

# JC Raulston Arboretum

## Friends of the Arboretum Newsletter

### Number 16

### June 1987

## J. C. Raulston

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### COMING EVENTS:

JULY 16 (THURSDAY) SLIDE SHOW - GARDEN HIGHLIGHTS OF SPRING 1987. Similar to other shows handled in the past, I will present slides from travels and happenings in the arboretum from January through June of this year. These will include Boston, St. Louis, Memphis, Chicago, D.C., N.C., and our own plantings. Meet at 8:00 PM in room 159 of Kilgore Hall on the NCSU campus.

JULY 24-26 NATIVE PLANTS IN THE LANDSCAPE CONFERENCE. This outstanding annual meeting held on the campus of Western Carolina University in Cullowhee, NC brings together a fascinating mixture of people at all levels from around the U.S. Registration information and a program of this year's schedule is available from Dr. James Horton, Department of Biology, Western Carolina University, Cullowhee, NC 28723.

JULY 31-AUGUST 2 SOUTHERN NURSERYMEN'S ASSOCIATION ANNUAL MEETING. One of the largest and best of the nation's nursery/landscape trade shows - worth attending by anyone interested in ornamental plants; both for the enormous trade show and the research presentations by scientists from throughout the southeast U.S. in the open educational sessions. Held at the Georgia World Congress Center in Atlanta, GA.

AUGUST 12 (WEDNESDAY) - ANNUAL FRIENDS PICNIC PLANT SWAP AND SLIDE SHOW. This has been a most popular event in the past with plants, food and good fellowship for everyone. Bring any extra plants you would like to swap or give away (we'll have one per person to give from the arboretum so no one will go away empty handed), a dish of food to share in a pot-luck dinner, and up to 10 slides of your plants or travels you would like to share during the slide show. Because of the heat and late evening light at this time of year - we'll start the plant swap at 7:00, the food about 8:00, and the slides as soon as it gets dark enough - probably about 8:45-9:00. Bring a blanket to spread on the grass or folding lawn chair for greater comfort (and mosquito repellent). A special treat of the event this year will be the first public "unveiling" and demonstration of the new night lighting system just installed. Meet in the White Garden of the NCSU Arboretum (now the JC Raulston Arboretum). (In case of rain we'll switch to room 159 Kilgore Hall.)

AUGUST 18 (TUESDAY) - ORNAMENTALS OPEN HOUSE AND FIELD DAY. In the last two years an enormous amount of development has occurred at the NCSU Mountain Horticultural Crops Field Station in Fletcher, NC and ornamentals programs have expanded greatly. This open house will showcase the new facilities and research programs. To get to the station take I-26 south of Asheville exit to the Asheville Airport - continue on that same road past the airport about one mile to the station. While in the area - you must go another half mile on up the road and visit the outstanding Holbrook Farms Nursery.

AUGUST 19-21 - NATIONAL MEETING OF THE AMERICAN CONIFER SOCIETY. The NCSU Arboretum (now the JC Raulston Arboretum) is hosting the national meeting of this outstanding society at the Mission Valley Conference Center in Raleigh adjacent to the NCSU Campus. The two days/three evenings conference will include talks by speakers from across the country, excursions to local nurseries and gardens, and a rare plants auction. Registration information is available from ACS Registration, NCSU Arboretum (now the JC Raulston Arboretum), NCSU, Box 7609 Raleigh, NC 27695-7609. Registration is \$95 for ACS members before August 1, \$105 after that date; Non-members will be \$115/\$125 respectively (to pay the additional \$20 annual dues for a membership).

Normally this large meeting is hosted by a major institution (such as Longwood Gardens next year) - it is going to be a major effort for us to carry off with our limited personnel (Newell and me!). We could very much use volunteer help on everything from registration through helping with refreshments in gardens, etc. Anyone wishing to help is invited to an organizational meeting at the arboretum on August 6 at 7:00 PM. Also we will be trying to groom the arboretum for its very best showing to the nation-wide group in attendance - anyone willing to weed, mulch, etc. is invited to help - Aug. 13-14 (evenings after 7:00 PM), Aug. 15-16 (Saturday & Sunday all day) - thanks.

AUGUST 23-25 - N.C. ASSOCIATION OF NURSERYMEN SUMMER SHORT COURSE & TRADE SHOW. This excellent meeting will be held in the Asheville Civic Center. Asheville, NC. A program and registration forms (\$10 preregistration before 8/10; \$15 late fee) can be obtained from NCAN, P. O. Box 400, Knightdale NC 27545.

SEPTEMBER 11 (FRIDAY) - SLIDE SHOW ON GERMAN GARDENS AND LANDSCAPING. At 7:00 PM in 3712 Bostian Hall, NCSU Campus, I will do a summary of the NCSU Arboretum (now the JC Raulston Arboretum) Nursery/Landscape tour to Germany during June 25/July 10. For those who wanted to go but couldn't - this show will present highlights of the many cities and institutions visited including the superb 1987 Dusseldorf National Landscape Show.

OCTOBER 6 (TUESDAY) - SLIDE SHOW ON "PLANT HUNTING IN TURKEY". We are most fortunate to be able to present Jim and Jenny Archibald from England during their 1987 U.S. lecture tour. They are renowned in the Rock Garden Society world as outstanding plantsmen both for culture of rare plants, and also for their extensive travels to collect seed for sale. This presentation "is a resume of the last three seasons spent collecting in this climatically and floristically diverse country. Examples of the wild flowers cover the entire range of habitats from the Mediterranean areas through the steppes of the Anatolian Plateau to the highest alpine-zones of the many great mountain ranges." Don't miss this superb show! 8:00 PM 3712 Bostian Hall, NCSU Campus. \*\*\*FOLLOWING THE SHOW WE WILL HAVE OUR ANNUAL PLANT DISTRIBUTION TO MEMBERS.

While here they will also present another show "Ten Thousand Miles of Bulbs" (collecting in Spain, North Africa, Yugoslavia, Greece, Turkey, Lebanon, and Iran) to the Piedmont Chapter of the American Rock Garden Society. If you are not already a member of this exciting organization of dedicated plant enthusiasts, you should be - join and attend this excellent talk. Membership and info from ARGS, Box 211, Route 5, Jones Ferry Road, Chapel Hill, NC 27514.

OCTOBER 30-31 NCSU DEPARTMENT OF HORTICULTURAL SCIENCE CONFERENCE/OPEN HOUSE. For the past year our entire department has been working on development of a program of great importance to horticulture in NC. The result is a two day meeting "Horticulture - A Look to the Future". This conference is to "give our alumni and industry people an opportunity to come together for the purposes of initiating and renewing social acquaintances and for professional gain. We hope the meeting spawns an association which (a) helps to develop a cohesiveness among the state's horticultural industries, and (b) supports the department for the betterment of the art, science and industry of Horticulture in North Carolina." Outstanding speakers from all over the U.S. - corporation presidents, academic authorities, etc. are featured (over \$14,000 in speaker fees to guarantee the best!) to analyze the future of Horticulture. Open house displays throughout the department and social gatherings will complement the meeting. This will be the biggest "event" for the NCSU Department of Horticultural Science since hosting the national ASHS convention in 1974 and we are all excited about the schedule and electricity of communication which will occur. WE PARTICULARLY INVITE OUR ALUMNI BACK, and anyone interested in the profession of Horticulture. For program and registration information - contact: Dr. Doug Sanders, Chairman Program Committee Department of Horticultural Science, Box 7609, NCSU, Raleigh, NC 27695-7609.

OCTOBER 29-31 SOUTHEASTERN REGIONAL MEETING - AMERICAN ASSOCIATION OF BOTANICAL GARDENS AND ARBORETA. For those interested in public gardens and their programs and workings, this meeting at UNCC, Charlotte, NC will provide excellent information and professional contact. For schedule and registration information contact: Dr. Larry Mellichamp, Biology Dept., UNCC, Charlotte, NC 28223 (704-547-4055).

DECEMBER 2 (WEDNESDAY) - SLIDE SHOW - ORNAMENTAL HORTICULTURE AND LANDSCAPE INDUSTRIES IN EASTERN EUROPE. Chapel Hill resident and RTP Union Carbide scientist, Mrs. Barbara Emerson, is a national authority on wild flowers and meadow gardening, turf, and herbicide research. She has been invited to tour Hungary, Czechoslovakia, Bulgaria, and Yugoslavia to meet professionals in the public garden, ornamental horticulture, and landscape fields - and exchange information on current developments in the U.S. and Eastern Europe. She will share her experiences and observations with us in this presentation at 8:00 PM in 3712 Bostian Hall, NCSU Campus.

NOVEMBER 1988 - NCSU Arboretum (now the JC Raulston Arboretum) TOUR OF NEW ZEALAND AND AUSTRALIA. During 1988 I will be gone from NCSU in a year of travel on study leave with January-August spent in England and Europe; and September-December in New Zealand and Australia. With the opportunity to study and preview the latter two countries in advance, this is the ideal time to sponsor our long-proposed tour to the wonderful gardens, nurseries, and landscape industries of New Zealand and Australia (as well as the World's Fair to be held in Perth). More details in the future - but block your calendar now and start saving change in your piggy banks for this lifetime experience.

# ASSORTED NOTES FROM THE ARBORETUM

PEOPLE It is with sadness that I must report the recent untimely death of Mr. John Scott, long-time superintendent of the university farm where the NCSU Arboretum (now the JC Raulston Arboretum) is located. John was well known to hundreds of people across the state who worked with him, received assistance and information from him, and valued him as a friend. He was a tireless worker who boiled his life into dedicated service to NCSU. He was involved with dozens of projects associated with the arboretum from its early conception until his declining health (involving a kidney transplant and subsequent complications) prevented further assistance. A scholarship fund for horticulture students has been established in his name - contributions can be made to: John Scott Memorial Scholarship Fund, NCSU Agricultural Foundation, Box 7207, NCSU, Raleigh N.C. 27695-7207.

We very much appreciate the assistance given by Mr. Clifton Ryan who has been handling the programs at the farm during John's extended illness. Cliff has been a willing helper of the arboretum over the years and we greatly appreciate all his special efforts. And of course Newell Hancock remains the incredible durable backbone of the arboretum - totally dedicated, able to do anything imaginable, and always there to cover or correct my mistakes and inadequacies in the arboretum development and maintenance. I can't praise him too much - thanks, Newell.

We also miss the presence of Mr. Len Burkart who handled the Edible Garden area with such excellence last year. He has returned to his native Illinois to continue his graduate work there. Graduate student Julia Whitworth has volunteered to manage that garden this year and we appreciate her efforts. Also, Clifton Stone, who helped maintain the White Garden in 1986, has moved away from our area. Deborah Harvey has volunteered to help maintain the flower beds in this area this year - many thanks to both. Dr. Roy Larson, floriculture professor in the Horticultural Science Department, volunteered to grow the bedding plants for the White Garden and Parking Lot plantings this year and provided us with nearly 200 dozen plants for the outstanding display there.

So many people provide help in so many ways in the garden, but special mention MUST be made to the unending herculean efforts of Edith Eddleman, Valerie Tyson, and Doug Ruhren who regularly provide plants and groom the magnificent perennial border at least 6 hours each week to keep it looking so very fine (photographers from Horticulture Magazine will shoot there next week!) - unquestionably the favorite attraction of arboretum visitors (sob, sob - won't anybody occasionally look at my "woodies" too??)

Each year it is a challenge to get good qualified help to maintain the arboretum during the peak summer work months when we can only offer poverty wages - half to a third of what students can make in alternate local work available to them. Somehow we've usually managed to attract a person or two who places the experience, chance to learn about uncommon plants, or dedication to helping the arboretum, above a chance to eat. I feel very lucky to have 3 wonderful part-time workers this summer - each one as eager, dedicated, and interested as any I've ever had in the past. Jeff Adcock and Tom Foley, Jr. are undergraduate horticulture students, and James Proctor is a MLA graduate student. They ask questions, write down observations, stay after hours, work with great dedication through the heat and dirt (I've seen them run in the heat to get equipment for jobs - a first over the years, I believe!) - what a special treat it is to work with these fine young men, and my thanks to each of them. If you see them during your visit this summer - offer your thanks as well.

Within the Horticultural Department, after years of stability in faculty - there are suddenly numerous major changes which can affect the arboretum and my teaching and graduate research programs. Dr. Gus DeHertogh, our department head who has supported the arboretum so well through the years, is returning to full time research in the department after 10 years as head and a search is beginning for a replacement. Both our undergraduate coordinator - Dr. Walter Ballinger, and our graduate student coordinator, Dr. Frank Haynes, are retiring. Both have been incredible in their support and assistance to students in our department, and of invaluable assistance to me in my teaching and graduate student programs. A scholarship fund is being developed in Dr. Ballinger's name and contributions can be sent for the Walter Ballinger Horticultural Scholarship to the same address mentioned above. Mr. Bryce Lane, who has handled so many of the arboretum projects with his classes, will become the new undergraduate student coordinator. Dr. Vinny Bonaminio, the state nursery crops extension specialist, left the department this spring and Dr. Ted Bilderback is transferring positions within the department to become the new nursery crops specialist. Ted has been invaluable in so many ways with help from his nursery management and arboriculture classes in the arboretum. While we advertise to fill his vacant position - I will teach his course this fall in addition to the other two I normally handle. Unfortunately this extra load will prevent my offering a planned night course in Charlotte and Asheville this fall - my friends there will now have to wait until after my sabbatical for a spring 1989 offering. The coming months will bring several new faculty members in our program - hopefully as interested in and supportive of the arboretum as others have been.

DEVELOPMENTS: A big project recently completed during June will be mostly invisible to the average visitor - but is very exciting to us for future benefits. For years, we've dragged hoses and sprinklers about almost daily to handle watering of our two intense display areas in the white garden and perennial border. Thanks to financial support by the student honor society of Pi Alpha Xi - funds were provided to install permanent underground pop-up sprinkler systems for easy watering of both areas, and a future overhead irrigation installation in the display lathhouse. While digging trenches everywhere, we decided to take advantage of the excavations to go ahead and install the night lighting system designed for the visitor center and white garden by MLA graduate student, Mr. Hoyt Bangs. Mr. Will Hooker's summer landscape design studio students also helped and for a week we all went through madness to get water, electricity and lighting installed. Severed water and electrical lines with trenchers, heavy rain in the middle of it with newly dug soil flowing and hardening into brick glazed surfaces, defective irrigation heads and electrical fixtures, boards ripped from the visitor center walls, gravel walks dug out, planters moved, a defective trencher which died every 15 seconds (true), and enough trenches in the white garden to serve several WWI

divisions were among the many and varied traumas. A very difficult mental and physical week for all - but a treat to finally see the water running and a testing of the lights at night was magical and a true inspiration. Wait until you see our large cut-leaf Japanese maple spotlighted at night on August 12!

