ARNOLD ARBORETUM
HARVARD UNIVERSITY

# ARNOLDIA

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# ARNOLDIA

A continuation of the
BULLETIN OF POPULAR INFORMATION
of the Arnold Arboretum, Harvard University

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## CONCERNING THE REGISTRATION OF CULTIVAR NAMES

THE International Code of Nomenclature for Cultivated Plants is an attempt to prepare a precise, stable and internationally acceptable system for the naming of plants under cultivation. The Code was drawn up by a special commission of the International Union of Biological Sciences in 1958 and has received general acceptance. One provision of this special code is the recognition of cultivar names (fancy names), for "an assemblage of cultivated individuals which are distinguished by any characters (morphological, physiological, cytological, chemical or others) significant for the purposes of agriculture, forestry, or horticulture, and which, when reproduced (sexually or asexually), retain their distinguishing features." Such taxa have usually been considered as varieties or forms in the past. The Code now requires that after January 1, 1959, such fancy names must have a definite structure, be markedly different from the scientific name of a Latin forma, they should be distinguished in print by single quotation marks or the abbreviation "cv." and follow prescribed rules of botanical and horticultural priority regarding their use and publication. Thus firm rules are now established to be followed in the naming of new varieties of cultivated plants.

An Appendix to the Code recommends the compilation and publication by interested groups of lists of cultivar names in categories of cultivated plants which are of significance to horticulture, forestry or agriculture. Such lists, when compiled, will form the basis for future registration of distinctive cultivated plants under equally distinctive names. The lists should enable one to determine the validity of existing names which are to be regarded as cultivar names, establish the uniqueness or identity of plants with cultivar names and clearly indicate names which have been used previously within a genus and therefore may not be used again. Only a few such lists exist and none has been compiled in the United States since the adoption of the Code for the Nomenclature of Cultivated Plants by the Botanical and Horticultural Congresses.

The Arnold Arboretum staff, under the sponsorship of the American Association of Botanic Gardens and Arboretums has been designated for a two year period as the National Registration Authority for all groups of woody ornamental plants not otherwise represented by special societies. Staff members are engaged in preparing lists of cultivar names for genera or species of interest to them. Furthermore, the staff is accepting for National Registration plant names submitted by nurserymen and others in groups for which no registration lists exist. For such groups a rapid though admittedly preliminary survey of existing names is made and a list compiled. At irregular intervals future issues of *Arnoldia* will include the lists of cultivar names prepared by staff members and others for various genera of ornamental woody plants. The purpose of this article is to point out for other compilers some of the problems encountered in the preparation of such lists and to the general reader the proper use and value of such lists.

**Procedure for the compilation of registration lists**

For groups not represented by societies the preparation of a list of ALL cultivar names can involve considerable bibliographic work and can be a serious challenge to the horticultural taxonomist. Only rarely have we found a monographer or specialist with even a partial list already prepared. For most groups it is necessary to start at the beginning for the Code calls for the application of the principle of priority, the retroactive application of the rules, and a starting place in Philip Miller's Gardener's Dictionary, ed. 6, 1752, if no later list has been accepted.

The basic reference we have found most useful is Alfred Rehder's Bibliography of Cultivated Plants. The Arnold Arboretum maintains the card file of references on which this work was based. This file which contains many cultivar references that Rehder did not include in his publication, has been kept current, as far as possible, particularly with woody ornamental plants. The staff of the Arnold Arboretum will assist any compiler of cultivar lists with the references available in this file. The Royal Horticultural Society's Dictionary of Gardening, and Bean's Trees and Shrubs of the British Isles have proved to be of great value in this work. Among other modern treatments the work of Boom of Wageningen (e.g., Ned. Dendr., Benaming, Geschiedenis, etc.) and Krüssman's Handbuch der Laubgeholze, being published in parts, contain lists of cultivars recognized and in many cases described for the first time. For names used in American horticulture the editions of Hortus are useful. Current offerings of American nurserymen can be found in the several editions of Plant Buyers Guide although it must be acknowledged that all these names are without description or bibliographic reference, and extensive correspondence is necessary to determine the origin of many names. We appreciate the interest and cooperation we have received from the nurserymen whom we have contacted.

According to the suggestions of the Code, registration lists should include the

names of all the cultivars currently in cultivation, giving for each name the particulars required in the registration of a new cultivar, e.g., the names of the owner of the parental stock, the originator and the individual who described the plant; the year of registration of the parentage of the plant; any particulars regarding the testing of the cultivar or any awards it may have received as well as a description of the plant. Further, the registration authority is requested to include all the cultivars, which, although no longer cultivated are of historical importance as ancestors of existing cultivars, and finally, all known synonymy of the group. No existing registration list of cultivar names contains this information in full.

Our goal in preparing lists is based on a taxonomic interest and will to the best of our ability:

1. List all of the cultivar names which can be properly assigned to the genus.
2. Indicate the earliest bibliographic reference where a description can be found.
3. Signify the validity of the reference according to the Code of Nomenclature.
4. Indicate synonymy where possible.
5. Note which cultivars are currently in cultivation in botanical gardens or available through commercial sources.
6. Indicate briefly the distinguishing characteristics used in describing the cultivar.
7. Record the date and place of origin of the cultivar when possible.

It is suggested that for easiest reference two separate lists be prepared, one to be an alphabetical list of all the names properly considered as cultivars whether so described originally or not, and a second list to place the cultivars in the proper species or other category where possible, recording at the same time the bibliographic reference and other data mentioned above. The first list of cultivar names will allow a quick decision by the originator of a new plant who wishes to register it, whether or not the name has been used before. The second list will be of greatest use for diagnostic and other taxonomic purposes.

**What names should go into a list**

The definition of a cultivar under the code is broad. Basically it is any plant under cultivation which can be distinguished morphologically, physiologically, chemically, or cytologically and be propagated to retain its distinctive features. Color, hardiness, taste, or chromosome numbers may be used as the basis of distinctiveness yet we know that color forms may depend on soil or other environ-

mental factors; hardiness may be a matter of microclimates; chromosome counts are subject to error and while some can be checked many cannot, and chemical difference as expressed in odor or taste may vary with the environment. Nevertheless a name submitted for registration and based on one of these tenuous characteristics must be accepted and considered. The case of older cultivar names is no different. The horticultural judgment of a worker in the 18th century must also be accepted since the rules are retroactive. The Registration Authority is not responsible for the decision of whether the cultivar is new or different, only whether or not the name submitted is legitimate under the Code. "The customer is always right" and a name submitted in proper form must be accepted.

A horticultural taxonomist working as a registration authority can and should express his judgment. The Code currently suggests that "testing" of cultivars be employed and the particulars reported. Unless the Registration Authority expresses an opinion in print the way is clear for repeated description of the same cultivar with only a change of name. The equation of older cultivars with plants bearing more modern names is difficult, but it is often possible and should be attempted.

### The bibliographic reference

Cultivar names in registration lists are not required to carry the names of the original author or the author of any transfer for cultivar names in existence before January 1, 1959. There are advantages and disadvantages to this practice. It is already evident that taxa now recognized as cultivars were previously described as botanical varieties or forms. If the transfer of these names to a cultivar status was to be regarded as a distinction and bear the authors name the way would be open for the change of literally thousands of names of cultivated plants. The disadvantage is equally clear. Without the authors name the place of publication of the basionym and its description or typification remains obscure. We intend to offer where possible the oldest reference available containing the epithet now used as a cultivar name which also describes the plant. If the place of publication of the transfer of this basionym to cultivar status is known this will be retained in the files of the Registration Authority but will not be published. If the Code is changed in the future these references will be at hand.

For cultivar names registered after January 1, 1959, the Code makes no specific suggestions regarding the form of publication of registration lists but calls for information on the describer and data on the characteristics of the plant. At a recent meeting of an international committee on plant registration and nomenclature it was decided that registration is publication for purposes of priority. The question of how such names are to be cited in technical horticultural literature remains unanswered.

There are additional problems involving the questions of valid publication and authorship. The Code indicates in Articles 24–27 the requirements for publication. To be validly published the cultivar name is to be in a publication multi-

plied by any mechanical or graphical process and distributed to the public. Since January 1, 1959, the publication must be dated, at least to the year. It can be in any language. Only handwritten material, even though mechanically reproduced and newspapers are excluded. Therefore in the preparation of the registration lists of cultivar names ALL nursery catalogues prior to January 1, 1959 must be considered and since that date the majority of catalogues which are dated to the year. This presents a tremendous task to the compiler who must attempt to procure or survey catalogues from all countries in order to have an International Registration List based on the principle of priority recognized by the Code. Rehder and other horticultural taxonomists have accepted nursery lists, even price lists as the source of cultivar names. These references must be re-examined by the compiler of registration lists. Names which are commonly known with the following abbreviation "hort." have often been validly described by Rehder and Bailey in familiar horticultural encyclopedias but equally validly described under the present rules at an earlier date in nursery catalogues. The amount of bibliographic research required to do a careful job in the preparation of either a National or International Registration list under the present rules must not be under-estimated.

An additional difficulty comes in the encounter and acceptance of names described by anonymous authors in uncredited publications. "Späth" is commonly cited as the authority for names used in catalogues through several generations of Späth ownership of a nursery. Whether or not a particular Späth actually published the description of a new cultivar is as difficult to determine as the author of a current catalogue of an existing nursery. A cultivar name validly described and published only a few years ago in the catalogue of an imaginary and authorless Johnny Jump Up Garden Center must be considered and listed. It appears that anonymous authorship should be accepted if a useable reference to the place of publication of a cultivar name can be cited.

### Legitimate and illegitimate names

A cultivar name is legitimate if it conforms with the provisions of the Code. The cultivar name theoretically can be rejected if it is illegitimate by not conforming to the Code. Three examples of categories to be termed illegitimate names have been found in the preliminay registration work which we have done.

A name can be considered illegitimate under the Code if it does not carry a description upon publication. For names created since January 1, 1959 the rejection of invalid names appears simple unless one considers the possibility of the same name being validly published elsewhere. It is not unusual to find names widely used in books on horticulture, handlists of botanical gardens and even in scientific publications which have not been legitimately published. We suggest that all of these names be included in the registration lists but designated as *nomina nuda*, thereby calling attention to the name. It is hoped the users of

registration lists will call attention to places of valid publication for such names as they are encountered.

A second category of illegitimate names are those transfers of true botanical varieties or forms to cultivar status. In several groups which have been studied recently modern authors have listed as cultivars native wild plants which are not known in cultivation. We do not believe that every plant in cultivation deserves a cultivar name nor do we subscribe to the hypothesis of a typical cultivar with segregated cultivars appropriately named.

The third category of illegitimate cultivar names encountered are those which are validly published since January 1, 1959 but do not conform to the rules. The rules of horticultural nomenclature are new and errors will be made. It appears desirable to be lenient until the rules are well known by suggesting changes to current authors and listing the illegitimate name as such in a registration list designating as well the legitimate substitute.

### Duplication of cultivar names

The Code suggests in Article 19 that "within a genus or hybrid genus the same cultivar name must not be used more than once without permission from the official registration authority, if such exists, and only when one or more of the following conditions obtain: a. the cultivars belong to subdivisions of a genus which are so markedly different as to provide wholly different groups; b. the first cultivar is no longer known to be in cultivation." Therefore with no registration authority for most genera of woody ornamental plants a cultivar name cannot be used a second time in a genus. From January 1, 1959 onwards this presents no real difficulty for newly described cultivars. However, the wisdom of allowing the repetition of a name when a plant is thought to be out of cultivation is questionable for two reasons: botanical gardens tend to maintain varieties long after they have passed from commercial favor, and the difficulty of citation when names must bear "sensu" citations of equal status. Prior to 1959 many duplications of cultivar names exist in such descriptive names as *variegata*, *fastigiata*, *pendula*, *rubra*, etc. The current rules do not permit the modern usage of names in latin form. They do provide for the change of a name when an earlier name is an exact duplicate (Recommendation 33A). We have no intention of implementing this option and will continue to recognize duplicate names within one genus fully expecting that future horticultural congresses will accept committee recommendations to apply the no-duplication rule at the specific level. The Registration lists which we publish will contain many duplicate names and often several repetitions of a name within the genus but not within the species.

### Some hybrids in cultivation

Botanical gardens and arboreta maintain collections of species which by their proximity to one another and their genetic relationship may cross spontaneously

or be crossed by a horticulturist. In the genus *Cornus* for example there are five hybrids described by Rehder which originated in botanical gardens and for which the parent species are suggested. Rehder considered these hybrids as species and so described them. The plants are not outstanding in quality and no breeder has seen fit to duplicate the cross. However, the plants have been propagated vegetatively and distributed to other arboreta. These plants fit the description of a cultivar in its broadest sense, i.e., they originated in cultivation and in fact are known only in cultivation. It does not seem appropriate to include such examples in a list of cultivar names at the present time.

The Code provides a means of handling such taxa as "groups" or "grex" if the cross is repeated with different results or if selections are made from variations resulting from mutations or sexual propagation of the original plants. It is obvious that many "species" in other genera must be handled in this manner with the cultivar name following the group name as suggested in Article 13.

**Patented plants and their names**

American registration authorities are faced with another problem regarding cultivar names published in the medium of the plant patent act. Currently a plant patent may be issued to either a named or unnamed plant or even to one designated by a number. We have records of many patented plants which the originator chose not to distribute. One case has come to our attention where a nursery distributed a plant under one fancy (cultivar) name which was validly described and published in their catalogue but they subsequently patented the plant under a different cultivar name. Plants are available today from commercial sources under both cultivar names. According to the Code and its regulations regarding priority of names the patented name should be rejected. Business practices being what they are the use of the patented name will continue, illegitimate or not. Registration lists should contain all designations included in the registry of plant patents.

**The typification of cultivars**

When accepting a name for registration it has been our practice to request an herbarium specimen to be considered as the type specimen of the cultivar, and plant material for propagation or testing within our area. If the herbarium specimen cannot be supplied one of the propagants is designated as the plant from which a type specimen is to be collected. We state that future propagants of these plants will not be distributed without the consent of the person registering the plant. We recognize there are many inadequacies to type specimens of cultivars when the cultivar is based on characteristics not adequately preserved such as color, odor, hardiness or chromosome number. Nevertheless the herbarium specimen is better than no specimen at all for future taxonomic work which may involve the assignment of a plant to the proper genus or species. We have been fortunate to receive excellent cooperation in our requests for herbarium specimens

and we suggest all registration authorities make such requests. The Arnold Arboretum is willing to accept such specimens for permanent deposit in its herbarium of cultivated plant specimens and will furnish such material on loan to other qualified scholars.

**Summary**

The compilation of a list of cultivar names for any genus of ornamental plants represents initially a bibliographic problem of great magnitude. There are obstacles in following literally the Code for the Nomenclature of Cultivated Plants which suggest that some changes should be made in the Code by future Horticultural and Botanical Congresses. The Registration lists to be of greatest value should be as complete as possible, not only in the cultivar names included but in the data supplied for each entry. There is a place in this work for the expression of taxonomic judgment and the efforts of horticultural taxonomists in the preparation of such lists is solicited. It is important to note, however, that the registrar will depend on the cooperation of the nurserymen and those persons who introduce and name plants in cultivation. The product produced, a registration list of cultivar names, will be a major contribution to the clarification of our knowledge of a group of cultivated plants and will be of benefit to the plant breeder, the commercial grower and the amateur as well as the professional horticulturist.

RICHARD A. HOWARD

# ARNOLDIA

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## REGISTRATION LISTS OF CULTIVAR NAMES IN CORNUS L.

THE principles used in compiling the list of names applied to cultivars in a genus have been discussed in a previous article (*Arnoldia*, XXI, No. 1), in which some of the problems encountered were also indicated. Two lists are given in this treatment of cultivar names in *Cornus*. The first is an alphabetical listing of the older names applied to cultivated plants as well as the more recent easily recognizable cultivar names. Each name is followed by the parenthetical reference to the species involved. The asterisk indicates that the cultivar is currently grown in the United States and is available under that name from commercial sources or from botanical gardens or arboreta. According to the rules of nomenclature for cultivated plants, these cultivar names cannot be used again in the genus.

The second list gives the species and their associated cultivars in alphabetical sequence, with the earliest bibliographic reference for the cultivar. Most of these taxa have been described as botanical varieties or forms. No attempt has been made to indicate whether or where these botanical taxa have received new status as cultivars, since the rules make no provision for author citation of such changes. However, many of the references cited are for earlier basionyms than those given in Rehder's "Bibliography of Cultivated Plants." Many of the epithets are designated as "illegitimate," being *nomina nuda*, or being used incorrectly as cultivars when the names are based on native plants. For the purposes of registering cultivar names, even the illegitimate use of an epithet precludes its use for any other cultivar within the genus.

A brief phrase follows each reference in the second list to indicate the principal characteristics used originally to define or distinguish the cultivar.

It should be noted that the hybrid species *Cornus arnoldiana* Rehd., *C. dubia* Rehd., *C. dunbarii* Rehd., *C. horseyi* Rehd., and *C. slavinii* Rehd., although described from plants in cultivation, are not included in this list as cultivars. In the future if selections are made from these hybrid species and named as cultivars, or

if the cross is repeated with different results, then the hybrid parent species should be considered as a group, in accordance with Articles 13 of the International Code of Nomenclature for Cultivated Plants.

It is obvious that in an initial effort to compile a registration list some errors will be made and others maintained. If older references are available to some of the people using this list, the author will appreciate receiving any additions and/or corrections. As additional epithets are received for registration in *Cornus*, supplementary lists as well as corrections will be published in future issues of *Arnoldia*.

**Alphabetical List**

Alba (mas)*
Alba plena (florida)*
Albo-marginata (alternifolia)
Albo-variegata (alternifolia)
Albocarpa (mas)
Andrzejowski (mas)
Angustifolia (amomum)
Angustipetala (alba)
Angustipetala (stolonifera)
Argentea (mas)
Argentea (alternifolia)*
Argenteo-marginata (alba)*
Argenteo-marginata (mas)
Argenteo-variegata (mas)
Ascending (florida)*
Atrosanguinea (alba)*
Atrosanguinea (sanguinea)
Aurea
Aurea (mas)*
Aurea-variegata (florida)*
Aureo-elegantissima (mas)
Aurora*
Benschi (alba)
Belmont Pink (florida)*
Bowood (alba)
Cherokee Chief (florida)*
Cherokee Princess (florida)*
Chinensis (kousa)*
Compacti (florida)*
Coral Beauty (alba sibirica)*
Corallina (alternifolia)
Crispa (mas)
De Kalb Red (florida)*
Eddiei (nuttallii)*
Elata (alba)
Elata (stolonifera)
Elegans (alba)
Elegans-tricolor (mas)
Elegantissima (alba)*
Elegantissima (mas)*
Elegantissima variegata (alba)*
Elongata (alba)
Elongata (stolonifera)
Fastigiata
Fastigiata (florida)*
Flava (mas)*
Flaviramea (stolonifera)*
Fröbeli (alba)
Fructu-lutea (florida)
Fructu violacea (mas)*
Gibbsii (alba)
Gigantea (florida)*
Gouchaulti (alba)*
Grandiflorum (amomum)*
Grandifolia (amomum)
Hillenmeyer (florida)*
Kelseyi (stolonifera)*
Kelseydwarf (stolonifera)*
Kesselringii (alba)*
Lanceolata (mas)*
Lanceolata albo-marginata (mas)
Luteocarpa (mas)
Macrocarpa (mas)*
Magnifica (florida)*

**Alphabetical List** (cont.)

Mietzschii (mas)
Mietzschii (sanguinea)*
Milky Way (kousa)*
Moon (florida)
Nana (florida)*
Nana (mas)*
Nana (stolonifera)*
New Hampshire (florida)*
Nitida (stolonifera)
Ochrocarpa (alternifolia)
Ochroleuca (alternifolia)
Parvifolia (amomum)
Pendula (florida)*
Pendula (stolonifera)
Plena (florida)*
Pluribracteata (florida)*
Polonica (mas)
Polonica minor (mas)
Prosser (florida)*
Prosser Red (florida)*
Pyramidalis (mas)
Repens (stolonifera)
Rich-red (florida)*
Rose Valley (florida)*
Rosea (florida)
Rosenthalii (alba)*
Rubra (florida)*
Rubra (kousa)*
Rubra (mas)
Salicifolia (florida)*
Sibirica (alba)
Sibirica elegantissima (alba)
Sibirica variegata (alba)*
Slavin's Dwarf (racemosa)*
Spaethii (alba)*
Spaethii aurea (alba)
Speciosa (kousa)*
Sphaerocarpa (mas)
Super Red (florida)*
Tricolor (alba)
Umbraculifera (alternifolia)
Undulifolia (amomum)
Variegata (alba)*
Variegata (alternifolia)
Variegata (amomum)
Variegata (brachypoda)
Variegata (controversa)*
Variegata (florida)
Variegata (kousa)*
Variegata (mas)*
Variegata (sanguinea)*
Variegata aurea (alba)
Violacea (mas)*
Virescens (alternifolia)
Viridis (kousa)*
Viridissima (sanguinea)*
Weaver (florida)*
Weeping (florida)
Welchii (florida)*
Westonbirt (alba)*
White Cloud (florida)*
Willsii (florida)
Winkenwerderi (nuttallii)*
Xanthocarpa*
Xanthocarpa (florida)*
Xanthocarpa (kousa)*
Xanthocarpa (mas)
Xanthocarpum (amomum)*

**Bibliographic List**

Cornus alba Linnaeus, Mant. Pl. 40. 1767.

