

JC Raulston Arboretum

Friends of the Arboretum Newsletter

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J. C. Raulston

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Notes from the Arboretum

As this last note gets typed and this issue and the Update head to the printers for processing - the arboretum staff is in full frantic frenzy working to get ready for our biggest "event" of the decade - the Southern Plant Conference. By the time you read it - the meetings with their outstanding array of guest speakers will be history and we hope all will have gone well and the "just spit-polished" arboretum will have been enjoyed by hundreds of visitors from across the country. It has been the usual up and down of weather during the year - with a mild winter and good spring flowering season (a highlight the first flowering of our 10' *Manglietia yunnanensis* - a magnolia family member with evergreen foliage and 4" showy white flowers with bright red stamens at the base - definitely worth the 7 year wait of juvenility and very exciting), wet cool early summer which "spoiled" the plants with soft lush growth which then stressed out as we went into a very hot and dry mid-summer period.

August was really rough - more than the normal number of plants died from the heat and drought - and particularly in the conifer section. But one removes such and goes on - few visitors realize the losses if not directly visible. Another hidden stress occurred when our container nursery irrigation system failed (on a Saturday morning of the hottest day of the summer - of course - not discovered until the weekend was over) and fried many of our new accessions (thankfully few actually killed - but a brown haze looking over the array of containers at first look). Fall has brought good rains and cool temperatures - as usual the best part of the year in N.C. - and we can now look at the garden and feel we'll perhaps survive another year. But we look at what England and the U.S. Northeast has gone through this year with incredible heat stress and drought damage - millions of plants damaged or killed - and realize we have little to seriously complain about.

An exciting year - all the Arboretum staff pushed to the limits with the normal bewildering array of projects - Catherine snagged a difficult and most prestigious Institute of Museum Services grant to provide 20% of our operating budget for the next two years, Tom (and Will Hooker) finished his/their "Paradise Garden" as well as a thousand other projects and we are delighted to have recently moved him to more permanent status within the university administrative system, Newell has developed new office space at the arboretum with more storage and a "clean computer and office work" room, and I continue to dash around running my mouth all over the country and wondering how this complex machine keeps running so well - something like the scientists who prove that bumblebees can't fly aerodynamically - and they keep buzzing along. Of course new plants roll in unceasingly - over 700 for the year at this point - with so many exciting new things from friends, institutions and growers all over the world.

In my "real life" as a university teacher - have the largest classes of nursery production students since arriving at NCSU 20 years ago - 100 enquiring minds wanting to know (well - most of them) and keeping me thoroughly engaged. A busy winter ahead, lots of good Friends programs with outstanding speakers coming here, the Winter Garden at the Arboretum should really hit its stride this third year year (sleep, creep, leap), and so it goes. We wish you well, hope your gardens are thriving, appreciate your support, and look forward to serving you. I'm excited to have this issue as the third newsletter out in the last 12 months - maybe we are approaching a regular schedule - horrors! My reputation ruined.

PLANTS DISTRIBUTED TO NURSERYMEN - 1994 NCAN SUMMER SHORT COURSE

NCAN Short Course and Trade Fair - Asheville, NC - August 27-28, 1994.

(Most members who comprise the Friends of The NCSU Arboretum (now the JC Raulston Arboretum) are not in the professional nursery/landscape trade, but are serious gardeners or people who want to support the continuation of the arboretum as a state resource. Beyond the arboretum use as a university teaching resource and display garden for the public, there is also the very important outreach to the commercial industry. Each year plants are taken to the North Carolina Association of Nurserymen's meeting for display, and thousands of plants are also propagated for free distribution as an incentive to try to encourage nurserymen to grow some new crops. To allow our "Friends" to have a feel for this outreach, I am again as for many years, including here the information on plants distributed at the 1994 meeting as these may be plants which will appear in garden centers for the public in the future - and of course many of the extras from this distribution end up in the autumn members plant giveaway so many of these are now in your gardens under trial.)

Each year a selection of plants from The NCSU Arboretum (now the JC Raulston Arboretum) is made for propagation and distribution to N. C. nurserymen at the summer short course as a means of spreading new or uncommon plants through the state for further observation and perhaps commercial production. This program has been underway since 1980 and ca. 65,000 plants of 320 different species and cultivars have been given to growers since its inception. Selection of plants is based on plant ability to be propagated when the Department of Horticultural Science propagation benches are empty, size of stock plants in the arboretum adequate to allow taking of 200-300 cuttings, and absence in the existing commercial industry. Plants will vary in commercial potential with some having great potential - others merely curiosities for adaptation study or hobbyist collector-type items.

The plants provided for growers represent just a sample of the 5,000 species and cultivars presently growing in The NCSU Arboretum (now the JC Raulston Arboretum). Commercial growers are most welcome at any time to come to the arboretum to collect propagation material to provide stock plants for their operations. We do request for nurserymen collecting plants from the arboretum for the first time, an appointment be made (call 919-515-1192 for J. C. Raulston, 515-5361 for Tom Foley, or 515-1632 for Newell Hancock) to coordinate which materials may be collected and our general guidelines for collection procedures. Dozens of growers now gather many hundreds of thousands of cuttings annually in this manner.

We very much appreciate the long, diligent efforts of a whole team of Friends of The NCSU Arboretum (now the JC Raulston Arboretum) Volunteers who spent a full week individually labeling, wrapping, and bagging the 6,000 plants in this year's distribution. Many, many thanks to all who have helped in this process, and especially to Rosanna Adams, Mary Edith Alexander, Bill Atkinson, Anna Berry, Tracey Brandt, Wayne Brooke, Harvey Bumgardner, Tom Bumgarner, Leah Bunker, Dan Burleson, Jo Ann Chiavrini, Linda Christiansen, Ann Clapp, Brian Cronin, Sarah Dickie, Alice Figgins, Vivian Finklestein, Lynn Holt, Susan Lambiris, Amelia Lane, Kitty Maynard, Prep Maynard, David Messer, Bob Olsen, Catherine Parker, Charlotte Presley, Lisa Stroud, Bee Weddington, G. Welton, and Bob Wilder for your incredible help.

- 9401 *Amsonia hubrectii* - "Treadleaf Bluestar" (Apocynaceae). An outstanding herbaceous perennial native to the central U. S. and just now coming into commercial useage in the perennials market. The "Blue Stars" include some 25 species native to the U. S. and Japan - and are most commonly represented in commercial use today by *A. tabernaemontana* from the eastern U.S. All have small blue star-shaped flowers in early summer on 2-3' plants.

This species differs by having long treadlike foliage which is beautiful through the summer following flowering - and it turns a brilliant ginkgo-yellow in the autumn for over a month of spectacular color display. In a recent, widely reprinted article I discussed this plant as perhaps the finest of all perennial plants with excellent stress tolerance and long season of beauty in the garden. It is easily propagated by seed (directly sown with no stratification), by softwood cuttings all summer (98+ rooting in several weeks), or by division of established clumps. In commercial production - cuttings will likely be used. Best in full sun but will tolerate light shade. USDA Zones 5-9. Excellent commercial potential. (Found at a variety of sites in the arboretum; front south side of lathhouse, the desert border, the early late border).

- 9402 *Camellia* X 'Carolina Moonmist' - "Carolina Moonmist Camellia" (Theaceae). A newly named cultivar of hardier camellia originating at The NCSU Arboretum (now the JC Raulston Arboretum) as a selection from a population of plants which were originally developed by Dr. Fred Cochran, former Horticultural Science Department head and plant breeder at NCSU. In the 60's he was among the first in the U.S. to hybridize the widely used *C. sasanqua* Thunb. with the most hardy of all camellia species, *C. oleifera* Abel., to combine cold hardiness of the latter with the larger and more colorful flowers of the former. Blocks of these hybrid seedlings existed at the Horticultural research farm when the arboretum was begun in 1977 - and the plants were saved and moved to locations around the parking lot to act as hedges and visual screens.

A renowned horticulturist, Mr. Charles Cresson of the Delaware Valley area, took cuttings of all these seedlings years ago and has been evaluating them for cold hardiness and plant quality at his garden in USDA Zone 6. This seedling has been among the best in his trials and we are releasing it for further trial. It has a large rosy, pink flower in November and has been through -7F in 1985 without injury at The NCSU Arboretum (now the JC Raulston Arboretum). Easy from semi-hardwood to hardwood cuttings

throughout the year. Sun or partial shade. USDA Zones 6-9. (Found at the northeast corner of parking lot next to the tall remaining Leyland cypress).

- 9403 *Celtis sinensis* Pers. 'Pendula' - "Weeping Chinese Hackberry" (Ulmaceae). A deciduous tree native to eastern China, Korea and Japan which was introduced to western cultivation in 1910. The species is quite handsome with glossy foliage which is not affected by the leaf gall insects which are so troublesome on the American species - and typical of hackberries - they are very drought stress tolerant. During a plant exploration trip to China, Dr. Clifford Parks of the University of North Carolina Botany Department discovered an ancient "National Treasure Tree" of this species which was heavily pendulous. He was allowed to bring seed of this tree back to the U.S. and one of the seedlings maintained this weeping character - and subsequently was found very easy to propagate by softwood cuttings (rare for hackberries).

He originally introduced it to commercial culture in catalog listings of Camellia Forest Nursery, 125 Carolina Forest Rd. PO Box 291, Chapel, Hill 27516 (919-967-5529) about 1989. It is so strongly weeping that it should be staked and trained up a pole or trellis until the height desired is reached. I have seen a magnificent 12' tree with flowing branches produced in 2 years in a garden near Houston, TX. A highly ornamental plant with good potential for use by discerning gardeners with creative imagination in plant design uses. Amazingly easy and fast from softwood cuttings under mist in early summer. Best in sun. USDA Zones 6-9. (Located in the northwest section of the west arboretum - between the crepe myrtles and redbuds there).