Continued great effort by Ms. Tracy Traer and her class brought the aquatic and reading model gardens nearer to completion. A new fence was built at the front of the aquatic garden, stepping stones were affixed to the pedestals in the pool, and the pool was sealed and painted. A variety of plants were moved to both gardens under the direction of Ms. Janice Spence, graduate MLA student, who originally designed the reading garden. The addition of an English teak bench donated by Post Properties of Atlanta and a beautiful sculpted planter donated by Ms. Sybil Sutton of Wakestone Gardens in Raleigh in memory of her mother bring the garden to near completion. I was nervous about the custom designed sculptural planter as public opinion is rarely uniform about any piece of design work - and I expected a certain amount of criticism of the piece - but comments have been uniformly favorable to my relief. Anyone interested in the artist or his work may contact him by writing or visiting Mr. David Renfroe, 407 Big Pine Rd., Marshall, NC 28753.

After finally laying out and planting in the last of the beds in the west arboretum last year it is now time to begin to work back through the earliest beds developed in the east arboretum a decade ago. Our bark mulching lasts about 6-8 years and the earliest beds have been bare for several years. Many plants have overgrown and were in need of maintenance. A week with chainsaws and loppers removed many large plants, including a large holly in the grasses area; and the entire Lonicera and Weigela collections were dropped to the ground. Collective growth over years can be fairly amazing - branches of a single Lonicera fragrantissima (fragrant honeysuckle or breath of spring) plant from a quart container 8 years ago filled the back of a truck. Many truck loads of brush from throughout the arboretum were carted off, and many more will follow through the summer. Last year was the turning point in our development and from here on more material will be taken out of the arboretum than is added each year. Massive amounts of bark now need to be hauled and spread.

Perhaps the most needed project has been permanent labeling for the collection. In the last year public complaints and criticism have risen dramatically demanding something be done. We have reached an agreement with the UNC Botanical Garden and are contracting to have labels made by them with their equipment. Sheets of label information began to go to them earlier this month for manufacture - and the first of our metal labels should be installed in July. It will be a long continuing effort at considerable expense (likely \$3,000 to do the entire collection) which we will work at as we have the labor to write label descriptions and money to pay for the labels.

Behind the scenes, our computer records are becoming more complete and mapping continues. A booklet with all plants in the Southall garden and parking lot beds is complete and ready for use. A guide to all the conifers in the arboretum and their location will be completed by August for the ACS meeting, and hopefully a book of the entire collection will be finished before I leave on my sabbatic leave.

So progress does occur, though slowly. At this time some of our major needs and goals for the future would include: completion of the central aisle paving through the groundcovers and model gardens area (my top goal at present) - which has remained as a half-completed mudhole for 8 years now (\$2,000); complete replacement and replanting of the rose border (\$4,000); completion of the stroll garden in the Japanese garden (mainly labor and time + about \$500 of materials); movement of the existing turfgrasses to another area and installation of the Elizabeth Lawrence memorial perennial border at that location. Plans are already under way for a memorial gift from the state landscape architects and contractors to provide a new entrance arbor into the display lathhouse this winter.

PLANTS: Every month new plants arrive (summarized at the end of the newsletter), usually a fair number depart through various causes, and existing plants develop to the point we see flowers, fruit, etc. for the first time. Even on a daily basis, each walk through the arboretum is new and different with so much to see and share. Unfortunately, space permits only a few random observations of this evolving pageant to be shared here.

After a year of several near losses and nervous concern about survival of a single plant of the special *Styrax japonicum* we found on Korea's Sohuksan Island in 1985 - this spring we were finally successful with grafting and now have plants (in widely scattered locations for safety) growing vigorously. The original promise of the vigor and size of this outstanding plant seems better all the time. Next year should bring first flowering and enough plants for distribution and real safety.

Though we had damage and a close call last fall with a very hard early freeze before plants had hardened, and two major snow and ice storms late this spring - this has been the best winter in many years for most plants in the garden. Temperatures were never severe and many rather tender plants easily came through undamaged. The record 8" of solid sleet this spring badly damaged our dwarf loblolly pines with considerable numbers of limbs snapped out; and isolated damage to other plants in the collections. One greenhouse collapsed from the weight load at our research farm but we were lucky when compared to other damage sustained throughout NC by this freak storm. One nursery alone lost 32 acres of new lathhouse structures built last summer - with the frame crashing down on plants underneath and damaging them as well.

The Hamamelis were the best ever as they get larger each year and the *Prunus mume* were wonderful as always. At one point both were in full bloom with the drama of a solid snow cover under them as a counterpoint to the flowers. Our student, Ms. Julia Mclver, had an article on *Prunus mume* in the American Nurseryman magazine to promote interest in this rarely grown magnificent plant. Also the Magnolia collection bloomed largely without the normal frost damage - *M. denudata* was incredible for the first time and each week brought new species and cultivars with all their glory in combination with the thousands of daffodils underneath the trees. 'February Gold' daffodil made it to bloom in February this year with the early spring; later we dug our two large drifts of older plantings of this

cultivar and I think we now have enough bulbs to plant the world. We are underplanting the entire Hamamelis bed with the bulbs which should make a spectacular show in three or four years. We saw the yellow-flowered Magnolia x 'Elizabeth' for the first time with 6 blooms and I can hardly wait to see it when mature and covered with thousands of flowers.

Later the 6 different Akebia on the entrance arbor were spectacular. My first time to see the white-flowered cultivar and I liked it very much. It was particularly nice to see intertwined with the pink and purple-flowered forms. Akebia are reported to rarely fruit in cultivation but the presence of several clones cross-pollinating on our arbor yield large masses of fruit which show to best advantage for visitors overhead as they enlarge and color in fall. Our Wisteria were the best ever with one cultivar with very long white racemes 14-20" long particularly fine. The uncommon form of our native species, *W. frutescens* 'Alba' was quite appealing with its late fragrant bloom covering the plant. The many Japanese and Siberian iris were both breathtaking in display this year with varied color, size and form.

Our "poinsettia tree", *Pinckneya pubens* has grown out through the roof of the lathhouse enough to fully display the showy heads of pink flowers and the dramatic display received much attention from visitors admiring the plant and wondering what it is. In the west arboretum our *Pterocarya* (near the large white oak with the swing) is in fruit for the first time and the long hanging chains of green "wing-nuts" (the common name) are quite attractive. This tree is the fastest growing plant in the arboretum (except for the hybrid poplars) with 8-12' of growth per year and a 14" trunk diameter in 3 years from seed.

The *Itea* were the best ever in flower and *I. virginiana* 'Henry's Garnet' was impressive with its much longer inflorescences. I have been intrigued by flowering on several of our very dwarf oddity Japanese cultivars of *Nandina* (what others have jokingly referred to as the "Hiroshima collection" - with plants looking like radiation-induced mutations) for the first time in the many years we have had them. I had been under the impression they were non-flowering types and will be very interested to grow the resulting seed to see what types of variations may show up.

It was exciting to receive two species of *Cercis* (redbuds) from Mr. Hans Simon in Germany this spring and complete our living collection of all the existing known 11 species - possibly for the first time in any one garden. Our *Cercis chingii* (which flowered for possibly the first time in the U.S. last year) was spectacular this year with 9' of growth covered solidly with pink flowers - two weeks ahead of other species.

Other plants possibly blooming for the first time in the U.S. included two more Chinese rarities. Our *Sinocalycanthus chinensis* bloomed for the first time in May with beautiful white somewhat camellia-like formal blooms. Though the Asiatic counterpart to our *Calycanthus*, the flowers have no surface resemblance to sweetshrub; however, the fruit are quite similar. The flowers are beautiful enough to merit serious consideration for garden use. Also, the *Mahonia mariei* I grew from seed several years ago bloomed in the greenhouse this spring with a spectacular two foot diameter spread of thousands of beautiful fragrant yellow flowers. It is now covered with a magnificent display of beautiful blue fruits hanging in long racemes - unfortunately it seems that no seed are developing in the fruit to use for further propagation. Perhaps when others of our several plants (which have now successfully overwintered outside for 2 years) bloom, cross-pollination may allow seed production on this beautiful new species.

In this year's trial with seed from several Chinese botanical gardens we were successful in obtaining a wide variety of new trees and shrubs. Most exciting are the very rare *Magnolia amoena* and *Sassafras tzumi*.

## **SOME UNCOMMON PLANTS RECOMMENDED FOR TRIAL FROM THE NCSU Arboretum (now the JC Raulston Arboretum) EVALUATIONS**

The following article was written for publication in the June 1987 issue of *The Avant Gardener* [Vol. 19(8):57-64]. Their offer to promote The NCSU Arboretum (now the JC Raulston Arboretum) program is very greatly appreciated and the article has generated many letters and requests for further information from both growers and consumers. Due to space limitations available for the article, it was considerably shortened when printed. The full wordy rambling version that I typically write is printed here (plus a location guide of where plants are located in the Arboretum) for the many Friends of the Arboretum who do not receive *The Avant Gardener* (which we have long highly recommended as a superb publication full of useful and diverse information - available from Horticultural Data Processors, Box #9, N.Y., N.Y 10028 - \$15.00 per year).

During the past ten years, over 5,000 species and cultivars of perennial landscape plants have been accumulated at The NCSU Arboretum (now the JC Raulston Arboretum) in Raleigh for evaluation of their suitability for use in gardens of the Atlantic coast piedmont (USDA hardiness

zone 7, elevation ca. 400', longitude 78° 47'W, latitude 35° 52'N, annual rainfall ca. 43"). The plants have been acquired from almost every imaginable source: commercial nurseries throughout North America, Europe, Asia, and New Zealand; seed exchanges with botanic gardens throughout the world; cuttings gathered from arboreta and public gardens in many countries; and seed from native plants in wild stands on various collecting trips. During the past five years, a wide variety of weather records have been broken at the test site such as the coldest temperature in history (-7F, breaking a 1890's record by 5 degrees), the earliest hard freeze in autumn, the latest hard freeze in spring, the hottest summer, the driest summer (combined ironically with the wettest August!), and many others. Plants which have survived all these conditions look promising for future use. Winter hardiness is represented in this article by USDA zones.

For the purposes of this article, I have selected fifty plants from our trials which encompass a wide variety of landscape uses - herbaceous perennials, groundcovers, deciduous and evergreen shrubs, vines, and trees, and conifers. Some are either extremely new or rare, others have been available for many decades; but all share a characteristic of being generally uncommon in commercial market channels of our region. A few are widely grown in certain regional markets. All have some ornamental feature that commend them for more widespread garden use.

1. *Abies firma* - The Momi Fir (Pinaceae). This beautiful fir species from Japan was selected as one which overcomes a major problem in this genera of plants generally not well adapted to many urban habitats, and specifically for its great heat tolerance. Most firs and spruces will not grow in regions of the U. S. with high summer night temperatures, whereas this species can be grown all the way to the Gulf coast. In Japan it is the largest species of fir up to 150' in height, but rarely exceeds 50' in cultivation. It has the typical fir conical shape and offers good possibilities for production as a cut or potted Christmas tree in southern areas in addition to landscape use. Propagation is from seed which normally must be obtained from Japanese or European sources. It can be rooted from cuttings in fairly good percentages but resulting plants take several years to develop a decent central leader and good conical form. It is very rarely available from commercial sources in the U. S. Adapted for use in zones 6-9. (West of Japanese garden)

2. *Acanthopanax sieboldiana* 'Variegatus' - The Variegated Fiveleaf Aralia (Araliaceae). This plant was chosen for the beauty of its foliage and great tolerance to unfavorable conditions and difficult urban environments. It is tolerant to drought, shading, air pollution, soils varying from sand to clay and acid to alkaline; and has no major insect or disease problems. Propagation by softwood cuttings under mist in summer is quite easy. The plant will become 8' high by 8' wide with time but is tolerant of heavy pruning and can be kept to more compact form. The stems have short spines and when sheared it can produce a good pedestrian barrier. The primary value of this extremely tough deciduous shrub is the beautiful five-leafed foliage with creamy-white edge variegation; flowers and fruit are not particularly notable. The variegated form is rarely available. Adapted for use in zones 4-8. (In white garden to left of the large cut-leaf Japanese maple)

3. *Acer palmatum* 'Sango Kaku' - The Coral-Bark Japanese Maple (Aceraceae). Japanese maples are well known and among the very finest of small ornamental tree species. Since the publication of Vertree's superb reference manual Japanese Maples by Timber Press in 1978, the dozens of widely varied cultivars have received much greater awareness, commercial production and public use. I have selected this one (of the many that I like very much) to feature as it expands the season of landscape value in this species. The unique feature of 'Sango Kaku' is the coral-red coloration of the bark on young limbs which develops in the fall as leaves drop and remains until spring when new growth begins. To obtain the best coloration the plant must be located where it receives bright sunlight and the color is most intense on vigorous young growth. The foliage is green in summer and in autumn has gold tones with a blend of apricot and light red. Where so many of our popular landscape trees have narrow periods of interest during the year, this plant is outstanding for being beautiful at all seasons. The cultivars of Japanese maple are most commonly propagated by grafting, though with proper post-rooting handling they can be grown from semi-hardwood cuttings in early summer. 'Sango Kaku' is now fairly widely grown across the U. S. in commercial production. The tree can reach 20' in height but is more commonly seen at 10-15'. Reportedly less hardy than the species and likely best adapted to zones 6-8. (At east end of grasses/yuccas garden; and in Japanese stroll garden near the bridge)

