are proper to the country, and have no name."

Here, for many pages, are featured such novelties as pitcher-plants under the name of "Hollow Leaved Lavender," Indian beans, squashes, sumach, hemlock trees, pitch trees (here meaning *Abies*), larch trees, "cranberry," pyrola, a "hellibore" with the note "the whole plant scents as strong as a fox" (skunk cabbage to us), plus a weirdly fanciful sketch that seems to have more to do with Ezekiel's vision of wheels-in-wheels than anything truly terrestrial. Nothing like a *Robinia* is mentioned, figured, or described. Josselyn also authored his *Voyages*, or accounts of his sea voyages to and adventures in New England. Published in 1675, it has only one possible reference to an unknown tree that might be a *Robinia*: "The Line-tree with long nuts, the other kind I could never find." William Wood's propagandistic *New-England's Prospect* (1634) also lacks any reference to a tree with the characteristics of a *Robinia*.

The botanical explorers and writers of the late 1700s and early to mid-1800s leave little room to believe that *Robinia pseudoacacia* was ever native to Massachusetts. The Rev. Manasseh Cutler's *Account* (1785) described the species as native to "southern states—only cultivated here." François Michaux (cited in Withers, 1842) categorically states that the tree did not grow naturally in any state east of the Delaware River, trees in those areas having been planted. Daniel Browne (1832) reiterated Michaux's statement and noted that the wood was not much used in construction except to support the sills—further evidence that Miller's source was incorrect. Torrey's *Flora of the State of New York* (1843) described the tree as "not indigenous in any part of the State . . . [A]lmost naturalized in many places." Finally, George B. Emerson's *Report on the Trees and Shrubs Growing Naturally in the Forests of Massachusetts* (1846) concisely claimed that "[*Robinia*] is not known to be, nor is it generally considered, a native of the State or of New England; and it is doubtful whether it grew

naturally in the northern part of the Middle States. . . . It does not grow spontaneously near the sea-coast, even in the Southern States."

Escape and Naturalization

Note the gap in time from the earliest colonial records of New England, in which black locust is not mentioned, to the botanical writings of the late 1700s and early to mid-1800s, in which *Robinia pseudoacacia* is described as naturalized. A major development in the *Robinia* story occurred in this period. First was the destruction of the original forests in Massachusetts (and the other colonies) as the colonists changed the forested territory to settled farm and pasturelands. New England is probably more forested at present (the 1980s) than at any time since the arrival of the colonists, thus it is easy for us to forget that much of the arable land of the state was practically clearcut. In addition, grazing was a component of agricultural settlement and much additional land, including parts of Cape Cod and the islands, was further stressed by this factor. Second, various attempts were made to reforest some of the abused land and exotic species were certainly tried. Evidence of more recent trials can be seen in the early ecological literature, as where an old private reforestation at Woods Hole was evaluated (Chrysler, 1905). The condition of this property in 1850—essentially deforested—was undoubtedly a widespread condition and was anything but new.

The reforestation of New England occurred primarily through the natural forces of forest succession on abandoned farms and pastures. Black locust probably became locally common by escaping from cultivation once it had been planted. Saint-Jean de Crève Cœur's account (1786) of the rapid spread of *Robinia pseudoacacia* in the colonies focuses on all the critical points of human interest for growing the tree: the fragrance of its flowers, the durability of its wood, and the rapidity with which it grew vegetatively, even on poor



Specimen of *Robinia pseudoacacia* in the Royal Botanical Gardens, Kew, planted in 1762 by Princess Augusta of Wales. Photograph by and courtesy of István Rácz.

soils. Saint-Jean de Crève Cœur recounts the development of nurseries for the production of robinias, and the establishment of robinias on Long Island, New York, on a major scale. He does not overlook New England:

It has been already observed, that the Americans plant the acacia [*Robinia*], with the view of meliorating such poor and defective soils, as they intend to put under crop, for a series of years; and, as the woods annually diminish in the inhabited parts of the country, it is no uncommon thing to see the old forests replaced by plantations of acacias. It is in Long Island, New Jersey, Prov-

dence, and in the vicinity of Boston, that I have particularly noticed the good effects of these plantations. In several places there were formerly moveable sands [that] by means of inclosures of acacias, and by planting a great number of trees in different ways, these moveable sands have been fixed.

He also notes the tendency of Americans to use black locusts as shade trees near watering spots, and to hold firm eroding river banks.

Black locust must have been introduced to Massachusetts by the mid-1700s (Catesby, 1767), recorded it as "very numerous in most

of our northern colonies"), the introduction having been driven by the overlapping forces of strong demand for the wood in both agricultural and marine markets, by the then-ongoing destruction of the original forests, and by the consequent need for a fast-growing tree capable of tolerating marginal agricultural land. *Robinia pseudoacacia* fit all these needs. Since the species is semi-weedy, once it was established within a region it was only a matter of time before naturalized populations became permanent and the species spread as a part of the secondary woodlands on disturbed and abandoned sites.