- 9404 *Cercis yunnanensis* 'Celestial Plum' - "Celestial Plum Chinese Redbud" (Leguminosae). The NCSU Arboretum (now the JC Raulston Arboretum) has the largest collection in existence of redbud species and cultivars. In recent years much attention has focused each spring on the showy flowering of a seedling plant of *C. yunnanensis* - a species from Yunnan Province, China which is very similar to the "common" Chinese redbud, *C. chinensis* (some authorities consider them to be one species). Since the commercially produced and similar *C. chinensis* 'Avondale' is produced from softwood cuttings - it was felt worth trying to propagate this superior form in this manner for distribution trials. Our cuttings were taken in June and rooted well in high percentages (95%+). It makes a small, multi-trunk tree to 15' with stems covered with masses of purple-lavender flowers in early spring. Best in sun. USDA Zones 6-9. (Located in the redbuds section in the west arboretum - northwest of the Leyland cypress circle).
- 9405 *Chrysanthemum weyrichii* (or now possibly *Dendranthema weyrichii* if you follow the new major taxonomic shakeup which replaced the entire *Chrysanthemum* genus with a dozen others)(Compositae). A herbaceous perennial native to Sakhalin Island near Japan where it grows on rocky seashores. A low mat-former groundcover to 2-4" in height with handsome bluish-green evergreen foliage and 1.5" diameter showy pink flowers in early summer. Excellent potential for commercial production as a new flowering groundcover - and also for beach use in seacoast areas where the salt tolerance will be invaluable. Propagated by underground runners which can be divided into segments. Runners form more rapidly in loose, well-drained mixes so production of stock beds in raised beds or flats of loose nursery mix will be most efficient. Sun or partial shade. USDA Zones 5-9. (Located to the left of the entrance to the lath house).
- 9406A *Cryptomeria japonica* D. Don 'Gracilis' - "Graceful Japanese Cedar" (Taxodiaceae). The "Japanese Cedars" represent one of the best collections in The NCSU Arboretum (now the JC Raulston Arboretum) with perhaps the largest collection of cultivars in the U.S. today. Various taxa of this handsome conifer have been distributed and promoted through this NCAN distribution in the past - and a comprehensive review of the group was published recently (Dr. Kim E. Tripp - "Sugi - The ancient Japanese cedar finds new life in a profusion of outstanding cultivar forms." *American Nurseryman* 178(7):26-39. Oct. 1, 1993).

Kim describes this cultivar as follows: "This is my current love affair - one of the most elegantly beautiful of the old European cultivars, with spring green foliage appearing braided around slender, erect branches arranged in a formally pyramidal habit. This cultivar eventually reaches 20 to 30 feet in height but is somewhat slower than fast-growing cultivars like 'Yoshino' which are usually used for screening. 'Gracilis' makes a striking specimen or fascinating massed planting. It has the potential to create an entirely new approach to screening hedges with an open, graceful effect that does not create a solid wall of privacy and does not turn small properties into dark, coniferous caves. Also, it will not infringe on power lines in a single season."

It was first described by Krussman in 1972. As with all *Cryptomerias* - rooting is best on cuttings with mature wood at the base - and with the proper cutting selection percentages are in the 90%+ levels and can be good at most times of the year. (See: Jull, Laura et al in "Effects of growth stage, branch position and IBA concentration on rooting stem cuttings of 'Yoshino' cryptomeria." *Proc. SNA Research Workers Conference* 38:30-32. 1993). Sun or partial shade. USDA Zones 6-9. (Located in the *Cryptomeria* collection section of the conifers in the northeast section of the arboretum).

- 9406B *Cryptomeria japonica* D. Don 'Yellow Twig' - "Yellow Twig Japanese Cedar" (Taxodiaceae). See generic background information on the Japanese cedars in the description above. Kim describes this cultivar in the *American Nurseryman* article as follows: "A medium-slow growing form with upright rounded habit and slightly pendulous branchlets. The twigs under the foliage are yellowish, giving the whole plant a sprightly golden cast. Excellent, quality growth with no dieback in a lovely, uniform beehive mound 5 to 6 feet tall. This cultivar may be the mid-size compact *Cryptomeria* of choice for the average grower. An excellent alternative foundation plant with a horticultural spark." It is not described in the new Welch "World Checklist of Conifers" and is essentially not available at present in U.S. commercial channels. Sun or partial shade. USDA Zones 6-9. (Again - located in the *Cryptomeria* collection section of the conifers in the northeast section of the arboretum).
- 9407 *Dasyliirion* sp. (3 Mexico collections) - "Desert Spoon, Bear Grass, Sotol" (Agavaceae, also listed in Liliaceae). About 18 species exist in this genus of Yucca-like plants from Texas and Mexico. They have essentially never been grown commercially in the eastern U. S. (and very little even where they are native) and as a result, very little is known of their total adaptability with some

references listing them as USDA Zone 8-10 plants based on their southern desert native habitats. However, we have had many of them in The NCSU Arboretum (now the JC Raulston Arboretum) for over a decade and some are spectacularly beautiful plants. We distributed two species for trial in 1989.

Mr. John Fairey and Mr. Carl Schoenfeld of Yucca Do Nursery, FM 359, PO Box 655, Waller, TX 77484 (409-826-6363) have been active in exploring for new plant species in Mexico over the last 6 years with over 60 expeditions for this purpose. They have recently shared new seed with the arboretum for trial - and plants from this seed make up this item. We are distributing this plant without a species name as taxonomy of the various species in this genus is difficult at best, and at time of seed collection (with flowers long gone) it is impossible to absolutely verify the exact species - and, in addition, new ones are continually being discovered. If hardy in your area, the plants should eventually reach 3-5" in diameter with flower stalks that can be 3-15' in height on various species. Propagation is by seed, or division of the occasional offsets. Grown in sun with good drainage - and it could be used as a houseplant in colder regions. USDA Zones 7-9. (Located in the desert border at the southwest corner of the arboretum).

- 9408 *Dionaea muscipula* Ellis. - "Venus Fly Trap" (Dionaceae). Probably the most famous of all N.C. native plants with great fascination to all - from children to physiological scientists - with the unique movement of the leaves which can close when hairs on their surfaces are triggered - and in nature trapping insects in that process. It is native only to a small region around the Wilmington, N.C. area in swampy regions. The plants have long been collected from the wild, but the huge commercial demands on a worldwide basis have caused serious concerns of endangering the species and the wild populations - and new laws now regulate wild collection and sale. Thankfully - commercial propagation with tissue culture, division of plants and leaf blade cuttings have made the need for wild collection unnecessary. Firms now exist which grow these plants by the hundreds of thousands for mass market chain store sales worldwide. The plants being distributed came to the arboretum as a gift of a nurseryman who purchased more tissue cultured plants than he needed. They grow best in full sun in a moist, acid medium - a 50:50 peat:sand mix works well. Excellent garden plant in bog areas - and excellent commercial potential for production and sale. USDA Zones 6-9. (Not currently on display - go to the UNC Botanical Garden in Chapel Hill and see their magnificent carnivorous plant display instead - also an incredible display at the Atlanta Botanic Garden).
- 9409 *Euonymus alata* (Thunb.) Sieb. 'Monstrosus' - "Heavy-Winged Euonymus" (Celastraceae). A deciduous shrub native to China and Japan which is noted for its brilliant red fall color, and in varying degrees - for the winged bark which is attractive in winter. It was introduced to western culture in 1860 and the species received an Award of Garden Merit from the Royal Horticultural Society in 1984. Several cultivars have been selected with 'Compactus', a slower growing and smaller U.S. cultivar introduced in 1928, making up most commercial production in this country today. This cultivar is more normal in size to the species with rapid growth to 6-9' and corky winged bark which is much larger and showier than other forms for more winter interest. In addition to landscape use, this cultivar has great potential for the florist cut branches market. Easily propagated from softwood cuttings in early summer. Best in sun - particularly to get full fall coloration on foliage. USDA Zones 4-9. (Located in the "Winter Garden" in the east arboretum - at the south side of the beautiful multitrunked *Quercus phillyreoides* tree with the wooden bench).
- 9410 *Fatsyhedera X media* Guillaum 'Annemieke' (also listed as 'Anna Mikkels', 'Lemon and Lime', 'Maculata' and 'Aureovariegata') - "Golden-Variiegated Fatsyhedera" (Araliaceae). A man-made bigeneric hybrid of *Hedera hibernica* and *Fatsia japonica* which occurred in France in 1910. The plant is an excellent ornamental with attractive foliage intermediate in size between the two parents and great shade and stress tolerance. Several variegation mutations have been selected - with this one being characterized by leaves variegated yellow in the center of the leaves. Very easy and fast from cuttings at any time of year - and can be cut down to single-node cuttings for maximum build-up potential. Can take full sun to heavy shade. Has been used for understock for production of "Tree ivies" with cleft grafts of *Hedera* on top of a staked understock of *Fatsyhedera*. USDA Zones 7-9.
- 9411 *Fokienia hodginsii* Henry & Thomas - "Fokienia" (Cupressaceae). A rare conifer as the sole member of this genus native to China - discovered by Captain Hodgins in 1908 and introduced to western cultivation in 1909. It is most closely allied to the genus *Thujopsis* in appearance with flattened sprays of foliage. Little is known of total adaptability with most European literature rating it a relatively tender species for USDA Zones 8 or 9. Our observations over recent years indicate with the additional heat of the southeast, hardiness is dependable in USDA Zones 7, and probably worthy of trial in 6. Unique fernlike appearance of the branches and of ornamental merit. Very easy from semi-hardwood to hardwood cuttings. Will grow in sun or shade. USDA Zones 7-9. (Located in the lathhouse).
- 9412 *Gelsemium sempervirens* (L.) J. St. Hill. 'Woodlander's Pale Yellow' - "Woodlander's Pale Yellow Carolina Jessamine" (Loganiaceae). A wonderful evergreen vine native to the southeastern U.S. which is widely grown in commercial culture for its bright yellow, fragrant flowers in early spring. In nature it is an extremely stable species with only one variant now in common production - the double-flowered *G. sempervirens* 'Pride of Augusta'. A few years ago Woodlander's Nursery, 1128 Colleton Ave., Aiken, S.C. 29801 (8030-648-7522) first introduced the now-widely grown *G. rankanii* which flowers in both fall and spring (but has no fragrance). More recently, they have discovered and introduced this clone which is the first flower color variant noted - with pale primrose-yellow flowers instead of the brilliant chrome yellow of the species. It has been greatly admired by the public and designers when in flower in The NCSU Arboretum (now the JC Raulston Arboretum). Like the species - it is very easy and fast from cuttings at almost any time of year. Needs much greater use - excellent commercial potential. USDA Zones 7-9. (Located on the vine trellis at the "Volunteer's Terrace" beside the arboretum work office).
- 9413 *Heptacodium miconioides* Airy-Shaw - "Seven-Son Flower; Autumn Lilac" (Oleaceae). A rare and beautiful deciduous shrub/small tree in an entirely new genera in cultivation from China. It was first discovered in China by E. H. Wilson, but was not brought into western cultivation until 1980. It was originally distributed as *H. jasminoides* and is still listed that way in many catalogs and references. It produces fragrant white flowers in terminal clusters in August-September, which are followed by showy purplish bracts through the fall (whence the name "Autumn Lilac"). In winter the peeling whitish bark is extremely attractive. The