4. *Agapanthus africanus* - The Lily-of-the-Nile (Amaryllidaceae). This beautiful white and blue flowered perennial plant in the lily family is widely grown as a landscape plant in California/Florida and occasionally as a pot plant in the rest of the country. The reason for inclusion on this list is to encourage experimentation through a wider range of the U. S. for use of *Agapanthus* in the garden. Unfortunately there is great confusion as to the true taxonomy of many of the plants commercially available, and existing literature emphasizes that they are not hardy in areas colder than zone 9 and must be kept indoors through the winter. If plants are mulched as they die down in the autumn they are proving to be excellent landscape plants for us in zone 7. We now have a number of types established and there are several gardens in our area which have large drifts which flower spectacularly in the summer. The deciduous forms are generally more hardy than the evergreen types, and the Headbourne hybrids are often recommended as being the most hardy. I have had letters from gardeners in both Pennsylvania and New York who have had *agapanthus* in the garden for many years by deep mulching to keep the roots from freezing. The plants are propagated by seed or division of clumps (you will be amazed by the extensive root system when you try to dig and divide an established plant!). I feel they are definitely worthy of experimental trial anywhere in zone 7-10, and cultivars obtained. (Many places - main collections south of white pine hedge in groundcovers plaza, and to left of display lathhouse under the large 'Burford' hollies)

5. *Ardisia japonica* 'Chirimen' - Japanese Ardisia (Myrsinaceae). A need always exists for good groundcover plants for use in landscape plantings. This relatively unknown species grows as an evergreen carpet in moist woodlands of Japan, Korea, and China. The Japanese have selected many cultivars of varying size, foliage color, and hardiness which we have been evaluating in our trials. The larger cultivars with variegated foliage have been root hardy but die back to the ground each winter. 'Chirimen' has proved to be the hardiest and most dependably evergreen cultivar for us. The plant grows to 3-4" in height in dense solid green mats, with white flowers in spring followed by bright red berries in fall which persist through the winter. Propagation is by division of the clumps which spread by underground runners or by leafy stem cuttings at most any time of year. At present, it is very rarely available from commercial sources. This plant should be useful anywhere in zones 7-9 (possibly 6) under shady conditions with moist, well-drained soils. (In display lathhouse)

6. *Aronia arbutifolia* 'Brilliantissima' - The Brilliant Red Chokeberry (Rosaceae). This cultivar of a native eastern U.S. deciduous shrub is now produced commercially but is deserving of much wider use. As a tough multiple-season plant for commercial use where lack of care and abuse is common - this plant is hard to beat. Easily propagated by summer cuttings or division of suckering plants and rapid

growing; it will tolerate a wide variety of soil types and moisture levels, and can grow in partial shade though best in full sun. Showy white flowers cover the 6-8' round plant in spring; lustrous waxy dark green leaves carry it through the summer and turn brilliant red in fall; and the fall and early winter display of shiny deep red fruit is perhaps the most spectacular of any fruiting plant in our arboretum. Though fine enough for any garden, it has greatest potential of wider use as a high-quality budget plant for highways, parks, commercial landscapes, etc. where long-season landscape interest from tough low-maintenance plants is rare and invaluable. Adapted to use in zones 4-9. (In east arboretum north of the Hamamelis bed near the tallest Leyland cypress hedge)

7. Azalea (Rhododendron) 'Pink Cascade' - Evergreen Groundcover Azaleas (Ericaceae). One could get into dozens of cultivars of this most popular group of landscape plants which offers so much variety in color, season, form, hardiness, etc. The reason for selection of this particular one (or group) is its merit as a double purpose plant. As mentioned earlier, there is an increasing awareness and demand for good groundcovers which can reduce maintenance costs; and people already know and are excited about use of azaleas. Recently a whole series of low-growing evergreen groundcover azaleas have entered the commercial market (including such other cultivars as 'Alexander', 'Red Fountain', 'Pink Pancake', 'Michael Hill', etc.). These plants grow 6-15" in height and spread 3-6' in diameter with time. They have the same requirements as most evergreen azaleas - moist, well-drained, acid organic soils in light shade. All are propagated easily by semi-hardwood cuttings in summer under mist. They can be found entering the commercial market in most areas of the country. Most are adaptable to zones 6-9. (In center of display lathhouse near the huge *Betula jacquemontii* growing through the roof)

8. *Baptisia pendula* - Wild White Indigo (Leguminosae). This beautiful herbaceous perennial native to the southeast Piedmont region from Florida to North Carolina is essentially unknown as a garden plant. Our plant is now over long inflorescences of pure white flowers against dark colored stems. The strongest flowering will occur on plants growing in full sun and it will remain in bloom 2-3 weeks. After flowering the foliage is attractive and remains until killed by frosts in autumn. The clumps can be dug and divided but commercial propagation is most likely by seed, with saleable plants produced in 8-10 weeks from seeding. On an experimental basis last year we also successfully rooted softwood cuttings under mist in early summer. Essentially unknown by the commercial perennials industry but active promotion to nurserymen by the N. C. Botanical Garden is beginning to move it toward availability. Will likely be useful in zones 5-9 (possibly colder areas with mulching of the crowns). (I have been asked why it is named *pendula* when nothing about the plant seems pendulous - but the name refers to the seed pods which hang down as compared to the upright pods of the very similar *Baptisia alba*). Located in the native plants garden and to the right of the entrance drive at the front of the farm.

9. *Cercis reniformis* 'Oklahoma' and 'Texas White' (Leguminosae). Redbuds have recently become a focused passion in our arboretum collections with all 11 existing species and many cultivars under observation - most of which have never been produced commercially in this country. In my view 'Oklahoma' and 'Texas White' are the finest redbuds available for landscape use making small deciduous trees to 12-18' in height. The foliage is outstanding with very thick, glossy dark green leaves looking much like a broadleaved evergreen in texture. They would be worth growing for the handsome foliage even if they never bloomed but both are outstanding in flower as well. 'Oklahoma' has the darkest red-purple flower color of any redbud and 'Texas White' has pure white flowers. My observation is that 'Texas White' is often misnamed in commercial production with this name often applied to the white flowered form of the eastern redbud *C. canadensis* 'Alba'. 'Texas White' has the thick, glossy foliage; whereas the white eastern redbud has the dull, pale green foliage of that species. These cultivars must be produced by budding on seedling understock - a more difficult technique with *Cercis* than many genera and accounting for their rarity in commercial production. 'Oklahoma' and 'Texas White' are available but very limited in sources and quantity - both deserve much greater popularity. They are likely adapted to zones 6-9. ('Oklahoma' is to the left of the visitor center by the parking lot; 'Texas White' still in the nursery)

One other redbud which should also be mentioned for future potential is *Cercis mexicana* - the Mexican redbud. Mexican redbud is native to Texas/Mexico and in trials there and in N. C. has proven hardy to at least 0-5F. Hardiness of some redbud species is much dependent on summer heat to ripen wood and in climates with cool summer and fall weather (England, Pacific northwest) they are often less winter hardy. The particular merit of the Mexican redbud involves the foliage which is thick and glossy like the two mentioned above but also with an undulate margin - much smaller than the familiar eastern redbud (1-3" in diameter) and the most beautiful foliage of all the redbud species. The plant is also smaller and more densely branched making it perhaps of a more appropriate scale for modern homes or apartments which have more compact landscapes - likely maturing in at 8-10' in height. Plants are propagated by seed or by budding onto eastern redbud understock. It is not yet in commercial production but production is beginning Lone Star Nursery in Texas. It would likely be useful in zones 6-9 (zone 6 only with ample summer/fall heat). (In west arboretum in the *Cercis* collection near the Leyland cypress circle)

10. *Chrysogonum virginianum* - Golden Star; "Green-and-Gold" plant (Compositae). Another excellent native herbaceous perennial groundcover from the eastern U. S. particularly notable for its extremely long bloom time - often from March until November in N. C. The plant grows 5-10" in height, and is evergreen in the south while it dies to the ground in colder areas. The 1" diameter flowers of 5 petals are bright golden-yellow in color. Although it is shade tolerant, flowering is more profuse with greater light levels. It will grow in a wide variety of conditions but is best in light shade with a moist, well-drained soil. Propagation is easy from either seed or division of the spreading clumps. There is considerable variation among seedling populations in plant height, flower size and quality, and length of bloom period. Selection of a superior form and vegetative propagation to increase a population for the garden would be desirable. Due to recent promotions by the N. C. Botanical Garden, "Green-and-Gold" is now nursery propagated and available from a number of commercial sources. Adapted to zones 5-9. (Native plants garden)

11. *Cornus controversa* - Giant Dogwood (Cornaceae). An outstanding large flowering tree which has long been in cultivation in the U. S. but never widely promoted as a commercial nursery crop. The largest of all dogwoods, reaching 70' in China, Japan, and Korea where it is native - but more commonly 30-40' in cultivation. Large masses of creamy-white flowers of the shrub dogwood type are produced in April-May. Purple-black fruit in late summer, handsome foliage, purplish twigs in winter, and horizontal branching are other attractive attributes of the plant. From a production standpoint - the easy propagation by seed or semi-hardwood cuttings, very rapid growth (3-5' per year for us - fastest of all dogwoods), and tolerance to a wide variety of soils make it a desirable commercial tree, but at this time it is fairly difficult to find for purchase. Best planted in full sun and with ample moisture to prevent drought stress. Adapted for use in zones 5-8 (possibly 4 and 9 with correct provenance selection). (Just after leaving the white garden in the Nandina collection)

12. *Cryptomeria japonica* 'Elegans' (Taxodiaceae). The Japanese cedar is fairly widely grown through the southeast and west coast, with many cultivars of widely varying characteristics available. This very old cultivar (introduced from Japan in 1854) was selected to present here for its unique texture and yearround interest; and relative lack of production in today's commercial market. Many ornamentals cycle in popularity and while older plants of 'Elegans' are seen in landscapes it is now difficult to find them for sale. This cultivar differs from the species in having soft feathery juvenile foliage with wonderful texture for the landscape and a color change from green to reddish-bronze during winter months. Plants are normally 10-15' in the landscape, though I have seen very old plants reach 35' in height. It is easily propagated by cuttings through much of the year and can grow 10-18" a year in production. Will grow in light shade or full sun but winter coloration is best in full sun. Adapted to zones 6-9 (somewhat less hardy than the species). (In Cryptomeria collection in east arboretum near the row of dwarf loblolly pines)

13. *Cupressocyparis leylandii* 'Leighton Green' - Leighton Green Leyland Cypress (Cupressaceae). Leyland cypress is a artificial bigeneric conifer hybrid of *Chamaecyparis* X *Cupressus* which first occurred in England in 1888. Since that time many cultivars have been developed and it has achieved widespread commercial use in Europe, California, and more recently in the southeastern U. S. The great popularity stems from its characteristic as the fastest growing conifer with a tall narrow shape suitable for hedges and property screening. In our area 3-4' per year of growth is possible in the landscape with good water and fertility availability. Unfortunately, the clone 'Leighton Green' which seems to have the finest ornamental qualities of dark green foliage, dense branching and superb form is seldom produced commercially in the U. S. It is best in full sun but can tolerate light shade. Propagation from cuttings is a bit slower and more difficult than many other conifers, but with proper selection of mature wood, correct timing, bottom heat, hormones, and patience - 60-90% rooting can be achieved. Adapted in zones 7-9. (In nursery)

14. *Delosperma nubigenum* - Hardy Iceplant (Aizoaceae). The hardy iceplant is a new and very hardy succulent from the mountains of Lesotho in South Africa which is rapidly appearing across the U. S. as a significant new groundcover plant. Iceplants have long been widely used in California for beach and highway plantings but those species were not winterhardy for most U. S. areas. This species is hardy to -20F, grows 2" tall and spreads to 36" wide. The foliage is yellow-green in summer and turns reddish in winter. Bright yellow daisy-like flowers 1" in diameter appear in early summer and sporadically later. It is deep rooted and very drought tolerant once established and will grow in full sun or light shade. Very easy and rapidly propagated by breaking off any of the small branchlets - saleable cellpack trays can be produced in 5-7 weeks. (Note - under nursery conditions with high water and fertilization levels it may grow so rapidly and succulent that hardening for winter cold tolerance is reduced compared to its normal garden performance.) It has excellent potential for commercial landscape use on banks in parking lot areas, and other places traditionally occupied by the overdone juniper syndrome. Plants are available from a number of commercial sources across the U. S. and will likely become relatively common in a few years. Adapted to zones 5-10 (4 with protective mulching). (At left in front of entrance to the display lathhouse)

15. *Gelsemium rankanii* (Loganiaceae). The Carolina Jessamine, *Gelsemium sempervirens*, is one of the finest and most widely grown evergreen flowering vines in the southeastern U.S. This widespread popularity is justifiably warranted by the handsome dark green dense, medium-textured foliage: rapid growth, bright golden flowers in February-April, and tolerance of sun and shade. The very rare and little known *G. rankanii*, adds one additional ornamental characteristic to those mentioned to justify greater awareness and use of it as an addition to the landscape palette. In addition to the spring bloom, a profusion of flowers are also produced in late fall - normally during October and November in N. C. On the surface it otherwise appears identical to the common species. It does seem somewhat less vigorous in speed of growth (perhaps desirable in keeping vines under control). and probably a little less hardy with growth activity occurring in fall when plants are hardening for winter. Useful in sun or shade as either vine or groundcover. Very easily propagated from cuttings at almost any time of year. Very few commercial sources and adapted for use in zones 7-9. (In west arboretum on left side of the first path after leaving the Japanese garden - in the deciduous holly collection)

16. *Genista pilosa* 'Vancouver Gold' (Leguminosae). This very handsome evergreen groundcover introduced by the outstanding program at the University of British Columbia Botanical Garden in Vancouver, Canada is rapidly becoming a major crop in the Pacific northwest. Although the individual stems and leaves are thin and small, the collective mass of the densely branched plant makes an excellent solid green carpet where used. 'Vancouver Gold' grows to 1' in height, spreads to 3' and is covered with a solid sheet of bright golden flowers in spring. It will grow in partial shade but flowers best in full sun. Very easily propagated by cuttings throughout the year. This plant will likely expand across the U. S. very rapidly in zones 6-9 where adapted for use and be widely used in the future. (In parking lot under weeping Camperdown elm)

17. *Hakonechloa macra* - Hakone Grass (Gramineae). Ornamental grasses are exploding in popularity for landscaping across the U. S. today following several decades of development and widespread use in Germany. Of the innumerable genera, species and cultivars of various "grasses" which exist, Hakone grass from Japan is perhaps the most elegant and beautiful of all - and one of the most difficult to find commercially due to its slow growth rate. The species is solid green in color and the several cultivars which exist offer varying

shades of white and yellow variegation. Plants will grow 1-2' in height and slowly expand in diameter to 3' in size with a soft arching "fountain" effect. Unlike most grasses which prefer full sun this type is best in light to medium shade with moist conditions and good drainage. The dead winter foliage is trimmed to the ground each spring before new growth from the roots begins. Propagation is easy by division of clumps, but slow growth prevents rapid buildup for widespread industry availability. Adapted to zones 6-9 (possibly 5 with a mulching of crowns). (In Asiatic plants section of display lathhouse near exit to Japanese garden on left side of path)