'Angustipetala' = *C. stolonifera* 'Angustipetala.'

'Argenteo-marginata' (Rehder in Bailey, Cycl. Am. Hort. 1: 378. 1900), described as having "leaves edged in white."

'Atrosanguinea' (Bean in R. H. S. Dict. Gard. 2: 546. 1951), a dwarf, with brilliant crimson stems.

'Behnschi' (St. Olbrich, Mitt. Deutsch. Dendr. Ges. 7: 96. 1898), originated at Zurich, Switzerland; leaves purplish, marbeled.

'Bowood' (Wyman, Amer. Nurseryman 111(9): 110. 1960), illegit. as a *nomen nudum*.

'Elata' = *C. stolonifera* 'Elata.'

'Elegans' (Späth, Cat. 87. 1915–16), originated at Späth nursery; described as having "variegated foliage."

'Elegantissima' (Bay State Nurs. Cat. 1906, Massachusetts) = 'Argenteo-marginata.'

'Elegantissima variegata' (Hort. ex Rehder in Bailey, Stand. Cycl. Hort. 2: 853. 1914), illegit. in syn. of 'Argenteo-marginata.'

'Elongata' = *C. stolonifera* 'Elongata.'

'Froebeli' (Bean, Trees & Shrubs 1: 384. 1914) = 'Gouchaulti.'

'Gibbsii' (Anonymous, Jour. Roy. Hort. Soc. 34: ccxl. 1909), illegit. as a *nomen nudum*. Exhibited by Vicary Gibbs, Elstree, England 1908.

'Gouchaulti' (Carriere, Rev. Hort. 1888: 519. 1888) France. "Beautifully streaked with yellow and red or various hues."

'Kesselringi' (E. Wolf, Izv. Leningr. Leisn. Inst. 15: 238. 1907), described as having the dark leaves and stems of *C. Hessei*. Originated as seedlings of *C. alba sibirica* at St. Petersburg, Russia.

'Rosenthalii' (Schwerin, Mitt. Deutsch. Dendr. Ges. 5: 38, 77. 1896), originated in Vienna. Described as having broad yellow or gold margins to the leaves.

'Sibirica' (Loddiges ex Loudon, Arb. Brit. 2: 1012. 1838), shoots "orange red with a bloom."

'Sibirica elegantissima' (Bunyard, Jour. Roy. Hort. Soc. 18: 86. 1895), originated at Maidstone, England. Described as "silvery leafed."

'Sibirica variegata' (Anonymous, Jour. Roy. Hort. Soc. 18: 69. 1895) = 'Argenteo-marginata.'

'Spaethii' (Späth, Ill. Monatsh. Gartenb. 4: 20. 1885), originated at the Späth arboretum in 1884. Distinguished by the young leaves being bronze in color and at maturity being golden margined or mostly yellow-gold in color.

'Spaethii aurea' (Halloway, Arb. Bull. 19: 120. 1956). Growing at Plainfield, New Jersey; described as having yellow-edged leaves.

'Tricolor' (Bean, loc. cit.) = 'Gouchaulti.'

'Variegata' (Wolf, Izv. Leningr. Leisn. Inst. 15: 228. 1907) = 'Argenteo-marginata.'

'Variegata aurea' (Anonymous, Pl. Buyers Guide 1938). Illegit. as a *nomen nudum* = 'Argenteo-marginata.'

'Westonbirt' (Hillier Nurs. Cat. 1950, Winchester, England). Stems coral red; original selection made at Westonbirt, England.

Cornus alternifolia Linnaeus f., Suppl. Pl. 135. 1781.

'Albo-marginata' (Hesse ex Schelle in Beissner et al Handb. Laubh. Ben. 365. 1903), illegit. as a *nomen nudum*='Argentea.'

'Albo-variegata' (Hort. ex Schelle, ibid.), illegit. as a *nomen nudum*='Argentea.'

'Argentea' (Rehder in Bailey, Stand. Cycl. Am. Hort. 1: 377. 1900), described as having "white marked foliage."

'Corallina' (Aiton, Hortus Kewensis 1: 159. 1789), described as being "red twigged."

'Ochrocarpa' (Rehder, Mitt. Deutsch. Dendr. Ges. 1907: 75. 1907), "pale muddy yellow fruit"; originated at Seneca Park, Rochester, New York, 1907.

'Ochroleuca' (Rehder in Bailey, Stand. Cycl. Hort. 2: 853. 1914)='Ochrocarpa.'

'Umbraculifera' (Dieck., Haupt. Kat. Zoschen 31. 1885), characterized as having the branches in conspicuous tiers. Originated at Zoschen Bot. Gard., Zoschen, Prussia.

'Variegata' (Waracek, Gartenwelt 19: 58. 1915)='Argentea.'

'Virescens' (Aiton, Hortus Kewensis 1: 159. 1789), branches green in color. Cultivated since 1760 by James Gordon, England.

Cornus amomum Miller, Gard. Dict. ed. 9, C. no. 5. 1768.

'Angustifolia' (Nichols., Kew Hand-list Trees, 2nd ed. 413. 1902), illegit. as a *nomen nudum.*

'Grandiflorum (Wyman, loc. cit.), illegit. as a *nomen nudum.*

'Grandifolia' (Nichols., loc. cit.), illegit. as a *nomen nudum.*

'Parvifolia' (Nichols., loc. cit.), illegit. as a *nomen nudum.*

'Undulifolia' (Nichols., loc. cit.), illegit. as a *nomen nudum;* Koehne, Mitt. Deutsch. Dendr. Ges. 12: 48. 1903. Leaf margin undulate. Originated in the Späth Arboretum, Germany.

'Xanthocarpum' (Wyman, loc. cit.), illegit. as a *nomen nudum.*

Cornus 'Aurea' (Moons Nurs. Cat. 1913, Morrisville, Pa.)=*C. stolonifera* 'Flaviramea.'

Cornus 'Aurora' (Rose Hill Nurs. Cat. Spr. 1956, Minneapolis, Minn.)=*C. stolonifera* 'Flaviramea.'

Cornus brachypoda 'Variegata' (Paul, Jour. Roy. Hort. Soc. 16: clxix. 1893) =*C. controversa* 'Variegata.'

Cornus controversa Hemsley, Kew Bull. 1909: 331. 1909.

'Variegata' (Bean, Trees & Shrubs, 1: 387. 1914). Characterized as having

narrow, lanceolate leaves with irregular yellowish white border. Apparently originated in England prior to 1893.

Cornus 'Fastigiata' (Anonymous, Jour. Roy. Hort. Soc. 43: 419. 1919), illegit. as a *nomen nudum.*

Cornus florida Linnaeus, Sp. Pl. 117. 1753.

'Alba plena' (Halloway, Gard. Club. Am. Bull. 38: 17. 1950) = 'Pluribracteata.'

'Ascending' (Scanlon, Registered 1952, Am. Assoc. Nurserymen #365), characterized by having a strong central leader with branches emerging at 30 degree angle.

'Aurea variegata' (Brimfield Nurs. Cat. 1958, Wethersfield, Conn.), illegit. as a *nomen nudum.*

'Belmont Pink' (Wyman, loc. cit., possibly Hicks Nurs. Cat. 1920, Westbury, L.I., New York), bracts pale pink.

'Cherokee Chief' (Plant Patent 1710, 1958. I. Hawkersmith, Winchester, Tenn.), described as having bracts "beautiful deep red, new growth a bright red."

'Cherokee Princess' (Tenn. Valley Nurs. Cat. Fall 1959, Winchester, Tenn.). a selection of the white-flowering dogwood.

'Compacti' (Plant Patent 1387, 1958. Alex. Toth, Madison, Ohio) as *Cornus* 'compacti.' Characterized as a "dwarf form" and considered by the Holden Arboretum as "*C. florida nana.*"

'De Kalb Red' (Plant Patent 965, 1950. Eugene Muller, Norristown, Pa. Registered 1960, J. H. Kirsh, De Kalb Nurseries Inc., Norristown, Pa.). Characterized as having a semi-dwarf habit and deep, rich, heavy, wine-red bracts.

'Fastigiata' (Wyman, Registered 1949, Am. Assoc. Nurserymen #174), described as having an upright branching habit. Originated Arnold Arboretum 1910.

'Gigantea' (Wyman, Amer. Nurseryman 111 (9): 110. 1960), supposed to have larger bracts, the inflorescence and bracts to 6″ across; plant from the Phipps Estate, Long Island, N.Y., around 1932.

'Hillenmeyer' (Tenn. Valley Nurs. Cat. Fall 1959–Spr. 1960, Winchester, Tenn.), illegit. as a *nomen nudum.*

'Magnifica' (Wyman, loc. cit.), described as having "full rounded bracts, 4″ from tip to tip"; originated on the Phipps Estate, Long Island, N.Y., around 1926.

'Moon' (Howell Nurs. Cat. 1942, Konxville, Tenn.), described as an "unusually large floriferous strain."

'Nana' (Lipp, Arb. Leaves 2: 23. 1960), "A five to six foot mounded tree." Received as *C.* 'compacti' q.v.

'New Hampshire' (Anonymous, Pl. Buyers Guide 1958, illegit. as a *nomen nudum;* Wyman, loc. cit.), distinguished by its hardiness in a northern location; selected from native material in New Hampshire.

'Pendula' (Jager (?), Weiner, Illustr. Garten-zeit. 12: 508–511. 1887), characterized by its pendant branches; selected from material received in Vienna from New Jersey.

'Plena' (Tenn. Valley Nurs. Cat. Fall 1959–Spr. 1960), illegit. as a *nomen nudum*, = 'Pluribracteata.'

'Pluribracteata' (Rehder, Jour. Arn. Arb. 7: 243. 1926), large bracts 6–8 with additional smaller bracts; flowers more or less completely aborted; originated in Orange County, North Carolina, before 1914.

'Prosser' (Krüss., loc. cit.) = 'Prosser Red.' Described by Krüssman as having carmine red bracts. Plants received from Hess Nursery, Wayne, N.J.

'Prosser Red' (Halloway, Arb. Bull. 19: 120. 1956). The earliest use of the name but with an inadequate description; e.g., "good color but slow establishing." All material originally from the Prosser property near the Fairgrounds, Knoxville, Tenn. First discovered in the wild about the time of the First World War.

'Rich-Red' (Weston Nurs. Cat. 1960, Hopkinton, Mass.), illegit. as a *nomen nudum.*

'Rosea' (Carrière & André, Rev. Hort. 1891: 369. 1891), characterized by rose-colored bracts, described in France from material received from Flushing, N.Y.

'Rose Valley' (F. & F. Nurs., Cat. Autumn 1945, Holmdel, N.J.), characterized by having light pink bracts.

'Rubra' (Weston, Bot. Univ. 1: 73. 1770; Krüss., loc. cit.). This name should not be used as a cultivar. Although Weston described it on the basis of cultivated material, the plant is known in the wild from pre-Linnean references as well as from modern observations and has been treated as *Cornus florida* forma *rubra* (Weston) Palmer & Steyermark.

'Salicifolia' (Kammerer. Morton Arb. Bull. Pop. Inform. 25: 18. 1950), distinct in having "narrow willowlike leaves"; apparently originated at the Morton Arboretum, Lisle, Illinois.

'Super Red' (Hillenmeyer Nurs. Cat. Spr. 1960, Lexington, Kentucky), distinct as a "better red."

'Variegata' (Westbury Rose Nurs. Cat. Fall 1947, Westbury, L.I., New York, characterized by its "variegated leaves."

'Weaver' (Glen St. Marys Nurs. Cat. 1941, Glen St. Marys, Florida), described as being stronger and having "bronze foliage with larger and more numerous blooms"; distinct as being hardy in Florida; selected from the wild.

'Weeping' (Meehan, Gard. Monthly 23: 229. 1881), illegitimate. Original publication was descriptive only; = 'Pendula.'

'Welchii' (Cole Nurs. Cat. 1937, Painesville, Ohio), described as having "leaves green, creamy-white and pink."

'White Cloud' (Wayside Nurs. Cat. 1946, Mentor, Ohio). Distinct in having bronze foliage.

'Willsii' (Krüss., Deutsch. Baumsch. 1955: 220. 1955), leaves irregularly white-edged and somewhat wrinkled; probably the same as 'Welchii.'

'Xanthocarpa' (Rehder, Jour. Arnold Arb. 2: 179. 1921). Distinct on the basis of the yellow fruit. Described from material collected in Saluda, North Carolina in 1919.

Cornus kousa (Buerger ex Miquel) Hance, Jour. Linn. Soc. Lond. Bot. 13: 105. 1873.

'Chinensis' (Authors). Illegitimate. This is a recognizable botanical variety with a geographic range and should not be considered a cultivar.

'Milky Way' (Wayside Gardens Cat. 1961: 100. 1961). "An outstanding specimen" selected from the "better forms" of C. kousa chinensis.

'Rubra' (Blackburn, Popular Gard. 3: 66. 1952). Selected by J. Hohman about 1940.

'Speciosa' (Pl. Buyers Guide 1958). Illegitimate as a *nomen nudum.*

'Variegata' (Wyman, loc. cit.), described as having variegated foliage; grown at the Arnold Arboretum from cuttings obtained from a cultivated plant at Westwood, Mass. 1948.

'Viridis' (Wyman, loc. cit.), illegit. as a *nomen nudum.* Wyman's citation was based on a plant in the Arnold Arboretum which is scarcely worth a description. It was grown from seeds received from Locust Valley, N.Y., in 1923.

'Xanthocarpa' (Krüss. Handb. Laubgeh 1: 345. 1960), distinguished by the yellow fruit. Plant originated in the Netherlands.

Cornus mas Linnaeus, Sp. Pl. 117. 1753.

'Alba' (Weston, Bot. Univ. 1: 73. 1770), white-fruited form.

'Albocarpa' (Schneider, Ill. Handb. Laubh. 2: 451. 1909)='Alba.'

'Andrzejowski' (Wyman, loc. cit.), illegitimate. Not a cultivated plant.

'Argentea' (Brimfield Nurs. Cat. 1954, Wethersfield, Conn.), illegitimate as a *nomen nudum;* ='Variegata.'

'Argenteo-marginata' (Schneider, loc. cit.)='Variegata.'

'Argenteo-variegata' (Kirchn., Arb. Muskau 420. 1864), distinct in having leaves with a broad white edge; origin unknown.

'Aurea' (Anonymous, Jour. Roy. Hort. Soc. 18: 72. 1895), illegit. as a *nomen nudum.*

'Aureo-elegantissima' (Moore, Flor. & Pomol. 1877: 109. 1877), described as having the early leaves golden-edged, but these become flushed with carmine on maturity. Originated in 1869 at the Isleworthy Nursery, Hammersmith, England.

'Crispa' (Dippel, Laubh. Ill. 246. 1893), characterized by having crisped leaves.

'Elegans-tricolor' (Kammerer, Mort. Arb. Bull. Pop. Inform. 13: 18. 1938), illegit. as *nomen nudum;* = 'Aureo-elegantissima.'

'Elegantissima' (Nichols. Ill. Dict. Gard. 1: 379. 1884) = 'Aureo-elegantissima.'

'Flava' (Weston, Bot. Univ. 1: 73. 1770), distinct in its yellow fruits.

'Lanceolata' (Groenland, Rev. Hort. 1862: 386. 1862), characterized by its narrow leaves; originated in France.

'Lanceolata albo-marginata' (Kirchn., Arb. Muskau 421. 1864), distinct in having narrow leaves which have a narrow, whitish border. Origin unknown.

'Luteocarpa' (Schneider ex Wangerin, Engl. Pflanzenreich IV. 229: 79. 1910) = 'Flava.'

'Macrocarpa' (Dippel, Handb. Laubh. 3: 245. 1893 = 'Flava.'

'Mietzschii,' see *C. sanguinea* 'Mietzschii.'

'Nana' (Carriere, Rev. Hort. 1879: 300. 1879), described as a "spherical bush"; originating in France.

'Polonica' (Wyman, loc. cit.), illegitimate; not a cultivated plant.

'Polonica minor' (Wyman, loc. cit.), illegitimate; not a cultivated plant.

'Pyramidalis' (Dippel, loc. cit.), distinct in its upright, only slightly spreading habit.

'Rubra' (Weston, Bot. Univ. 1; 73. 1770), fruit a deep red color.

'Sphaerocarpa' (Krüss., loc. cit.), illegitimate; not a cultivated plant.

'Variegata' (Loudon, Arb. Brit. 2: 1015. 1838), described as having the "leaves edged in yellow or white."

'Violacea' (Jäger, Ziergeholze 174. 1865). Characterized by having blue fruits. Cultivated in Moscow Botanic Garden in 1865.

'Xanthocarpa' (Bean, Trees & Shrubs 1: 391. 1914), fruit a clear bright yellow; probably the same as 'Flava.'

Cornus nuttallii Audubon, Birds Am. 4: t. 467. 1837.

'Eddiei' (Certificate of Registration, Canadian Hort. Council, June 1925; Vrughtman, Deutsch. Baumsch. 9: 197. 1957, distinct in having foliage variegated with white. Selected from the wild in 1923.

'Winkenwerderi' (Metzger, Arb. Bull. 9: 31. 1946), illegitimate as a *nomen nudum.*

Cornus racemosa Lamarck, Encycl. Meth. Bot. 2: 116. 1766.

'Slavin's Dwarf' (Harkness, Am. Rock Gard. Soc. Bull. 12: 15. 1954), described as a dwarf less than 30″ high. Grown from seed sown at Rochester, N.Y., in 1918.

Cornus sanguinea Linnaeus, Sp. Pl. 171. 1753.

'Atrosanguinea' (Gibbs, Aldenham House Garden Surplus Pl. 5. 1915), original reference unavailable. Described by Rehder as having branches of a deep red color.

'Mietzschii' (Schwerin, Mitt. Deutsch. Dendr. Ges. 5: 77. 1896, based on *C. mas mietzschii* Schwerin, Gartenfl. 1894: 556. 1894), distinct in having leaves marbled with white, gray or green streaks. Originated in Germany.

'Variegata' (Weston, Bot. Univ. 1: 73. 1770), described as having variegated leaves.

'Viridissima' (Dieck. Haupt. Kat. Zoschen 31. 1885). A variety with greenish branches.

Cornus sibirica, see *C. alba* 'sibirica.'

'Coral Beauty' (Wayside Nurs. Cat. 1957, Mentor, Ohio), a commercial synonym for *C. alba* 'Westonbirt.'

Cornus stolonifera Michaux, Fl. Bor. Amer. 1: 92. 1803.

'Angustipetala' (E. Wolf, Izv. Leningr. Leisn. Inst. 15: 228. 1907). Selected at Leningrad around 1900 from plants grown from seed received from North America. Distinguished by the smaller corolla with sharply pointed petals and the smaller endocarp.

'Elata' (Koehne, Mitt. Deutsch. Dendr. Ges. 12: 39. 1903), plant with green stems, leaves 5-6-nerved, upper leaf surface dull, fruit blue. Originated in the Späth Arboretum.

'Elongata' (Koehne, ibid.), plant with green stems, the leaves 2.5 times longer than broad or longer. Originated in the Späth Arboretum in 1892.

'Flaviramea' (Späth ex Rehder in Bailey, Cycl. Am. Hort. 1: 377. 1900), branches yellow.

'Kelseyi' (Kelsey-Highlands Nurs. Cat. 1939, E. Boxford, Mass.), low-growing plant of dense foliage.

'Kelseydwarf' (Standardized Pl. Names 1942, *nomen nudum;* Morton Arb. Bull. Pop. Inform. 27: 20. 1952) = 'Kelseyi.'

'Nana' (Pl. Buyer's Guide 1958), illegit. as a *nomen nudum* = 'Kelseyi.'

'Nitida' (Koehne, loc. cit.), oldest stems green. Originated in Germany.

'Pendula' (Elliot in Bailey, Stand. Cycl. Hort. 2: 852. 1914), described as a low shrub with pendulous branches.

'Repens' (Wyman, loc. cit). Originally described as a wild plant and not yet known in cultivation.

Cornus 'Xanthocarpa' (Halloway, Gard. Club. Amer. Bull. 38: 17. 1950) = *C. florida* 'Xanthocarpa.'

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# ARNOLDIA

A continuation of the
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## THE TREE LEGUMES IN THE ARNOLD ARBORETUM

THE trees and shrubs in the Arnold Arboretum include, insofar as possible, specimens of all the woody plants known to be hardy in the Boston area. Many of these plants not only enhance the beauty of the garden, but are arranged in family or generic collections for greater ease in conducting scientific or horticultural studies. Several of these areas have become of special interest to visitors. The legumes seldom attract the casual visitor, who is lured to the garden by the breathtaking beauties of the lilacs and the Oriental cherries, but it offers much to those with time enough to examine it carefully. Located in the loop formed by the Meadow Road as it meanders down to the ponds and then turns to climb past the forsythias and the lilacs, this area contains seven genera and approximately forty-four species, varieties or cultivars.

### Cercis

In the spring the first of this group to flower and the one best known to Arboretum visitors is the red-bud or Judas tree, *Cercis canadensis*. The showy magenta flowers appear in umbel-like clusters along the bare branches. Often flower clusters can be found arising from buds on the trunk and from the base of the tree, as well. When the foliage appears, it, too, is very attractive. The simple, heart-shaped leaves are easily distinguished from the compound leaves generally associated with the legumes. Although the specific epithet indicates that this plant is native in Canada, it occurs there only in southern Ontario near the Great Lakes, but is more frequently found in the southeastern section of the United States as far north as Connecticut and reaching westward into southern Wisconsin.