broad curling leaves are glossy and attractive in summer.

Propagation from semi-hardwood cuttings in summer is relatively easy (see: Bilderback's paper in Nursery Notes 24(1):31 - Jan/Feb '91) and plants can grow 2-4' per year when young. Young plants from cuttings tend to grow laterally and sprawl. Staking these branches will not develop upright growth. Plants will develop normally upright tree growth when planted in field conditions to allow roots to grow sufficiently to force the upright growth. With time, plants can be limbed up to multi-trunk small trees which will probably reach 15-20' with age. Highly ornamental and worthy of commercial production and use. Best in sun. Very drought tolerant. USDA Zones 5-9. (Located in the southeast section of the arboretum in the "magnolia/barberry peninsula").

- 9413A *Ilex vomitoria* Ait. 'Will Fleming' - "Will Fleming Fastigate Yaupon Holly" (Aquifoliaceae). The yaupon holly is an broadleaved evergreen tree native to the southeastern U.S. from Virginia to Texas with many selected cultivars grown as ornamental crops. It is an extremely stress tolerant species growing successfully in a wide variety of habitats with great drought and salt tolerance. The most commonly used commercial forms are the compact "green meatballs" - but other growth forms exist such as the weeping *I. vomitoria* 'Pendula'. This cultivar is very narrowly and tightly fastigate - I have seen plants 14' tall and less than 1' in diameter! It was first widely produced commercially in the Houston, TX area and is now moving throughout the southeast - and not yet common in N.C. Relatively easy from semi-hardwood to hardwood cuttings. With the tight growth form - in northern areas of its useage range - it is probably wise each fall to spiral wrap the plant in green twine for the winter to prevent snow load breakage and branch splaying. Best in sun but tolerates shade. USDA Zones 6-9. (Located on either side of the arbor entrance into the arboretum from the parking lot).
- 9413B *Ilex* X 'Red Robe' - "Red Robe Hybrid Holly" (Aquifoliaceae). A broadleaf evergreen shrub from a cross of *I. cornuta* 'Burfordii' X *I. pernyi* with the resulting characteristic small, dark green toothed foliage associated with most pernyi hybrids. A female plant with red fruit. Easy from semi-hardwood to hardwood cuttings at most any time of year. A dense, dark plant which could be a specimen or sheared and used for smaller barrier protection hedges. Sun or shade. USDA Zones 5-9. (Located in the west arboretum in the bed east of the "building footprint" - under the large wingnut tree).
- 9414 *Itea virginiana* L. 'Saturnalia' - "Saturnalia Virginia Sweetspire" (Grossulariaceae). An excellent ornamental deciduous white-flowering shrub from the southeastern U.S. - native from New Jersey to Louisiana. It reaches 3-4' in height and is grown for its showy white flower racemes in early summer, and for fall color - garnet red in the popular cultivar 'Henry's Garnet'. 'Saturnalia' was introduced in 1993 by Larry Lowman of Ridgecrest Nursery, Rt. 3, Box 241, Wynne, AR 72396 (501-238-3763) as a selection from a population of plants grown from seed collected along the Wolfe River in Fayette County, TN. (See American Nurseryman - Dec. 15, 1993; p. 108.)

This selection was made for its particularly brilliant fall foliage display of intense red, orange, hot pink and yellow foliage - and was named for the wildly exuberant autumn celebrations of ancient Rome. Extremely easy to propagate from leafy cuttings all summer (even down to single nodes) and very fast growing. Tolerates wet and dry sites - and sun and light shade but fall color will be most intense in full sun. Excellent commercial potential. USDA Zones 5-9. (Located in the southwest corner of the arboretum).

- 9415 *Juniperus chinensis* L. 'Oblonga' - "Oblong Chinese Juniper" (Cupressaceae). A conifer shrub which has mixed juvenile and dark green adult foliage - similar to *J. chinensis* 'Japonica' but lower and more widely spreading. It originated at the Bobbink and Atkins Nursery, Rutherford, N.J. in 1932. The arboretum plant had reach a large size (10') and needed to come out for space conservation and new plantings - and we stuck available cuttings before removing it. Not a particularly distinguished plant nor necessarily recommended for production - sort of a big green thing like many other plants in the industry. Roots well from hardwood cuttings taken in mid-winter. Best in sun. USDA Zones 4-9. (No longer in the collection).
- 9415A *Juniperus horizontalis* Moench. 'Variegata' - "Variegated Creeping Juniper" (Cupressaceae). An excellent groundcover conifer species and one of the most important nursery crops in the world with millions of plants produced for use in the U.S. from coast to coast and from Florida to North Dakota. Native to northern North America from Washington to Maine and throughout Canada. Many selections have been made for form, color, texture, height, etc. and The NCSU Arboretum (now the JC Raulston Arboretum) currently has the world reference collection of ca. 55 cultivars which was assembled by graduate student Larry Hatch for a taxonomic study under the direction of Dr. Paul Fantz.

This cultivar has white variegated patches of growth thrown out in a relatively stable and consistent manner (i.e., seems to not do all white, or all green chimeral sections in a planting) - which provides a variation from the normal appearance of this plant in the landscape. Certainly not a "commercial plant" for widespread landscaping - but of interest again to a variegated plant enthusiast or conifer specialist. Easily rooted under mist from hardwood cuttings at any time of year on mature growth. Potential for use in sunny locations in USDA Zones 3-9. (Also distributed in 1993 as #9319A). (Located in the west arboretum in the aisle lined with this collection).

- 9415B *Juniperus virginiana* L. (NCSU Selection) - "Eastern Red Cedar" (Cupressaceae). A well-known conifer tree native throughout the eastern U.S. Widely variable in nature and over 60 cultivars have been named (see: J. C. Raulston, "Eastern Red Cedar - An appreciation of an overlooked tree." Fine Gardening 89:50-55 Jan/Feb 1989). With easier propagation and less susceptibility to cedar apple rust - the Chinese species of junipers (particularly *J. chinensis* cultivars) completely dominate this market in the eastern U.S. with far too rare production of our fine native tree.

This selection being distributed would make a good hedging/screening plant with tight columnar growth and dark green color. Relatively easy from winter hardwood cuttings under mist and grows about 2' per year in production. A female plant which

produces the typical blue "berries" of the species. Best in sun and tolerant of a wide range of soils and drought. USDA Zones 4-9. (Located in the arboretum field nursery research area - not open to general public).

- 9416 *Lagerstroemia fauriei* Koehne 'Townhouse' - "Townhouse Japanese Crepe Myrtle" (Lythraceae). This "new" species of crepe myrtle was collected on the southern Japanese island of Yakushima - where it is a rare endemic plant - by a Dr. John Creech-lead National Arboretum/Longwood Gardens collecting team in the 1950's for its increased cold hardiness, disease resistant foliage, and beautiful red flaking bark. Several of the original collection seedlings found their way to NCSU in the early 60's and now make superb 40-50' tree specimens in the arboretum.

A volunteer seedling from these old trees was dug from the west arboretum and planted in the student designed-and-built model garden known as the "Townhouse Garden" in 1984. As this seedling grew it became a very beautiful plant - and was greatly admired by arboretum visitors for the extremely dark red bark - the darkest of all the crepe myrtles in our collection. Public demand for the plant spurred growers to propagate it for sale - and this use led the arboretum to naming it 'Townhouse' for market identification. It has white flowers in summer typical of the species and wonderful dark red bark usually appearing by the third year of production. Softwood and semi-hardwood cuttings root easily and grow off rapidly (2-4' per year). Best in sun. Hardiness of *L. fauriei* is very much influenced by water and nutrition in the fall and for maximum hardiness it should be grown with as little water and nutrition as possible after July. USDA Zones 6-9. (Located in the Townhouse Garden east of the bedding plant trials).