18. *Hamamelis X intermedia* 'Arnold Promise' - 'Arnold Promise' Witch Hazel (Hamamelidaceae). This and the many other cultivars of this superb winter flowering deciduous shrub/tree hybrid of *H. mollis* X *H. japonica* have existed for many years but have never achieved the widespread popularity they warrant. Desirable qualities include vigorous growth on problem-free plants reaching 15-20' in height with mid-winter fragrant flowers, and excellent fall color. 'Arnold Promise' is the most widely grown cultivar in the U. S. and has clear yellow flowers covering the plant in February-March. Other cultivars such as 'Ruby Glow', 'Primavera', 'Jelena', 'Carmine Red', 'Diana', etc. have flowers varying in color from pale yellow, through yellow shades, oranges into dark reds; and bloom periods from January through April. At present they are rather "confined" to public botanic gardens where they bloom when few people are there to view and become excited by their glory. Also when offered for sale, few people are shopping for plants when they bloom and there is little appeal from the barren sticks later when buyers are dazzled by the azaleas flowering around them. Propagation is normally by grafting on seedling understock. Cuttings can easily be rooted but require very specific and careful post-rooting handling to survive. Plants are available with searching but deserve much wider popular use in the public landscape. Adapted to zones 5-8. (Hamamelis collection bed just after leaving the white garden)

19. *Hedera helix* 'Gnome' - 'Gnome' English Ivy (Araliaceae). Of over 100 cultivars of this widely-grown species originally planted for evaluation, 'Gnome' is among the most distinctive and potentially useful for garden and landscape use in shady areas. The growth remains flatter and closer to the ground than any other in the collection with the best fine texture. The leaves are normally less than 1" in length and the mat of foliage rarely over 2-3" deep. Typical of all English ivy cultivars it is very easy to propagate from cuttings at any time of year and numbers can be built up quickly. Adapted to use in zones 6-9. (In display lathhouse on right side of the south path across from the bank of rhododendrons)

20. *Helianthus angustifolius* - Tall Autumn Sunflower, Swamp Sunflower (Compositae). This native southeastern U. S. sunflower is unquestionably the most spectacular flowering herbaceous perennial in our collections. In our perennial border with good care, full sun, water and fertilizer a mature clump can reach 8-9' in height and a 6' spread with solid masses of 3" diameter golden flowers from top to ground in October. The species exists from New York to Florida to Texas but has never been widely used as a garden plant either here or in Europe. It is sometimes confused with the more commonly grown *H. salicifolius* which is also tall with narrow leaves. *H. salicifolius* tends to produce flowers in terminal masses whereas *H. angustifolius* flowers as low on the plant as good light penetration permits. Botanists of the area indicate that our clone (originally obtained from Powell's Garden in Princeton, NC) is somewhat different than most wild populations with smoother foliage, slightly wider leaves and finer flowers so it may be more useful for ornamental culture than the species. Very easy to propagate by seed, from division of clumps or by softwood cuttings through the summer. Again through promotion of the N. C. Botanical Garden and our distribution to nurseries this fine plant is beginning to appear in commercial channels. Adapted to zones 6-9 (possibly 4-5 by mulching trials??). (Multiple plants at back of perennial border)

21. *Hemerocallis* 'Stella de Oro' - 'Stella de Oro' Daylily (Liliaceae). Daylilies need no introduction as they are among the toughest, most beautiful and widely used of landscape perennial plants in America today with many hundreds of cultivars available. 'Stella de Oro' is recommended here for its exceptional long-flowering period sometimes extending from May until November in North Carolina. Golden yellow 2" flowers on 2' stems contrast well with the handsome green foliage and tolerance of full sun or partial shade make it an excellent commercial landscape plant as well as one for the home garden. Easily propagated by clump division and available from most major daylily specialists across the country. Adapted to zones 4-9. (perennial border)

22. *Ilex* (Deciduous Hybrids) - Winterberry Hollies (Aquifoliaceae). Selections of the native winterberry hollies, *I. decidua* and *verticillata*, and hybrids of these with the Japanese species, *I. serrata*, have provided many new cultivars of superior deciduous shrubs with spectacular fall and winter fruit display. Such cultivars as 'Afterglow', 'Cacapon', 'Christmas Cheer', 'Red Sprite' (excellent dwarf), 'Sparkleberry', 'Sunset', 'Warren Red', and 'Winter Red' make densely branched shrubs to small trees with dark green summer foliage which drops in fall to show the spectacular orange to brilliant red fruit. Useful in a wide range of environmental conditions of wet to dry soils (but not tolerant of high pH) and sun to partial shade. Propagated by semi-hardwood stem cuttings in mid to late summer. Not common in commercial outlets but available with searching. Adapted to zones 4-9. (West arboretum in first bed on left after leaving the Japanese garden)

23. *Illicium mexicanum* - Mexican Anise (Illiciaceae). As recent severe winters in the southeast have devastated many commonly grown broadleafed evergreen shrubs, the hardiness and desirable qualities of the several "anise-trees" grown in this region have become more apparent. *I. anisatum*, *floridanum*, and *parviflorum* are all grown commercially and have much to offer with handsome evergreen foliage and unusual, sometimes spectacular, flowers of white, yellow, and purplish-red color. The very rare Mexican anise has appeared promising in our trials with the unusual feature of producing its showy reddish-purple flowers in autumn rather than spring-early summer as the other three species do. All four are easily propagated by cuttings in summer or winter, grow rapidly in sun or partial shade and are deserving of much wider commercial use. Hardiness is unknown for the Mexican anise and further trials are needed but it should be adapted to zone 7-10 (possibly 6?). (West arboretum, in fourth bed down the hill with *Ilex* and *Illicium* collections)

24. *Juniperus conferta* 'Silver Mist' - 'Silver Mist' Shore Juniper (Cupressaceae). Shore juniper is a very widely produced commercial groundcover for sunny sites in the southeastern

U. S., with less common use in the lower central states and west coast. The species is tall growing and coarse-textured in comparison to *J. horizontalis* though the cultivars 'Blue Pacific' and 'Emerald Sea' offer improved color and form where available. 'Silver Mist' is a new and rare Japanese cultivar introduced by Brookside Gardens which offers bright blue-gray foliage with compact growth. Not presently available at nurseries, but will likely be extremely popular when numbers have been built up to levels for commercial sale. Propagation by cuttings of mature wood with slower growth to salable size than the species. Likely adapted to zones 6-8. (In front of display lathhouse to right of entrance)

25. *Lespedeza thunbergii* 'Alba' - White-Flowered Lespedeza (Leguminosae). This beautiful autumn-flowering herbaceous shrub to 4-6' has originated independently in a number of location at varying times, but it has never been widely produced in commercial channels. The U. S. National Arboretum recently brought a clone from Japan which is being propagated by various nurseries here and should begin to appear in markets in the near future. The plant dies to the ground each winter but rapidly regrows with handsome delicate-textured foliage through the summer and blooms in September-October with masses of white pea-like blooms covering the 5' wide plant. Very easily propagated by softwood cuttings in summer, and more slowly by division of clumps. Adapted to zones 5-8. (White garden between visitor center and large cut-leaf Japanese maple)

26. *Leucothoe populifolia* - Florida Leucothoe (Ericaceae). Like the native Florida anise mentioned above, the native Florida leucothoe did not really attract the attention it deserves until the winter of 1984-5 killed back other "competing" broadleaved evergreens and left it standing uninjured as a strong contender for more widespread use. A handsome large shrub reaching 6-10' in cultivation with cream-colored flowers in late spring. Though normally seen in shady habitats in nature, cultivated plants do quite well in full sun if moisture is available and they have not foliage scorched here even at below 0F in sun. Can be sheared to maintain various heights and will gradually spread by suckers in loose, well-aerated soils. Very easily propagated by cuttings at most times of year except when in active spring growth. Not common, nor rare, but available with searching. Adapted to zones 6-9. (White garden in the small cove garden north of visitor center - beside fence)

27. *Liquidambar styraciflua* 'Rotundiloba' - Fruitless Sweetgum (Hamamelidaceae). The American sweetgum is a superb deciduous tree from the southeastern U. S. which has found widespread commercial use on the U. S. west coast as well as in Asia and Europe. With great stress tolerance, rapid growth, handsome foliage, good fall color, etc. it is among the finest of urban shade trees, marred only by the abundant "gumball" fruit it produces. The fruitless sweetgum was discovered in the wild in North Carolina in 1930 and has existed in arboreta collections since that time, but has never been produced commercially for sale. In addition to never producing fruit, it is also distinctive in having rounded lobes on leaves rather than the normal pointed "star" shaped leaves. Fall coloration varies from year to year and throughout the tree with leaves from yellow to dark burgundy in color. Propagation is relatively easy by budding on seedling understock, rooting of softwood cuttings, or by tissue culture. A number of nurseries began to obtain propagation wood in the last two years and these plants should soon begin to appear in commercial markets. Likely adapted to zones 6-9. (With sweetgums in bed north of the Hamamelis collection, small plant near grass path)

28. *Lonicera X heckrottii* - Goldflame Honeysuckle (Caprifoliaceae). This old vine honeysuckle originated before 1895 as a hybrid of *L. sempervirens* X *L. americana* and is still likely the finest of the many flowering vines in this genus. It is deciduous or evergreen depending on severity of winter temperatures (foliage surviving to about 15-20F) and blooms as long as weather conditions permit growth - in Raleigh at times from March into December. Flowers are a blend of yellow, pink and carmine. Easily propagated by softwood cuttings and rapid growing to 12-15' in either full sun or partial shade. Adapted for use in zones 5-9. (Two vines inside visitor center)

29. *Lygodium japonicum* - Japanese Climbing Fern (Schizaeaceae). This handsome herbaceous perennial vine appeals with the novelty concept of a fern with spiraling stems which climb to a height of 6-8'. In reality the true stems are underground horizontal rhizomes and what appears to be vining stems are the greatly elongated leaf midribs. When killed by autumn freezes, the foliage turns brown and remains until physically removed for regrowth of new "shoots" in late spring. The very lacy and attractive foliage makes an appealing fence cover or the plant can be used to climb through the branches of leggy shrubs. Fairly uncommon in commercial trade. Propagated by spores or by division of clumps into individual rhizome pieces. Adapted to zones 6-9 (perhaps 5 with mulching?). (At left of entrance to visitor center on arbor post)

30. *Magnolia ashei* - Dwarf Bigleaf Magnolia (Magnoliaceae). With over 100 different magnolias in our collection, most of which are quite beautiful when in bloom - it is difficult to select one or two to single out. The several species of huge-leaved deciduous magnolias native to the southeastern U. S. have perhaps the most spectacular foliage of any temperate zone trees with leaves reaching from 12-30" in length. Most are very large trees which do not bloom at an early age or where the flowers can be easily observed up close. *M. ashei* is essentially a dwarf form of *M. macrophylla* with the same 15-25" long foliage on a compact plant which begins to produce its 8-10" diameter blooms when only 2' high. Though plants can reach 20' in height it is normally seen in the 4-8' range. Useful for achieving an exotic subtropical effect in moist areas with sun or light shade and best where strong winds will not tear the beautiful thin leaves. The English wryly comment about American plantsmanship in the following statement about this spectacular garden plant native to Florida; "it is strange that a plant of this quality growing in a country enjoying Western civilization was not recorded in cultivation until 1933." Perhaps even stranger that over 50 years later it is still very unknown in gardens here. Grown from seed and adapted to zones 6-9. (In front of display lathhouse - to far right side near corner)

31. *Magnolia grandiflora* 'Little Gem' - 'Little Gem' Southern Magnolia (Magnoliaceae). The southern magnolia is one of the finest and most widely planted ornamental trees in the southern U. S., and is also greatly admired and planted wherever adapted and available throughout the world. Over 100 cultivars have been named with variations in foliage, flowers, hardiness, and form. 'Little Gem' is a compact form of the species with leaves and flowers about 1/2 to 1/3 normal size, maturing in at about 10' wide by 20' in height in 25 years. Plants bloom heavily even when just a few feet in height. If cost and availability were not a problem it would make a magnificent sheared evergreen hedge. Mr. Warren Steed originally selected this plant at his North Carolina nursery in 1960. Little commercial interest existed until Monrovia Nursery began production about 1978 and it is slowly becoming more available. Propagation is by cuttings (tricky and difficult) or more commonly by side veneer grafting on seedling understock. Adapted for use in zones 6-9 where summer heat is available to ripen wood - apparently it has not been successful in the Pacific northwest. (East arboretum in Magnolia collection beside path with memorial plaque to our former student Terry Groves who worked for (and was an "adopted son" of) Mr. & Mrs. Steed)

32. *Mahonia* X 'Arthur Menzies' - 'Arthur Menzies' Hybrid Mahonia (Berberidaceae). At the University of Washington Arboretum in 1961, a group of seedlings which came from a parent plant of *M. lomarifolia* had one plant distinctly different from the others. When this plant flowered in 1967 it was determined that the other parent was *M. bealei* and the hybrid was eventually named 'Arthur Menzies' in honor of the supervisor of plant accessions for the Strybing Arboretum from whom the seeds were obtained. Mahonias are beautiful landscape plants with large, dramatic compound leaves, showy yellow flowers, and often have attractive fruit. 'Arthur Menzies' combined the hardiness of the *bealei* parent with the longer, and more delicately beautiful foliage of the less hardy *lomarifolia* to produce a plant superior to either parent. It is spectacular in bloom with large upright panicles of bright yellow flowers which are produced in mid-winter during December-January. Plants are best located where they will have winter shade and normally reach 4-6' in height but can get up to 8-10'. Unfortunately some mahonias are slow to propagate vegetatively and in spite of a nationwide distribution for testing in 1977, 'Arthur Menzies' is still only rarely available even in Seattle where it originated. This and the similar English *M. lomarifolia* X *M. japonica* hybrids such as 'Buckland', 'Charity', 'Winter Sun', etc. are much superior to any mahonias now sold in the U.S. and deserve far greater attention. Such mahonia clones are successfully propagated on a large scale in Holland by leaf-bud cuttings taken in mid-summer, and this technique has proven successful with 'Arthur Menzies'. Likely adapted for use in zones 6-9. (At right side of entrance arbor at visitor center; other species and cultivars in the Mahonia collection in the small garden north of the display lathhouse)