### Cladrastis

In this collection the genus *Cladrastis* is represented by three species, all of which produce panicled racemes of white flowers during the early summer. The *Cladrastis* takes its name from the Greek *klados*, a branch, and *thraustos*, fragile,

since when the branchlets are bent even slightly they break under the strain. The most widely grown of this genus is *C. lutea*, the yellow-wood, a native of the area encompassed by Kentucky, Tennessee and North Carolina, which attains an average height of thirty feet. The pendulous panicles of this species, often sixteen inches long, consist of fragrant, pea-like white flowers. In addition to its showy flowers, the tree has clear yellow foliage in the fall while the light gray trunk gives it an attractive appearance in winter. One cultivar, known as 'Rosea,' has originated in the species. This is a tree growing on the grounds of the Perkins Institute for the Blind in Watertown, Massachusetts, which has pink flowers with golden yellow bases. No specimens of this selection are grown in the Arboretum at present, but as soon as the plants in the nursery reach the proper size, they will be added to the collection.

*Cladrastis sinensis* and *C. platycarpa* represent the east Asian members of the genus. Mature trees of the Asiatic species can be distinguished from the native by their upright inflorescences. The Arboretum's only specimen of *C. sinensis* is quite a recent, and as yet immature, addition to the group, but will soon contribute much-branched panicles of pinkish-white flowers to the summer scene. The flowers of *C. platycarpa* are not nearly so attractive as those of *C. lutea*, for they are neither so large nor so numerous and the brownish-green calyx covers a portion of the corolla, but they appear in late June or early July when few trees are in bloom.

### Maackia

The *Maackia*, named for the Russian naturalist Robert Maack, is less well known and less frequently planted than *Cladrastis*. All natives of Asia, the Maackias produce white flowers which are borne in dense, upright racemes, several of which usually unite to form a terminal panicle, and while the inflorescences and the individual flowers are smaller than those of *Cladrastis*, their flowering in late July or early August makes them a welcome addition to the garden. Of the two species in the Arboretum collection, *M. chinensis*, a native of central China, has 11–13 leaflets on each leaf and three-quarter-inch-long flowers, while *M. amurensis*, a native of Manchuria, has 7–11 leaflets, with flowers half an inch long. *Maackia amurensis* var. *bueggeri*, differing from the species in having more obtuse leaflets which are pubescent on the under side, is also found in the collection.

### Sophora

*Sophora japonica* is one of the most beautiful of all the leguminous trees. The origin of the generic name is somewhat obscure, but it appears to have been taken from the Arabic *Sophira*, the name for a tree bearing pea-shaped flowers. Neither the common name, Japanese pagoda tree, nor the scientific name is accurate in designating the area in which the plant is native, since it comes from China and Korea. One of the specimens growing in the Arboretum collection is the picturesque 'Pendula,' having stiff, drooping branches. The flowering period of late August

and early September is the most valuable attribute of *Sophora japonica*, although one should not discount the dense, deep green foliage which remains on the tree until late in the fall, forming an interesting contrast with the yellow Maackias and the neighboring *Nyssa sylvatica*, its flaming reflection igniting the nearby pond. The pea-like flowers, white or on occasion slightly pinkish, are borne in loose terminal panicles. This species does not have the distressing attribute of producing nectar containing an insecticidal agent, as does some members of this genus. During their flowering season the ground around those plants producing this substance is littered with dead and dying bees. The fruit produced is a pod unlike those of other legumes, being constricted between the seeds and thus giving the effect of a chain of beads.

**The Robinia**

The *Robinia*, named for the French herbalists Jean and Vespasien Robin, has the largest representation of any genus in the legume collection. The taxonomy of this group is very much confused because some of the early botanists failed to recognize the large number of hybrids which exist both in nature and in cultivation. In some cases more than one specific name has been applied to the selection from a hybrid swarm. All species within this genus have some ornamental value; most are cultivated for their showy, often fragrant flowers and some for their growth habit or foliage. The white-to-pink-to-magenta flowers appear in early June.

Some excellent specimens of *Robinia pseudoacacia*, the black locust, are in the Arboretum collection. A native from Pennsylvania to Georgia and westward to Iowa, Missouri and Oklahoma, this is the species most commonly found in gardens. It has become naturalized in many more northern areas, being found now as far north as southern Canada. Glabrous seed pods and branches distinguish this from other members of the genus. Many variations have arisen in this species and these have been propagated by cuttings or grafts and widely distributed to the nursery trade. The typical form is a tree up to 80 feet tall, having compound leaves with 7–19 leaflets and bearing white flowers. Twelve selections from this species are grown in the Arboretum collection.

*Robinia pseudoacacia* 'Microphylla' differs from the typical form in having smaller, narrower leaflets which give the plant an airy delicacy.

The selection or cultivar *Robinia pseudoacacia* 'Unifolia' occasionally has only one, but generally 2–7 leaflets on each leaf. These leaflets are larger than those of the typical form. Other selections with the same leaf variation but having in addition a variation in habit are *R. pseudoacacia* 'Dependens' with pendulous branchlets and *R. pseudoacacia* 'Erect,' a columnar form.

A number of plants have been selected which lack stipular spines. *Robinia pseudoacacia* 'Inermis' differs from the typical form only in lacking stipular spines while *R. pseudoacacia* 'Umbraculifera' is an unarmed selection whose branches

form a dense, subglobose head. The tree in the Arboretum collection is small and planted so that it will have its globose head near the ground. Usually these plants are seen in formal gardens or on narrow streets as grafts on high trunks of the typical form. The selection rarely produces flowers, being grown only for its interesting shape. *Robinia pseudoacacia* 'Bessoniana' closely resembles the preceding selection, but differs in having more slender branches and a less dense, ovoid head.

A number of plants have been selected and grown because of the interesting patterns formed by their branches and foliage. The densely covered branches of *Robinia pseudoacacia* 'Annularis' have contorted branchlets and leaves. This growth pattern results in a reduced branch spread and a narrow crown.

*Robinia pseudoacacia* 'Rectissima' is a fastigiate form with stiffly ascending branches. *Robinia pseudoacacia* 'Cylindrica' produces short, lateral, ascending branches which cause the tree to have a narrow crown.

Several selections have been made because of flower characteristics. *Robinia pseudoacacia* 'Semperflorens' is characterized by the sporadic production of flowers throughout the summer.

Rose colored flowers distinguish *R. pseuoacacia* 'Decaisneana' from other members of the species.

*Robinia hispida* is represented in the collection by several plants. The species is a small tree or shrub growing to a height of 10 feet, having hispid stems, branches and peduncles and with profuse rose-colored to pale purple flowers, many of which are nearly an inch long. Spreading rapidly by root sprouts, this species can be a problem to keep under control.

Closely related to *Robinia hispida* is *R. fertilis*. Both occur in much the same area of southeastern United States. In fact, *R. fertilis* is considered by some to be a variety of *R. hispida*. The distinction usually made between the plants is that *R. hispida* has leaflets which are suborbicular to oval, rounded at the apex, and glabrous, while the leaflets of *R. fertilis* are elliptic-ovate to oblong-ovate, acute to obtusish, and slightly pubescent beneath.

*Robinia neo-mexicana*, the New Mexico locust, is a small tree which may occasionally grow to a height of 25 feet. This is a common, often abundant species of the canyons and coniferous forests from southern Colorado to southern Nevada, western Texas, New Mexico, Arizona and northern Mexico. It is distinguished from the other species in the collection by the presence of numerous short hairs on the branches and leaflets which cause them to have a grayish appearance. There are no specimens in the Arboretum collection labeled '*Robinia luxurians*,' although it is cited as a parent of some of hybrid selections, but according to Kearney and Peebles' Flora of Arizona, which covers the area in which *Robinia neo-mexicana* and *Robinia luxurians* are native, the latter is considered "a scarcely worthwhile variety" of *R. neo-mexicana*.

Two small trees approximately seven feet tall represent *Robinia hartwigii*. The

**PLATE I**

*Albizia julibrissin* var. *rosea*. Above: Habit of flowering tree. Below: Close-up of flowering branch.

flowers are pale pinkish-purple and appear after most of the other species have ceased flowering. It may be distinguished from other small-tree species by its branches, peduncles, and petioles, which are covered with short hairs and in addition bear stalked glands.

*Robinia leucantha* is represented in the collection by a small tree approximately 8 feet tall. There is a distinct possibility that this species result from hybridization between some of the species which occur in Georgia where this plant was discovered. Its outstanding characteristics are its glabrous leaves and branchlets and its white flowers. Further study is needed to show the relationship of this plant to others in the genus.

Many species of Robinia have been found to hybridize readily with other members of the genus in gardens and in the wild. Some of these hybrids have characteristics which make them desirable from a horticultural point of view. Unfortunately botanists have often failed to realize just how readily these species hybridize and with insufficient evidence, have described new species.

The following are all reputed hybrids and are listed under the formula of the hybrid.

Perhaps the cross between *Robinia pseudoacacia* and *R. hispida* has produced more hybrid species than any other. *Robinia kelseyii* has been accepted as a distinct species by a number of botanists but appears to be a selection from the above cross. It is intermediate between the two parental species in such respects as habit, color of flowers and vestiture of leaves and twigs. *Robinia margaretta* is presumed to have originated from such a cross and resembles *R. pseudoacacia*, though it differs in having pinkish flowers, slightly glandular rachi, pedicels and calyx, and a rather rough pod. *Robinia* 'Idaho,' which flowers two or three weeks later than most trees in the collection, is a selection from the hybrid population and is notable for its very bright purplish-pink flowers.

The cross between *Robinia kelseyii* (*R. pseudoacacia* × *R. hispida*) and *R. pseudoacacia* is a type of hybrid known as a backcross. Two plants in the collection represent selections from this hybridization. *Robinia slavinii* is a small tree which has rosy-pink flowers and shows some pubescence on the branchlets and petioles. *Robinia hilleri* is a selection made by Hillier & Sons, Winchester, England. The tree in the collection is 15 feet tall and produces lilac-pink flowers.

*Robinia holdtii* is a hybrid of *R. neo-mexicana* (*R. luxurians*) × *R. pseudoacacia*. The tree in the collection is 12 feet tall, and bears pinkish flowers which are borne in somewhat less dense racemes than those of the previous hybrids.

*Robinia ambigua* 'Bella-rosea' is a selection from the hybridization of *R. pseudoacacia* with *R. viscosa*. The selection is notable for its larger and more deeply colored flowers.

## Albizia [1]

[1] The correct spelling of this generic name is *Albizia* not "Albizzia" as in general usage. Article 73 of the International Code of Nomenclature states, "The original spelling of a

An exotic which has its origin in the area stretching from Persia to central China is the *Albizia*, named for the Italian nobleman F. degli Albizzi. *Albizia julibrissin* var. *rosea*, the silk tree, is an exceptionally hardy clone which is able to survive the rigorous New England climate prevailing in the Arboretum. This species is the sole representative of the subfamily Mimosoidea, which contains such interesting genera as *Mimosa* and *Acacia*, both of which are well known to travelers in the American tropics.

The leaves of the *Albizia* are finely bipinnately divided and have a definite fern-like appearance. The folding of the leaflets at night in so-called "sleep movements" is also distinctive. The tree is among the last in this area to come into leaf in late spring and because of this, trees have been presumed dead and destroyed by gardeners not acquainted with its habits. The deep pink or reddish staminal filaments of what would otherwise be inconspicuous flowers, resemble dainty fans held up above the delicate, deep green foliage. These appear in early July and continue until early September. Only the variety *rosea* is hardy in the Boston area. Care should be taken, also, against introducing to this area plants grown in the South since there is a blight prevalent among southern plantings which has done much harm.

Trees of this species are very fast-growing, often reaching a height of 20 feet and a spread of 30 feet.

### Gymnocladus and Gleditsia

The remaining genera in the Arboretum collection are considered primarily as shade trees. *Gymnocladus dioicus*, the Kentucky coffee-tree, dominates the lower portion of the collection. As is true of all members of this species, its branches appear fluted because of the gray outer bark which splits and rolls back. This character can be easily recognized even in the dead of winter. The flowers, opening in mid-June, are regular, approximately half an inch in diameter and, being greenish-white, do not contrast sufficiently with the foliage to attract much attention. The fruit is a short, broad pod containing a thick pulp in which the seeds are embedded. *Gymnocladus dioicus* is native to the area bounded by New York State and Pennsylvania in the east, Minnesota and Nebraska in the west, and Oklahoma and Tennessee in the south. The common name comes from the attempt by the early settlers in Kentucky and Tennessee to use the beans as a coffee substitute. The attempt was not completely successful and was abandoned as soon as coffee became readily available.

The diseases affecting some of the genera long used as shade and street trees have been the means of arousing interest in various species of *Gleditzia*. The only

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name or epithet must be retained. except that typographic orthographic errors should be corrected." The name was spelled uniformly in the original publication (Duraz., Mag. Tosc 3 (4): 10, 11, 13, illus. 1772) as *Albizia* even though Durazzini states that the name honors "Il Sig. Cavalier Filippo degl 'Albizzi." For further study see E. Little, Amer. Midl. Nat. 33: 510. 1945.

species widely grown and the one from which a large number of selections have been made is *G. triacanthos*, the honey locust. The typical form of the species is represented in the collection by mature trees approximately 60 feet tall It is easily recognized by the large, much-branched thorns borne on the trunk and main branches. These are rigid and sharp enough to puncture an automobile tire. The flowers are small and inconspicuous, adding little to the desirability of the tree. The fruits are often more than 10 inches long and remain on the tree until blown off by the strong mid-winter winds. These pods, tobogganning over the snow in January or February, may be carried considerable distances from the parent tree.

It would appear from the description of the typical form that the poor qualities of this tree more than outweigh its virtues as a disease-free, robust shade tree. However, there exists in nature a population (*Gleditsia triacanthos* forma *inermis*) without thorns. Although trees of this form are of a more slender habit when young, they eventually grow to be much like the typical form in height. It is from this *G. triacanthos* forma *inermis* population that the many widely advertised cultivars have been selected. Some are excellent shade trees and are to be highly recommended. The selections cited here are those present in the Arboretum collection and are not to be considered superior or inferior to any selections not mentioned.

*Gleditsia* 'Elegantissima,' the oldest in date of origin of these selections, is unarmed and of a dense, bushy habit. Another selection here is G. 'Moraine,' a patented plant which does not bear fruit. This plant flowered heavily this spring, but since they were all staminae or male flowers, no fruits could be formed. This has less dense foliage than the typical form, giving the plant an attractive, lacy appearance. *Gleditsia* 'Seiler' is another of the sterile forms but the Arboretum specimen has not reached sufficient size to indicate the growth habit. *Gleditsia* 'Sunburst' was selected because the terminal leaflets on each branchlet remain a bright yellow throughout the summer. The specimen in the collection is not particularly attractive, but this may be due to any one of several reasons. Probably one should match the environment of a flourishing specimen if one wished to plant this selection in his grounds.

The hybrid species *Gleditsia*×*texana* is a hybrid of *G. triacanthos*×*G. aquatica* and can be distinguished from the preceding species by its straight pods and from the following species by the number of leaflets, which generally exceed twenty per leaf. This tree bears thorns similar to *G. triacanthos*.

Two Asiatic species, *Gleditsia japonica* and *G. sinensis*, are also represented. Both species bear spines and pods and in general resemble *G. triacanthos*, althogh they never reach the height of that species. *Gleditzia sinensis* is distinguished from other members of the genus in the collection by its terete spines and flat pods. *Gleditsia japonica* has twisted pods and flattened spines and is distinguished from the honey locust by its obtuse leaflets and glabrous ovary.

**PLATE II**

Above: *Gymnocladus dioicus.* Leaf and fruit on 1-inch grid. Below: Inflorescence of *Robinia kelseyi.*

## Laburnum

The description of tree legumes in the Arboretum would be incomplete without some mention of *Laburnum*. None of this genus are planted in the basic collection, but several may be found in other parts of the Arboretum. *Laburnum* alpinum, the Scotch laburnum, can be distinguished from other members of the genus by its glabrous leaves and branchlets. A form known as *L. alpinum* 'Fragrans' has been selected for its fragrant flowers. *Laburnum anagyroides* is distinguished by its pubescent leaves and branchlets, while *L. anagyroides* var. *alschingeri* has silky leaflets which are bluish-gray beneath. The flowers are borne on nearly upright racemes. A hybrid of *L. alpinum* and *L. anagyroides* is *L.* × *watereri*, commonly called the golden chain tree. In most characters it is intermediate between the parent species. An excellent specimen is growing near the road just below the crest of Bussey Hill.

BURDETTE L. WAGENKNECHT

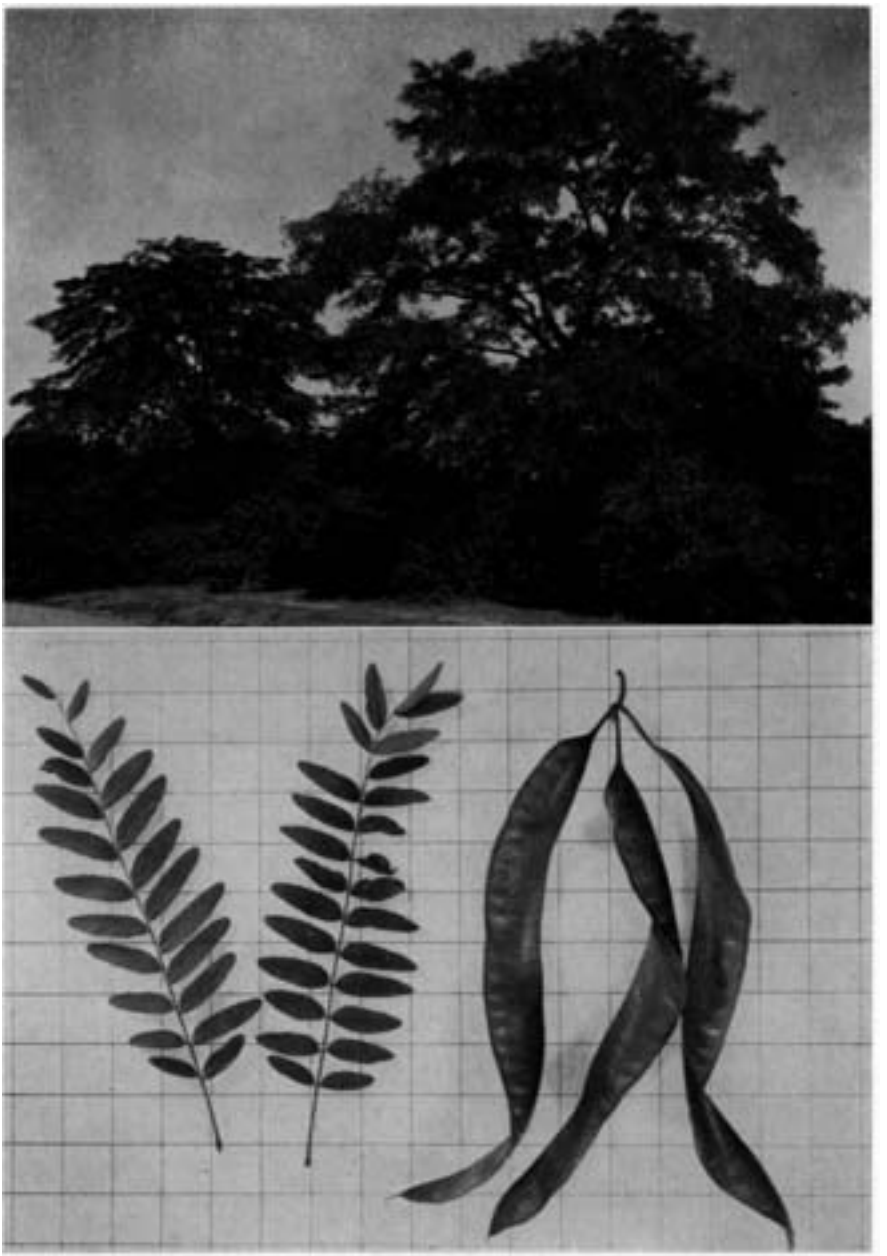

**PLATE III**

*Gleditsia triacanthos.* Above: Habit of mature trees. Below: Foliage and fruit on 1-inch grid.

**Key to the Genera of Tree Legumes**

1. Leaves simple . . . . . Cercis.
1. Leaves compound . . . . . 2.
2. Leaves bipinnately compound . . . . . 3.
2. Leaves pinnately compound . . . . . 4.
3. Flowers in dense heads, stamens numerous, longer than corolla, filaments pink . . . . . Albizia.
3. Flowers in terminal, loose panicles, stamens 6–10, shorter than corolla, filaments greenish white . . . . . Gymnocladus.
4. Flowers not papilionaceous . . . . . Gleditsia.
4. Flowers papilionaceous . . . . . 5.
5. Leaflets three, flowers yellow, in pendulous racemes . . . Laburnum.
5. Leaflets more than three, flowers not yellow . . . . . 6.
6. Flowers in simple racemes. . . . . Robinia.
6. Flowers in panicles . . . . . 7.
7. Flowers appearing in August, legume constricted between the seeds . . . . . Sophora.
7. Flowers in June or July, legume flat, not constricted between seeds . . . . . 8.
8. Winter buds free, scaly, leaflets opposite . . . . . Maackia.
8. Winter buds enclosed in the petioles, leaflets alternate . Cladrastis.

# ARNOLDIA

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## REGISTRATION LISTS OF CULTIVAR NAMES IN GLEDITSIA L.