- 9417 *Liatris microcephala* (Small) K. Schumann - "Small-headed Blazing Star; "Dwarf Blazing Star". (Asteraceae). A very beautiful herbaceous purple-flowered perennial native to western N. C. (and SC, GA, AL, TN, KY). Reported to reach 3' but seen in the arboretum at 1-1.5' in height with many flowering stems forming a globe shaped plant of fine and delicate texture. Much less prone to topple and sprawl than other species tried. Best in full sun and very drought stress tolerant. Very easy from seed gathered when ripe and can be sown without any stratification; will also go by softwood stem cuttings, and older clumps can be divided. Will make an attractive quart plant for sales in one season from greenhouse winter-sown seed. Has potential for both fresh and dried cut flower markets. USDA Zones 5-9. (Located several places - in front of the lath house as one).
- 9418 *Magnolia denudata* Desprouss. 'Forrest's Pink' - "Forrest Pink Yulan Magnolia" (Magnoliaceae). The Yulan magnolia from China has been in cultivation there for over a thousand years as one of the very finest of garden plants (the blossoms often featured in classic black ink paintings) and it has been in western cultivation since 1789. It makes a small tree to 35' with pure white, wonderfully fragrant flowers appearing very early in spring (and thus often frost damaged). This rarely grown, clear pink flowered cultivar was originally selected and introduced by Treseder's Nurseries, from the original tree at Caerhays Castle, Cornwall, England, which was grown from seed collected by the noted plant explorer George Forrest (1873-1932 - discovered over 1,200 new species of plants in China).

Our plant was imported from a noted Swiss grower and has flowered quite beautifully in the arboretum now for several years. Often considered difficult to propagate, this year we needed to trim our plant to a single trunk specimen and as we did so, I had our crew stick all the cuttings on the prunings - and to my amazement - they rooted well! - with enough for this distribution. (Admittedly - I worry - with the easy propagation, is this possibly rootstock from a grafted plant?? With further experience and thought in '95 - I think likely so - sigh!). Probably best sited on a cooler north slope to retard early flowering with some light tracery of branches overhead as protection for radiational frost late in the season. Certainly worth having even if seen at peak only once in five years. USDA Zones 5-9. (Located east of the rose garden).

- 9419 *Manfreda virginiana* (L.) Salisbury. - "False Aloe; Rattlesnake Master" (Agavaceae or Amaryllidaceae). Botanically complex plants of about 20 species with placement in two different families and three different genera (also Agave and Polianthes) by various authors. They could be considered basically herbaceous perennial agaves with above ground growth dying to the ground each winter with regrowth from fleshy underground roots and rhizomes.

This species is found from the coast to the mountains of the Carolinas with most N.C. populations in the Piedmont. On many plants the foliage can be very handsomely mottled and patterned - and superior clones could probably be developed. Long willowy flower stalks 2-4' tall with small greenish-white flowers appear in summer. Propagated easily from seed without stratification or division of colonies. Best in sun with drainage but surprisingly tolerant of a wide range of conditions. A Mexican species was distributed in this program in 1989 as #8914. USDA Zones 6-9. (Located in the desert garden in the southwest corner of the arboretum).

- 9420 *Muhlenbergia dumosa* - "Bamboo Muhly" (Graminae). A stunning ornamental grass I first saw in the gardens at Yucca Do Nursery in the fall of 1992 while on a Texas lecture tour. The texture and form were unique and exquisitely beautiful - I felt it was the most beautiful new ornamental I saw in 1992 and certainly deserving of trial to see its potential in N.C. It is a clump-forming (no aggressive runners) grass with coarse bamboo-like stems which emerge from the ground to a height of 5' and arch out 5-7' wide like a graceful fountain of finely divided, almost gossamer-like pale green foliage.

Native to Arizona and grown in California by " the grassman" John Greenlee (who grows every grass known) - and has moved into N.C. production by grass specialists since my promotion of it in 1993. It is reputed to be a USDA Zone 8 plant - but it survived the rough winter of '94 in Raleigh coming through (short-term) lows of near zero - with mulching it should be dependable in USDA Zone 7. It can be propagated by division of the clumps - but more easily by seed which are available from Wild Seed, Inc., P. O. Box 27751, Tempe, AZ 85285 (602-345-0669) at \$12/1,000 seed. Best in sun. (Located at the north end of the parking lot backing the arboretum sign on Beryl Road).

- 9421 *Nolina* sp. - "Beargrass" (Agavaceae or Liliaceae). A little-grown genera of 25 species of plants found mostly in the southwest and Mexico - although the southeastern U.S. has several species including *N. georgiana* from N.C. They are somewhat yucca-like plants with many tending to a more "grassy" look with longer, thinner and more flexible leaves than most yuccas. Some remain as grassy rosettes, while others can make massive woody trunks and reach 25' in height. They produce tall, branches panicles of whitish-green flowers in summer.

We have a half-dozen species doing well in the "desert habitat" on the southwest corner of The NCSU Arboretum (now the JC Raulston Arboretum). As above in #9407, *Dasyilirion* sp. - the plants in this distribution come from seed of new unknown species collected in Mexico by Yucca Do Nursery - and are being distributed for adaptation trial. Best in sun and good drainage. All species are easily propagated by seed without stratification, or by division of multiple-crown clumps. USDA Zones 7-9.

- 9422 *Osmanthus heterophyllus* (G. Don) P. S. Green 'Fastigata' - "Columnar Osmanthus" (Oleaceae). A broadleaved evergreen shrub introduced from Japan by Thomas Lobb in 1856. The species - or more commonly cultivars of this species - are widely grown as important commercial plants in the southeastern U.S. with varying characteristics. Their ease in propagation, rapid growth, freedom from pest and physiological problems result in wide industry and public acceptance.

This tightly fastigate form was obtained from Head-Lee Nursery, Inc., 2365 Bl. Ridge Blvd., Seneca, S.C. 29678 (803-882-3663) as one of many new plant introductions they have recently developed. Our plant is now nearly 5' in height and less than a foot in diameter - much like the *Ilex vomitoria* 'Will Fleming' (#9413A) above. It should be very useful for smaller screening hedges. Best in sun but will tolerate light shade. Very easy from semi-hardwood to hardwood cuttings at any time of year. USDA Zones 6-9. (Located to the north of the entrance arbor beside the tile planter with the weeping Norway spruce).

- 9423 *Parthenocissus henryana* (Hemsl.) Diels & Gilg - "Henry's Creeper" (Vitaceae). A highly ornamental deciduous vine from China which was first discovered by Austine Henry in 1885 and introduced to western cultivation by Ernest Wilson in 1900. It was awarded the Award of Merit in 1906 and the Award of Garden Merit in 1984 by the Royal Horticultural Society. It differs from the more commonly seen Virginia Creeper by the purple-bronze coloration of the compound foliage - particularly on the underside of leaves - and the whitish mid-vein coloration. Very handsome foliage with good fall color and purple fruit clusters. Very easy from softwood cuttings. Useful in either full sun or partial shade. It climbs by aerial attachments and can be used on wood or stone walls or support without need for twining around a wire. USDA Zones 6-9. (Located inside the visitor center pavilion on the north wall).
- 9424 *Photinia villosa* (Thunb.) DC 'Village Shade' - "Village Shade Tree" (Rosaceae). A small deciduous tree native to China, Korea, and Japan which was introduced by Siebold about 1865. It is noted for bearing white hawthorn-like flowers in May, followed by small, egg-shaped, bright red fruits in autumn. This cultivar was recently named from a seedling variant in The NCSU Arboretum (now the JC Raulston Arboretum) noted for its better foliage characteristics - dark green, glossy foliage through the summer which turns yellow in fall. It is being introduced and promoted for the "small shade tree under powerlines market" with a likely height of 15-20'.

Easy from softwood and semi-hardwood cuttings in early summer and growing 2-3' per year when young. Best in sun but will take light shade. Very stress tolerant. One market concern is the name "Photinia" which now has a negative connotation in many markets - and we have considered releasing it under the name the Chinese botanists use - *Pourthiaea villosa* - which would not come with this potential market problem. Outstanding ornamental plant. USDA Zones 5-9. (Located in the southwest arboretum south of the *Abelia* collection).

- 9425 *Prunus glandulosa* Thunb. 'Plena Alba' - "Double White Flowering Almond; Chinese Bush Cherry" (Rosaceae). A small, bushy shrub native in China and long cultivated in Japan - the species introduced in 1835 with this cultivar originating in 1852. It received an Award of Merit in 1950 and an Award of Garden Merit in 1984 from the Royal Horticultural Society. A plant growing 3-4' in height and 4-7' in width with spectacular fully double white flowers completely covering the plant in very early spring.

Once widely grown in commercial culture until recent decades when the broadleaved evergreen mania sidetracked most deciduous shrubs - in southern gardens. New interest in deciduous plants is bringing back many of these fine plants - and this is an exceptionally fine one worthy of being grown. Also useful for the forced cut branches floral market. A pink form from Japan (1774) also exists (which we have in the arboretum beside the white one). Very easy and fast from summer cuttings - and few growth problems. USDA Zones 4-9. (Located in the east arboretum to the east of the "crepe myrtle peninsula").