33. *Morus bombycis* 'Unryu' - Contorted Mulberry (Moraceae). We obtained this dramatic deciduous tree from an Asian rare plant collector in California in 1981 and took several years to trace down a name as it is apparently not produced commercially in the U. S. or Europe and did not appear in any of the horticultural literature we had available. Apparently it is an old Chinese cultivar which originated there centuries ago. It much resembles the noted Harry Lauder's walkingstick bush - *Corylus avellana* 'Contorta' - except the scale is much larger and the plant far more rapid growing. Growth of 8-10' per year on young trees is relatively easy to achieve and our oldest plant is now about 25' tall. The leaves are large, shiny, and attractive; but the real beauty of the plant occurs when the bare twisted corkscrew branches are silhouetted against the sky or a contrasting surface in winter. It would also be an excellent plant to use as cut branches for florists or interior decoration. Certainly not to be a plant of mass popularity but a most interesting specialty novelty. At present we do not know if it produces fruit or not - but it seems likely at some point (which it did this summer for the first time after I sent this to press!). Extremely easy to propagate from either softwood cuttings in summer or hardwood cuttings in winter (we've rooted cuttings 2" in diameter!) and rapid growing. Cuttings have been distributed to many growers across the country and it should soon begin to be commercially available. Total adaptability is unknown at present but it has survived -7F with us and Krussman in Germany lists the species as zone 5 - so likely zone 5-9. (West arboretum at south border holly hedge west of the large 'Golden Curls' weeping willow)

34. *Nandina domestica* 'Alba' and 'San Gabriel' - Heavenly Bamboo Cultivars (Berberidaceae). The species "heavenly bamboo" has long been a popular broadleaved evergreen shrub throughout the U. S. in zones 7-9 with white flowers in spring and showy red fruit through the winter. After overuse in the 1930-50 period it fell from favor in the landscape trade and at present seems to be in a time of revival interest with many new cultivars entering the trade and excellent commercial sales. We have grown and evaluated 25 cultivars in our trials and feel the two presented here offer great potential for more widespread use. 'Alba', the white (or yellow) berried heavenly bamboo is a very old standard-sized cultivar from Japan which has had limited production in this country. The pale whitish-yellow fruit contrast well with the green foliage and show up well in the landscape under lights at night. 'San Gabriel' is also very likely a Japanese cultivar which was renamed as it entered the California nursery industry in the last 5 years. It is quite unlike any of the many other cultivars now available with greatly reduced leaflet blade tissue creating a very delicate and lacy effect on shortened plants. Both cultivars are being produced commercially but normally require considerable hunting to find. Both can be propagated by stem cuttings but lack of propagation wood makes this a slow increase method. 'Alba' can be grown from seed which come relatively true to type if parent plants are isolated from red-fruited plants. Tissue culture has been very successful with other nandinias and will ultimately be the way these plants should be built up for the mass market. Both are likely adapted to zone 8-9. (Nandina collection just after leaving the white garden)

35. *Picea pungens* 'Foxtail' - 'Foxtail' Blue Spruce (Pinaceae). Blue spruce from the Rocky Mountains has long been a popular plant in northern and western U. S. areas for its conical evergreen nature and varying degrees of blue foliage color. As one moves to southern (or hotter night temperature) regions, most spruce and fir species and cultivars become less useful for landscape planting. In evaluating a number of blue spruce cultivars we made a happy accidental discovery in finding that the new cultivar 'Foxtail' from Iseli Nursery in Oregon was quite heat tolerant. In two years in the arboretum it has grown 40" in height while other cultivars grew 2-6" (now plus another 14" and still expanding with the '87 flush). The color is an excellent blue and it should be adapted as far south as any *P. pungens*

cultivar now in existence. Though more expensive as vegetatively propagated liners than normal seedlings, there are possibilities it could be grown as a new Christmas tree for the south also. Unlike most blue spruce cultivars which must be propagated by slow and difficult grafting with resulting misshapen plants, 'Foxtail' is propagated by cuttings and grows off into normally shaped plants in minimal time. At present available only from the Pacific northwest but being propagated in mass quantities there. Adapted to zones 2-8 (9?). (East arboretum - on path between Magnolia and Berberis collections in southeast corner)

36. *Pieris japonica* 'Mountain Fire' - 'Mountain Fire' *Pieris* (Ericaceae). This popular broadleaved evergreen shrub with white flowers from Japan is also seeing an explosion of numerous new cultivars with varied characteristics coming into the nursery trade. 'Mountain Fire' combines the brilliant red new foliage color of the non-hardy *P. formosa forrestii* with the fine qualities of *P. japonica* - hardiness, dark green foliage and white flowers. Exceptionally eye-catching in spring during the marketing period which will help its public acceptability. Best in areas with moist, well-drained organic soils and light shade. (Sensitive to herbicides and should always be hand-weeded to prevent possible damage.) The species is hardy to zone 5 but the hybrid parentage may make this cultivar less hardy (?) - likely best in zones 6-8. (*Pieris* collection under 'Burford' hollies north of display lathhouse)

37. *Pinckneya pubens* - Feverbark; Hardy Poinsettia Tree (Rubiaceae). This rare monotypic genus native only to the southeastern U. S. has never been produced commercially as a landscape plant though it has many desirable ornamental qualities. It is a small deciduous tree reaching 20' in height, with 4-7" long pubescent leaves, and showy inflorescences in July up to a foot in diameter with large pink bracts much like a poinsettia in nature. White and rose colored forms have also been found in wild populations. Extremely easy to propagate from softwood cuttings in summer and very fast growing in light shade to full sun with ample moisture. Only a few commercial sources but worthy of a hunt for its novelty and beauty. Hardiness is very likely dependent on amount of summer heat, but has been through -10F in some North Carolina gardens without injury, likely best adapted to zones 7-9. (Growing through roof of display lathhouse to left of entrance - in full peak bloom as this goes to press 6/10 - wonderful!)

38. *Pinus taeda* 'Nana' - Dwarf Loblolly Pines (Pinaceae). Among the finest plants in the NCSU Arboretum (now the JC Raulston Arboretum) is a group of about forty-five 30 year old dwarf loblolly pines which arose as seedlings from witches broom cones originally collected by university forestry researchers. The slow-growing seedlings now vary in size from 8' to 15' in height with beautiful dense rounded crowns. Few dwarf pine cultivars are well adapted to the heat of the south and these pines would be magnificent ornamentals if commercially produced. Unfortunately these pines must be produced by side-veneer grafting on seedling loblolly understock. Southern growers do not graft conifers, and the northern growers who do graft pines do not have easy access to either understock or stock plants to produce the plants so they remain unavailable. Perhaps one of the most beautiful and useful potential landscape plants in existence for southern gardens - badly needing production and marketing - not available at present. Likely adapted to zones 6-9. (East arboretum in conifer area; around the Japanese garden; and a block of trees outside arboretum boundaries at the southeast corner)

39. *Prunus laurocerasus* 'Mt. Vernon' - 'Mt. Vernon' English Laurel (Rosaceae). Numerous cultivars exist of this fine broadleaved evergreen shrub which is so widely grown in the Pacific northwest and in Europe. 'Mt. Vernon' is a "local cultivar" which originated in Washington state at Well's Nursery and is mostly confined in availability to the Seattle area. It differs from other English laurel cultivars in having a low-spreading growth habit much like a 'Pfitzer' juniper - supposedly reaching 3-5' in height and 5-8' in width with age. This cultivar should be adapted wherever the species is currently being used; and have the advantage of being easier to control in size and shape. Easily propagated by cuttings and moderate in growth rate. Likely adapted to zones 6-9. (West arboretum - fourth bed down the hill with *Ilex* and *Illicium* collections)

40. *Prunus mume* - Japanese Flowering Apricot (Rosaceae). The American plant industry has adapted so many of the fine Japanese ornamental plants that it is hard to understand why this magnificent ornamental flowering tree which the Japanese consider their most beautiful tree (much above the flowering cherries) is so unknown and little produced in this country. The glory of the flowering apricot is the mid-winter flowers of great beauty and intense fragrance which appear from January through March. The Japanese have over 250 named cultivars with flowers of white pink, rose and red in single and double-flowered forms on plants up to 20' in height which have normal, fastigate, corkscrew, and pendulous habits. Flowering apricot is very well adapted to the southeastern U. S. and the entire west coast but very rarely found for sale outside of California. Named cultivars are easily propagated by softwood cuttings in summer, by budding on purple-leafed plum understock, or the species can be grown by seed after cold stratification. Adapted for use in zones 8-9. (Isolated plants scattered all over the arboretum; major block west of Japanese garden)

41. *Quercus robur* 'Fastigata' - Upright or Fastigate English Oak (Fagaceae). Tall narrow trees for screening or architectural accent have great appeal in the landscape which accounts for the widespread popularity of such plants as Lombardy poplar and Leyland cypress. The fastigate form of the English oak has much to recommend it as a deciduous tree replacement for Lombardy poplar. It is more expensive to obtain, but grows nearly as fast (under our conditions to 25' in 7 years) and is much longer lasting and more maintenance free. Best in full sun and capable of reaching 60' in height with maturity. The form of the plant varies greatly when produced from seed with everything from tight pencilpoint form to broadly oval trees out of the same seed lot. One can select superior forms from seedling fields; or plants can be produced by grafting which will guarantee uniformity in the offspring. Available in most sections of the country with some searching. Adapted zones 4-8. (In parking lot)

42. *Rhododendron* x 'Trudy Webster' - (Ericaceae). Another monster genus with dozens of species and hundreds of hybrid cultivars in every conceivable size, flower quality, and hardiness - and all spectacular and wonderful when in bloom. Here I'm going to reject my usual selection criteria and just go for the sheer unabashed gaudy spectacle this genus is so good at. 'Trudy Webster' was the first plant to receive the Superior Plant Award the highest award possible for a rhododendron. The gigantic trusses (which can be a foot in

diameter) carry huge clear pink flowers above excellent foliage with good color. It has grown very well in the heat of the Carolina piedmont and is in demand by rhododendron specialists around the world from Australia to Europe. As with most rhododendrons, moist well-drained organic soils in partial shade will provide best growth. Available from many rhododendron specialty nurseries. Adaptable for use in zones 6-8. (Immediately inside the entrance to the display lathhouse on right)

43. *Rosa pimpinellifolia* (formerly *spinosissima*) 'Petite Pink Scotch' - 'Petite Pink Scotch' Rose (Rosaceae). A cultivar of this European and north and west Asian species discovered growing on an old Cape Fear River plantation near Wilmington - and first offered for commercial sale by The Antique Rose Emporium in Texas. It produces a low, dense suckering shrub about 2' tall, covered with pink flowers in early summer. The foliage is delicately cut, shiny, and quite handsome even when the plant is out of flower - and is evergreen to 10F. There is a need for a good tough commercial groundcover for use in difficult sunny areas to dilute the overwhelming use of junipers and this plant has that potential. Unlike most roses it does not require either pruning or spraying to remain attractive (though it would likely benefit from an annual mowing to about 1'). Extremely easy to propagate rapidly at any time of year. Widely used in Europe (over 100 cultivars of this species before 1822 in Scotland alone) and worthy of greater use here. Likely useful in zones

5-9. (Our several plants will be gone by time this is out, sacrificed for cuttings to get it into the N.C. nursery trade - but will be replanted with small ones for future display)

44. *Salix* X 'Golden Curls' - 'Golden Curls' Willow (Salicaceae). A relatively new cultivar hybridized from two beautiful and popular trees which combines desirable qualities of each parent. A cross of the corkscrew willow *S. matsudana* 'Tortuosa' - with contorted and twisted branches, and the golden weeping willow *S. alba* 'Tristis' - with gold bark in winter and long pendulous branches. The hybrid has golden barked branches which are both contorted and pendulous. Very rapid growing and most useful in sunny sites on moist soils where it should reach 40' in height. Easily propagated from either softwood or hardwood cuttings, and becoming fairly available in many sections of the country. Adapted for use in zones 4-8. (West arboretum large tree by south boundary holly hedge)

45. *Schizophragma hydrangeoides* - Japanese Climbing hydrangea (Hydrangeaceae). This uncommon deciduous climbing woody vine is very similar to the more popular and widely-grown *Hydrangea anomala* subsp. *petiolaris* which is also sold as climbing hydrangea. Both are excellent plants for use on shady brick or wood surfaces where they cling by aerial rootlike holdfasts and grow to almost any height of a supporting tree or structure. Cream to white flowers are produced in profusion in mid-summer. *Schizophragma* is presented here as a recommended addition to or replacement for the *Hydrangea* as the flowering time is 2-3 times as long in the summer and the plant grows flatter to the wall for a more tidy appearance. Also, there is a superb 'Roseum' cultivar with pink flowers at the Arnold Arboretum which deserves massive propagation and widespread acceptance in the nursery industry. Propagation is relatively easy from semi-hardwood leafy cuttings in summer under mist. The plants are slow growing when young as they put down a supporting root system first, but after the first 2-3 years growth is quite rapid. Adapted for use in zones 5-8. (On post in display lathhouse - southeast corner section; and on wall in new 'reading garden' model garden)

46. *Sinarundinaria murielae* - Hardy Clump Bamboo (Gramineae). Most bamboos have problems as garden plants of either being invasive and hard to control, or the species which are delicate textured and graceful are often not hardy. This clump forming bamboo was introduced from China by Ernest Wilson in 1913 and is named after his daughter. It is widely considered to be the most beautiful of hardy bamboos in cultivation with elegant foliage on graceful arching stems reaching 8-12' in height. Will grow in almost any soil and best in slight shade or at least shade during the winter months. Clumps slowly increase in diameter and the plant size is never a problem as propagules from this plant are in such demand that any plant deemed too large could always be divided and excess divisions sold at premium prices. Propagation is only by clump division and plants are available from bamboo specialists with hunting - needing much greater availability in the nursery industry. Adapted for use in zones 5-9. (Small plant recently planted in 'pool garden' model garden west of pool)