THE procedures followed in compiling the lists of names applied to cultivars in *Gleditzia* L. are those of Professor R. A. Howard in "Registration Lists of Cultivar Names in Cornus," *Arnoldia* 21: No. 2, 1961. The presence of an asterisk following a cultivar name in the alphabetical list indicates a cultivar presently being grown in North America. The words "*nomen nudum*" indicate cultivar names which have not been described and for that reason are illegitimate.

Additions and corrections to the list accompanied by a reference to a valid publication or by application for registration will be welcomed. All information of this nature should be addressed to the author.

### Alphabetical List

Beatrice (triacanthos f. inermis)*
Browni (triacanthos f. inermis)*
Bujoti (triacanthos f. inermis)
Bujoti Pendula (triacanthos f. inermis)
Calhoun (triacanthos)*
Columnaris (triacanthos)
Elegantissima (triacanthos f. inermis)*
Excelsa Pendula (triacanthos f. inermis)
Imperial (triacanthos f. inermis)*
Majestic (triacanthos f. inermis)*
Major (triacanthos)
Millwood (triacanthos)*
Monosperma (triacanthos)
Moraine (triacanthos f. inermis)*
Nana (ferox)
Nana (sinensis)
Nana (triacanthos)
Nana Inermis (triacanthos f. inermis)
Park (triacanthos f. inermis)*
Pendula (sinensis)
Pendula (triacanthos f. inermis)
Purpurea (japonica)
Shademaster (triacanthos f. inermis)*
Sieler (triacanthos f. inermis)*
Skyline (triacanthos f. inermis)*
Stephens (triacanthos f. inermis)
Sunburst (triacanthos f. inermis)*
Variegata (triacanthos f. inermis)

Gleditsia 'Excelsa Pendula' (C. de Vos, Handb. Boom. Heest. ed. 2; 486. 1887.)=G. triacanthos 'Bujotii.'

Gleditsia ferox Desfontaines, Hist. Arb. Arbris 2: 247. 1809.
'Nana' (Rehder in Bailey, Cyclo. Am. Hort. 2: 650. 1900). =G.triacanthos 'Nana.'

G. horrida Gordon, Dermer & Edmonds, Cat. Trees, Shrubs Pl. 14. 1782. *Nomen nudum.*
'Purpurea' (loc. cit.) illegit. as *nomen nudum* ?=G. japonica 'Purpurea.'

Gleditsia horrida Salisbury, Prodr. Stirp. Chap. Allert. 323. 1797.
'Major' (Conrad Loddiges and Sons, Hackney, England, Catalogue, 1834). Illegit. as a *nomen nudum.* =G. sinensis 'Major.'
'Nana' (Loudon, Arb. Brit. II: 654. 1838). =G. triacanthos 'Nana.'

Gleditsia japonica Miquel in Ann. Mus. Bot. Lugd. -Bat. 3: 54. 1867.
'Purpurea' (Rehder in Bailey, Cycl. Am. Hort. 2: 650. 1900). "Lfts. broadly oval to oblong-oval, obtuse or emarginate, $\frac{1}{2}$–$1\frac{1}{2}$ in. on the pinnate, smaller on the bipinnate leaves."

Gleditsia sinensis Lamarck, Encycl. Meth. Bot. 2: 465. 1788.
'Major' (Loudon, Arb. Brit. II: 654. 1838), "seems scarcely to differ from the species."
'Nana' (Loudon, loc. cit.)=G. triacanthos 'Nana.'
'Nana Inermis' (Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 254. 1903). =G. triacanthos 'Nana.'
'Pendula' (Kew Handlist of Trees & Shrubs, 2nd ed. 203. 1902), illegit. as a *nomen nudum.*

Gleditsia triacanthos Linnaeus, Sp. Pl. 1056. 1753.
'Calhoun' (Sunnyridge Nursery, Swarthmore, Pa., Catalogue, 1948).
Selected for its heavy production of fruits to be used as fodder.
'Columnaris' (Schwerin, Deutsche Dendro. Gesell. 22: 322. 1913), "of beautiful columnar growth."
'Millwood' (Sunnyridge Nursery, Swarthmore, Pa., Cat. 1942).
Selected for superior fruiting, grown as a source of stock feed.
'Monosperma' (Beissner, Schelle & Zabel, Handbuch der Laubholzbenennung 255. 1903), illegit. as a *nomen nudum.* Not. G. monosperma Walter.

Gleditsia triacanthos L. f. inermis (L.) Beissner, Schelle & Zabel, Hanb. Laubh.-Ben. 255. 1903.

'Beatrice' (Inter-State Nurseries, Hamburg, Iowa, Catalogue Spring 1955), "a majestic tree and more like the American Elm in form than any other tree with which we are acquainted, seeds very sparingly and is thornless."

'Browni' (William Flemmer III, Princeton, N.J., Plant Patent 1514, September 11, 1956).

'Bujotii' (Newmann in Rev. Hort. ser. 2, 4: 205. 1845). "Weeping habit."

'Bujotti Pendula' (Rehder in Bailey, Cycl. Am. Hort. 2:650. 1900)='Bujotii.'

'Elegantissima' (Grosdemange in Rev. Hort. n. ser. 5: 512, t. 199. 1905, as G. inermis elegantissima), "unarmed and of dense bushy habit; leaflets smaller."

'Imperial' (Cole Nursery Co., Painesville, Ohio, Registered Mar. 20, 1957, Plant Patent May 21, 1957). "A strong, sturdy, straight trunk, very evenly spaced wide spreading branches, and very strong crotches. Leaves are graceful and feathery in appearance, with dark green color above and below."

'Majestic' (Cole Nursery Co., Painesville, Ohio, Registered Mar. 20, 1957, Plant Patent, Dec. 11, 1956). "Strong, sturdy straight trunk, with compact growth habit and moderate rate of growth. Foliage remains green and in good condition at least ten days longer than the common honeylocust and other varieties tested."

'Moraine' (The Siebenthaler Co., 3001 Catalpa Dr., Dayton, Ohio, Plant 836, May 17, 1949. Registered June 21, 1951, Trademark 541,111). "Thornless, seedless, desirably shaped tree, rapid growing, dark green foliage, disease resistant."

'Park' (Marshall Nurseries Catalogue, Arlington, Nebraska, Catalogue 1958). "Has not produced thorns or legumes in 17 years of observation."

'Pendula' (Talou in Hortic. Franc. 1859: 156. 1859)='Bujotti.'

'Shademaster' (William Flemer III, Princeton Nurseries, Princeton, New Jersey, Plant Patent 1515, Sept. 11, 1956). Upright form.

'Sieler' (Linn County Nurseries, Center Point, Iowa, Catalogue 1949). "Large, widespreading trees, almost completely seedless."

'Stephens' (Marshall Nurseries, Arlington, Nebraska, Catalogue 1940). Thornless and seedless.

'Skyline' (Cole Nursery Co., Painesville, Ohio, Catalogue 1955, Registered, March 20, 1957, Plant Patent July 16, 1957). "A strong, sturdy, straight trunk with well spaced and uniformly arranged branches, said branches emerging from the trunk at a wide angle, but quickly turning upward to give a pyramidal shape to the tree."

'Sunburst' (Cole Nursery Co., Painesville, Ohio, Registered Oct. 12, 1953, Plant Patent 1313, Nov. 2, 1954). "A thornless honeylocust distinguished by the bright golden-yellow color of young leaves, giving the tree the appearance of being entirely golden in color; and by its relatively slow, compact habit of growth."

'Variegata' (Kew Handlist of Trees and Shrubs, 2nd ed. 203. 1902), illegit. as a *nomen nudum* = 'Bujotii.'

BURDETTE L. WAGENKNECHT

# ARNOLDIA

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## THE FORSYTHIA STORY

*Forsythia suspensa sieboldii* was the first forsythia introduced into Europe from the Orient, going to Holland in 1833. Unquestionably it was popular. Here was a new plant with brilliant yellow blossoms each spring, always dependable. It was soon learned that in good soil it would have more blossoms than in poor soil, but even when the growing conditions were difficult, it would grow into an interesting, green-leaved bush which was not susceptible to serious inroads from insect or disease pests.

As time went on, and more horticulturally-minded individuals visited the Orient, other species were introduced. *Forsythia viridissima* was brought from the Orient by Robert Fortune in 1844.

It is of interest to note that other species have not contributed much to the beautiful cultivars we grow today. The European Forsythia of Albania is not outstanding and was not even "discovered" until 1897. Two years later it was introduced into England. China is the habitat of both *Forsythia suspensa* and *F. viridissima*, as well as *F. giraldiana*, which was not introduced until 1914.

Korea is the homeland of *Forsythia ovata* (introduced to America by E. H. Wilson of the Arnold Arboretum in 1918), as well as *F. viridissima koreana* (introduced in 1917) and *F. japonica saxatilis* (introduced in 1924). Although most of these have probably been grown in Japan for centuries, *F. japonica* is the only species native to that country. None is native in North America. So the two introduced species growing in Europe by 1850 (*suspensa* and *viridissima*) can be considered to be the "ancestors" of the many cultivars we are growing today. Undoubtedly these two species were grown side by side in several places and, of course, eventually had the opportunity to hybridize.

Then the great Späth Nurseries in Berlin, Germany, became interested in growing seedlings. The seeds were collected from plants which obviously had an opportunity to hybridize, and in 1885 the hybrid species *Forsythia intermedia* was

described. Seedling selections were made by Späth in this group and several were introduced. These were more upright and vigorous in growth than was the arching *F. suspensa*, and several of the new hybrids produced larger and more profuse flowers. Also, some clones were selected because they had lighter (or darker) yellow flowers than had been noted before.

Because these plants grew rapidly and were easily propagated by cuttings, they were widely distributed, and some have been popular ever since.

The parade of "new" varieties started in 1899 with the introduction of 'Vitellina' by the Späth Nurseries. It will be noted that this is not one of the best for ornamental purposes in modern gardens (Arnoldia 19: 11–14, 1959). This was quickly followed by the introduction of 'Densiflora' by Späth in 1899, long a popular plant. Now it is superseded by others. Two years later 'Decipiens,' a poor-flowered clone of *Forsythia suspensa*, originated at Späth's, but it never proved popular.

However, in 1906 this same nursery introduced *Forsythia intermedia* 'Spectabilis' which was extremely popular right from the start, and has been so to the present time. For a profuse display of deep golden yellow flowers, this is the one that any new cultivar has to beat when it comes to critical comparisons. Never before had any forsythia produced as many flowers or such deep-colored flowers as did this new hybrid selection. Another selection of *F. suspensa* named 'Pallida' appeared in Germany in 1906 and merited some attention at the time because the flowers were a much lighter color than those of the more popular 'Spectabilis.'

During the ensuing years, these forsythias were, of course, being grown in the United States, and in the Arnold Arboretum an attempt was made to grow them all. There, about 1912, a new seedling was found and later named 'Primulina.' This was another cross between *Forsythia suspensa* and *F. viridissima* and was appropriately named because of its pale yellow flowers. Many liked it, especially those who did not prefer the strikingly brazen yellow of 'Spectabilis.'

In Mentor, Ohio, a suburb of Cleveland, a gardener of some note by the name of M. H. Horvath had been experimenting with plants for several years, growing new seedlings, selecting some and discarding others. In his garden there was a plant of 'Primulina' which he watched carefully from year to year. In 1930 he noted that one branch consistently produced larger flowers than those on the rest of the bush, and they were certainly more densely arranged. Cuttings of this were taken, producing plants that were superior to 'Primulina' and about 1942 this was introduced to the trade by Wayside Gardens of Mentor, Ohio, as 'Spring Glory,' a plant that has been one of the most popular of all forsythias ever since.

The Forsythia story continued on the other side of the Atlantic, in a beautiful garden called Lynwood in northern Ireland, where the owner, Miss Adair, was growing, among other things, a plant of *Forsythia* 'Spectabilis.'

Miss Adair noted that a branch of this plant had flowers that were more open

and better distributed along the stem than were those of the rest of the plant. Cuttings were taken and grown by the Slieve Donard Nursery of Newcastle, Ireland, and named 'Lynwood' about 1935 in honor of the estate where it originated. Unfortunately, in the early years it was not properly described, and somehow or other, by 1949 when it had reached America, where supersalesmen are sometimes overly anxious to coin new plant names, the name was changed to 'Lynwood Gold.' The plants are the same. This cultivar is known all over England as 'Lynwood,' and in America as 'Lynwood Gold.' It, too, is one of the most popular forsythias at the present time.

Coming back to America, the New York Botanical Garden enters the story, for slightly before 1939 an extremely dwarf forsythia was found there. This was named *Forsythia viridissima* 'Bronxensis' by T. H. Everett in 1947. It was early to bloom, but difficult to propagate and grow properly, an unfortunae characteristic, since all forsythias are commonly considered easy to grow.

At the same time Dr. Karl Sax of the Arnold Arboretum became interested in the *Forsythia* clan and started treating some plants with colchicine and hybridizing others. Many seedlings were grown; a few have been named.

'Arnold Giant' was produced by treating a seedling of *Forsythia intermedia* with colchicine. The resulting plant was a tetraploid, but it was unfortunate that it was ever named and released. Although vigorous, it proved too rigidly upright and was hard to propagate by cuttings. Two years later, in 1941, a very dwarf forsythia was produced as a cross between *F. intermedia* and *F. japonica*. This roots extremely easily, makes an excellent plant for banks and is now widely available. It was named 'Arnold Dwarf.'

More crossing and experimenting on the part of Dr. Sax and his students and careful examination of earlier seedlings brought to light another seedling, a cross between 'Arnold Giant' and *Forsythia ovata*. This was a triploid, first called 'Farrand' by Dr. Sax and later changed to 'Beatrix Farrand' at the request of Mrs. Beatrix Farrand, for whom it was named. This produces dense clusters of flowers, is upright and dense in habit, slightly darker in flower than 'Spectabilis' under some conditions, and now widely popular. During these years, several seedlings were sent out for trial by the Arboretum and one, which was a cross between 'Arnold Giant' and an unknown forsythia, proved to be a tetraploid and was noted as being hardier in the mid-west. This was named 'Karl Sax' by Dr. J. L. Thomas of the Arnold Arboretum for Dr. Sax, who originated it.

The Swiss nursery firm of Mertens and Nussbaumer named 'Mertensiana' in 1949, but it has not proved a very desirable ornamental. A variegated form of *Forsythisia viridissima* originated in England some time before 1951 and a more ornamental cultivar of *F. suspensa atrocaulis* was selected and named 'Nyman's Variety' in 1954, in honor of the beautiful estate in the south of England where it originated.

Undoubtedly yellow-leaved plants have appeared in the past, most of them

suffering severely when exposed to full sunlight, but the one which has been named *F. intermedia* 'Aurea' (1958) was found in a garden near the Beardslee Nurseries of Perry, Ohio.

And so it is seen how two species introduced into Europe from the Orient before 1850 started a colorful procession of cultivars. Many individuals, in widely separated places, have been responsible for the selections. Others yet unknown may have tried crosses without striking results. Certain it is, however, that although several species have been introduced from the Orient since 1900, it is chiefly *Forsythia suspensa* and *F. viridissima* from China which have been largely responsible for the best of the forsythias grown today.

DONALD WYMAN

## SPRING CALENDAR

April 13. Lecture — "The Garden Islands, the West Indies." Administration Building, 8 p.m. Dr. Richard Howard

April 19. Lecture — "Plants and People in Finland." Administration Building, 8 p.m. Mr. Peter Tigerstedt, Mercer Fellow at the Arnold Arboretum and Director, Mustila Arboretum, Finland.

April 26. Lecture — "Plants and People in Ceylon." Administration Building, 8 p.m. Mr. D. Jayaweera. Rockefeller Fellow at the Arnold Arboretum and Director, Royal Botanic Garden, Ceylon.

April 28. First of five Friday meetings of the Spring Field Class. 10 a.m. at the Administration Building. Dr. Donald Wyman

May 2. First of five Tuesday meetings of the Field Botany Class. 2 p.m. at the Barn, Case Estates, Weston. Dr. Lorin Nevling

May 3. Lecture — "The Royal Botanic Garden, Edinburgh." Administration Building, 8 p.m. Mr. Peter Green

May 13. Lecture-demonstration. "Pruning." 2 p.m. at the Administration Building. Mr. Robert Williams

May 14. Open House, The Case Estates, Weston. 10 a.m to 5 p.m. The Staff

May 21–27. Lilac Week at the Arnold Arboretum.

All programs will be free of charge.

# ARNOLDIA

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## REGISTRATION LISTS OF CULTIVAR NAMES OF FORSYTHIAS

### Alphabetical List

'Arnolds Brilliant'*
'Arnold Dwarf' (intermedia×japonica)*
'Arnold Giant' (intermedia)*
'Aurea' (suspensa)
'Aurea' (intermedia)*
'Aureo-variegata' (suspensa)
'Beatrix Farrand' ('Arnold Giant×ovata)*
'Bronxensis (viridissima)*
'Compacta Nana' (intermedia)
'Decipiens' (suspensa)*
'Densiflora' (intermedia)*
'Dwarf' (intermedia)
'Farrand' ('Arnold Giant'×ovata)
'Fortunei Nana' (suspensa)
'Golden Belle'
'Golden Queen'
'Gloriosa'
'Golden Sun'
'Karl Sax' (Arnold Giant'× ?)*
'Lynwood' (intermedia Spectabilis)*
'Lynwood Gold' a commercial synonym='Lynwood'*
'Mertensiana' (intermedia)*
'Nana' (intermedia)*
'Nyman's Variety' (suspensa)*
'Pallida' (suspensa)*
'Primulina' (intermedia)*
'Robusta' (ovata)*
'Spectabilis' (intermedia)*
'Spring Glory' (intermedia)*
'Variegata' (viridissima)
'Variegata' (suspensa)
'Vitellina' (intermedia)*

### Bibliographic List

*intermedia* (*suspensa*×*viridissima*) (Zabel in Gartenfl. 34: 35. 1885).

'Arnold Dwarf' (Sax, Arnoldia 7: 10. 1947). (*intermedia*×*japonica*) Originated Arnold Arboretum, Jamaica Plain, Mass., 1941; dwarf, branches rooting where they touch soil, poor, pale greenish-yellow flowers, few; excellent ground cover.

'Arnold Giant' (Sax, Arnoldia 7: 10. 1947). A colchicine-induced tetraploid

(by treating a seedling of *F. intermedia*). Originated in the Arnold Arboretum 1939. Leaves thicker, larger than species; plant stiff and difficult to propagate.

'Arnolds Brilliant' (Tingle Nurs. Cat., Pittsville, Md., 1959). Illegit. *nomen nudum.*

'Aurea' (Beardslee Nurs., Perry, Ohio, Cat. 1958). "Golden leaved Forsythia with pale yellow flowers, found by us in a flowering shrub border."

'Beatrix Farrand' (Wyman, Arnoldia 19: 12. 1959). 'Arnold Giant'×*ovata*, originated by Dr. Karl Sax, Arnold Arboretum in 1944. Flowers often $2\frac{1}{2}''$ diameter and sometimes darker than those of *F. intermedia* 'Spectabilis.' A triploid, upright, dense habit, heavy bloom.

'Compacta Nana' (Anonymous, Plant Buyer's Guide, Oak Park Nurseries, Inc., East Patchogue, L.I., New York, 1958). Illegit. *nomen nudum*=*intermedia* 'Nana.'

'Densiflora' (Koehne) Schelle in Beissner, et al., Handb. Laubh.-Ben 413. 1903. Introduced by Späth Nurseries, Berlin, Germany, 1899; profuse flower production.

'Dwarf' (Siebenthaler Nurs. Cat., Dayton, Ohio. 1951). Illegit. as a *nomen nudnm;*=*intermedia* 'Nana.'

'Farrand' (Sax, Arnoldia 15: 10. 1955; Sax ex Wyman, Arnoldia 16: 14. 1956). Changed at the request of Mrs. Beatrix Farrand to 'Beatrix Farrand' in 1959;='Beatrix Farrand.'

'Karl Sax' (J. L. Thomas. Arnoldia 20: 49. 1960). 'Arnold Giant'× ?. A tetraploid originated by Dr. Karl Sax of the Arnold Arboretum, 1944. Similar in most ways ornamentally to 'Beatrix Farrand' except that it is reported hardier in the midwestern United States.

'Lynwood' (G. E. Peterson, Jour. Roy. Hort. Soc. 82: 127. 1957). Originated as a sport on *F. intermedia* 'Spectabilis' in the garden of Miss Adair, Lynwood, Cookstown, Co. Tyrone, Northern Ireland, in 1935. Introduced by Slieve Donard Nurs. Co., Newcastle, Co. Down, Ireland. Flowers more open and better distributed along branches than those of *F. intermedia* 'Spectabilis.'

'Lynwood Gold' (Wayside Garden Cat., Mentor, Ohio, 1949). A commercial synonym='Lynwood.'

'Mertensiana' (Mertens & Nussbaumer ex Krussm. in Deutsche Baumschule 2: 298. 1950). Originated in nursery of Mertens and Nussbaumer, Zurich, Switzerland, in 1949. "Low, compact, leaves monstrous, variable. Distintinguished by deformed leaves and crowded flowers."

'Nana' (Wyman, Nat. Hort. Mag. 40: 194. 1961). Low dwarf, with simple, lobed and sometimes compound leaves; lamellate pith between the nodes, solid pith at the nodes; slow to bloom; poor, greenish-yellow flowers. A twenty-year-old plant was only 5′ tall and 8′ wide. Originated in midwestern United States.