- 9426 *Prunus persica* (L.) Batsch 'Pillar' - "Pillar or Columnar Peach" (Rosaceae). The common peach species grown for fruit production also has many ornamental cultivars (which rarely have decent fruit in comparison) that have been in production over the last century. These include dwarfs, weeping, fastigate, and multi-colored flower forms. This cultivar was selected for its tightly fastigate form and pure white flowers which make a spectacular show in early spring. Very easy from semi-hardwood cuttings under mist in summer and rapid growing. Generally considered to be relatively short-lived in the southern landscape (10-20 years) - but the inexpensive plants are cost effective and useful even so. Best in sun and with good moisture availability. It does produce fruit which are edible - but they won't win any prizes at the fair. USDA Zones 5-9. (Located in the west arboretum as framing elements on the first walkway to the right after entering that section of the garden).
- 9427 *Sarcococca hookeriana* Baill.- "Sweet Box" (Buxaceae). An excellent broadleaved evergreen groundcover shrub from the Himalayas. Introduced to western cultivation in 1884. Can reach 4' in height though usually seen shorter than that in southern gardens - and slowly suckering to form wide colonies. Flowers and fruit are essentially non-ornamental and rarely noticed. Very easily propagated from stem cuttings - can be dug and divided in the landscape but not really commercially cost effective to do

so. Slower to cover areas than some other groundcover materials - but an outstanding long-term investment for a quality landscape. Best in light shade. USDA Zones 6-9. (Located in the east arboretum under a large American holly west of the square pool).

- 9428 *Sinojackia rehderiana* H. H. Hu - "Jack's Tree" (Styraceae). A very rare, Styrax-like deciduous white-flowering tree from east China discovered and introduced to western cultivation in 1930. In The NCSU Arboretum (now the JC Raulston Arboretum) trials it has been an outstanding ornamental with merits of easy propagation from softwood and semi-hardwood cuttings, rapid growth, glossy stress-tolerant foliage, showy white flowers in spring, and interesting beaked seeds in fall. It was distributed in 1989 as #8921, and more recently has been on the NCAN promotion program for several years.

The primary problem being encountered by some nurserymen is failure of rooted cuttings to overwinter successfully in the winter after propagation - a common problem in the Styrax family. Once past this stage and established in the ground, there seem to be no major problems. The seed has extremely thick walls and is virtually impossible to germinate. Suggested as a small tree for use under powerlines with literature describing it as reaching 14' - but the arboretum tree is already above this and growing. Best in sun. Outstanding ornamental plant. USDA Zones 5-9. (Located in the west arboretum below the Japanese garden near the tall Momi fir).

- 9429 *Tsuga sieboldii* Carr. - "Japanese Hemlock" (Pinaceae). A beautiful conifer tree to 60' from southern Japan introduced to western culture by Phillip von Siebold about 1855. The needles are broader than the American species, glossy above with a white band beneath. Rapid growing and a very handsome species worthy of commercial trial. Surprisingly easy from hardwood cuttings taken in January - our plants rooted 98%+ with massive root systems by summer. Sun or partial shade. USDA Zones 5-8. (Plants located in the conifer section of the northeast arboretum and in the lath house).
- 9430 *Wisteria floribunda* (Willd.) DC. 'Mon Nishiki' ('Brocade Cloth') - "Variegated Wisteria" (Leguminosae). A novelty variegated foliage cultivar of the common wisteria which was collected in Japan and introduced by Brookside Gardens, Wheaton, MD. It emerges most showy in the cooler spring temperatures with whitish-yellowish variegation which can be quite strong and dramatic at times. In the heat of the south the variegation fades back to solid green by mid-summer; but could perhaps retain its color in cooler areas such as the Pacific northwest, England, or northern US areas. The flower color is the normal violet-blue seen on most wisteria. Probably of interest only to variegated plant crazies with little commercial use - and distributed mainly for conservation purposes to get it scattered around the country. Propagation is easy with softwood cuttings under mist in summer - and the typical widely rampant growth once established. Potential use in USDA Zones 5-9.

(Note - also distributed in 1993 as #9335). (Two plants located in the wisteria collection in the model gardens area - north of the rose garden).

CANDIDATES ATTEMPTED AND FAILED FOR THE 1994 DISTRIBUTION WINDOW

Least growers think all is rosy in our propagation efforts and we have none of the problems that each of you face daily - we've decided to include our failure list for plants we tried to produce for this distribution. If one figures it up - we've had only about a 60% success rate over the last two years of this observation!

- *Castanopsis cuspidata* - winter hardwood cuttings; rooted well but a section of bed failed - yielding only 130 of 200.
- *Cupressus macrocarpa* 'Saligna Aurea' - winter hardwood cuttings; none rooted (normally grafted in trade).
- *Cupressus sempervirens* (hardy Turkey selection) - container plant cuttings - too few for '94; will be ready for '95. *Daphniphyllum macropodium* - summer semi-hardwood cuttings; stuck too late; for '95.
- *Enkianthus serrulatus* - summer semi-hardwood cuttings; stuck too late and too few available - but 40 of 90 rooted.
- *Hedera colchica* 'Dentata Variegata' - any cuttings off potted plants; all rooted easily but still small numbers; for '95. *Ilex chinensis* - winter hardwood cuttings; only 10 of 200 rooted.
- *Ilex crenata* Rocky Road' - winter hardwood cuttings from pot plant; few available - many deteriorated after rooting.
- *Lonicera nitida* 'Silver Beauty' - 200 cuttings - all rooted quickly; pulled for future NCAN promotion.
- *Juniperus formosana* - winter hardwood cuttings - 15 of 200 rooted.
- *Keteleeria davidiana* - winter hardwood cuttings; surprised 120 of 200 rooted (our first success with this highly desired species); many single roots with fragile attachment and had high transplant losses.
- *Magnolia virginiana* 'San Jose' - taken too late and then pulled for future NCAN distribution.
- *Pittosporum heterophyllum* - winter hardwood cuttings - heavily damaged (frozen) when taken; 10 of 70 rooted. *Pittosporum tobira* 'Tall & Tough' - late winter hardwood cuttings with some cold injury - got 90 of 200; for '95.
- *Platyclusus occidentalis* 'Filiformis Erecta' - winter hardwood cuttings; only 35 of 200 rooted (normally grafted in trade).
- *Prunus persica* 'White Glory' - about 60 of 250 rooted; many weak.
- *Ulmus alata* 'Lace Parasol' - summer softwood cuttings - about 60 of 250 rooted; some deterioration before potting.
- *Zenobia pulverulenta* 'Blue Form' - limited propagation wood available; rooted well; should be numbers enough for '95.

1993-94 WINTER HARDINESS EVALUATIONS IN THE NCSU Arboretum (now the JC Raulston Arboretum)

(original version in Proc. SNA Res. Workers Conf. 39:355-358)

Winter hardiness is commonly perceived to be one of the most important measures of plant adaptability in evaluating woody plants for long-term landscape use. So many factors (photoperiod, temperature, nutrition, watering, etc.) affect the conditioning and hardening of woody plants to tolerate low temperatures that it is difficult to fully ascertain the precise hardiness a given plant may actually have in landscape use even after extensive field and laboratory research (8). Data slowly accumulates from field experience in trials of new species and cultivars in varied landscape environments and cultural regimes. As more experience and data is obtained over many years of time, this information is used in technical references and industry guides to help growers and homeowners better know where and how new plants may be successfully used (2). Much such information on rare plants is first available in reference materials from England (1,3,7), Germany (5,6), or the U.S. west coast (4), but the total environment of the southeastern U.S. is so different that many plants from the same USDA hardiness zones in the three areas may have markedly different tolerance to cold. For example, *Gardenia*, *Lagerstroemia*, and *Nandina* are winter-killed in areas which never go below 20F in England, yet tolerate conditions below 10F routinely in Raleigh with no injury thanks to high summer temperatures here which allow carbohydrate accumulation and hardening of wood. "Local" information over many years is still needed to know the true winter hardiness of a plant for any given area.

The NCSU Arboretum (now the JC Raulston Arboretum) focuses on field trials of rare woody plant taxa to determine adaptation potential and ornamental merit in USDA Zone 7 in the southeast U.S. Piedmont region. Over 9,000 taxa have been accessioned in the 18 years of the arboretum's life, and the current collections contain an estimated 5,000 taxa of shrubs and trees. Many of these plants are new to U.S. cultivation from exotic climates and many are new hybrids or cultivars which have not been tested for specific genotype stress tolerance. During the winter of 1993-94, the coldest temperatures registered in 9 years were experienced with many hundreds of new and/or rare plants being exposed to temperatures below 10F for the first time.

Results and Discussion: The following compilation presents information on response of uncommon woody plants to a low of 2F in a period of several days with temperatures below 10F. Observations through the arboretum showed the wildly variable patterns commonly seen in exceptional winter periods, with some familiar plants of "known" hardiness which "should be killed" showing little or no injury (e.g. *Mahonia lomarifolia*), others which "should have no injury" being killed (e.g. *Trachycarpus fortunei*, which went through 10 degrees colder weather 10 years ago with no injury), and others ranging in injury depending on exposure (e.g. *Mahonia X intermedia* 'Arthur Menzies' ranging from no injury to dead at two sites 100' apart). Wind and sun exposure markedly affected injury ratings of broadleaved evergreens and was particularly dramatic at a lath house environment where branches extending through the lath were killed on the outside and had no injury inches away on the inside. Thus, all information below should be considered observational, but in many instances this information is the first to be recorded for these taxa in this temperature regime and can be used for a starting point of potential adaptations for the southeast U.S.