47. *Styrax japonicum* 'Carillon' (also listed as 'Pendula') - Weeping Japanese *Styrax* (Styracaceae). The Japanese *styrax* is one of the toughest, most dependable and beautiful of small flowering deciduous trees with white flowers produced in great abundance in early summer. This cultivar was introduced recently from Japan and is now becoming available from commercial sources in several areas of the country. It differs from the species with the arching pendulous branches and subsequent smaller size for landscape use. "Weeping" plants of different species and cultivars vary widely in beauty with some too sharply vertical and stiff (like weeping dogwood) or so horizontal (like the "weeping" *parrotia*) to preclude a true fountain effect. 'Carillon' is very graceful and beautiful in this regard and a truly handsome garden plant which will probably ultimately reach 8-12' in height after slow vertical growth. Best in sun or partial shade. Propagation is relatively easy from softwood cuttings in summer but the resulting plants take time to develop height for effective marketing. A better technique is probably to topwork species seedlings at 4-7' height to produce a weeping standard. Adopted for use in zones 5-9 but best in 6-8. (In front of 'reading garden' model garden)

48. *Syringa* 'Miss Kim' - 'Miss Kim' Lilac (Oleaceae). The taxonomy and literature on this and closely related plants is extremely confused with plants listed commercially under this cultivar name or as varying species of *S. meyeri*, *microphylla*, *palibiniana*, *patula*, or *velutina*! Perhaps it would be simplest to deal with the issue by avoiding choice of a lilac for this article. But the inclusion is important as lilacs are one of the standard plants of the north most missed by immigrants to the Sunbelt since the familiar and spectacular French hybrids do not tolerate the heat and low-chilling winters of southern areas. 'Miss Kim' is a dwarf lilac which flowers quite dependably here in zone 7-8 with fragrant blue flowers on a plant reaching 4-6' in height. Perhaps the best of the heat-tolerant lilacs in our trials has been *S. oblata* var. *dilatata*, a Korean species which blooms very early and profusely each year. Unfortunately it is virtually unobtainable in

commercial commerce. Lilacs are propagated by softwood cuttings in early summer with correct timing and handling critical for success. 'Miss Kim' is adapted for use in zones 3-8. (Lilac collection, north of Hamamelis and Lagerstroemia collection beds by tallest Leyland cypress hedge)

49. *Vaccinium crassifolium* 'Bloodstone' and 'Well's Delight' - Creeping Blueberries (Ericaceae). These two cultivars of an evergreen groundcover native to the Carolinas were introduced to the nursery trade by NCSU in 1984 and have the potential to become major landscape plants across many areas of the U. S. The plants are very reminiscent of periwinkle, *Vinca minor*, in habit and texture; but unlike periwinkle they are tolerant of exposed sites subject to heat and drought. Broadleaved evergreen groundcovers normally scorch during extremely cold periods if exposed to full sun, but the creeping blueberries have been known to tolerate -15F in full sun with no leaf scorch. The foliage is very dark green in color with 'Well's Delight' about the size of periwinkle foliage and 'Bloodstone' about twice that size. The plants reach 5-9" in height and spread in colonies which in the wild can cover areas hundreds of feet across with obvious great age. Attractive white flowers are produced in late spring but fruit are rarely produced. The plants are very tolerant of heat and drought when established but do best with adequate drainage to prevent root rot during summer hot, wet spells. Propagation is very easy by cuttings at most times of year and plants can produce 2-3' of lateral growth a year under good cultural conditions. Cuttings have been distributed across the

U. S. but at present most commercial sources are in North Carolina. Total adaptation is as yet unknown, but definitely useful for zones 5-9. (In groundcovers plaza; and in 'townhouse' model garden)

50. *Viburnum plicatum* var. *tomentosum* 'Summer Snowflakes' (or 'Fujisanensis') (Caprifoliaceae). This old Japanese cultivar of a popular deciduous flowering shrub has recently become a major "hot" crop in the Pacific northwest with its naming, release, and promotion by the University of British Columbia Botanical Garden. The major advantages of this cultivar over the widely popular doublefile viburnum are the more compact growth and summer-long flowering characteristic - staying in bloom in Raleigh from late April into November with terminal panicles of beautiful white flowers on any new growth. In the northwest and cooler climates it also produces spectacular red fruit, but the heat of the south seems to reduce or eliminate that display. Best in full sun or partial shade and will likely mature in at about 6-8' in height. With the extreme long flowering period and compact habit, this wonderful plant should become one of the most widely planted shrubs in the country as supplies become more widely available. Very easily propagated from softwood cuttings. Adapted for use in zones 5-8. (Small plant newly installed at left after leaving the visitor center in the "cove" garden)

This list of fifty plants presents only a very few of the many promising plants which have been noted in our trials. Many others could be listed and described; and of course in other areas of the U. S. in other trials long lists of wonderful plants could be added to these. Perhaps the most appealing part of the gardening world to me is the knowledge that after I garden for 90 years, there will still be an enormous unexplored fascinating world of wonderful new and different plants to observe and learn about. Although adaptability has been suggested for the plants listed, total environmental conditions vary so much from area to area that the only sure way to know how useful a given plant will be in any given area is to plant it in the most likely potential environment available and observe it carefully. Often observing how or why a plant fails can lead to the knowledge of how to successfully handle it in a repeated trial. There is a great amount of truth in the philosophy expressed by the great plantsman, Sir Peter Smithers, "Every plant is hardy until I have killed it myself. "

Gardeners often complain about the lack of variety available in American markets, but in reality there is an enormous diversity of choice plants available in this country if they are diligently sought out. The superb lists in the 1987 Source Guide published by The Avant Gardener (Vol. 19(3) - January 1987) can lead the serious gardener to thousands of new, rare, and unusual plants for trials. On the other side of the coin, most nurserymen who produce "different" plants remark about the great difficulty of finding buyers willing to try the new items being produced - particularly in the commercial landscape field. Publishers, the academic world, public gardens, growers, retailers, and the public must all share the responsibility for ensuring that a rich diversity of high quality landscape plants is developed and maintained in this country.

## **SMALL TREES SUITABLE FOR MULTI-TRUNK SPECIMENS AND ADAPTED FOR USE IN CENTRAL NORTH CAROLINA**

This winter I had a request for a list of plants that would meet the criteria of the title and after taking the time to compile it, felt others might be interested in having a copy for future use - whether as homeowner, nurseryman or landscape architect. Multiple-stem plants have always had a beauty and magic to me and I remember doing renderings of large multiple-stem crepe myrtles in my first landscape design as an undergraduate student at OSU. Certain trees such as clump birches in New England, or *Cercis chinensis*, *Ilex verticillata*, and *Viburnum sieboldii* are rarely thought of in any other form. Today an emphasis exists in the nursery industry to upgrade quality of plants - and in trees that often means a perfectly straight, single trunk stem with all limbs pruned up to 6.5' with a perfectly circular tight head on the plant (what I call "lollipops"). The great popularity of 'Bradford' pear in part results from the fact that it very easily assumes this "neat and tidy" shape with minimum handling (and the density of the exterior foliage hides the weakness of internal branch attachment to the trunk which will split apart as it ages). Such trees are very useful for formal symmetrical planting as exists on most commercial properties but in rustic and informal landscapes there is also a place for irregularly shaped trees, and those with multiple stems.

Multiple-stem plants can be produced either by planting several individual plants (usually 2 - 7; though on a personal basis when 2 or 4 stems are developed they drive me crazy) in close proximity from 6" to 3' apart depending on the ultimate size and character of the given plant. If field grown, the entire group can be dug as a unit. In the west arboretum three *Pinus virginiana* have been planted this way

to demonstrate the concept. In container production, growers rarely think of multiple plants in one container for trees but the concept works well and is used commonly in Europe and occasionally in the Pacific northwest. Another technique is to prune the top from a single plant at 2-6" above ground. As multiple sprouts develop from the stem they can be thinned to the number desired. The multiple stem 'Heritage' birch near the barberries and groundcover plaza in the arboretum was developed in this manner. With a number of plants this technique can have the disadvantage that such shoots have weak attachment to the stem, particularly when young and if very vigorous. They can break from the stem easily with stress from rain, wind, or perching birds. Staking until stems have greater attachment can help - and if angled out from the center can also improve the aesthetics of the clump.

At first, it might seem that any tree could be handled as a multiple stem plant and probably the majority could be. However, rigidly upright trees with dense inner branching will not work for this purpose. Among the worst would be the dawn redwood - *Metasequoia glyptostroboides* - which I realized upon seeing a landscape in Asheville where multiple clumps of 3 trees planted in triangles about a foot apart grew straight upright with parallel trunks. Generally, plant species which have irregular growth and branching give the best effect for use as multiple stem trees. The list of plants on the following page includes those that are well adapted for growth in zone 7 of central North Carolina and normally are seen in the 8-20' range at 10-20 years of age (there are of course exceptions - e.g. *Acer griseum*).

*Acer buergerianum*

*Acer campestre*

*Acer cissifolium*

*Acer ginnala*

*Acer griseum*

*Acer japonicum*

*Acer palmatum*

*Aesculus pavia*

*Alnus* - several species

*Amelanchier* - several sp./cv.

*Aralia spinosa*

*Betula nigra* 'Heritage'

*Carpinus caroliniana*

*Cercis canadensis*

*Cercis chinensis*

*Chamaecyparis pisifera*

*Chamaecyparis thyoides*

*Chilopsis X Catalpa*

*Chimonanthus praecox*

*Chionanthus virginicus*

*Cladrastis lutea*

*Cladrastis platycarpa*

*Clerodendron trichotomum*

*Clethra barbinervis*

*Cornus alternifolia*

*Cornus florida*

*Cornus kousa*

*Cornus mas*

*Cornus officinalis*

*Corylus colurna*

*Cotinus obovatus* or *coggygria*

*Crataegus* sp. & cv.

*Diospyros kaki*

*Franklinia alatamaha*

*Gordonia lasianthus*

*Halesia carolina*

*Hamamelis* X *intermedia* hybrids

*Hamamelis virginiana*

*Ilex cassine*

*Ilex opaca*

*Ilex verticillata*

*Illicium parviflorum*

*Juniperus rigida*

*Juniperus virginiana*

*Koelreuteria bipinnata* or *paniculata*

*Lagerstroemia* (*indica* X *faureii* hybrids fastest growing, hardiest, best).

*Ligustrum lucidum*

*Ligustrum japonicum*

*Magnolia kobus*

*Magnolia liliflora*

*Magnolia* x 'Merrill'

*Magnolia* x (National Arboretum hybrids)

*Magnolia salicifolia*

*Magnolia* x *soulangiana*

*Magnolia virginiana*

*Malus* sp.

*Myrica cerifera*

*Nyssa aquatica*, *ogeche*, or *sylvatica*

*Osmanthus americanus*

*Ostrya virginiana*

*Oxydendrum arboreum*

*Persea borbonia*

*Photinia* X *fraseri*

*Photinia villosa*

*Pinus bungeana*

*Pinus flexilis*

*Pinus glabra*

*Pinus sylvestris*

*Pinus virginiana*

*Pistachia chinensis*

*Poncirus trifoliata*

*Prunus X blireana*

*Prunus caroliniana*

*Prunus cerasifera*

*Prunus X 'Hally Jollivet'*

*Prunus maackii*

*Prunus mume*

*Prunus x 'Okame'*

*Prunus serrula*

*Prunus subhirtella 'Autumnalis'*

*Pseudocydonia sinensis*

*Ptelea trifoliata*

*Pterostyrax hispida*

*Quercus virginiana*

*Rhus chinensis*

*Salix alba sericea*

*Salix caprea*

*Sapindus drummondii*

*Sassafras albidum*

*Sorbus alnifolia*

*Stewartia - any species*

*Styrax japonica*

*Syringa amurensis* var. *japonica*

*Tsuga canadensis*

*Ulmus alata*

*Ulmus crassifolia*

*Ulmus parvifolia 'Sempervirens'*

*Viburnum macrocephalum* var. *sterile*

*Viburnum sieboldii*

*Vitex agnus-castus*

*Xanthoceras sorbifolium*

## **BOOK NEWS:**

A frustrating situation exists - because of the lengthy reference section following, only one page can be devoted to specific new books received and other book news - at a time when I have a huge backlog to discuss of many interesting new books from a recent explosion of publishing. So most must be put on hold and the September issue will be thick on books and thinner on the plant sections.

Two most significant books MUST be included here as items which will quickly become standard references for anyone involved in plant propagation activities - whether nurseryman or amateur. The almost simultaneous emergence of these two books which mirror and complement each other so extraordinarily well is fortuitous and a bit strange - coming from two countries, two separate publishing agencies, and two completely independent programs of two very talented individuals.

The first to appear is by Bruce Macdonald of the University of British Columbia Botanical Garden, Vancouver, Canada - PRACTICAL WOODY PLANT PROPAGATION FOR NURSERY GROWERS VOL. I (1987. 660 p. ISBN 0-88192-062-2, hardbound \$54.95) available from Timber Press, 9999 SW Wilshire, Portland, OR 97225 (503-292-0745). To quote the press release "the first comprehensive book on plant propagation oriented to the practical needs of the professional nurseryman. From growing from seed through the various means of cuttings, grafting, layering, etc. to tissue culture, every means of propagating woody plant material is dealt with in detail. Variants of all the methods discussed are clearly outlined to meet the inevitable variations ... all the factors which the professional nurseryman must take into account to develop and maintain a profitable propagation unit," The text is clearly written and very understandable from a practical standpoint by non-technical amateurs and laymen as well as the serious professional. Points are illustrated well by the profuse supply of 627 b/w photographs. No better applied reference exists on HOW to propagate plants.

The second book to appear (just this week) comes from Dr. Michael Dirr of the University of Georgia. Dr. Dirr's MANUAL OF WOODY LANDSCAPE PLANTS is likely the most widely used reference on plant materials in the U.S. In his new book coauthored with Charles W. Heuser, Jr. - THE REFERENCE MANUAL OF WOODY PLANT PROPAGATION - FROM SEED TO TISSUE CULTURE (1987, 239 p., ISBN 0-942375-00-9, softbound \$31.85 including shipping) he brings his additional expertise in the field of propagation to the public in this practical guide to the area of nursery propagation. The beginning 78 pages is a summary of the various techniques of propagation - distilling a vast amount of information into a compact digested form. The remainder of the book covers specific techniques for the propagation of 1,100 species, varieties, and cultivars of woody plants. He relied on his own extensive research, detailed dredging of technical literature, and a thorough study of the Arnold Arboretum propagation records (during his year of sabbatical leave there) to compile this excellent source of information. This book brings the nursery industry into this century on "public" access to applied propagation techniques (and ruins one of my best nursery production class exercises of requiring a report from each student on propagation of specific crops - for which generations of students will now be thankful). This book is an ABSOLUTE MUST for anyone interested in woody plants. Available from: Varsity Press, P. O. Box 6301, Athens, GA 30604.