The *Robinia* craze in the United States witnessed by Saint-Jean de Crève Cœur was ultimately thwarted by the presence of a native insect borer. The borers stunt individual trees, and greatly reduce the commercial quality of the wood. Sargent (1892) considered only the borers to prevent *Robinia pseudoacacia* from being one of the most important timber trees in North America. A significant *Robinia* craze swept Europe in the early 1800s, aided in good part to the horticultural phenomenon in the person of one Mr. William Cobbett. Between 1817 and 1819 he managed a farm on Long Island, New York. He became enthralled with "especially the Flowering Locust, or Acacia, which, in my opinion, surpasses all other trees, and some of which, in this Island, are of very great height and beauty" (Cobbett, 1828). Upon his return to Europe, he established a nursery and is supposed to have sold more than one million *Robinia* seeds and trees; that leads to another chapter in horticultural history.

There is an irony here. One *Robinia* craze fed another, and both ended with *Robinia pseudoacacia* permanently naturalized far beyond its homeland in the central and southern Appalachian Mountains. *Robinia*'s naturalization has been so convincing that I have been assured—incorrectly—that the extensive groves of *Robinia* on Cape Cod most certainly are *not* artifacts of European settlement.

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BOOKS

Encyclopædia of Ferns: An Introduction to Ferns, Their Structure, Biology, Economic Importance, Cultivation and Propagation, by David L. Jones. Portland, Oregon: Timber Press, 1987. xvii + 433 pages. 250 color plates, 150 black and white photographs, and numerous line drawings. Introduction by A. Clove Jermy. \$50.00 hardbound. (Exclusive distributor: ISBS Inc.)

MIRIAM Z. EZUST

When a new fern book comes to my attention I am always eager to read it and learn more about my favorite plants. David L. Jones' *Encyclopædia of Ferns* had more than justified my initial enthusiasm. In addition to being a prized reference work for amateur and professional fern-growers, this book will also be of considerable interest to anyone who grows indoor, greenhouse, or outdoor plants and is looking for something different, exotic, and interesting to grow. Jones' book is so broad in scope and yet so rich in detail that it can be appreciated instantly for the beauty of its illustrations and drawings and it also can be studied carefully as an instruction manual for the successful growing of these fascinating plants. The book is divided into seven parts, each in several chapter. The seventh part consist of appendices.

Jones presents his material with depth, logic, and common sense. His readers will quickly become familiar with the many forms, shapes, colors, sizes, and other decorative features of hundreds of species of ferns and fern allies.

The first two chapters, "Introduction to Ferns and Fern Allies" and "The Economic

Importance of Ferns," while not the strongest chapters in the book, give a good overview of the subjects to be covered later. In Chapters 3 through 6 Jones presents his botanical basics: the structure, reproduction, life cycle, and classification of ferns and fern allies (*Psilotum*, *Lycopodium*, *Selaginella*, *Isoetes*, *Equisetum*, and others). The text of these chapters is very clear, and terminology is explained as it is used. There is also an excellent glossary. Unfortunately there are no figure numbers to accompany the author's line drawings so that a great deal of page-flipping is required to match illustrations with text. Moreover, captions do not indicate sizes of the illustrated subjects so, to a naive reader, a leaflet could appear as large as a sporangium. The thirty-two gorgeous color photographs by E. R. Rotherham illustrating some of the many variations of soral patterns on fertile leaves (pages 17 to 20) are consistently mislabeled "economic importance" and belong more properly on page 32 in the chapter on structure.

These three criticisms are the only complaints I have, and as minor flaws they are certainly overpowered by the strength of the rest of the work.

Jones discusses and carefully illustrates not one, but thirteen representative classes of ferns and allied plants in his chapters on structure, reproduction and life cycles. These chapters will be of inestimable help to the fern grower in deciding which spores will be likely to germinate readily and which would be especially difficult or impossible for the home grower to start. Part One ends with a brief but highly informative chapter on cultivars (of special interest to growers) and a chart

of terminology usually associated with these botanical oddities.

Part Two, the "Cultural Requirements of Ferns," and Part Three, "Pest, Diseases and other Ailments of Ferns," are essential to have on hand whenever disaster strikes. The descriptions of problems and their effects on ferns are vivid and detailed and will enable even a novice grower to make rapid diagnoses, employ effective remedies, and reduce the likelihood of future difficulties.

Part Four is the part that every amateur and professional fern grower will want to read most carefully. It deals with propagation and hybridization of ferns, and includes the simplest vegetative propagation techniques, complete directions with illustrations for the more sophisticated home techniques, and an excellent article on tissue culture. In Chapter 17, "Propagation from Spores," Jones lists fourteen steps to follow to ensure good results in spore germination. There are sound reasons given for each step. Even if you have never before attempted to raise ferns from spore, and even if you have accepted the myth that it is too difficult, I am sure that you, too, will have success following the excellent instructions in this chapter. It is also worth mentioning the Jones provides a list of fern societies and study groups from whom it is possible to obtain spores. Indeed, you might become too successful and wind up with dozens of diminutive gametophytes demanding to be nurtured.