Uncommon woody plants which demonstrated no damage at 2F:

- *Abelia chinensis* - deciduous flowering shrub from Asia.
- *Bischofia polycarpa* - deciduous shade tree from Asia.
- *Callicarpa kwangtungensis* - deciduous fruiting shrub from Asia.
- *Camptotheca acuminata* - deciduous tree from Asia (Morris Arboretum germplasm source only - others killed).
- *Castanopsis cuspidata* - evergreen tree from Asia.
- *Celtis bungeana, jessoensis, sinensis* - deciduous trees from Asia.
- *Cercis chingii, gigantea, glabra, yunnanensis* - deciduous flowering trees from Asia.
- *Chimonanthus nitens, zhetangensis* - evergreen shrubs from Asia.
- *Choisya ternata, C. ternata* 'Sundance' - evergreen shrubs from Mexico.
- *Clerodendrum cryptophyllum* - deciduous summer flowering shrub from Asia.
- *Cupressus chengiana, duclouxiana, lusitanica, macnabiana, macrocarpa* - conifer trees.
- *Cyclocarya palouris* - deciduous tree from Asia.
- *Dalbergia hupehana* - deciduous tree from Asia.
- *Daphniphyllum macropodum* - evergreen tree from Asia.
- *Dendropanax trifidus* - evergreen tree from Asia.
- *Echinosophora koreensis* - deciduous shrub from Korea.
- *Ehretia acuminata* - deciduous tree from Asia.
- *Emmenopterys henryi* - deciduous tree from Asia.
- *Enkianthus serrulatus* - deciduous shrub from Asia.
- *Fokienia hodgsonii* - conifer tree from Asia.
- *Gardenia* 'Kleim's Hardy' - selection of evergreen shrub from Asia (all other cultivars killed to ground).
- *Gymnocladus chinensis* - deciduous tree from Asia.
- *Halesia diptera* var. *magniflora* - Florida ecotype of native deciduous tree.
- *Illicium anisatum, floridanum, henryi, mexicanum, parviflorum* - evergreen shrubs.
- *Itea chinensis* - evergreen shrub from Asia.

- *Kadsura japonica* cultivars - evergreen vines from Asia (defoliated but not stem injury).
- *Keteeleria davidiana* - conifer tree from Asia.
- *Liquidambar acalycina* - deciduous tree from Asia.
- *Lithocarpus chinensis*, *glaber*, *henryi* - evergreen trees from Asia.
- *Magnolia biondii*, *zenii* - deciduous trees from Asia.
- *Magnolia schiedeana* - evergreen tree from Mexico.
- *Mahonia gracilis* - evergreen shrub from Mexico.
- *Manglietia yunnanensis* - evergreen tree (Magnolia relative) from Asia.
- *Pinus kwangtungensis*, *pinea*, *quadrifolia*, *yunnanensis* - conifer trees.
- *Pittosporum bicolor*, *heterophyllum*, *undulatum* - evergreen shrubs from Asia.
- *Poliothrysis sinensis* - deciduous tree from Asia.
- *Pteroceltis tatarinowii* - deciduous tree from Asia.
- *Pyracomeles vilmorinii* - bigeneric hybrid evergreen shrub.
- *Quercus cambyi*, *polymorpha*, *risophylla* - evergreen trees from Mexico (defoliated but no branch injury).
- *Rehderodendron macrocarpum* - deciduous tree from Asia.
- *Sapindus mukorossi* - deciduous tree from Asia.
- *Sinocalycanthus chinensis* - deciduous shrub from Asia.
- *Sinojackia rehderiana*, *xylocarpa* - deciduous trees from Asia.
- *Styrax youngae* - deciduous tree from Mexico.
- *Taiwania cryptomerioides* - conifer tree from Asia.
- *Zizyphus jujuba* - deciduous tree from Middle East.

Uncommon woody plants which were damaged or killed at 2F:

- *Acer pentaphyllum* - deciduous tree from Asia.
- *Athrotaxis cupressoides* - conifer tree from Tasmania.
- *Azara microphylla* - evergreen shrub/tree from Chile.
- *Callistemon citrinus*, *salignus*, *subulatus*, *viminalis* - evergreen shrubs from Australia (to ground; resprouted).
- *Callitris oblonga*, *presissii*, *rhomboides* - evergreen conifers from Tasmania
- *Celtis choseniana* - deciduous tree from Asia (multiple accessions).
- *Cercis racemosa* - deciduous tree from Asia (20-30% killback).
- *Chamaerops humilis* - palm from Europe.
- *Cinnamomum japonicum*, *porrestris* - evergreen trees from Asia.
- *Clethra pringlei* - deciduous tree from Mexico (young plant killed to ground - resprouted).
- *Colletia armata*, *paradoxa* - evergreen shrubs from South America.
- *Diospyros palmeri* - deciduous shrub from Texas (60% killback).
- *Fitzroya cupressoides* - conifer tree from New Zealand.
- *Heteromeles arbutifolia* - evergreen tree from California (30% killback).
- *Heteropsis argentea* - deciduous shrub/vine.
- *Laurus nobilis* X *Umbellularia californica* - evergreen tree hybrid (killed to ground - resprouted). *Machilus grijiei*, *thunbergi* - evergreen trees from Asia (*thunbergi* killed to ground - resprouted).
- *Paliurus spina-christi* - deciduous shrub/tree from Middle East.
- *Phoebe chekiangensis*, *shearei* - evergreen trees from Asia.
- *Pileostegia viburnoides* - evergreen woody vine from Asia.
- *Pittosporum tobira* - evergreen shrub from Asia (all clones except one Korean accession).
- *Prunus campanulata* - deciduous tree from Asia (40% killback).
- *Rhus lancea* - evergreen tree from South Africa (killed to ground - resprouted).
- *Stachyurus himalaicus* - deciduous shrub from Asia.
- *Trachycarpus fortunei* - palm from Asia.
- *Viburnum davidii*, *suspensum* - evergreen shrubs from Asia.
- *Xylosma congestum* - evergreen shrub from Asia.

Significance to Industry: The winter of 1993-94 was the coldest in N.C. in 9 years and gave valuable data on hardiness of a variety of uncommon woody plants. Of those plants which showed no injury at 2F, the most promising uncommon plants for ornamental value, hardiness, and nursery production potentials for landscape use would include: *Castanopsis cuspidata*, *Daphniphyllum macropodum*, *Gardenia* 'Kleim's Hardy', *Keteeleria davidiana*, *Manglietia yunnanensis*, *Pittosporum undulatum*, *Sinojackia rehderiana*, and *Taiwania cryptomerioides*.

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WISTERIA EVALUATIONS IN THE NCSU Arboretum (now the JC Raulston Arboretum)

Tom Foley, Jr. and J. C. Raulston (original version in Proc. SNA Res. Workers Conf. 40:(in press).

Vines have experienced a marked increase in market popularity in recent years for use on screening trellises and fences, for groundcovers, for covering walls, and for use in patio containers. The vigor of most vines have made them a more difficult and awkward group of plants for the nursery production and retailing markets to handle with often rampant growth and resulting control and confinement issues to master. The public often feels that as a group they are uncontrollably aggressive and must be used with great restraint or in areas where high pruning maintenance can be provided. A wide range of both deciduous and evergreen vines exists with diverse ornamental characteristics, seasons of interest and growth rates (3,4,9,10,13).

Wisteria is almost synonymous with the South as a symbol of the region, and both planted and naturalized populations lend much color and fragrance during the spring flowering season. Two American and three Asian species exist which produce inflorescences of varying lengths with flower colors from white through rose, pink, lavender, and to deep purple with some bi-colored cultivars (1,6,11,13). Some 70 cultivars have been described (12), and 35 taxa are currently listed for sale in the largest United States source reference (5), and 43 taxa are listed for the English market (8). The taxonomic confusion in this group of plants is probably greater than almost any other group of woody plants in the American horticultural field with difficulties even at the species level (6,7). Valder devotes an entire chapter to taxonomic issues and provides a new key to the species which is the most comprehensive yet created (12). In addition, problems of multiple renaming of Japanese clones with varied English names, propagation of local origin seedling types, and loss of clonal identity in accidentally propagating understock from grafted plants has occurred. Many unnamed, color-form ('Pink', 'White') clones are propagated and sold which take many years to first flowering and are often of poor to moderate quality even when flowering is achieved. Over the years, The NCSU Arboretum (now the JC Raulston Arboretum) has acquired over 20 clones of *Wisteria* with about 15 currently under evaluation for cultural and ornamental characteristics in USDA Zone 7. Most are planted either in the model gardens area opposite the rose garden; or on the vine trellises (aka - "The KKK Korridor") in the first walkway in the west arboretum.

Results and Discussion: The following list summarizes 20 taxa either listed in literature or observed in The NCSU Arboretum (now the JC Raulston Arboretum) and gives their general ornamental attributes. Taxa currently in The NCSU Arboretum (now the JC Raulston Arboretum) collection are indicated by bold type.

Wisteria brachybotrys (*W. venusta*) Sieb. & Zucc. - "Silky Wisteria." One of two species native to Japan and much rarer in cultivation than *W. floribunda* with only the white form ('Shiro Kapitan') in general cultivation outside Japan. Violet, pink and mauve-pink flowered cultivars also exist. It has much broader racemes than *W. floribunda* with heavy textured flowers and rich fragrance.