#### Book Sources Summary

Universe Book

Dept 80

381 Park Avenue South

New York, NY 10016

(Diverse publishers clearance)

Botany Catalogue

Julian J. Nadolny

121 Hickory Hill Road

Kensington, CT 06037

(Mostly botanical)

Edward R. Hamilton

Falls Village, CT 06031-0358

(Publishers clearance)

Hacker Art Books

54 West 57th St.

NY, NY 10019

(Garden History & Design)

David and Charles

North Pomfret, VT 05053 (802-457-1911)

(Catalog - \$2.)

Gary Wayner, Bookseller

Route 3, Box 16

Fort Payne, AL 35967 (205-845-5866)

(Catalog - \$1)

The Scholar's Bookshelf

51 Everett Drive

Princeton Jct., NJ 06550

(1300 books at discounts)

Baluster Books, Inc.

PO Box 10500

Ft. Dearborn Station

Chicago, IL 60610 (312-664-5660)

(Catalog \$1.)

Warren F. Broderick-Books

695 4th Ave. PO 124

Lansingburgh, NY 12182 (518-235-4041)

(Catalog \$1)

John D. Cheesborough

Avocet Books

827 South Horner Blvd.

Sanford, NC 27330 (919-775-7926)

(Catalog \$2)

Barnes & Noble

126 Fifth Ave

NY, NY 10011

(55 page catalog)

Raymond M. Sutton, Jr.

430 Main Street

Williamsburg, KY 40769 (606-549-3464)

(Catalog \$1)

Overseas Book Sources

Antique Collector Club

5 Church Street

Woodbridge, Suffolk

England

Watch House Rare Books

43 Belsize Park Gardens

London NW3 4JJ

England (Phone 01-586-3983)

(Catalog \$2.)

Bookstore Sales

Wisley Gardens

Ripley, Surrey

England

(Huge listing in catalog, very reasonable prices)

Miscellaneous Resources

GARDENING BY MAIL by Barbara J. Barton is an excellent new (1987) publication with addresses and information covering - 1,200 nursery and seed companies indexed by plant specialty and location; 300 garden supply and service companies indexed by product or service; 200 plant and horticultural societies; 100 useful gardening books for reference; 100 horticultural libraries; and 40 magazines and newsletters. It is very reasonably priced at \$16.00 (\$18 postpaid) from Tusker Press, Order Department, P. O. Box 597004, San Francisco, CA 94159 (415-931-7877).

## OFFICE MANAGEMENT ON THE PARETO PRINCIPLE

Those who know me well, realize I am possibly the world's most disorganized and tardy individual - constantly struggling to catch up and complete overdue work. Annually I read the half dozen time management handbooks I have in my office, and try to do better - with discouragingly slow and barely visible results. Old habits are difficult to break. Each year I have become more and more impressed by the many applications of an obscure "law" of life and how it applies to almost everything in the world, and specifically both to my professional field and my work. The Pareto Principle was formulated by Vilfredo Pareto (1848-1923), Italian economist and sociologist in Switzerland, and can be summarized as the "importance of the significant few". In essence, in all kinds of situations and applications there is about a 90/10 ratio - e.g. 90% of profits will be made from 10% of a product mix; 90% of worker productivity (or problems) will come from 10% of the workers; in landscape plants 90% of the market comes from 10% of plant species sold in an area (my current philosophy that 40 plants [species or cultivars] will make up 90% of the plant market value sold in any given area of the U.S.). I could go on and on with many examples but to the point of the article (and how it rates inclusion in the book news section) - I've realized how inefficient my office was in providing the information and services which go with my activities.

In my 10' X 16' office there is a 7' tall front door cabinet which acts as a temporary dumpster to hide all the papers and periodicals I haven't organized or brought myself to discard - totally useless and requiring massive searching to find obscure items; 3 four drawer filing cabinets full to overflowing - of which at least 95% of the material has not been seen or used in the last 4 years; 80' of shelved reference books (the "lesser" books have already been squeezed out and relegated to the 170' of bookshelves at home); 90 slide file boxes containing 54,000 slides; 10' of desktop with assorted scattered papers and piles; and drawers and shelves of unseen obscure objects (including such treasures as sea shells, an internally lighted electric praying hands, an 8" Eiffel tower, and black velvet fabric for photography). Most of my life in the office was spent in travel from desk to opposite wall to hunt needed books and slides, hunting for papers and supplies - and occasionally a little productive work.

Over the past two months I have tried to create a more efficient "work center" for my specific needs, and am so pleased with the results that it may be worth sharing (though surely, no one else has my time squeeze/inefficiency problem!). A small desk (20" X 5') was installed to the right and at right angles to my computer desk (yes, I do finally use the computer routinely after the year of fearsome avoidance). A frame 5' long with one shelf 14" high was put on top of the table. Phone and desk lamp were moved to the corner where the two tables meet. At the left hand of the computer desk - the one foot of files constantly used were placed in a drawer of the file cabinet where they can be reached from my chair (a computer rocker seat with knee rests).

The following supplies are assembled for immediate access: stapler, tape dispenser, scissors, stamps, arboretum labels, pencils, pens, marking pens (for labels), circulation sheets (all magazines are circulated to other faculty as received), index cards, address file box, checkbook, two sizes of Post-It pads, and small pocket calculator.

A shoulder rest was attached to the phone receiver so I can continue to pound away at the computer keyboard while talking or reach for references needed to answer questions. The sheet of phone numbers for the horticulture department is taped to the computer directly over the phone and an appointment calendar for the year is on the shelf under the computer for continual reference. And I must not forget the nerve center of all this activity - my Lisa/MacIntosh computer, keyboard and printer.

To the real part of inclusion of this rambling article under book news - the "significant few" books I use most often to do my job were assembled where they can be reached without moving from the keyboard. Selection was based on the number that could fit into the 60" of shelf space available within arm's reach. These shelves contain:

Lined 8.5" X 11" writing tablets

NSCU Department of Horticulture 1986 Summary of Activities

Certified Nurseries and Plant Collectors of N.C.

(all NC nurserymen addresses)

NCSU Directory (phones & addresses)

ISHS, ASHS, & AABGA Membership Directories

Raleigh Telephone Book

New World Reference Dictionary (3" thick, many years old and well worn)

Gardens of North America and Hawaii - A Traveler's Guide.

Irene & Walter Jacob

Guide to the Gardens of Britain and Europe. Elizabeth Drury & Harriet Bridgeman (magnificent but sadly out of print and unavailable today)

North American Horticulture - A Reference Guide.

American Horticultural Society

Gardening by Mail. Barbara Barton

Sunset New Western Garden Book. Sunset Publishing Co.

Manual of Woody Landscape Plants. Michael Dirr

Wyman's Garden Encyclopedia. Donald Wyman

Landscape Plants for Eastern North America. Harrison Flint

Hillier's Manual of Trees & Shrubs. Hillier Nursery

(original edition, not the newer photographic manual

which is useless in comparison)

Manual of the Vascular Flora of North Carolina.

Radford, Ahles, and Bell

Manual of Cultivated Trees and Shrubs. Alfred Rehder

Manual of Cultivated Broadleaved Trees and Shrubs (3 Volumes).

Gerd Krussman

Manual of Cultivated Conifers. Gerd Krussman

Conifers. van Gelderen and van Hoey Smith

Hortus Third. Bailey Hortorum

Trees, Shrubs, and Woody Vines of the Southwest. Robert Vines

The NY Botanical Garden Encyclopedia of Horticulture.

Ed. Thomas Everett

The Reference Manual of Woody Plant Propagation.

Michael Dirr

Seeds of Woody Plants in the United States USDA Forest Service

Trees & Shrubs Hardy in the British Isles. W. J. Bean

1985 Korean Expedition Collection Data. Barry Yinger

These books are by no means the finest - as innumerable other excellent ones exist which I use frequently as needed for varied information - but these best serve to most often meet the specific needs I have at this moment to do my particular job. This collection of books would cost about \$1,600 if purchased new today. Now a good 95% of my office work can be done without moving from a seat.

Although very pleased with all this - a nagging image of poultry production with "efficient" chickens in cages tugs at the back of my mind and reminds me it is important to not be totally captured here - and to devote a balanced amount of time to work in the arboretum and the "real plants" world.

## NEW CATALOGS AND PLANT SOURCES OF INTEREST

Again as in the book section - I have many new things I want to share here but must limit it to one page with my space limitations. Much more next issue.

The first item I've had for quite some time and need to clear it/them out. This fits both in the books and plant sources sections but will include it here. A whole packet of manuals, newsletters and catalogs was received from an intriguing organization called FRIENDS OF THE TREES, P. O. Box 1466, Chelan, WA 98816. "Friends of the Trees Society is a network of individuals, local groups and international organizations working to preserve forests and plant trees. The roots of this network are strongest in the Pacific northwest region of North America but today the network reaches throughout the U.S. and Canada with increasing international coverage." In their Friends of the Trees Yearbook (80 pages, \$4) a wide array of information and sources are compiled. In relation to the topic of this new catalogs and plants section one can access: perennial seed exchange, seed services, seed people networks, ethics of seed collecting, propagation, seed and nursery companies, catalogs of catalogs. A fascinating compilation of information and sources. As one very specialized area they also publish THE ACTINIDIA ENTHUSIASTS NEWSLETTER (\$3 per issue). About once a month I receive a request for information on growing kiwi fruit in N.C. and many people are experimenting with this crop on the east coast - I refer them to researchers in this area as well as suggest this organization. (Kiwi grows as a huge and vigorous vine with perhaps ornamental value as well as for the fruit though dangerously close to kudzu in vigor). Readers share letters (one from a determined individual trying to succeed in Alaska - "we had 26 below zero last winter which didn't seem to bother them"), and sources of plants are given.

As a new N.C. source - a catalog was received from a young nursery operation between Raleigh and Wilson which has a wide selection of herbs and herbaceous perennials (many daylilies and hosta). In addition to materials in the catalog, at the nursery they have limited quantities of unlisted rarer plants (such as bananas, aroids, etc.). An interesting sideline business is an antiques store on the property. Little River Farms - Herbs & Perennials, Rt. 1, Box 174, Middlesex, NC 27557 (919-965-9507). The farm is located on Highway 39, one-half mile north of highway 42 and makes a pleasant day trip to the country from the Triangle area - call before making the drive out. (I particularly want to urge support at this time as the owner recently suffered a devastating fire at his home).

A new mail order catalog source for the following popular N.C. plants - deciduous and evergreen azaleas, conifers, ferns, Hosta, hollies, Kalmia (22 cultivars!), Pieris, and Rhododendrons - fills 65 pages with detailed listings of hundreds of varieties. Catalog is available from Roslyn Nursery, Box 69, Roslyn, NY 11576 (516-643-9347) (211 Burrs Lane, Dix Hills, NY if visiting the nursery).

Yet another source of unusual bamboo cultivars to add to other past listings is Morningside Farm/Nursery, Route 1, Box 151E, Morrilton, AK 72110 (501-354-8470). They have a wide selection available including the beautiful Sasa veitchii which many have admired under the black bamboo as one leaves the display lathhouse into the Japanese garden. The white-edged leaves make a beautiful contrast.

## THE NCSU Arboretum (now the JC Raulston Arboretum) - NEW PLANTS RECEIVED JANUARY - MAY 1987

87-0001 Miscanthus sinensis 'Yaku Island Form' - Kendall Gambrill (Windsor Great Park, England source) - Division - 2/19

87-0002 Polygonum campanulatum - Kendall Gambrill-Division - 2/19

87-0003 Acer saccharum 'Green Mountain' - Pleasant Cove Nursery, Rock Island, TN - 4' B&B - 2/20

87-0004 Acer rubrum 'Autumn Flame' - Pleasant Cove Nursery, Rock Island, TN - 1' B&B - 2/20

87-0005 Acer rubrum 'Red Sunset' - Pleasant Cove Nursery, Rock Island, TN - 1' B&B - 2/20

87-0006 Amelanchier x 'Prince Charles' - Pleasant Cove Nursery, Rock Island, TN - 6" QT - 2/20

87-0007 Amelanchier x 'Prince William' - Pleasant Cove Nursery, Rock Island, TN - 6" QT - 2/20

87-0008 Amelanchier x 'Princess Diana' - Pleasant Cove Nursery, Rock Island, TN - 6" QT - 2/20

87-0009 Forsythia x 'Meadowlark' - Pleasant Cove Nursery, Rock Island, TN - 6" QT - 2/20

87-0010 Cercis canadensis 'Ruby Atkinson' - Pleasant Cove Nursery, Rock Island, TN - 3' B&B - 2/20

87-0011 Hamamelis 'James Wells' - Pleasant Cove Nursery, Rock Island, TN - 8" grafts QT - 2/20

87-0012 Platanus occidentalis 'Howard' (Golden Sycamore) - Burgaw Creek Nursery, Burgaw, NC - 8' B&B - 2/22

87-0013 Crocosmia x masonorum 'Firebird' - Wayside Gardens, Hodges, SC - Division - 2/23

87-0014 Clematis montana 'Rubens' - Wayside Gardens, Hodges, SC - 3" pot - 2/23

87-0015 Forsythia x 'Goldzauber' - Wayside Gardens, Hodges, SC - 1' BR - 2/23

87-0016 Acer negundo 'Flamingo' - Wayside Gardens, Hodges, SC - 1' BR - 2/23

87-0017 Rhododendron x 'Golden Gala' - Wayside Gardens, Hodges, SC - 8" QT - 2/23

87-0018 Rhododendron x mucronulatum 'Cornell Pink' - Wayside Gardens, Hodges, SC - 8" QT - 2/23