'Primulina' [Rehder, Mitt. Deutsch. Dendr. Ges. 1912 (21): 193. 1913]. A chance seedling in the Arnold Arboretum, Jamaica Plain, Mass., prior to 1912, with light-colored primrose yellow flowers.

'Spectabilis' (Koehne in Gartenflora 55: 227. 1906). Originated in Späth Nurseries, Berlin, Germany, 1906; noted for its profuse and large, dark yellow flowers.

'Spring Glory' (Wayside Gardens Cat., Mentor, Ohio, 1942). A branch sport of *F. intermedia* 'Primulina' found in garden of M. H. Horvath, Mentor, Ohio, about 1930. Introduced by Wayside Gardens about 1942. Larger and more profuse flowers than those of *F. intermedia* 'Primulina.'

'Vitellina' (Koehne in Späth Nurs. Cat., Berlin, Germany, 1899). Introduced by the Späth Nurseries in 1899; noted for having the smallest flowers of this general group of hybrids.

*ovata*

'Robusta' (Krussmann, Die Laubgeholze, p. 155. 1951). "Vigorous growing form of *F. ovata* with primrose yellow flowers; or hybrid?"

*suspensa* (Thun. Vahl, Enum. Pl. 1: 39. 1804).

'Aurea' (Anonymous, Pl. Buyer's Guide, 1958). Illegit. *nomen nudum* = 'Variegata.'

'Aureo-variegata' (Koehne, Gartenflora 55: 206. 1906). = 'Variegata.'

'Decipiens' (Koehne, Gartenflora 55: 205. 1906). Originated in Späth Nurseries, Germany, 1905; flowers single, not nearly as conspicuous as those of other cultivars of this species.

'Fortunei Nana' (Siebenthaler Nurs., Dayton, Ohio, Cat. 1938). Illegit. *nomen nudum* = *F. intermedia* 'Nana.'

'Nyman's Variety' (Krussmann, Die Laubgeholze 155, 1951). Branches bronze-colored, closely resembles *F. suspensa atrocaulis*, bush erect, profuse flowers of ivory yellow.

'Pallida' (Koehne, Gartenflora 55: 206. 1906). Flowers a very pale, washed-out yellow.

'Variegata' (Butz; Penn. State Ag. Coll. Rep. 1899–1900: 376. 1901). "With yellow variegated leaves."

*viridissima* (Lindley, Jour. Hort. Soc., London 1: 226. 1846).

'Bronxensis' (T. H. Everett, Gard. Chron. Am. 51: 296. 1947). Extremely dwarf variety, flowers freely; originated New York Bot. Gard. 1939.

'Variegata' (Dic. of Gard.; Royal Hort. Soc. 2: 830. 1951). A "golden variegated form."

Other hybrids (?)

'Golden Queen' (Anonymous, Pl. Buyer's Guide, 1958). Illegit. *nomen nudum.*

'Gloriosa' (Brimfield Gardens Nurs., Wethersfield, Conn., Cat. 1956). Listed as "pale yellow flowers." Illegit. *nomen nudum.*

'Golden Belle' (Anonymous, Pl. Buyer's Guide, 1958). Illegit. *nomen nudum.* Undoubtedly confused with the sometimes used general common name of Forsythia.

'Golden Sun' (L. Kammerer, Morton Arb. Bull. Pop. Inf. 34: 25. 1959). Illegit. *nomen nudum.*

DONALD WYMAN

# ARNOLDIA

A continuation of the
BULLETIN OF POPULAR INFORMATION
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VOLUME 21 APRIL 21, 1961 NUMBER 7

## WINTER INJURY NOT SEVERE

AS spring continues to unfold, every gardener becomes increasingly interested in determining how winter cold has affected his plants. Plant hardiness is the end product of several varying situations and conditions, only one of which is minimum temperature. Last winter was not a truly severe one, as New England winters go, but there were some conditions which have resulted in the injury of some woody plants. Which ones? Let us first take a look at what happened according to the U.S. Weather Bureau at Boston.

November of 1960 was unusually mild, the mildest in seven years, with a slight decrease in precipitation. However, winter came suddenly on December 12th with the heaviest December snowstorm on record—13 inches in the city of Boston, considerably more elsewhere. It was truly a "severe blizzard," even in the language of the Weather Bureau, tying traffic in knots, but doing practically no damage to plants. Fortunately for many a low plant, this blanket of snow lasted a long time and was eventually followed by another blizzard January 19–20 and still a third heavy snowstorm on February 4th. All in all, snow-coverwise, it was a good winter.

The trouble, so far as the plants were concerned, came in the form of freezing temperatures that lasted for an unusually long period. Using the words of the Weather Bureau, "At 5 p.m. on the 18th (of January) the mercury sank below the freezing mark for the rest of the month. This 13-day spell was the longest enduring period of sub-freezing temperature in 43 years."

February contributed another 4 days to this cold spell (the Weather Bureau worked it out on a basis of 394 hours of continuous below-freezing weather). The all-time record was for 406 hours in 1918. At no time this last winter did the "official" minimum low go below $-4^{\circ}$ F., and, in fact, there were only two days when the official figures were below zero, but in the early morning hours of several

days, my thermometer read −15° F. in Weston, and Mr. Wilfrid Wheeler reported −21° F. on Cape Cod.

Recapitulating, Boston did not have an unusually cold winter with severe minimum temperatures; we were fortunate in having an adequate snow cover for most of the winter. There was very little frost in the ground even in February, because that first blizzard came before the ground had been thoroughly frozen. However, we did have a record-breaking period of below-freezing weather. Now is the time to study the plants as they began to leaf out and flower this spring and determine what a long, though not a severe, cold spell can do. (It might be interesting to compare these notes with those in *Arnoldia*, Vol. 17, No. 3, April 5, 1957, for here injury was reported due to extremely low temperatures.)

The following notes were taken in the Arnold Arboretum on March 29th, and it may well be that by the time this is printed and read, the information contained here will not be news.

### Broad-leaved Evergreens

There has been practically no major injury to the leaves of most of the broad-leaved and narrow-leaved evergreens. *Ilex crenata* varieties, *I. pedunculosa*, *I. yunnanensis*, *I. opaca*, most of the *Buxus sempervirens* and *B. microphylla* varieties, *Berberis verruculosa*, *B. julianae*, *B. chenaultii* and *Lonicera henryi* are all in perfect leaf condition. Exceptions are the following:

Berberis sargentiana – all leaves killed, proving again that this is not a good evergreen for this area.

Buxus 'Curly Locks' – 25% of the leaves were injured.

" 'Newport Blue' – 50% of the leaves killed.

" 'Tide Hill' – all the leaves killed on two small plants.

Euonymus 'Berry Hill' – 25% of the leaves killed. However, E. 'Dupont' and 'Manhattan' are uninjured and 'Sarcoxie,' growing with the same exposure as 'Berry Hill,' is in perfect condition — proving that this is one of the hardier of the new varieties.

Mahonia aquifolium – a few of the top leaves burned.

Prunus laurocerasus schipkaensis – only the top leaves and twigs were killed.

### Flower Buds of Deciduous Plants Killed

Abeliophyllum distichum – 90% killed.

Chaenomeles – The flower buds of many varieties exposed above the snow line have been killed. Exceptions seem to be those of 'Marmorata' and 'Simonii.'

Corylopsis veitchiana (but those of C. pauciflora and spicata were not injured).

Lonicera fragrantissima

" purpusii

Magnolia soulangiana 'Candolleana' (but other varieties not harmed).

Rhododendron 'Charles Dickens'

**PLATE IV**
Prunus sargentii 'Columnaris'

Rhododendron 'Cunningham's White'
" 'Dr. H. C. Dresselhuys'
" minus – some injury. However, some rhododendrons that had flower buds killed in the severe winter of 1957–58 were not injured this past winter; for example, *R. laetvirens*, *R. smirnowii*, *R.* 'Henrietta Sargent,' 'Norma,' 'Purpureum Grandiflorum' and 'Roseum Superbum.'

Those interested in the spring displays in the Arnold Arboretum will be glad to know that none of the following had flower bud injury:

Cornus florida
Cytisus praecox
Davidia involucrata
Malus species and varieties, most of which are seldom injured.
Pieris floribunda and P. japonica (but considerable flower bud injury above the snow line at the Case Estates, Weston).
Prunus – none of the cherries seem to be injured.
Rhododendrons and azaleas (including R. obtusum kaempferi).
Viburnum burkwoodii and V. carlcephalum.

All in all, it has been a normal winter. At this time (March 29) it is difficult to say whether the spring bloom is retarded or advanced. Up to this time, *Hamamelis* species and *Daphne mezerum* have bloomed on schedule.

Many people are interested in knowing whether the spring is "early" or "late." One way we have of comparing the season with others, at this time, is to note when a certain willow tree, observed from this office window, has first shown a definite green color—giving a clear comparison of "early" and "late" springs:

| | |
|---|---|
| 1950—April 28 | 1956—May 3 |
| 1951—April 8 | 1957—April 21 |
| 1952—April 19 | 1958—April 16 |
| 1953—April 5 | 1959—April 25 |
| 1954—April 15 | 1960—April 15 |
| | 1961—April 25 (estimate) |

DONALD WYMAN

*Note:* This was proofread on April 13, after days of cold, some rain and considerable snow. There is nothing like New England weather! *Cornus mas* is not even in bloom yet—it should have been ten days ago.

# ARNOLDIA

A continuation of the
BULLETIN OF POPULAR INFORMATION
of the Arnold Arboretum, Harvard University

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## REGISTRATION LISTS OF CULTIVAR NAMES IN THE GENUS PIERIS D. DON

THE procedures followed in compiling the lists of names applied to cultivars in *Pieris* are those followed in previous registration lists published in this journal. The presence of an asterisk following a cultivar name in the alphabetical list indicates a cultivar presently being grown in North America. The words "*nomen nudum*" indicate cultivar names which have not been described and for that reason considered illegitimate.

Additions and corrections to the list accompanied by a reference to a valid publication or by application for registration will be welcomed. All information of this nature should be addressed to the author.

### Alphabetical List

Albo Marginata (japonica)
Bonsai (japonica)*
Chandleri (formosa var. forrestii)
Chandleri (japonica)
Compacta (japonica)*
Compact (japonica)*
Crispa (japonica)*
Dorothy Wyckoff (japonica)*
Elegantissima (japonica)
Elongata (floribunda)
Flame of the Forest (japonica × formosa var. forrestii 'Wakehurst')
Flamingo (japonica)*
Forest Flame (japonica × formosa var. forrestii 'Wakehurst')*
Grandiflora (floribunda)
Jermyns (formosa var. forrestii)

Minima (japonica)
Nana compacta (japonica)
Pink Bud (japonica)*
Pygmaea (japonica)*
Rosea (japonica)
Variegata (japonica)*
Variegata Nana (japonica)
Wakehurst (formosa var. forrestii)
Whitecaps (japonica)*
White Cascade (japonica)*
White Rim (japonica)

**Bibliographic List**

Pieris floribunda (Pursh) Bentham & Hooker f., Genera Plantarum 2: 588. 1876.

'Elongata' (Jour. Roy. Hort. Soc. 63: 295. 1938). Described as "quite distinct from the type plant. The time of flowering is some weeks later, the flowers are larger and the panicles longer."

'Grandiflora' (Herm. A. Hesse, Weener, Hanover, Germany, Preisliste 1927/28: 72. 1927). Originally appearing as an undescribed catalogue name this selection has not been listed since 1930. Competing with a later generally established cultivar name which has been widely described this name is rejected as a *nomen nudum* and under the provisions of Article 31 of the International Code of Nomenclature for Cultivated Plants.

'Grandiflora' (Hillier & Sons, Winchester, England, Catalogue of Trees and Shrubs 49T: 78. 1949). Selected by Messrs. D. Steward and Son, Ltd., Ferndown, Dorset, England. Selected from seed first sown in 1934 or 1935. First flowered in 1938. Described as, "Notable for its unusually long flower racemes."

Pieris formosa (Wall.) D. Don var forrestii (Harrow) Airy-Shaw, Bot. Mag. 157: t. 9371. 1934.

'Chandleri' (R. E. Harrison, Handbook of Trees and Shrubs for the Southern Hemisphere 251. 1959. = *P. japonica* 'Chandleri'

'Jermyns' (Jour. Roy. Hort. Soc. 84: 377. 1959). "This form has reticulate, lustrous leaves about $3\frac{1}{2}$ inches long and 1 inch wide and carries loose, terminal panicles of flowers consisting of about 6 racemes 4–5 inches long. The rachis and sepals are deeply tinted with red and are emphasized by the pendent, urceolate, white corollas."

'Wakehurst' (Jour. Roy. Hort. Soc. 82: 309. 1957). "It differs from the type in that the leaves are relatively short and broad. Somewhat clustered at the ends of the shoots, the dark green leaves are elliptic-oblong, acuminate,

finely serrulate, glabrous, from 2 to 4 inches long, and $\frac{3}{4}$ inch wide. The deep red colour of the young foliage sets off the pure glistening white of the flowers most handsomely. The flowers are carried in terminal spreading panicles, 5 inches long and broad, and are urn-shaped, bluntly lobed and $\frac{1}{3}$ inch across."

Pieris japonica (Thunb.) G. Don, Gen. Hist. Dichlam. Pl. 3: 832. 1834.

'Albo Marginata' (Maximowicz in Bull. Acad. Sci. St. Petersb. 18: 49. 1873). Although clearly the earliest name applied to the variegated selection of this species no description accompanied the publication of the name. No manual has used this name for the past fifty years, all authors taking up the validly described name 'Variegata.' The name 'Albo Marginata' is rejected as a *nomen nudum* and under the provisions of Article 31 of the International Code of Nomenclature for Cultivated Plants. ='Variegata'

'Bonsai' (Alpenglow Gardens, New Westminster, Brit. Columbia, Canada, Catalogue 1957). "Very dwarf with leaves and flowers similar to *P. japonica.*"

'Chandleri' (Como Nurseries, The Basin, Victoria, Australia, Catalogue 1954). "In this form, the young foliage, on unfolding is a beautiful pink salmon, changing to a glossy cream, and finally white, before passing off to deep green."

'Compacta' (Westbury Rose Co., Inc., Long Island, New York, Spring Catalogue 1949). "A compact plant, six feet tall and very dense in growth with foliage averaging one-half the size of neighboring plants."

'Compact' (Registered by Peter Vermeulen, Neshanic Station, New Jersey, 1961). A compact plant with foliage of normal size.

'Crispa' (A. Rehder in Jour. Arnold Arboretum 27: 173. 1946). "Leaves strongly undulate crispate."

'Dorothy Wyckoff' (Registered by Henry J. Hohman, Kingsville, Maryland 1960). "Growth habit, compact; leaves very rich dark green in summer, turning a handsome reddish-green in winter. The flower buds during winter are deep, dark-red, and in spring when beginning to swell are red to very dark pink, and when flowers open they are a fine true pink, not pale to white."

'Elegantissima' (A. D. Webster, Hardy Ornamental Flowering Trees and Shrubs 86. 1893). ='Variegata'

'Flamingo' (Registered by Lambert Gardens, 5120 S.E. 28th Ave., Portland 2, Oregon 1961). "Deep pink panicles which do not fade. Panicle size—11 cm. Florets 9 mm. long by 7 mm. wide. Leaf slightly rounder than *Pieris japonica.* New growth bronzy-red."

'Minima' (H. Lincoln Foster, Norfolk, Conn., in Amer. Rock Gard. Soc. Bull. 7: 96. 1949). "4 inches tall and 3 inches wide after four growing seasons." No longer in cultivation.

'Nana Compacta' (Herm. A. Hesse, Weener, Hanover, Germany, Preisliste 1951/52: 42. 1951). = 'Pygmaea'

'Pink Bud' (John Vermeulen & Son, Neshanic Station, New Jersey, Catalogue 1960: 17. 1960). Buds and newly opened flowers pink.

'Pygmaea' (Maximowicz in Bull. Acad. Sci. St. Petersb. 18: 49. 1872). Dwarf form, "the leaves are small, linear-lanceolate, crenate, usually $\frac{1}{2}$–1 inch long. The flowers are mostly in simple racemes, and of ordinary form and size."

'Rosea' (L. N. Roberson Company, 1539 East 103rd Street, Seattle 55, Washington, Catalogue 1952). Flowers pale pink. No longer perpetuated by the introducer.

'Rosea' (Plant Buyer's Guide 6th edition: 218. 1958). An undescribed selection first appearing in a 1958 handwritten supplement to the catalogue of Kingsville Nurseries, Kingsville, Maryland. No longer offered for sale. Rejected as a later homonym of *P. japonica* 'Rosea' L. N. Roberson, Portland, Oregon 1952.

'Variegata' (Carriere in Rev. Hort. 1881: 328. 1881). Described as bearing leaves with white margins and apices.

'Variegata Nana' (Otto & Sons, Boskoop, Netherlands, Catalogue 1954). = 'Variegata'

'Whitecaps' (Registered by Peter Vermeulen, Neshanic Station, New Jersey, 1961). "It has exceptionally long flower clusters and in its location the blooms last for about six weeks. The color of the flowers is pure white and they are more outstanding than those on other plants of the same species nearby."

'White Cascade' (Registered by Raymond P. Korbobo, Middlesex, New Jersey, 1961). "Perfectly clear white flowers; full flower clusters; fully clothed with foliage all around; flowers stay white for 5 weeks; produces heavy flower set each year."

'White Rim' (Mayfair Nurseries, Bergenfield, New Jersey, Catalogue 1948). = 'Variegata'

Pieris japonica Don × P. formosa var. forrestii 'Wakehurst'

'Flame of the Forest' (Sunningdale Nurseries, Windlesham, Surrey, England, Catalogue 1952). = 'Forest Flame'

'Forest Flame' (Sunningdale Nurseries, Windlesham, Surrey, England, Catalogue 1959). Combines the hardiness of *P. japonica* with the foliage characteristics of *P. japonica* var. *forrestii* 'Wakehurst.' Name changed from 'Flame of the Forest' to conform to the International Code of Nomenclature for Cultivated Plants.

BURDETTE L. WAGENKNECHT

# ARNOLDIA

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## THE BEST ORNAMENTAL SPIREAS*

SPIREAS, as a group, are not a very important part of the garden picture. A few have been extremely popular, and at least one may have been over planted in the past. Of the many species and varieties, 84 are growing in the Arnold Arboretum and only half that number are offered by American nurseries.

In the recommended list are only 28 species and varieties which I think are worthy of consideration for landscape planting, a too large number made necessary because there is a spread of nearly three months in the time of bloom. Also these recommended range in height from 1 to 12 feet, so that actually there are none too many for specific purposes.

There are several native to North America but these have not been selected as worthy landscape plants. *Spiraea latifolia* is the hardiest of all (Zone 2) and grows about four feet tall with white to pink flowers in pyramidal spikes, but it is only planted in the coldest regions (if at all) where other plants are not hardy.

*Spiraea tomentosa*, the native Hardhack Spirea of the eastern United States, is a weedy, three foot high shrub with poor foliage, possibly looking well in old cow pastures where it is native but suited for little else than in naturalistic plantings. It is listed by only a few United States nurseries.

The majority of those recommended are hardy in either Zone 4 or 5. Other than those already mentioned, it is highly probable that most spireas would suffer winter injury and hence require much renewal pruning if tried in colder areas, although there may be a few exceptions. For instance, F. L Skinner of Dropmore, Manitoba, Canada, lists *Spiraea bumalda* 'Anthony Waterer,' *billiardi*, *media sericea*, *menziesi*, *pikoviensis*, *trichocarpa* and *trilobata*.

As a group they are valued chiefly for their flowers. None have ornamental

* Spirea is the correct spelling of the common name, but *Spiraea* is correct for the generic scientific name. This article is from a recent series by the author, appearing in the American Nurseryman.

fruits. Only a few like *S. prunifolia* and *thunbergii* may have autumn color worth mentioning.

Concerning the time of bloom, they are listed below in groups as they bloom in the vicinity of Boston, Mass.

| **Early May** | **June** | **Early to Mid-July** |
|---|---|---|
| thunbergii | brachybotrys | albiflora |
| | decumbens | bumalda |
| **Mid-May** | margaritae | canescens |
| arguta | nipponica | japonica |
| multiflora | superba | |
| prunifolia | trichocarpa | **July-August** |
| | veitchii | bullata |
| **Late May** | wilsonii | |
| cantoniensis | | |
| vanhouttei | | |

Most growers know that spireas can be divided into two groups for pruning purposes. Those that bloom on the previous year's growth (i e., the early flowering ones) should be pruned before they flower. In fact, if this is done in the very early spring this is one of the ways to increase the size of the flower clusters of such species as *bumalda*, *japonica* and *margaritae*. Other species blooming on the current year's growth are *aibiflora*, *bullata* and *canescens*. (All the others in the recommended list bloom on the previous year's growth.)

As a group the spireas are thought of as having small, creamy white flowers in flat clusters or pyramidal spikes. Mention must be made of four species with pink flowers (*brachybotrys*, *bullata*, *margaritae* and *superba*) and two species with deep pink and almost red flowers—*bumalda* and *japonica*.

'Anthony Waterer' is perhaps the most popular of all low red flowered spireas, but *bumalda crispa* has flowers practically the same color and much better foliage. Both are about two feet tall, while the *japonica* varieties are about twice that height. These are undoubtedly mixed up or misnamed in the trade. The variety with the darkest red flowers of all the spireas is *S. japonica atrosanguinea*. The variety *ruberrima* has lighter colored flowers but they are still an excellent deep pink.