- *Wisteria floribunda* (Willd.) DC. - "Japanese Wisteria". Native to Japan and in literature as early as 712 but cultivated long before that in the gardens of Japan. Although long known and greatly admired, it did not enter western cultivation until 1830. Today it is the most widely grown wisteria with by far the largest number of selections and cultivar variants in garden culture. Significant cultivars in more common use include:
- *Wisteria floribunda* 'Domino' ('Issai') - light blue flowers are produced in quantity on young plants - a favorite clone for use in bonsai or potted shrub culture.
- *Wisteria floribunda* 'Honbeni' ('Rosea'; 'Honey Bee Pink') - lavender pink flowers on an old clone in cultivation in the west since 1903. Reported to need correct pruning and training for best flowering which may account for less showy performance at The NCSU Arboretum (now the JC Raulston Arboretum); but rated by authorities as one of the best wisteria cultivars.
- *Wisteria floribunda* 'Macrobotrys' (many clonal names) - noted for its exceptionally long racemes of flowers - exceeding 3 feet in length on well grown plants and rated as "one of the world's great garden plants" (12).
- *Wisteria floribunda* 'Mon Nishiki' ('Variegata') - cream-spotted variegated foliage and pale blue-lavender flowers. In spring the foliage can be interesting but in the heat of the south the variegation fades to green by midsummer.
- *Wisteria floribunda* 'Royal Purple' ('Black Dragon') - young flowering and blooms early in the season with the darkest purple flower color of any wisteria.
- *Wisteria floribunda* 'Shiro Noda' ('Longissima Alba') - a white flowered form similar to 'Macrobotrys' above with exceptionally long racemes of flowers.
- *Wisteria floribunda* 'Violacea Plena' - a very old cultivar introduced into the U.S. before 1875, and the only double-flowered wisteria. One of the darker colored cultivars. More difficult to get to flower as a young plant than many and requires correct culture for best

results.

- *Wisteria frutescens* (L.) Poir. - "American Wisteria". Native to the Southeastern U.S. from Virginia to Florida. The first *Wisteria* to be known in Europe (1724) and the one to which the generic name was first applied by Linnaeus. It has violet-purple flowers and is less vigorous and invasive than Asian species and is more easily controlled in the landscape. Significant ornamental trait differences are its later flowering when foliage has emerged on the plant, and the much shorter racemes. It can have significant merit in use by combining it with the Asian species to extend the flower display season with this species blooming some weeks after the Asian species have finished.
- *Wisteria frutescens* 'Nivea' ('Alba') - A white flowered clone first described in 1854.
- *Wisteria frutescens* 'Amethyst Falls' - A selected form found in Oconee County and introduced by Head-Lee Nursery of Seneca, SC. It has deeper colored amethyst flowers and tends to rebloom at times through the summer.
- *Wisteria macrostachya* (Torr. & A. Gray) Nutt. - "Kentucky Wisteria". First described in 1838 and occurs naturally from Louisiana to Illinois. Taxonomically it overlaps somewhat with *W. frutescens* and various authorities debate its separate species vs. botanical variety status. 'Macrostachys' means "long spikes" in reference to its longer racemes than *W. frutescens*. It is also even later flowering than *W. frutescens* and can be used to further extend the flower display period in mixed plantings. It is the hardiest wisteria species and can be grown dependably in the Chicago area. Several cultivars have been named from natural variants by Louisiana Nursery.
- *Wisteria macrostachya* 'Clara Mack' - A white flowered cultivar which flowers prolifically and at a young age. Named for an avid gardener in S. C. who found it in the wild; introduced to nursery trade by Woodlanders Nursery.
- *Wisteria sinensis* (Sims) Sweet - "Chinese Wisteria". Cultivated in China for over a thousand years, with the first description in western literature in the early 1700's, with subsequent introduction to Europe in 1816. Although a number of cultivars are described, little significant variation exists except for the two main violet and white color forms. The most important cultivars include the following:
 - *Wisteria sinensis* 'Alba' - a white flowered form with long racemes of flowers which hang down close to the rachis giving a narrow appearance to the racemes.
 - *Wisteria sinensis* 'Amethyst' - sold by Duncan & Davies Nursery of New Zealand, this cultivar is the most strongly scented of all wisterias and is rated by Valder as an excellent plant sufficiently distinct to warrant cultivation (12).
 - *Wisteria sinensis* 'Caroline' - sold by Duncan & Davies Nursery of New Zealand under this species name - but is considered to either be *W. floribunda* or a hybrid by other authorities. It has somewhat bicolor deep violet flowers and is an extra early flowering clone useful to add to the spread of the season. In The NCSU Arboretum (now the JC Raulston Arboretum) it has been an outstanding plant with precocious and extremely heavy flowering, and intense fragrance. Highly recommended.
 - *Wisteria sinensis* 'Consequa' - a soft blue-violet flowering clone which was introduced from a Chinese merchant's garden of this name in 1830. Rated by Valder as "one of the great garden plants of all time."
 - *Wisteria sinensis* 'Jako' ('Reindeer') - a white flowered clone with strongly scented flowers. Often first of the clones to flower in The NCSU Arboretum (now the JC Raulston Arboretum) with very heavy flowering. Highly recommended.

Propagation of *Wisteria* can be achieved by seed, softwood cuttings, dormant hardwood cuttings, root cuttings, layering, whip-and-tongue or cleft grafting, and chip budding (2,12). In a notable negative quote (4), the use of seed is discouraged: "Seed-raised plants are variable and, with bad luck, may take up to twenty years to bear late flowers of poor quality, that are then obscured by foliage." Grafting on seedling stock of *W. floribunda* is widely practiced in Asian production and the vigorous understock frequently overgrows the scion cultivar, causing a major source of misnamed cultivars in the trade. With modern rooting hormones and intermittent mist technology, rooting of softwood cuttings throughout the summer is the simplest and most recommended procedure for commercial production. *Wisteria* are essentially insect and disease free in common useage.

Growers should make every attempt to secure and propagate superior, precocious flowering, known cultivar clones of *Wisteria* to replace many of the poorly identified and difficult-to-flower types currently being sold. The first comprehensive English language book devoted to *Wisteris* (12) is now available and should be utilized for detailed understanding of this group of horticulturally important deciduous vines. The author, who has 40 years of practical nursery experience in collecting and growing this group, rates the following as the ten best wisterias: *W. sinensis* 'Consequa', *W. brachybotrys* 'Murasaki Kapitan' and 'Shiro Kapitan', and *W. floribunda* 'Honbeni', 'Kuchibeni', 'Lawrence', 'Macrobotrys', 'Royal Purple', 'Shiro Noda', and 'Violacea Plena'. Greater use should be made of the two native American species, especially for use in combination with the Asian types to extend flowering period of a given display area.

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BOOKNEWS

Well of course THE book news of this period is The NCSU Arboretum (now the JC Raulston Arboretum)'s long agonized over and awaited - The Year in Trees: Superb Woody Plants for Four-Season Gardens by former Arboretum conifer curator and general miracle worker, Dr. Kim Tripp, with a few accompanying notes by yours truly and lots of color photographs culled from 81,000 slides (the most painful part of the whole process - looking through every one of those in a two week period - ugh). As I wrote in the introduction chapter, "Dr. Tripp has the rare combination of a keen observational eye of a technically trained scientist, the soul and vision of a poet to see the rarely recognized inner beauty and secrets of these plants, and the technical proficiency of a practiced professional writer to clearly convey this knowledge and awareness." 204 p. with 150 color photos for \$44.95 from Timber Press. We will have it for sale at various arboretum functions, Timber Press books are almost universally available from most major bookstores, and you can order it directly from them by mail at 1-800-327-5680 (We're the lead featured book in their beautiful fall catalog!). Congratulations to Kim on a magnificent job well done.

Another excellent and highly recommended trees reference book is Shade Trees for the Southeastern United States by Williams, Fare, Gilliam, Keever, Ponder, and Owen. 132 p. softback with color photographs - available from the Office of Research Information, Comer Hall, Auburn University, Auburn, AL 36849 (205-844-4985) for \$10. Another university contribution worth having from the same office is Hollies for the Landscape in the Southeast by Tilt, Williams, Witte and Gaylor - Circular ANR-837 - #3.25 which includes shipping - from. Make checks payable to Alabama, Cooperative Extension Service.

With the announcement of several "bamboo events" in the accompanying arboretum calendar of coming events - perhaps it is time to again remind readers of the Temperate Bamboo Quarterly published by Sue and Adam Turtle, 30 Myers Rd., Summertown, TN 38483 (615-964-4151) - \$24 per year for 4 issues. Full of lots of good information by passionate folks.

Enjoyed quotes:

"I was gratified to be able to answer promptly, and I did. I said I didn't know." Mark Twain

"Many eyes go through the meadow, but few see the flowers in it." Emerson

"Work is the refuge of people who have nothing better to do." Oscar Wilde

The entire winter 1994-95 issue of *Arnoldia* (Volume 54, Number 4) is a unique and valuable source of information often sought by those wrestling with the endless agony of plant nomenclature. The entire issue is devoted to giving reference sources and authorities for naming of various groups of ornamental plants - listed by genus with a huge literature citation section. Outstanding reference source. (Available from: *Arnoldia*, Circulation Manager, The Arnold Arboretum, 125 Arborway, Jamaica Plain, MA 02130-3519).

A strong positive review of the gardens of the N.C. Triangle area was presented in the June 1995 issue of *Travel & Leisure Magazine*, p. 10-16 (Melanie Fleischmann - Gardens: The Plots Thicken). I roared with amusement at the quote "Going from Raulston's gardens (The NCSU Arboretum (now the JC Raulston Arboretum)) to those at Duke, although they may be geographically close, is the aesthetic equivalent of leaving a seaside cottage for Versailles." An apt observation on our relative financial status for certain. But the article was highly complimentary to all three of the great University gardens of the Triangle and will surely lure many new visitors from across the country. It was nice to read the view in a bold text blowup that "Serious gardeners would say that the NCSU Arboretum (now the JC Raulston Arboretum) is to the nursery trade what Milan is to the fashion industry." Incidentally also in June our local newsmagazine published the results of their annual reader's poll (*Spectator* 17(30):9 - June 8-15, 1995) and awarded The NCSU Arboretum (now the JC Raulston Arboretum) their award as Best Arboretum in the Triangle in reader's opinions.