Part Five gives many suggestions about the general needs for your window-sill-sitters or greenhouse inhabitants, and how to show them off to their best advantage, whether they spread, climb, or cascade. Moreover, eleven of the twelve appendices list material pertinent to this sections. Eight will be of particular interest to gardeners in New England: there are more than one hundred species listed which are cold-hardy, and quite a few, though not native to that area, can withstand frost and snow.

Jones has placed the most beautiful and fascinating portion of his book last. In Part Six, "Ferns to Grow," a worldwide selection of more than seven hundred species of ferns, fern allies, and cultivars are discussed. Brief but comprehensive information about each one is provided. Their grouping is not strictly by genus, but by the consideration of their cultural requirements, making it more convenient for growers to use. The use here of line drawings, black and white photographs and color plates give the reader a real sense of the habits and most distinguishing visual characteristics of most of the ferns under discussion.

All in all, this a a delightful and practical book for any horticulturist to own and enjoy. It may also serve as a valuable bridge between the more popular (but less technical) fern books and the more sophisticated and specialized fern literature.

Miriam (Mimi) Ezust assists in the curation of ferns in the Harvard University Herbaria and avidly grows ferns in and around her home.

The Garden and Farm Books of Thomas Jefferson, edited by Robert C. Baron. Golden, Colorado: Fulcrum, Inc., 1987. 528 pages.

MARION D. CAHAN

The greatest service which can be rendered any country is to add a useful plant to its culture.

—Thomas Jefferson

The major portion of this book contains a printed copy of Thomas Jefferson's "Garden Book" and his "Farm Book." In addition, there is a section of selected letters to friends and family members in this country and abroad on the subjects of gardening and farming. These poetically written letters provide great insight into the inner life of Thomas Jefferson—his character, his warmth and

enthusiasm, and above all his obsession and fascination with gardening. Thomas Jefferson was by nature a gardener. The following excerpt provides the reader with a personal aspect of the writer:

I never before knew the full value of trees. My house is entirely embosomed in high plain trees, with good grass below and under them. I breakfast, dine, write, read and receive my company. What would I not give that the trees planted nearest round the house at Monticello were full grown.

—Letter to Anne Cary Randolph (his grand daughter), November 6, 1807

Jefferson's "Garden Book," written over a period of almost sixty years (from 1766 to 1824), is a detailed account of every aspect of what he planted—the dates, the development, the transplanting, the observations of temperature and weather conditions, the failures and successes.

What with his keen observation of nature, Jefferson constantly experimented with new varieties of plants while exchanging ideas, seeds, and cuttings with gardeners in America and all over the world. He succeeded in making Monticello a truly *botanical* garden.

The "Farm Book" was written from 1774 until a few weeks before his death in 1826. In it Jefferson recorded not only detailed information on all farm operations—the tools, machinery, planting, animals, and buildings—but also extensive information about the slaves (he had more than two hundred)—their names, locations, life spans, and what material possessions, primarily clothing and bed supplies, that Jefferson afforded them. The reader becomes drawn into the daily life of Monticello. Jefferson's systematic attention to accuracy and detail is fascinating and sometimes amusing.

As an eminent agriculturist, Jefferson believed that agriculture was a science of prime importance and strongly recommended that agriculture be included in the curriculum of every college and university.

A significant inclusion in this book is an essay by the renowned historian Henry Steele

Commager, entitled "Thomas Jefferson and the Character of America." Professor Commager presents an absorbing account of historical events in Jefferson's time, simultaneously weaving facts about Jefferson's activities, accomplishments, ideas, and ideals. As an ardent proponent of "Enlightenment" throughout his life, Jefferson's social, political, and moral concepts of Man are brought forth and interlaced into the entire essay.

Jefferson's attitude toward slavery provides information about his character. He expended much energy and thought to the eradication of slavery, even though he himself was a large slaveholder. His success was limited to ameliorating slavery, not ending it, but his influence was far reaching and significant.

Much of Jefferson's writing took the form of a crusade against ignorance. He worked endlessly to establish and improve the laws for educating the common people. While in his seventies he wrote, "Enlighten the people generally, and tyranny and oppression of body and mind will vanish like spirits at the dawn of day."

Commager's essay provides a penetrating background to Jefferson not only as a political figure but as a unique human being. The Garden Book and Farm Book sections of this volume would be incomplete without this rich information that emphasizes and expands Jefferson's human side.

The excellent quality of the paper used is enhanced by the beautiful color photographs of Monticello and the truly arresting black and white portrait of Thomas Jefferson by Rembrandt Peale.

This book would not interest the casual reader but rather the historian, the horticulturist, the farmer, and—with the aid of the included horticultural bibliography—gardeners who would create their personal Monticellos.

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