Finally, mention should be made of height and habit of these spireas. The lowest ones are *decumbens* and *bullata* which are 12 inches and 15 inches tall respectively—suitable only for planting in limited situations. *Spiraea albiflora* is only 18 inches high and the *bumalda* varieties about two feet. The tallest of the recommended spireas is *S. veitchii*—about 12 feet high. There must be a lot of planting room available to put in such a plant requiring an area of at least 225 square feet, where better shrubs like viburnums or rhododendrons would give much longer ornamental interest.

**PLATE V**

Spiraea veitchii, one of the tallest spireas.

It must be admitted that species like *S. arguta* and *vanhouttei* have a gracefully arching habit which is difficult to improve upon, especially when the branches are covered with flowers.

Spireas are easily propagated by cuttings, grow fast and so make saleable plants in a short time. They have no serious insect or disease pests, can be harshly pruned and recover quickly, and so have been used as cheap landscape "fillers" in many situations. As they mature they frequently require renewal pruning. The discerning plantsman will not grow many spireas, and the more valuable the garden space available, the fewer are the spireas that should be considered for it.

### Recommended Spireas

**albiflora** 1½′ Z 4 Japan Japanese White Spirea

This species is in many nurseries as *S. japonica alba* which is actually a synonym. It is a fine July-blooming, low, white spirea, which can be used to excellent advantage with the pink to red flowering *S. japonica* which is taller. It is also good to use in combination with *S. bumalda*.

**×arguta** 5–6′ (*thunbergii*×*multiflora*) Garland Spirea

Originating before 1884, this is the most free flowering of the early spireas blooming in mid-May. The white flowers are borne in small umbels on arching branches, making it excellent for specimen planting.

*compacta*—The plant in the Arnold Arboretum is still pretty small but it looks as if it might have merit for ornamental planting.

**×brachybotrys** 8′ Z 4 (*canescens*×*douglasii*)

One of the best of the taller summer blooming spireas with small, bright pink flowers in panicles 1½–3 inches long. Blooms in late June.

**bullata** 15″ Z 5 Japan

Flowers deep rosy pink, July and August—only valued as a dwarf shrub.

**×bumalda crispa** 2′ Z 5 (*japonica*×*albiflora*)

Bright crimson flowers in flat clusters sometimes as much as 6 inches in diameter, the same color as those of 'Anthony Waterer.' This is of particular interest because of its leaves that are slightly twisted or crinkled, making it an excellent specimen for its foliage as well as its bright flowers.

**×bumalda froebelii** 3′ Z 5 (*japonica*×*albiflora*) Froebel Spirea

With bright crimson flowers this is a popular plant among many U.S. nurserymen because the secondary growth is sufficiently tall and vigorous to cover the dead flower heads produced in early to mid-July.

**PLATE VI**
Spiraea bumalda crispa

×**bumalda** 'Anthony Waterer' 2′ Z 5

A very low, crimson flowered spirea, popular since 1890 when it originated. The young foliage is tinged pink as it first appears in the early spring. The flowers first appear in late June.

×**bumalda** 'Norman' 10″ tall, compact and very rare. The foliage is brown turning a raspberry purple in the fall and the flowers are rosy pink. *Note:* There are one or two other low 'mound like' spireas being offered in the trade, none of which I have yet seen but which may belong here. One is listed as *S. bumalda alpina* with pink flowers and another is listed as *S. digitata nana* with raspberry red flowers. The plant is reportedly only 4 inches tall and is supposed to come from Siberia.

**canescens** 6–10′ Z 7 Himalayas Hoary Spirea

Blooming in July with clusters of white flowers 2 inches in diameter, borne on the upper side of gracefully arching branches.

**cantoniensis** 3′ Z 6 China and Japan Reeve's Spirea

Sometimes incorrectly termed *S. reevesiana*, this is often considered even a better ornamental than the very popular *S. vanhouttei*, although the latter is more hardy. In parts of California it keeps its foliage a greater part of the year. The small, rounded white flower clusters are only 1–2″ in diameter and appear in late May.

**decumbens** 1′ Z 5 Southern Europe

Of special interest for rockeries, this low European, white flowering spirea is extremely difficult to find in American nurseries at present.

**japonica** 4½ Z 5 Japan Japanese Spirea

A handsome Japanese spirea but its height is sometimes against it, forcing people to use the lower *S. bumalda* varieties. However, the flowers are pale to deep pink, sometimes white, appearing in mid-June.

**japonica atrosanguinea** Mikado Spirea

This has the deepest red flowers of any spirea, the flat flower clusters often being 4–5″ in diameter.

**japonica ovalifolia**—flowers white.

**japonica ruberrima**—flowers a deeper pink than those of the species.

×**margaritae** 4′ Z 4 (*japonica*×*superba*) Margarita Spirea

With flat clusters of rosy pink flowers in late June. If the plant is thinned out

in the late winter and the few remaining shoots cut back to about one foot, it should be covered with blooms by late June, the blooms being from 3–6 inches in diameter. It may bloom a second or even a third time during the summer.

**×multiflora** 5′ Z 4 (*crenata*×*hypericifolia*) Snow Garland Spirea

An excellent hybrid originating before 1884 with long slightly arched branches covered with small white flower clusters in May. This does very well indeed in the Dakotas, apparently better than in New England. Sometimes incorrectly listed as *S. multiflora arguta*.

**nipponica rotundifolia** 7′ Z 4 Japan Big Nippon Spirea

With bluish green foliage, this shrub is rather stiff and not as graceful as others. The small clusters of white flowers are numerous, appearing in late May. It has larger leaves and flowers than the species, hence is recommended.

**prunifolia** 9′ Z 4 Japan and China Bridalwreath

The small double white, button sized flowers in mid-May are this plant's popular feature. However, it is one of the very few spireas which has red to orange autumn color in the fall. The single flowered variety, *simplicissiflora*, does not make nearly as good an ornamental. There is no such variety as *plena* or *floreplena*. This double flowered plant was the first to be found by botanists in the Orient (1843) and was given the specific name *prunifolia*. When the single flowered form was found *later*, it was given the varietal name. Usually the sequence is just reversed.

**×superba** 3′ Z 4 (*albiflora*×*corymbosa*) Striped Spirea

Only valued because of its late June flowers (light rose) and its low height.

**thunbergii** 5′ Z 4 Japan and China Thunberg Spirea

Single white flowers in early May, this is usually the first of the spireas to bloom. The leaves are small and pointed, the plant is graceful and finely branched and the foliage may turn orange in the fall under some conditions. However, it does better in the Middle Atlantic States and the South than in New England where it tends to be killed back somewhat by winter cold or where late spring frosts injure the early blossoms.

**thunbergii compacta**—I have not seen this plant but if correctly named it should have merit.

**trichocarpa** 6′ Z 5 Korea Korean Spirea

Somewhat similar to *S. nipponica* and its varieties but it has larger flower clusters than *S. vanhouttei* and blooms shortly afterwards.

**trichocarpa erecta**—according to F. L. Skinner this is more compact, more dwarf than the species; flowers and flowering habit are similar.

**×vanhouttei** 6′ Z 4 (*cantoniensis*×*trilobata*) Vanhoutte Spirea

Originating before 1868, this has become the most popular of all the spireas. It blooms in late May. Its arching habit is one of its best assets.

**veitchii** 12′ Z 5 Central and West China Veitch Spirea

The tallest of the spireas with flat white flower clusters about 2 inches in diameter during mid-June.

**wilsonii** 7′ Z 5 Central and Western China Wilson Spirea

In general this looks like *S. vanhouttei* but blooms slightly later—in early June.

### Dropmore Hybrids needing more trial

The following three hybrids have originated at the Dropmore Nurseries of F. L. Skinner, Dropmore, Manitoba, Canada. Presumably they are hardy there in extremely low winter temperatures.

'Rosabella' (*S. betulifolia* hybrid) 12–15′ tall with flat panicles of pink flowers throughout the summer, $2\frac{1}{2}$′ tall; flower clusters terminal and 6″ in diameter. They are a washed pink, not a good color.

'Snow White' (*S. trichocarpa*×*trilobata*) The foliage is larger and a paler green and the individual flowers are slightly larger than those of *S. vanhouttei* which it closely resembles. However, 'Snow White' is quite hardy at Dropmore and *S. vanhouttei* is not.

'Summer Snow' (*S. betulifolia*×*media*) 2′ tall, with flat panicles of white flowers starting the end of June and blooming until the end of August.

Other spireas needing further study are listed in the trade as:

*bumalda alpina*—"low cushion type with pink flowers."

*digitata nana*—"with raspberry red flowers, the plant being only 4 inches tall and from Siberia."

DONALD WYMAN

# ARNOLDIA

A continuation of the
BULLETIN OF POPULAR INFORMATION
of the Arnold Arboretum, Harvard University

VOLUME 21 | JUNE 23, 1961 | NUMBER 10

## LIQUIDAMBAR

THE sweetgum (*Liquidambar styraciflua* L.), also known as redgum or star-leaved gum, is a very common tree in the forests of southeastern United States, extending as far north as southeastern Connecticut. Under favorable conditions sweetgum develops into a large tree, 80–100 feet tall and with a trunk 2–4 feet in diameter. The largest specimen on record* at the present time is 112 feet tall and 16 feet 6 inches in diameter. There are several aspects of the sweetgum which are both interesting and ornamental at various seasons of the year, making it a rather popular tree for cultivation.

The trunk is usually long and straight, often with a buttressed base; the latter being especially prevalent in wet, swampy habitats. The bark is dark and deeply furrowed, and the branches are often winged with corky ridges. While the tree is young and growing vigorously it has a long, regular, conical-shaped crown, giving the tree a growth form somewhat resembling that of a conifer. After most of the height growth is obtained, however, the crown begins to spread and becomes more oval or rounded in shape.

The leaves are star-shaped, usually with 5–7 points, and with finely-toothed margins (Plate VII). At maturity the leaves are smooth, bright green and shining, and contain a pleasantly-scented essential oil which is given off when the leaves are bruised or crushed. In the fall, sweetgum leaves show a great deal of variation in their coloring. Typically they turn a deep red or crimson, but at different times they will exhibit a range in color from pale yellow to deep blue-violet.

The flowers of sweetgum, though inconspicuous and often unobserved, are interesting in many respects. In the southern states they appear in March and April, whereas in New England they usually appear in late April or May. The male and female flowers are separate, although both occur on the same tree. The male flowers are in terminal racemes 2–3 inches long, and consist of small, sphe-

* American Forests 1956, 4:39.

roid heads of stamens surrounded by hairy bracts. The female flowers occur in solitary heads composed of numerous pistils with two broad, curved stigma lobes. The female flowers often develop small, non-functional stamens also, indicating that the sweetgum probably evolved from a form which had bisexual flowers. The heads of female flowers develop into the familiar "sweetgum balls" which are actually compound fruits composed of many small capsules (Plate VIII). The capsules have two short beaks, and are subtended by small, pointed scales. The fruits mature in September, but usually remain on the tree throughout the winter. The seeds are described in detail below under propagation.

### Habit and Tolerance

The American sweetgum is a typical southern bottomland species, and prefers rich, moist, well-drained, alluvial soils. It is especially abundant in the Mississippi Delta region, where it is the most common and widely distributed single tree species. Found on a great variety of sites in this region, sweetgum is tolerant of many different soil types, but does not do well on poorly drained, clay soils.

Throughout its life sweetgum is very intolerant of shade. Under the dense canopy of the bottomland forests few sweetgum seedlings are ever encountered. Although seedlings often develop in the more open pine forests on drier sites, they seldom reach maturity. Usually seedlings develop only in clearings or open areas in the forest. Abandoned fields are quickly invaded by sweetgum, and here it is often found in dense, even-aged stands. Seldom does one encounter an "over-topped" sweetgum tree, for it dies quickly if shaded. For this reason sweetgum is usually a dominant or canopy tree.

The root system varies considerably in different habitats. Generally the trees in bottomlands have a fairly large taproot, with extensive, well-developed lateral branches. On hillsides and in drier regions the root system is much deeper, with a very large taproot. In very wet swampland the tree does not develop a taproot at all, the root system as a whole being very shallow and spreading, with many small, profusely-branching lateral roots.

### Species, Forms and Cultivars of *Liquidambar*

Sweetgum is a member of the witchhazel family (Hamamelidaceae) and is not related to the blackgum or tupelo (*Nyssa*) as is commonly believed. Other members of this family which are in cultivation include the witchhazel (*Hamamelis*), bottlebrush (*Fothergilla*), and winterhazel (*Corylopsis*). Within the Hamamelidaceae *Liquidambar* is quite different from the other genera, however, and some botanists have suggested that perhaps it should be placed in a separate family. Members of this genus differ not only in structure but also in chromosome number. Most members of the Hamamelidaceae have 12 pairs of chromosomes or a multiple of 12, whereas *Liquidambar* has 15 pairs of chromosomes.

In addition to the American sweetgum there are two Asiatic species of *Liquidambar* which are occasionally cultivated in some areas of the United States.

*Liquidambar formosana* Hance, a native of southern China and Formosa, is distinguished by its three-lobed leaves. The lobes are serrate and usually broadly ovate with acute or acuminate tips. The fruiting heads of *Liquidambar formosana* are also distinct, having slender, persistent styles and elongate, awl-shaped scales surrounding the capsules. The second Asiatic species, *Liquidambar orientalis* Mill. is native to Asia Minor. It is distinguished from other species of *Liquidambar* by its deeply incised leaves which somewhat resemble those of the Japanese maple. The fruiting head of *Liquidambar orientalis* is similar to the American species, having short beaks and scales.

In addition to the above species, the following forms and cultivars of *Liquidambar* have been selected and introduced into cultivation.

*Liquidambar styraciflua* f. *rotundiloba* Rehd. This form has leaves with short, rounded lobes and only faintly serrulate margins, in contrast to the pointed lobes and distinctly serrate margins found on leaves of the normal species. The tree was found near Pinehurst, North Carolina by Mr. R. E. Wicker.

*Liquidambar styraciflua* f. *pendula* Rehd. This form has a straight trunk which bends over at the very top, and pendulous branches of uniform size that turn abruptly downward, giving the tree a somewhat columnar appearance. The overall shape will probably become more rounded in older trees, however, as is generally true of the species. This form was discovered in 1935 near Hatton, Arkansas by Miss Sara W. Crawford.

*Liquidambar styraciflua* f. *suberosa* Schwerin. This form was described in 1933 as having branches with unusually thick, corky wings. It differs very little from the normal species, however, which likewise usually has thick corky wings, and is thus hardly worth distinguishing.

*Liquidambar styraciflua* 'Palo Alto.' This is the first, and to my knowledge the only cultivar that has been selected from the American sweetgum. It was introduced into cultivation by the Saratoga Horticultural Foundation in California. The cultivar is described as a well proportioned, pyramidal tree with rich green leaves which turn a bright orange-red in autumn. The distinctive characteristic of this tree is its autumn coloration which is not only exceptionally brilliant, but also uniform over the entire tree. According to Dr. Maunsell Van Rensselaer, Director of the Saratoga Horticultural Foundation, *Liquidambar* 'Palo Alto' has become very popular in California and is being specified by landscape architects and park superintendents in many parts of the state.

*Liquidambar styraciflua aurea.* I have been unable to locate any information on the origin or introduction of this plant. It is a yellow variegated form which retains its yellow coloration throughout the growing season. The variegation is not uniform, however, which probably accounts for its lack of popularity as a cultivated plant.

*Liquidambar formosana* 'Afterglow.' Another selection from the Saratoga Horticultural Foundation, this is the first cultivar to be named in the Chinese species. The three-lobed leaves are described as downy and violet-red while young, turning to delicate shades of old rose in autumn.

## Styrax

The name sweetgum is derived from the tree's gum-like exudate, usually termed styrax, but often erroneously called storax. This product has a long and somewhat confused history. At an early date it was confused with a similar product derived from a different Asiatic plant, *Styrax officinale*. The terms styrax and storax (both of which were derived from the same Greek word) were used interchangeably in referring to these two substances. In order to clarify the situation a convention was adopted by some of the earlier writers of Materia Medica to use the term styrax to refer to the resin of *Liquidambar*, and the term storax to refer to the resin of *Styrax officinale*. It is unfortunate that the terms were not reversed at that time, for the convention and the resulting confusion have been retained to the present time.

The original styrax, and that which has been of most importance commercially, was derived from *Liquidambar orientalis*, the species native to Asia Minor. The product of the American sweetgum is almost identical to that of the Asiatic species, however, and has been used commercially to a small extent. A small amount of styrax is also derived from the third species, *Liquidambar formosana*, but this is primarily for local use and has never been of much importance commercially.

The sweetgum trees develop this resin as a response to injury. When the trunk of a tree is injured in some manner, such as by a cut or a bruise, a series of small canals is formed in the inner bark near the injured area. These canals are formed by a pulling apart of some of the cells. Specialized cells then develop along the margins of the canals and secrete the resin which flows through the canals to the wounded area. It has been suggested that this resin secretion serves a useful purpose in the healing of the tree's wounds, but the manner in which it functions in this respect has not been verified. Possibly it is a means of preventing insects or fungi from invading an injured area.

The use of styrax has declined considerably in recent years, but historically styrax ranks high among medicinal plant products. The early history of its use is now quite vague and it is not known just how long this product has been in use. It likely predates the birth of Christ, for there are authenticated records as early as the seventh century A.D. describing a pharmaceutical preparation by the name of "Zygia" which was composed primarily of styrax. Practically all of the writers on Materia Medica have a few words to say about the use of styrax. It was once an important constituent in many of the pharmaceutical preparations and "all purpose drugs" used by the early physicians. It was also used in fumigatories, incenses, and perfumes. The residue remaining after pressing the inner bark was

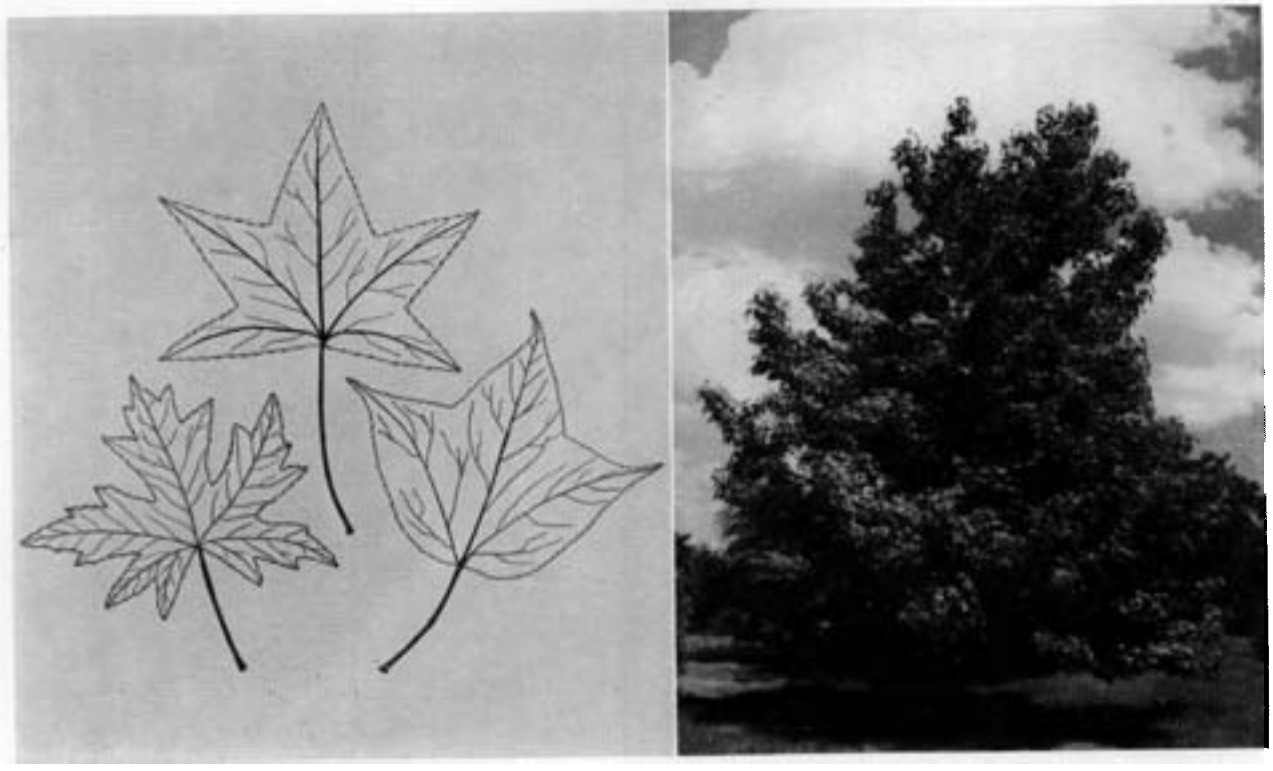

**PLATE VII**

(Left) Leaf shapes of the three species of *Liquidambar*. Bottom left, *L. orientalis;* bottom right, *L. formosana;* top, *L. styraciflua*. Magnification ca. 1/3×. (Right) *Liquidambar styraciflua* growing in the Arnold Arboretum. This specimen is approximately 25 years old.

commonly used in churches as an incense. The resin itself was eaten in the pure form, used as a salve or balm, or adulterated in a multitude of different ways.