My greatest laugh of the last several months came in reviewing a complimentary (one should never laugh in a gift horses' mouth I realize) copy of Educator's Tech Exchange - a publication for the Academic Computing Community with an issue devoted to how the new high tech world of computers is going to transform teaching. To illustrate the wonders of the World Wide Web as a source of unlimited useful information, they illustrate it with a page on teaching ornamental plants through student review material sheets - with a color photo of each plant and all the information about it that can be pulled up on screen. Unfortunately - the example they just happened to use to illustrate the advantages of this fine system - *Cornus florida* - flowering dogwood; was illustrated by a beautiful photograph of a bright pink weeping cherry - *Prunus subhirtella* 'Pendula'. Well - I've done far worse in my writings here over the years - but I never claimed to be high tech or perfect either.

An article in the Sunday, November 24, 1994 New York Times by Anne Raver - What Horrifies Roaches and Grows on Trees?, yields the observation that the yellowish-green grapefruit-sized fruits of Osage Orange, *Maclura pomifera* are extremely effective at repelling roaches ("think of them as winter floral arrangements - doubling as roach controls").

Horticultural travelers are well aware of the riches of the Philadelphia area for innumerable public gardens. A new book, Gardens of Philadelphia and the Delaware Valley, by William M. Klein, Jr. (former director of the Morris Arboretum and currently director of the National Tropical Botanical Garden in Hawaii) with photography by the noted Derek Fell, presents these gardens and their history and contents in a superb manner. 327 pages with 300 full color photographs - for \$29.95 + \$3.50 shipping from Temple University Press, Borad & Oxford Sts., Philadelphia, PA 19122 (1-800-447-1656).

A "local" southeastern garden center is Charleston and a new travel guide to that area has also appeared: Gardens of Historic Charleston by James R. Cothran from University of South Carolina Press, 205 Pickens St., Columbia, SC 29208 (1-800-768-2500) - \$39.95 + \$4 handling).

The Dictionary of British & Irish Botanists and Horticulturists by Ray Desmond is a useful reference with 13,000 entries covering the contributions of 1,500 gardeners and garden designers, and over 1,500 nurserymen in British Isles history. 1994, 825 p. - \$250 from Taylor & Francis, 1900 Frost Road, Suite 101, Bristol, PA 19007-1598 (1-800-821-8312). Nice to see something like this done - but when are we going to respect the rich history and heritage of American horticulture enough for someone to do a U.S. companion volume? Badly needed.

One contribution to American horticultural history is a new book on the history of the development of the Arnold Arboretum of Harvard University - Science in the Pleasure Ground - A History of the Arnold Arboretum by Ida Hay, a beautiful companion book to the earlier volume on Arnold Arboretum plant introductions by Dr. Spongberg. It is available from Northeastern University Press, C/O CUP Services, Box 6525, Ithaca, NY 14851 - \$39.95 + \$3 handling.

For Magnoliaphiles - several wonderful recent additions - Check List of the Cultivated Magnolias (1994) - biographical listing of over 1,000 magnolia cultivars with original descriptions and comments. \$15 + \$3.50 shipping from: The Magnolia Society, Also, The World Of Magnolias by Dorothy J. Callaway from Timber Press - 260 p. with many illustrations and color photos (\$44.95)

Another new speciality plant reference that is excellent - Wisterias - A Comprehensive Guide by Peter Valder. This is the first book devoted entirely to this beautiful group of woody vines. Illustrated with stunning color photographs from a lifetime of collecting and growing these plants in a nursery in Australia. Amazingly comprehensive - right down to describing plants in The NCSU Arboretum (now the JC Raulston Arboretum) collections! - and newly introduced U.S. cultivars. Highly recommended - and it is hoped it will stimulate commercial production of a wider and better range of Wisteria cultivars in the U.S. - as Vertrees did years ago with his classic book on Japanese Maples. 160 p. - from Florilegium (Australia) but handled already by many U.S. book sources.

Out-of-print horticultural books from:

Books from BREE, 6716 Clybourn Avenue #153, North Hollywood, CA 91606 (818-766-5156; e-mail: bree@netcom.com).

Gardens, Quest Rare Books, 774 Santa Ynez, Stanford, CA 94305 (415-324-3119).

Fair Meadow Books, Emily Collins and Laura Levine, 36 Rucum Road, Roxbury, CT 06783 (203-354-9040).

Landscape #495, Elisabeth Woodburn, Booknoll Farm, P. O. Box 398, Hopewell, NJ 08525 (609-466-0522).

Brooks Books, P. O. Box 21473, Concord, CA 94521 (510-672-4566).

Patricia Ledlie Bookseller, Inc. One Bean Rd., P. O. Box 90, Buckfield, ME 04220 (207-336-2778).

There are hundreds of new gardening books issued each year, and as Allen Lacy states "sadly, many - perhaps the majority - are early candidates for a garage sale." But there are treasures at intervals - and a recent such instant "classic" which will long be read is A Year at North Hill: Four Seasons in a Vermont Garden by the noted writers, gardeners, and designers Joe Eck and Wayne Winterrowd. Again - Allen Lacy says it far better than I ever could "it is toothsome - passionate, reflective, inspiring, endlessly quotable and filled with good humor and humanity." Available in most bookstores or book suppliers (e.g. Capability's 1-800-247-8154) - published by Little, Brown \$29.95.

During the 1995 NCSU Arboretum (now the JC Raulston Arboretum) trip to England and Ireland, while at Mt. Usher Gardens in Ireland - we all stocked up on books from a used bookstore to take us through a long day of ferry and bus travel ahead. A random grabbing of two "local" Irish books proved to be fortuitous - with essentially the best reading of my over 50 fiction books so far this year. Oranges from Spain by David Park (Jonathan Cape Publishers) is perhaps my best book of the year with many powerful short stories on the Northern Ireland experience. Nearly as good is State of the Art - Short Stories by the New Irish Writers - Edited by David Marcus - with a reworking of the cliché "ignorance is bliss" in the statement in one story, "He cursed intelligence, culture, education and insight. These things had deprived him of comfort and a happy life."

Three recommended books in my current reading pile talk about the philosophy of life and gardening - worth looking at:

Why We Garden - Cultivating A Sense of Place - by Jim Nollman - 312 p. - Henry Holt & Company, NY.

The Attentive Heart - Conversations with Trees - by Stephanie Kaza - 258 p. - Fawcett Columbine, NY.

In the Eye of the Garden - by Mirabel Osler - 176 p. - Macmillan Publishing Co., NY.

Earlier this year The NCSU Arboretum (now the JC Raulston Arboretum) sponsored a growers workshop on speciality cut materials for the design industry. The following references were shared as being useful in this area:

Speciality Cut Flowers by Dr. Allan M. Armitage. 372 p. Timber Press.

Postharvest Handling and Storage of Cut Flowers, Florist Greens and Potted Plants. Nowak and Rudnicki. Timber Press.

Proceedings of Commercial Field Production of Cut and Dried Flowers. The Center for Alternative Crops and Products, Dept. Hort. Sci., University of MN, St. Paul, MN.

Proceedings of the 2nd National Conference on Speciality Cut Flowers. Dr. Allan Armitage, Dept. Hort. Sci.,

University of Georgia, Athens, GA 30602.

Holland Bulb Forcer's Guide. Dr. A. A. DeHertogh, Dept. Hort. Sci., NCSU, Raleigh, NC 27695-7609.

Speciality Cut Flowers - A Commercial Growers Guide. Stevens and Gast, Cooperative Extension Service, Kansas State University, Manhattan, KS.

Association of Speciality Cut Flower Growers (ASCFG) produces The Cut Flower Quarterly. Membership, ASCFG, MPO Box 268, Oberlin, OH 44074. Can also provide back issues of Proceedings of National Conferences on Speciality Cut Flowers.

A new and quite elegant periodical from England is Gardens Illustrated with quality writing and beautiful photographs.

It can be seen on larger and more comprehensive speciality newstands - or can be ordered directly through their phone credit card hotline at England 01373-451777 (\$52 per year - 6 issues) - or by writing to Gardens Illustrated: Freepost (SW6096), Frome, Somerset, BA11 1YA, England.

Perhaps the best gardening book in existence in respect to climatic adaptation information is the Sunset Western Garden Book which has been the gospel for the horticultural faithful in the western U.S. for the last 40 years. It has developed and uses a unique climatic mapping system of 24 zones of adaptation throughout the west half of the U.S. and specifies the adaptation of each plant in the book to these zones. From 1954 to 1994 over four million copies were sold. A new edition arrived in 1995 - and is of course magnificent and a must for any plantsman's reference collection. An interesting concept is explained by Joseph Williamson in a Pacific Horticulture story on this new edition: "There is a subtle change that the gardening public may not notice - references to drought have been eliminated. That word is more suited to the eastern United States, which experiences the dictionary definition of drought - periods of dryness. Here in the West it is more accurate to say that we have periods of wetness; aridity is the ever ongoing condition."

PLANT SOURCES NEWS

Arborvillage Farm Nursery, 15604 County Road "CC", PO Box 227, Holt, M) 64048 (816-264-3911). Unquestionably the finest array of uncommon woody plant cultivars of any woody plant nursery in the U.S. - astonishing listing and very, very dangerous to the pocketbook for arborealophiles.

Sweetbay Farm, 4260 Enon Road, Coolidge, GA 31738 (912-255-1688) - specializing in magnolias (14 types - \$10-25@) and pawpaws, *Asimina triloba*.

Plants Preferred, P. O. Box 287, Old Westbury, New York, NY 11568-0287 (516-579-6517). *Helleborus* and *Hydrangea*.

Southeastern Palm and Exotic Plant Society, C/O Will Roberds, 2652 Woodridge Drive, Decatur, GA 30033 (404-634-4391) has a comprehensive listing of palms, their characteristics and cross-indexed to 10 nursery sources where each may be purchased.