Some of the magical properties attributed to the resin were, in some instances, associated with the entire tree. In one of the old volumes of Chinese Materia Medica, Pen Ts'ao Kang Mu (1595) gives one of the most all-inclusive lists of ailments that were treated with styrax and other parts of the sweetgum tree. He said that styrax is used chiefly to cure swellings, toothache, scales, boils, ulcer, cancerous growth, and internal hemorrhage. He also states that it will help in healing cuts and wounds, especially those of the muscles, and that it helps circulation. The bark, he says, is used to cure dropsy, diabetes, dysentery, cholera, and colds. Preparations made from the roots and leaves were said to cure boils, ulcer and cancer; and preparations from the fruits were said to prevent the plague, clear the eyes, stop spasms, cure backaches, and general aching of the body.

Styrax was not considered to be quite such a cure-all in other Materia Medica of the sixteenth century, but it was certainly regarded as an important drug for several hundred years. Between the seventeenth and twentieth centuries the list of cures slowly diminished, and by the beginning of the present century the only ailment remaining on the list was ulcer. There is a patent medicine on the market even today by the name of "Storaxol" (containing styrax) which is used in the treatment of ulcers. Other than this, styrax is presently used as a balm and flavoring in a few pharmaceutical preparations; it is used in the preparation of certain adhesives, and to a small extent in the perfume and tobacco industries.

### Sweetgum blight

In recent years sweetgum trees over rather wide areas have been affected by a disorder referred to as sweetgum blight Affected trees are characterized by dieback of the upper branches and leaders, eventually leading to the death of the tree in severe cases.

The U.S. Forest Service* has made considerable effort to discover an organism or transmissible virus which is associated with this blight, but none has been found. Instead, it is now thought that environmental factors alone are responsible for the blight. The disorder was found to be most common in areas that are subject to extreme fluctuations in the amount of available water. This included both dry hillsides and low, poorly drained soils. In moist, but well-drained areas, where sweetgum reaches its best natural development, the occurrence of blight is very low, and in some areas non-existent. Thus the sweetgum blight is apparently quite different from the chestnut blight or the Dutch elm disease. The latter diseases pose a serious threat of extinction to certain species, whereas the sweetgum blight serves merely as a striking illustration of the ecological limitations of this species.

JOAB L. THOMAS

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*Toole, E. R. Sweetgum Blight. U.S. Dept. Agri. Forest Service, Forest Pest Leaflet 37. April 1959.

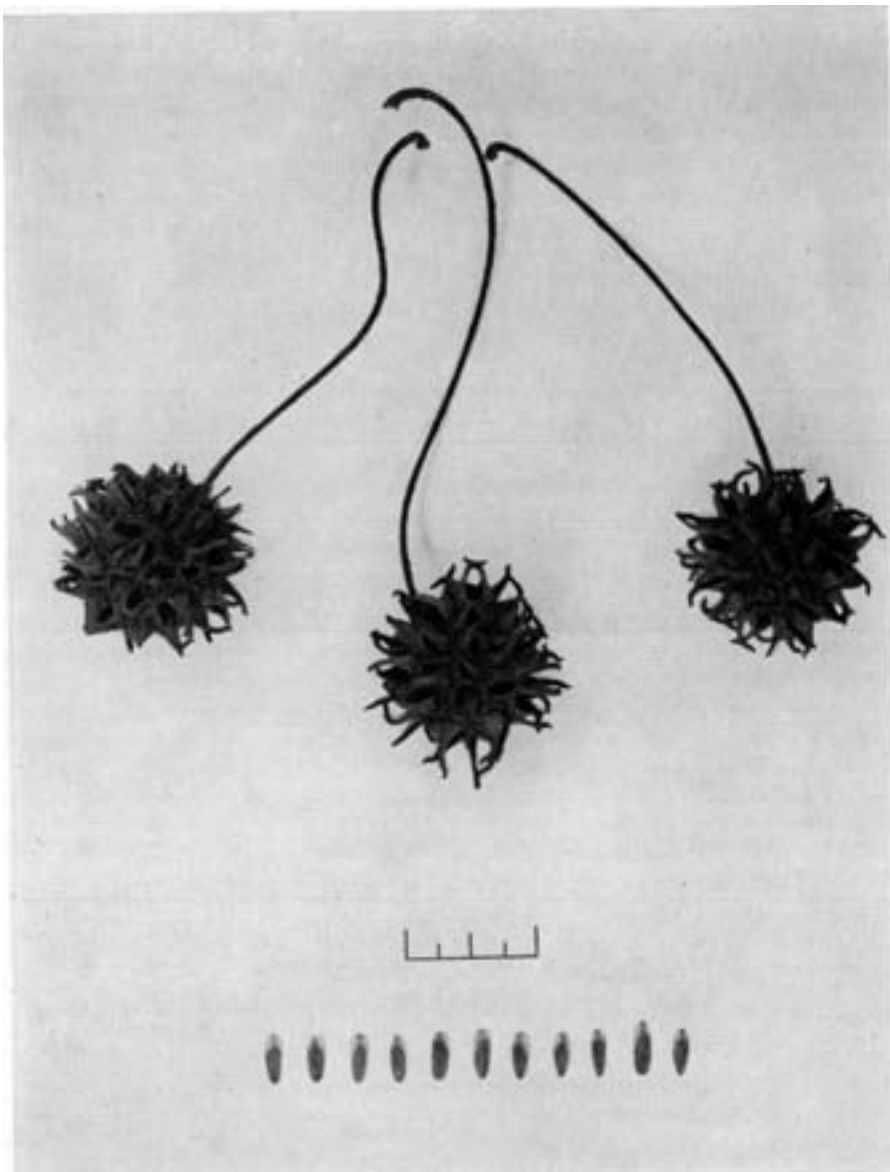

**PLATE VIII**

Fruits and seeds of *Liquidambar styraciflua*. Each division of the scale represents 1/2 cm.

## PROPAGATION OF LIQUIDAMBAR STYRACIFLUA

### Collection, Cleaning and Storage of Seeds

The round, spiny, aggregate fruit of *Liquidambar styraciflua* must be collected before dehiscence occurs or the seeds will be lost by natural distribution. This occurrence will vary with location and season. Observation at the Arnold Arboretum in 1960 revealed that fruits gathered during the last week in September were intact, while those collected after the first week in October had shed their seeds.

When the collected fruits are provided with a warm dry location, the capsules will open to release the seeds in a week or two. Small quantities of fruit stored in a paper bag can be shaken to separate the seeds from the fruits after dehiscence has taken place. Relative sizes of fruits and seeds make cleaning by two screenings a simple process. First, a screen of large mesh such as one-half inch can be used to separate the sound and abortive seeds from the fruits. Second, a screen with ten squares to the inch will retain the sound seeds but permit the small abortive seeds, which always seem to be present in large amounts, to pass through.

Plate VIII depicts fruiting heads of *Liquidambar styraciflua* which comprise an aggregation of capsules, about 3 cm. in diameter together with the long slender peduncles on which they are borne. Also shown in this Plate are the winged seeds with dimensions of approximately 8 mm. long by 2.5 mm. wide. The wing, which aids in wind dispersal extends past the seed for a distance of about 2 mm.

### Seed Germination

Seeds of *Liquidambar styraciflua* to be sown out-of-doors in the spring can be stored dry until time for stratification. Either two or three months prior to sowing, the seeds are placed in a polyethylene bag with a medium composed of equal parts moist sand and peat moss. In proportion, the medium should be two or three times the volume of seeds. The bag is made vapor tight by twisting the mouth and binding it with a rubber band. It is then placed in a refrigerator set at about 41° for the two or three months stratification period. At sowing time the entire contents of the bag are sown.

With seeds processed indoors, the same course of action would be followed, but with the stratification period planned to provide germination and seedling growth in the lengthening days of late winter. When treated by this method, using either a two or three months stratification period, general germination occurs in about eighteen days.

### Cuttings

*Liguidambar styraciflua* will root from cuttings in high percentages when made in early July using half-ripe summer wood. Ray E. Halward (Plant Propagator 6 (2): 5. 1960), reports rooting of 90% when cuttings were taken at this season.

### Bud Grafting

*Liquidambar styraciflua* bud grafts readily. The varieties may be propagated by this method using the species as understock. To accomplish this, two-year-old seedling understocks are field planted in early spring while dormant. In the Massachusetts area these would be ready for shield budding in August.

ALFRED J. FORDHAM

# ARNOLDIA

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## HURRICANE "DONNA" AND ITS AFTER EFFECTS TO A CHATHAM, MASSACHUSETTS, GARDEN

WE have 8 acres here in Chatham, originally covered with native shrubs and trees and later cleared in some portions to allow for planting other material. The land slopes from a hill down to a salt water inlet; beyond is Stage Harbour and the open Atlantic. The southwest hurricane winds of "Donna" on Monday, September 12, 1960, had an unobstructed path to our property direct from the ocean; there is absolutely no cover between.

Wind damage was surprisingly slight; it was much more in evidence in the Middleboro, Bridgewater and Brockton areas. However, large limbs broke off on *Ailanthus altissima* and several tall trees of *Pinus rigida*. Another *Ailanthus altissima* was uprooted and many terminal twigs of *Pinus rigida* were strewn on the ground.

The other hurricanes experienced here, beginning with the hurricane of 1938, were accompanied by deluges of rain. This meant that although salt water spray was deposited on the foliage, the wash-off resulting from the heavy rains prevented any noticeable salt spray damage on this property. Hurricane "Donna," however, brought to Chatham a scant .20 inches of rain. Consequently, when the winds ceased, our windows on the southwest side of the house had the appearance of having been white-washed.

Some plants showed no ill effects whatever from this salt bath. We have 650 plants of *Pinus thunbergii*, most of them from 12 to 16 feet tall, and not a needle turned color. The only exceptions were the 10 trees which are variants from the type and the greater the variation from type, the more needles that were browned.

Following the hurricane, many trees and shrubs whose leaves were 100% browned put out new leaves all over. This was natural in view of the later fall rains and the warm temperatures which we enjoy on Cape Cod in September, October and November. Forsythia and one or two other shrubs even put out a few scattered flowers. Walking over the property in January, I was encouraged to see in general good leaf and flower buds on most plants.

## Holly Notes Interesting

Mr. Wilfrid Wheeler of Falmouth and Mr. Louis H. Carter of East Orleans, have compared notes with me on the hardiness of hollies in the Cape Cod area. A surprising number of them can be grown and with an expectancy of complete hardiness, although some survive better at Chatham than they do at Falmouth. Damage was greater there this past winter, not so much because of any vagaries of Hurricane "Donna," but because the winter temperatures there were lower (down to −12°F.) than at Chatham (+5°F.).

*Ilex opaca* showed a general die-back of 1–3″, whereas with *I. aquifolium*, presumed to be less hardy, many varieties went through unscathed in my plantings and even though the leaves may have shown a very slight injury, the twigs were in perfect condition, plump up to the end, in May 1961. The *Ilex aquifolium* varieties were badly injured at Falmouth. Some were killed outright, some were killed to the snow line, while others, at best, required severe pruning. The Chatham planting apparently had more salt spray than those at Falmouth. It seems a fair conclusion that *I. aquifolium* will come through a complete salt bath successfully when the following winter's lowest temperature is 5° F. or higher and the soil is good, but severe loss can be expected when salt spray is followed by winter temperatures of much below zero or when plants are growing in extremely poor, sandy soil.

Mr. Wilfrid Wheeler of Falmouth took holly cuttings early in 1961 from plants which had been exposed to Hurricane "Donna" and later observed that never in his long career did he have such difficulty in obtaining rooted cuttings, for only 60% of *Ilex aquifolium* cuttings rooted, in comparison with other years. Of *I. opaca* cuttings, some rooted normally, while others rooted only 15% as well as they had done in other years.

Given good soil and proper culture, it is evident that in an area with Chatham's temperatures a wide selection of *Ilex* species and varieties can be successfully grown, even to the accompaniment of a thorough salt bath. The varieties of *Ilex* in the following lists have been thoroughly hardy at Chatham, year after year, without any winter damage. The varieties of *Ilex opaca* growing at Chatham are:

| | | |
|---|---|---|
| Aaron | Emily | Pearle le Clair |
| Aalto #3 and 6 | Fallaw | Perpetual |
| Aalto Lunn | Freeman | Polly |
| Amy | Goldie | Robin Tree |
| Ashumet | Griscom | Ruth |
| Barberry | Kate | Sally |
| Barbosa | Laura Thomas | St. Ann |
| Betty Ann | Laurie | St. Mary |
| Big Tree | Lawrence | Vera |
| Davis | Mt. Vernon | |
| Elizabeth | Natale | |

The following are *Ilex aquifolium* varieties which are growing so successfully here and in Orleans. The asterisks (*) indicate those varieties which, through the years, have also proved hardy at Falmouth:

| | | |
|---|---|---|
| alcicornis | Father Charles | Lawson |
| *Alice | Fertilis | Moore |
| *altaclarensis | Firecracker | ovata |
| *Ames | *Glory | pendula |
| Angustifolia | Gold Gem | perado |
| Arnold | Gold Milkmaid | Pinto |
| Belgica | Golden Queen | recurva |
| *Boyce Thompson | *Goliath | Rederly |
| Brownell's Special | Green Knight | Scotia |
| *camelliaefolia | Green Maid | Shepherd |
| *ciliata major | *Hazel | Teufel's Dwarf |
| Echo | Henderson | Teufel's Hybrid |
| Escort | *James G. Esson | Whitney #2 & 3 |
| fructu-aurantiaco | *Jan Van Tol | Whitney Lunn |
| fructu-luteo | laurifolia | Wilson |

Also 17 other seedlings unnamed.

For those plants of *Ilex* that were damaged this year for the first time, undoubtedly due to salt spray injury, see page 71.

**Ilex crenata.** All named clones of the species *I. crenata* (Japanese holly) that we have tested thrive well. These include *compacta*, *convexa*, 'Glass,' 'Green Cushion,' 'Helleri,' 'Hetzii,' Howardi,' 'Longfellow,' *major*, *microphylla maculata*, *oleafera*, 'Stokes' and 'T 1' (Tingle).

**Miscellaneous species.** Other species proved perfectly hardy are *cornuta* (Chinese holly), varieties 'Burford,' 'National,' 'Rotunda,' and eleven seedlings and cuttings without names; *glabra* (the native Inkberry), *pedunculosa*, *pernyi* in four different forms, its variety *veitchii*, *verticillata* and the hybrid *aquipernyi* (*aquifolium* × *pernyi*).

### General Comments

Here are some general observations as a result of closely examining the plants subjected to this salt spray bath in September, 1960:

If a tree or shrub were in poor condition from whatever cause, it invariably suffered greater damage from salt spray than did healthy specimens of the same species.

Shrubs attempting an existence in what is largely Cape Cod sand were usually hurt more than the same species growing in good soil. Fortunately, our own soil is excellent and our material came through better than that of people whose soil

is chiefly sand. The damage was much more extensive in Falmouth than in Chatham. Because of this, apparently low temperatures in the winter also contributed to the injury, for Falmouth's low reading in the winter 1960–1961 was −15° F., while Chatham's was +5° F. Many of our shrubs showing 1–12″ dieback were a total loss in Falmouth.

### List of Woody Plants Observed

Explanation of symbols: **Bold Face**—Although some may have had the leaves partly or wholly burned with salt spray right after "Donna," these plants showed no injury nine months later.

*—Slight salt browning of foliage after hurricane; not serious.

‡—Leaves of entire shrub or tree browned immediately after hurricane.

If inches or feet are noted after the name, it indicates that the twigs died back just that much in the nine months after the hurricane.

Abelia grandiflora 1–3′ (slightly more than usual) *

Abies balsamea, few stems 6″ *

Acer palmatum atropurpureum 3–4′ ‡

Albizzia julibrissin rosea, one died; another 6″–2′ *

**Amelanchier canadensis**

**Arctostaphylos Uva-Ursi**

**Aronia arbutifolia**

" melanocarpa, 2–4′

Berberis thunbergii ‡

" " atropurpureum, few twigs, 2–4″

Berberis triacanthophora, most twigs, 3–6″

Berberis verruculosa, few twigs, 1–3″

**Berberis thunbergii 'Crimson Pygmy'**

Betula papyrifera, one, no damage; another 10 feet away, 2½′

**Buxus microphylla compacta**

" **microphylla 'Curly Locks'**

" **sempervirens** (some people whose plants are in sand had complete loss)

**Buxus sempervirens rotundifolia**

" **sempervirens, variegated**

" **sempervirens 'Vardar Valley'**

Callicarpa japonica, normal dieback only

**Calluna vulgaris,** 23 varieties

" vulgaris aurea *

" " pygmaea *

" " rubrum *

" " 'J.H. Hamilton' *

Carya illinoensis, 4″ ‡

Caryopteris incana, 8–12″

Celastrus scandens, 3–6″

Cercidiphyllum japonicum, 6″–2′ ‡

Cercis canadensis ‡ (died)

**Chaenomeles lagenaria 'Apple Blossom'**

Chionanthus virginiana, 3–6″ ‡

Clematis virginiana, normal dieback only

**Clethra alnifolia**

Cornus alternifolia, most showed 6–18″, some even 3′; a few died. Have about 30 which were native here. ‡

Cornus florida, those in open area died; those protected by screen of pines, no damage; those surrounded by shrubs died above line of shrubs. ‡

Cornus kousa, 6–18″ ‡

" mas, 3–6″ ‡

" paniculata, 18″ wind side; lee side no damage ‡

**Cornus stolonifera flaviramea**

**Cotoneaster apiculata**
" **divaricata**
" floribunda, 4–12″ *
" foveolata, some twigs, 4″ *
Cotoneaster franchetii, 18″ wind side, some in more protected spot unharmed *
Cotoneaster horizontalis, 1″ wind side*
**Cotoneaster horizontalis perpusilla**
" **microphylla buxifolia seedling**
Cotoneaster multiflora, 4″ *
" racemiflora, 3–6″ *
" wardii; some stems 3′; where more protected, no damage *
**Crataegus oxyacantha paulii**
" **phaenopyrum**
**Cytisus kewensis**
" **praecox**
" praecox alba, few stems 5″
" **purgans**
" scoparius andreanus, one stem only died
Cytisus scoparius var., large, old plants died; healthy young stock, 6–24″
Davidia involucrata ‡
Deutzia gracilis, 3–6″ ‡
Elaeagnus umbellata, 6–24″ on wind side ‡
Enkianthus campanulatus, 3′ wind side ‡
**Erica** (25 varieties)
Euonymus alatus, 4″ ‡
" europaeus, 6–12″; 1 died
" **fortunei kewensis**
" **fortunei vegeta**
Exochorda grandiflora wilsonii, 4–12″‡
Forsythia intermedia spectabilis, some stems 12″; some plants undamaged*
Forsythia 'Beatrix Farrand,' 6″–3′ *
**Forsythia viridissima 'Bronxensis'**
" 'Spring Glory,' some stems 12″; some plants undamaged *
Fothergilla major, 3′ wind side ‡
Franklinia alatamaha, one died in the open; one protected by pines 1–3″ ‡
Gleditsia triacanthos inermis, 6–8″
**Halesia monticola**
**Hypericum 'Hidcote,'** normal dieback
" **'Sun Gold,'** " "
**Ilex aquifolium** (24 varieties)
(A friend in Orleans had 2 5-ft. plants really hurt out of a total of 200.)
**Ilex aquipernyi**
" **cornuta**
" **crenata compacta**
" " **convexa**
" " **microphylla maculata**
" " **oleafera**
" **glabra**
" opaca (37 varieties), 2–3,″ some none *
Ilex pedunculosa, 3–6″ *
" **pernyi veitchii**
" **crenata 'Glass'**
" **aquifolium 'Good Luck'**
" crenata 'Green Cushion'
" " **'Helleri'**
" " **'Hetzii'**
" **opaca 'Howard'**
" **crenata 'Longfellow'**
" " **'Major'**
" " **'T 1'**
" " **'Stokes'**
" **pernyi**
Juglans cinera, died ‡
Juniperus virginiana—probably 200± on the place—remarkable variation in results of trees side by side; one wholly undamaged, the next showing complete browning on wind side; actual dieback abont 4–6″
Kalmia latifolia, few twigs, 6″ *
**Koelreuteria paniculata**
Kolkwitzia amabilis, 6–12″ ‡

**Laburnum vossii**
Lespedeza bicolor ‡
Ligustrum obtusifolium regelianum, 3–6″, a few 2′ *
**Lonicera japonica halliana**
" tatarica, some undamaged; others 2′
**Magnolia virginiana**
" soulangiana ‡
" " **'Alba Superba,'** pink
**Magnolia loebneri 'Merrill'**
" **soulangiana 'Rustica Superba'**
**Malus baccata seedling**
" 'Oekonomierat Echtermeyer,' 12″ ‡
**Malus prunifolia rinki**
" **sargentii** (seedling)
" sargentii
" **'Hopa'**
Morus alba, 6–24″ ‡
**Myrica carolinensis**
Nandina domestica *
Oxydendrum arboreum, 6–36″ ‡
**Pachysandra terminalis**
**Parthenocissus quinquefolia**
Philadelphus 'Belle Etoile,' 12–18″
" 'Minnesota Snowflake,' 6–18″
**Photinia villosa**
Picea abies, few stems 8–14″ *
" canadensis, few stems 8–14″ *
**Pieris japonica,** few twigs 3″
Pinus banksiana, few twigs 4″ *
" resinosa, few terminals dead, but chiefly unharmed *
Pinus rigida, some undamaged, others nearby 12″, some worse *
Pinus strobus, exposed trees dead or nearly so, needles totally browned on entire southwest side of plants by Jan. 9, 1961
Pinus sylvestris, many large limbs and some whole trees dead where fully exposed. Needles totally browned on entire southwest side of plants by Jan. 9, 1961
**Pinus thunbergii**
Paulownia tomentosa ‡
**Potentilla fruiticosa 'Lemon Drop'**
" " **'Moonlight'**
" " **'Mt. Everest'**
" " **'Primrose Beauty'**
**Potentilla fruiticosa 'Klondike'**
Prunus (peach and cherry) ‡
" (flowering peaches), died
**Prunus caroliniana,** few stems 3″
**Prunus maritima**
Pseudotsuga taxifolia, 6″ on wind side on badly exposed trees; needles totally browned on entire southwest side of plants by Jan. 9, 1961. Protected tree wholly unharmed.
**Pyracantha coccinea lalandi,** a few slightly hurt
Quercus coccinea, some stems 12″ ‡
" palustris ‡
**Quercus pedunculata**
" rubra, some stems 12″ ‡
" **velutina**
**Rhododendron carolinianum** (protected spot)
**Rho. dauricum sempervirens** (azalea)
Rho. fortunei, a few stems 8″
" **molle**
" **mucronatum,** some branches 12″ wind side; perfectly OK on lee side: some plants no damage
**Rho. obtusum seedling**
" " arnoldianum, 12″ wind side; some plants no damage
**Rho. satsuki seedling**
" **schlippenbachii**
" **viscosum**
" **yedoensis poukhanensis**
" **'Brilliancy×satsuki'**
" **Stewartstonian'**
Rosa floribunda, 24″ compared to normal dieback of 8–12″

**Rosa hugonis**
" **spinosissima**
" **virginiana**
" **rugosa 'Agnes'**
" " **'Blanc Double de Combert'**
Rubus 'Indian summer,' all canes died to ground
Rubus 'Latham,' $\frac{3}{4}$ of canes died to ground; remainder 6–24″ dieback
Salix alba vitellina, twigs 6–18″
" caprea, 6–12″
Sorbus aucuparia, some twigs 4″ ‡
Spiraea billardii, 2′
**Spiraea thunbergii compacta**
" trilobata, 4–6″
Styrax japonica, 12″ ‡
**Symphoricarpos chenaultii**
Symplocos paniculata, 12″ ‡
Syringa persica, 3″ ‡
" " alba, 3″
" **velutina**
" **vulgaris 'Leon Gambetta'**
" " **'Montaigne'**
" " **'Mme. Lemoine'**
" " **'Chas. Joly'**
" " **'Souvenir de Ludwig Spaeth'**
**Syringa vulgaris 'Pres. Grevy'**
" " **'Sensation'**
" " **'Adelaide Dunbar'**
" " **'Blue Hyacinth' seedling**
**Syringa vulgaris 'Esther Staley' seedling**
**Taxus baccata repens**
" **cuspidata** (only 2 plants showed damage)
**Taxus cuspidata nana**
" **media hatfieldii**
" " **hicksii**
Tsuga canadensis, burns badly with only normal winter winds unless completely protected.
Ulex europaeus, 2–3′ (normally 18″)
Ulmus americana, 6″–3′
Vaccinium corymbosum, several hundred on the place; those partially protected show no damage; those in open, range from 3–6″ dieback to completely dead on wind side *
**Vaccinium vitis-idaea majus** and **minus**
**Viburnum carlcephalum**
" **carlesii**
" cassinoides, completely dead on wind side; badly hurt on lee side. The worst hit of our 17 *Viburnum* varieties. *V. setigerum* was next. ‡
Viburnum dentatum, several hundred on the place. Of those fully exposed, some are dead and on the wind side most are dead or nearly so. Of those somewhat protected by other shrubs, some are unhurt and others have 4–12″ dieback. ‡
Viburnum dilatatum, 3–6″ ‡
" " **xanthocarpum**
" **opulus**
" **plicatum tomentosum**
" prunifolium, few stems 4″ ‡
" pubescens, several hundred on the place. Of those fully exposed, some are dead and most are dead or nearly dead on wind side. Of those somewhat protected by other shrubs some are unhurt and others have 4–12″ dieback.
**Viburnum rhytidophylloides**
" **rhytidophyllum**
" sargentii, 4–6″ on wind side ‡
Viburnum setigerum, 6–18″ ‡
" **sieboldii**
" trilobum, 6–12″ ‡
" wrightii, 3–6″; a few 12″ ‡
Weigela, branches on some 1–2′ ‡
" **florida variegata**

HAROLD W. COPELAND
Chatham, Mass.

# 1961 Fall Program of the Arnold Arboretum

## FIELD TRIPS

**Friday morning trips at Jamaica Plain**

Dr. Donald Wyman will lead five trips around the collections of the Arnold Arboretum on successive Fridays beginning **September 29 at 10 a.m.** All trips will start at the Administration Building, where the meetings will be held in case of rain. These trips will consider trees and shrubs in their fall condition. Berried plants, trees, and shrubs for fall color, broadleaved evergreens, and cone-bearing plants will receive special attention.

**Tuesday afternoon trips at the Case Estates in Weston**

Dr. Carroll Wood will conduct five trips around the Case Estates of the Arnold Arboretum on successive Tuesdays beginning **September 26 at 2:30 p.m.** The group will meet at the Barn, 135 Wellesley Street in Weston. Footwear suitable for walking in the woods is recommended. Both cultivated and native plants will be considered as they are encountered in an informal consideration of this interesting area in the suburbs.

## LECTURES

A series of five popular talks by the Arboretum staff and visiting scientists on their work or their interests will be offered on Wednesday evenings. The lectures will be given in the Administration Building at the Arboretum in Jamaica Plain, with all talks beginning promptly at 8 p.m.

**October 4. The Collection and Treatment of Seeds.** Mr. Fordham

Do you save seeds to grow your own plants? Mr. Fordham, propagator at the Arboretum, will discus the methods and pitfalls of collecting and storing seeds and fruits and the proper methods of getting them to germinate.

**October 11. A Botanist Looks at Hawaii.** Dr. Howard

Dr. Howard has visited Hawaii not as a tourist, but as a botanist looking at agricultural, horticultural, and forestry problems. Kodachrome slides illustrate this talk.

**October 18. Preparing Your Garden for the Winter.** Mr. Williams

The Superintendent of the Arnold Arboretum will discuss some of the practical steps which may be taken to lessen the winter damage to plants grown in the Boston area.

**October 25. Dried Specimens and Botanical Research.** Dr. Nevling

The preparation and use of dried botanical specimens which form the herbarium of the Arnold Arboretum, form the basis of much of the work of the staff. Amateur naturalists, tourists, or teachers will gain from this discussion of the preparation and use of dried specimens for botanical research.

**November 1. Mediterranean Gardens.** Mrs. Weber

The Mediterranean can be a geographic area or a type of environment. Mrs. Weber is from Geneva, and she will discuss and illustrate with kodachrome slides the gardens of the area and many of the plants which grow so well there.

All programs are open to the public without charge.

# ARNOLDIA

A continuation of the
BULLETIN OF POPULAR INFORMATION
of the Arnold Arboretum, Harvard University

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## THE WALTER STREET "BERRYING" GROUND

AT the turn of the 18th Century the town of Roxbury was growing rapidly. Out by Jamaica Pond, along the Dedham Road, the section called "Jamaica End" was filling up with thriving farms. By 1702, Joseph Weld and forty-four other men felt that the community was large enough to support a church of its own. Until this time they had been parishioners of the Roxbury town church on Meeting House Hill—a long, weary way from Jamaica Pond, especially on cold winter nights. On account of the distance, and, as they said, "The great travail and time in going and coming," they petitioned to be allowed to establish a second parish, with a meeting-house nearer home. The petition was ignored.

In the records that remain to us, the next five years are shrouded in silence, but by 1711 it was clear what the men of Jamaica End had been up to. They had built a meeting-house and started a parish, and were now suing for pardon and recognition by the General Court and Town Assembly. The church they thus established surreptitiously was on Walter Street (then part of the Dedham Road), and the remains of their parish cemetery are now part of the grounds of the Arnold Arboretum.

### Revolutionary Soldiers Buried Here

The little cemetery, now reduced to thirteen stones and a crypt, can be found on the far side of the Peter's Hill Road, nearly opposite the dirt road leading to the crest of the hill. Originally the area was somewhat larger. As late as 1903, according to the records of the Cemetery Department (which held jurisdiction of it until the land came to the Arboretum in 1923), it covered 34,800 square feet. At this time about 300 square feet were taken from the grounds in order to widen Walter Street and in the subsequent excavating for the street, the remains of twenty-eight bodies were found. These were said to have been soldiers killed in the Revolution. Supposedly, they were reinterred, but there is no sign of them

today except for a commemorative marker erected by the Sons of the American Revolution. Perhaps they were put in the underground crypt, which appears to be of later date than the original stones.

Although the church was gone by the time of the Revolution, there is good reason to think that the convenient facilities of a burying ground by the side of the road might have been utilized by the Continental Army. During the battle of Dorchester Heights and the accompanying Siege of Boston, the Dedham Road was the lifeline of the Army, connecting the active forces with their arms and supplies stored in Dedham. Today one soldier's grave remains—that of Capt. Jonathan Hale, of Glastonbury, Connecticut, who died March 7, 1776, at the age of 56, three days after the decisive battle. Capt. Hale's present stone is a modern replacement, telling us only that he was a member of Wolcott's Regiment of Militia, but the original stone, which remained well into the last century, was more detailed. It is also known that after the war was over, the bodies of soldiers who had been buried in various parts of Jamaica Plain were gathered together and reinterred in the Walter Street Cemetery.

Aside from these interesting but purely fortuitous soldiers, the occupants of the cemetery were members of the Second Parish Church of Roxbury (now the First Parish Church of West Roxbury), which stood near the corner of Walter and South Streets from 1712, when the General Court formerly recognized the *fait accompli* of its existence, until 1773, when it moved to its present location.

### Land Provided by Weld Family

Since about 1640, the tract of land which is now the grounds of the Arnold Arboretum had been the property of the Weld family, so it is not surprising that Joseph Weld, the prime mover for the new parish, should have provided the plot of land for the church and the cemetery. Unfortunately, in 1712, just as the new parish was about to be recognized, Joseph Weld died and was therefore unable to enjoy the results of his labor and generosity. It would be satisfactory to know, at least, that he was buried in the new burying-ground, but of this there is no record. Until the 19th Century very little ritual surrounded the disposal of the dead. Cemeteries were exactly what they were called, "berrying-grounds," and few records of burial were kept by the church. As far as the grounds and plantings were concerned, the cemetery looks today much as it did in its prime.

### First Pastor Ordained

On November 2, 1712, Nehemiah Walter, the pastor of the First Parish, formally gathered the congregation (now numbering eighteen), and they duly ordained their own pastor, the Reverend Ebenezer Thayer of Boston, on November 26. By the first of the year 1713, the parish was well under way. The first communion was in January, the first baptism in February—and thereafter baptisms made up a large part of the church records. In the first year there were eleven; in the second year, twenty-two.

In those days the congregation did not sit in church by family groups. Men sat on one side, women and girls on the other. Overhead, in the gallery, were the boys, watched over by one or more "tything-men," members of a special committee "to take care of ye boys and to prevent their playing or making any disturbance in ye meeting house." Although many churches made do with one or two, the Second Parish immediately appointed four tything-men, a number which was soon increased to six. It may have been a small parish, but apparently it was a lively one up in the gallery. A similarly cryptic notation in the year 1733 makes one wonder what had been going on downstairs. Among the measures which the parish passed to cope with its maintenance problems, there appears the regulation that those who sat by the windows should mend all the broken glass.

Maintenance was a constantly recurring problem. We are not told what the church looked like. It was probably, like most churches of the time, a fairly rude structure, possibly thatched, and almost certainly without the steeple and belfry with which our imaginations automatically equip New England meeting-houses. The cemetery lay to the north of the church and the parsonage to the south, at the junction of Walter and South Streets. Before the streets were named, when Walter Street was still only part of Dedham Road, this corner was identified as "Cookson's Corner."

Roxbury, with its streams, ponds and wooded hills, was a very beautiful place to live and already becoming known for the salubrity of its climate. Certainly, if the gravestones remaining in the cemetery are a valid sampling of the total population, long life was the rule. Of the twelve civilian stones, only two record the deaths of persons under the age of 60. The average of the other ten is somewhat over 75; two were in their eighties; one was ninety-five. We would consider these respectably venerable today.

The Reverend Mr. Thayer kept his records meticulously, in a small, neat hand, and in as terse and unemotional a style as can be imagined. It is, therefore, the more surprising to come across one entry, dated September 24, 1723, in which we can detect a generous glow of very human exasperation. "Isaac Bowen," the Reverend Mr. Thayer writes, "Having in several respects given great offence to the church and obstinately refusing to make the satisfaction the Brethern insisted upon, tho strongly urged thereto was, after Two Months waiting upon him, this day suspended from their Communion till he should give a Christian satisfaction for his miscarriages, pursuant to their own vote." To our eternal frustration, Mr. Thayer neglects to mention what, exactly, Mr. Bowen had done to cause such general consternation. Although today we find the occasional note of discord interesting for the breath of life it brings to dead records, on the whole there is every indication that the life of the little parish was serene and prosperous. Mr. Thayer's neat records continue in this vein until the time of his death in March of 1733.

### Nathaniel Walter Called to the Pastorate

In January of 1734 the parish elected for its new pastor Nathaniel Walter, son of the Nehemiah Walter who had originally consecrated the church, and grandson of Increase Mather. His ordination in July of that year was a noteworthy event for which the congregation raised the sum of £45 to defray expenses. Lunch and dinner for all at a local tavern alternated with the examination of the candidate in the morning and the service in the afternoon.

The Reverend Mr. Walter, like his famous ancestor, was an energetic man and active in the life of the community. His popularity may be recognized in the naming of Walter Street. One story is often told to illustrate the intrepidity with which he embraced new ideas. In the "great small-pox time" of 1751, when Dr. Boylston was advocating innoculation in the face of lively public disapproval, Mr. Walter had himself innoculated. As he was recovering in the home of Dr. Boylston, some aroused member of the opposition threw a grenade into his room through an open window. Fortunately, the fuse of the grenade immediately went out and Mr. Walter was spared to continue his pastoral duties.

It is interesting to note that at the time of the small-pox several children described as "of Boston" were baptized in the Walter Street church. Presumably these had been sent to Roxbury to escape the pestilence.

In the meantime, Roxbury had continued to grow, and the meeting-house to deteriorate. In 1766 it was voted to build a new building, but nothing was done. In 1769 the Third Parish of Roxbury was established, the church being built where the First Church of Jamaica Plain now stands, in Monument Square. This was, of course, rather close to the Walter Street meeting-house, which lost some of its adherents to the new parish. These people felt it proper to take with them some of the Second Parish plate, which the Second Parish resisted. There was further dispute over the parish boundaries.

All these factors no doubt led to the decision, reached in March of 1773, to pull down the Second Parish meeting-house and use the good parts toward a new building "at the west end of Roxbury, towards Dedham." This resolution was immediately put into action, and by June a committee of fifteen had, by themselves, accomplished the task. Although occasional individuals were later interred in the old burying-ground, its period of regular function in the community had ended.

### Interesting Headstones Remain

Today when we visit the little plot, our attention is attracted by the archaic quality of the stones, the quaint phraseology of the epitaphs, and the way the decorations gradually change from the grim death's-heads of the earliest years to quite cheerful little cherubs as the century progressed. The last stone, erected in 1812, is replete with urn, weeping willows and sentimental verse in full-blown romantic tradition:

EARLY CHURCH.

**PLATE IX**

Upper: Sketch of a typical early church, taken from page 447 of Francis Samuel Drake's book, "The Town of Roxbury," published in 1878. Lower: Marker in the old burying ground on Peter's Hill commemorating the soldiers of the American Revolution who were buried here.

"While the dear dust she leaves hehind,
Sleep in thy bosom, sacred tomb. . . ."

the last two lines being illegible.

By a coincidence, the stone with the earliest date commemorates the only other young person buried here—Mrs. Anna Bridge, who died at the age of 30. The date on the stone, 1722, is apparently a stone-cutter's error. Mrs. Bridge did not die until 1729, and in fact, did not marry Mr. Edward Bridge until November 7, 1728. Previously she had been Mrs. Anna Child, of Brookline, a young widow. The Bridge estate was at the corner of May and Centre Streets and remained without a mistress for thirty years before Edward remarried.

The oldest stone, therefore, is the double one for Grace and Benjamin Child, husband and wife, who died just over a year apart, in their sixties. Nearby is the stone of Benjamin's brother, Joshua, and we know that as late as 1878 the stone of his wife, Elizabeth, was also there. These two couples were apparently very close in life as well as in death. Not only were the husbands brothers, a year apart in age and baptized on the same day, but the wives were sisters, the daughters of one Edward Morriss. Each couple had twelve children, most of whom survived to maturity, and as Joshua and Benjamin were themselves part of a large family, it is not surprising that the name Child was a common one at the time in Roxbury, Brookline and Boston. The family estate was near the Brookline border, on the right going up Pond Street, and originally consisted of a house and barn and 80 acres "conveniently adjoining to ye sd housing."

Another early stone is that of Thomas Bishop, who died in 1727 at the age of eighty-two. Little can be found about this man. We can assume that he was prosperous, as he presented a silver cup to the church in 1721. He was, of course, 65 when the Second Parish was established and so unlikely to figure prominently in the records.

Lt. Daniel Weld was a son of the Joseph Weld who founded the church. As a very young man he married a girl named Susanna and was the father of a daughter at 16. This infant was baptized Hannah in 1713, the third child to be baptized in the new church. Shortly thereafter Susanna must have died, for in 1720 Daniel was married again, this time to Elizabeth Tucker, and subsequently became the father of nine children, only two of whom (twins) failed to survive to adulthood. He lived on the Weld estate where the Arboretum now stands, and was buried in 1761 at the relatively early age of 64, the last person (according to the stones which remain) to be buried on Walter Street before the church was moved. Elizabeth lived to be 83, and was probably buried in West Roxbury.

Daniel's mother is also buried on Walter Street, under the name of Mrs. Sarah Chamberlin. Seven years after Joseph Weld's death, Sarah married Jacob Chamberlin and apparently was buried with the Chamberlins instead of the Welds. There is a considerable body of evidence that Sarah's daughter, also

Sarah, had married Jacob's son Jacob, so that the Welds and the Chamberlins were doubly allied.

Far off by themselves are the small and crumbling stones of Deacon Ezra Davis and his wife Sarah. These two were both brought back to Walter Street after the church had moved, presumably to be buried with the rest of their family, since in 1787 several other stones bearing the name of Davis still remained. This family, abounding in deacons, was very prominent and active in the church from the beginning. Deacon Ezra and his wife lived in a farmhouse on the corner of the Weld estate about where the railroad underpass is now.

Another family which continued to use the old cemetery was the Bakers. Mrs. Hannah Baker, who died in 1776 at the age of 95, was interred in the family plot near her husband, Thomas, who had died previously at the age of 83. She was born Hannah Park, of Newton, and the two were married in 1722 in Watertown. Their house and Thomas' wheelwright shop were on Centre Street near Boylston Street, and there they raised three sons.

Capt. John Baker was apparently more prosperous, with a large farm near the Brookline border, where he raised six children. We are not told in what capacity he received his title of Captain, but of course all the commissioned men buried in the Walter Street cemetery, with the exception of Capt. Hale and the anonymous soldiers, were pre-Revolutionary.

With these Bakers, John and Hannah, we find the first real departures from the old skull motif in headstone decoration. Hannah's stone has what appears to be a bow-knot and John's, although it has the usual cheerful later variation of the conventional skull and wings, is further embellished with a short poem:

"Life is uncertain. Death is sure.
Sin is the wound. Christ is the cure."

This was a time of change in many ways, ecclesiastical and social as well as political. With the countryside about to take up arms against the British, many of the older members of the Second Parish were still "up in arms" over the changes which had recently been introduced in the singing of hymns in church. Before this time hymns had been sung responsively, one verse at a time being read aloud by a deacon and then sung in unison by the congregation. The new method eliminated the reading by the deacon, and was extremely unpopular at first. At much the same time the public confession of sins in the aisle was also abandoned. It is possible that many of the older people were more upset by such trifling innovations than by the Revolution itself.

### Gregorian Calendar Changes Dates

One very widespread and significant change which probably upset no one, is graphically illustrated in the old burying-ground. From the Twelfth Century until England accepted the Gregorian Calendar in 1752, the New Year had been

celebrated on March 25th, causing the dates from January 1st through March 24th to belong to what we would consider the previous year. Apparently the discrepancy caused some contemporary uneasiness, for about 1670 the custom began of hyphenating the two years during January, February and the early part of March. Many of the stones in the Walter Street Cemetery are dated in this fashion, and when we read a date recorded as 1729/30 we can remember that for our purposes the later year serves.

It is surprising what a strong sense one has of knowing the people from reading the old records, bare and factual though they be. Except possibly in the case of Isaac Bowen (and even there it is purely conjecture), we find little evidence of the stern, dogmatic Puritans so beloved by later writers. Some of these there may have been, but Jamaica Plain appears to have been settled by a hard-working, practical crowd, trying to be good, but slipping with monotonous regularity from the straight and narrow, only to be forgiven and brought back into the fold. They were people with a nice appreciation of the value of a pound and a healthy awareness of the good things of life, restrained from the excesses of many frontier towns by domesticity and a steady striving for decency and orderliness.

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Illustrations are in **bold face** type.