87-0019 Rosa x 'Happy' - Wayside Gardens, Hodges, SC - 1' BR - 2/23

87-0020 Rosa x 'Betty Prior' - Wayside Gardens, Hodges, SC - 1' BR - 2/23

87-0021 Rosa x 'Bonica' - Wayside Gardens, Hodges, SC - 1' BR - 2/23

87-0022 Rosa x 'Carefree Beauty' - Wayside Gardens, Hodges, SC - 1' BR - 2/23

87-0023 Acer cappadocicum rubrum - Whitman Farms, Salem, OR - 1' BR - 2/26

87-0024 Acer grosseri - Whitman Farms, Salem, OR - 1' BR - 2/26

87-0025 Acer trautveteri - Whitman Farms, Salem, OR - 1' BR - 2/26

87-0026 Evodia hupensis - Whitman Farms, Salem, OR - 1' BR - 2/26

87-0027 Styrax japonica (10) - Whitman Farms, Salem, OR - 1' BR - 2/26

87-0028 Styrax japonica (10) - Woodlanders, Aitken, SC - 2' Gal - 3/1

87-0029 Lagerstroemia indica 'Centennial Spirit' - Morningside Nursery, Morrilton, AK - Liners - 3/6

87-0030 Lagerstroemia indica 'Country Red' - Morningside Nursery, Morrilton, AK - Liners - 3/6

87-0031 Lagerstroemia indica 'Hope' - Morningside Nursery, Morrilton, AK - Liners - 3/6

87-0032 Lagerstroemia indica 'Houston Red' - Morningside Nursery, Morrilton, AK - Liners - 3/6

87-0033 Lagerstroemia x 'Okmulgee' - Morningside Nursery, Morrilton, AK - Liners - 3/6

87-0034 Lagerstroemia indica 'Queen's Lace' - Morningside Nursery, Morrilton, AK - Liners - 3/6

87-0035 Fuchsia exoniensis - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0036 Fuchsia magellanica 'Folia Variegata' - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0037 Fuchsia magellanica 'Maiden's Blush' - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0038 Fuchsia magellanica 'Pumila' - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0039 Fuchsia magellanica 'Senorita' - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0040 Fuchsia magellanica 'Tom Thumb' - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0041 Fuchsia x 'Mme. Cornelissen' - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0042 Phygелиus capensis - Lamb Nursery, Spokane, WA - Liner - 3/10

87-0043 Buxus 'Vardar Valley' - Schaefer Nursery, Winchester, TX - Liner - 3/10

87-0044 Mahonia x wagneriana 'King's Ransom' - Schaefer Nursery, Winchester, TX - Liner - 3/10

87-0045 Canna x 'Los Angeles' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0046 Canna x 'Moonglow' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0047 Canna x 'Stadt Fellbach' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0048 Canna x 'Mandarin Orange' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0049 Canna x 'Tobacco Harvest' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0050 Canna x 'Cleopatra' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0051 Canna x 'Creamy Spoon' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0052 Canna x 'Lippios Kiwi' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0053 *Canna* x 'Striped Beauty' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0054 *Crinum* x 'Elsie' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0055 *Crinum* x 'Powellii Album' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0056 *Crinum* x 'J. C. Harvey #1' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0057 *Crinum* x 'St. Christopher' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0058 *Crinum* x 'Louis Bosanquet' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0059 *Crinum* x 'Carolina Beauty' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0060 *Crinum* x 'Ellen Bosanquet' - TyTy Bulb Co., TyTy, GA - Division - 3/15

87-0061 *Hymenocallis harrisiana* - TyTy Bulb Co., TyTy, GA - Bulb - 3/15

87-0062 *Zephyranthes citrina* - TyTy Bulb Co., TyTy, GA - Bulbs - 3/15

87-0063 *Cooperia pedunculata* - TyTy Bulb Co., TyTy, GA - Bulbs - 3/15

87-0064 *Maackia tenuifolia* (7) - Potted seedlings NCSU grown - 3/20

87-0065 *Betula glandulosa* - Coles Nurseries, Inc., Furlong, PA - 1' liner - 3/21

87-0066 *Hovenia dulcis* - 7 Longwood - PA - Flat of seedlings - 3/21

87-0067 *Cryptomeria japonica* 'Elegans Nana' - Delaware Valley College, Doylestown, PA - 1 Gal - 3/21

87-0068 *Raphiolepis indica* 'Van's Pink' - Don Rose, Walnut Creek, CA - 2 Gal - 3/23

87-0069 *Prunus mume* 'Pendula' - Don Rose, Walnut Creek, CA - 2 Gal - 3/23

87-0070 *Prunus mume* 'Contorta' - Don Rose, Walnut Creek, CA - 2 Gal - 3/23

87-0071 *Hexastylis speciosum* - Eastern Plant Specialities, Colonia, NJ - Division - 3/26

87-0072 *Hamamalis* x 'James Wells' - Eastern Plant Specialities, Colonia, NJ - 2' graft - 3/26

87-0073 *Pieris* x 'Browsers Beauty' - Eastern Plant Specialities, Colonia, NJ - 1' B&B - 3/26

87-0074 *Wisteria floribunda* 'Nishiki-Fiyi' - Brookside Gardens, Wheaton, MD - Rooted cuttings from fall collection - 3/29

87-0075 *Salix cinerea* 'Tricolor' - Brookside Gardens, Wheaton, MD - Rooted cuttings from fall collection - 3/29

87-0076 *Styrax japonicum* 'Angyo Dwarf' - Brookside Gardens, Wheaton, MD - Rooted cuttings from fall collection - 3/29

87-0077 *Hypericum moserianum* 'Tricolor' - Brookside Gardens, Wheaton, MD - Rooted cuttings from fall collection - 3/29

87-0078 *Osmanthus heterophyllus* 'Akebono' - Brookside Gardens, Wheaton, MD - Rooted cuttings from fall collection - 3/29

87-0079 *Abies* x bornmuellerana - ForestFarm, Williams, OR - Liner - 4/2

87-0080 *Eucalyptus alpina* - ForestFarm, Williams, OR - Liner - 4/2

87-0081 *Eucalyptus gunnii* - ForestFarm, Williams, OR - Liner - 4/2

87-0082 *Eucalyptus perriniana* - ForestFarm, Williams, OR - Liner - 4/2

87-0083 *Sequoia sempervirens* 'Soquel' - ForestFarm, Williams, OR - Liner - 4/2

87-0084 *Sequoia sempervirens* 'Aptos Blue' - ForestFarm, Williams, OR - Liner - 4/2

87-0085 *Sorbus alnifolia* - ForestFarm, Williams, OR - Liner - 4/2

87-0086 *Syringa* x 'James McFarlane' - ForestFarm, Williams, OR - Liner - 4/2

87-0087 *Hamamalis japonica* - ForestFarm, Williams, OR - Liner - 4/2

87-0088 *Fontanesia fortunei* - ForestFarm, Williams, OR - Liner - 4/2

87-0089 *Sophora mollis* - ForestFarm, Williams, OR - Liner - 4/2

87-0090 *Pistachis vera* - ForestFarm, Williams, OR - Liner - 4/2

87-0091 *Calycanthus occidentalis* - ForestFarm, Williams, OR - Liner - 4/2

87-0092 *Purshia tridentata* - ForestFarm, Williams, OR - Liner - 4/2

87-0093 *Arctostaphylos uva-ursi* 'Microphylla' - ForestFarm, Williams, OR - Liner - 4/2

87-0094 *Arctostaphylos uva-ursi* 'Big Bear' - ForestFarm, Williams, OR - Liner - 4/2

87-0095 *Arctostaphylos uva-ursi* 'Pt. Reyes' - ForestFarm, Williams, OR - Liner - 4/2

87-0096 *Arctostaphylos uva-ursi* 'Wood's Red' - ForestFarm, Williams, OR - Liner - 4/2

87-0097 *Xanthoceras sorbifolia* - ForestFarm, Williams, OR - Liner - 4/2

87-0098 *Vinca minor* 'Wine' - ForestFarm, Williams, OR - Liner - 4/2

87-0099 *Catalpa fargesii* var *duclouxii* - ForestFarm, Williams, OR - Liner - 4/2

87-0100 *Cornus alba* 'Gouchaultii' - ForestFarm, Williams, OR - Liner - 4/2

87-0101 *Acer grosseri* - ForestFarm, Williams, OR - Liner - 4/2

87-0102 *Fallugia paradoxa* - ForestFarm, Williams, OR - Liner - 4/2

87-0103 *Euscaphis japonica* - 1985 Korean Expedition Seed - Lot 3364 - Seedlings potted - 4/6

87-0104 *Euscaphis japonica* - 1985 Korean Expedition Seed - Lot 3531 - Seedlings potted - 4/6

87-0105 *Euscaphis japonica* - 1985 Korean Expedition Seed - Lot 3695 - Seedlings potted - 4/6

87-0106 *Euscaphis japonica* - 1985 Korean Expedition Seed - Lot 3795 - Seedlings potted - 4/6

87-0107 *Styrax japonicum* - 1985 Korean Expedition Seed - Lot 3526 - Seedlings potted - 4/6

87-0108 *Styrax japonicum* - 1985 Korean Expedition Seed - Lot 3528 - Seedlings potted - 4/6

87-0109 *Styrax japonicum* - 1985 Korean Expedition Seed - Lot 3561 - Seedlings potted - 4/6

87-0110 *Styrax japonicum* - 1985 Korean Expedition Seed - Lot 3622 - Seedlings potted - 4/6

87-0111 *Styrax japonicum* - 1985 Korean Expedition Seed - Lot 3684 - Seedlings potted - 4/6

87-0112 *Styrax japonicum* - 1985 Korean Expedition Seed - Lot 3708 - Seedlings potted - 4/6

87-0113 *Cornus walteri* - 1985 Korean Expedition Seed - Lot 3745 - Seedlings potted - 4/6

87-0114 *Cornus controversa* - 1985 Korean Expedition Seed - Lot 31 - Seedlings potted - 4/6

87-0115 *Cornus controversa* - 1985 Korean Expedition Seed - Lot 3161 - Seedlings potted - 4/6

87-0116 *Cornus controversa* - 1985 Korean Expedition Seed - Lot 3302 - Seedlings potted - 4/6

87-0117 *Viburnum awabuki* - 1985 Korean Expedition Seed - Lot 3458 - Seedlings potted - 4/6

87-0118 *Daphniphyllum macropodum* - 1985 Korean Expedition Seed - Lot 3303 - Seedlings potted - 4/6

87-0119 *Ficus nipponica* - 1985 Korean Expedition Seed - Lot 3532 - Seedlings potted - 4/6

87-0120 *Potentilla dickinsii* - 1985 Korean Expedition Seed - Lot - Seedlings potted - 4/6

87-0121 *Liatris borealis* - Amer. Rock Garden Soc. Seed Dist. #2758 - Seedlings potted - 4/6

87-0122 *Chilopsis linearis* - Amer. Rock Garden Soc. Seed Dist. #1021 - Seedlings potted - 4/6

87-0123 *Yucca angustissima* - Amer. Rock Garden Soc. Seed Dist. #4879 - Seedlings potted - 4/6

87-0124 *Agave schidgera* - Amer. Rock Garden Soc. Seed Dist. #4884 - Seedlings potted - 4/6

87-0125 *Agave palmeri* - Amer. Rock Garden Soc. Seed Dist. #122 - Seedlings potted - 4/6

87-0126 *Agave chisosensis* - Lone Star Nursery, San Antonio, TX (seed) - Seedlings potted - 4/6

87-0127 *Agave harvardiana* - Lone Star Nursery, San Antonio, TX (seed) - Seedlings potted - 4/6

87-0128 *Agave falcata* - Lone Star Nursery, San Antonio, TX (seed) - Seedlings potted - 4/6

87-0129 *Cryptomeria japonica* 'Akita Strain' - WNCA 87-01' - Western N. C. Arboretum, Fletcher, NC (seed) - Seedlings potted - 4/6

87-0130 *Cytisus striatus* - Univ. of Wash. Arb., Seattle, WA (seed) - Seedlings potted - 4/6

87-0131 *Vaccinium sprengerii* - Shanghai Bot. Garden, Shanghai, China (seed #301) - Seedlings potted - 4/6

87-0132 *Corylopsis multiflora* - Shanghai Bot. Garden, Shanghai, China (seed) - Seedlings potted - 4/6

87-0133 *Cornus officinalis* - Shanghai Bot. Garden, Shanghai, China (seed) - Seedlings potted - 4/6

87-0134 *Halesia diptera* - Biltmore Estate, Asheville, NC (seed) - Seedlings potted - 4/6

87-0135 *Acer elegantulum* - Camellia Forest, Chapel Hill, NC - Liner - 4/8

87-0136 *Cercis glabra* - Camellia Forest, Chapel Hill, NC - Liner - 4/8

87-0137 *Cleyera japonica* - Camellia Forest, Chapel Hill, NC - Liner - 4/8

87-0138 *Corylopsis gotoana* - Camellia Forest, Chapel Hill, NC - Liner - 4/8

87-0139 *Glochidium puberum* - Camellia Forest, Chapel Hill, NC - Liner - 4/8

87-0140 *Lithocarpus edulis* - Camellia Forest, Chapel Hill, NC - 1 Gal - 4/8

87-0141 *Manglietia fordiana* - Camellia Forest, Chapel Hill, NC - Liner - 4/8

87-0142 *Sorbus huphenensis rosea* - Camellia Forest, Chapel Hill, NC - Liner - 4/8

87-0143 *Lagerstroemia* NA 58481 (Light pink flowers, dark orange-brown trunk) - U.S. Nat Arb, Washington, D.C. - Liner - 4/12

87-0144 *Lagerstroemia* NA 58482 (Medium pink flowers, near white trunk) - U.S. Nat Arb, Washington, D.C. - Liner - 4/12

87-0145 *Lagerstroemia* NA 58484 (Dark magenta flowers, light brown trunk) - U.S. Nat Arb, Washington, D.C. - Liner - 4/12

87-0146 *Lagerstroemia* NA 58485 (Dark coral pink flowers, light tan trunk) - U.S. Nat Arb, Washington, D.C. - Liner - 4/12

87-0147 *Lagerstroemia* NA 58486 (Dark pink flowers, light brown trunk) - U.S. Nat Arb, Washington, D.C. - Liner - 4/12

87-0148 NA 58487 (Dark magenta flowers, gray brown trunk) - U.S. Nat Arb, Washington, D.C. - Liner - 4/12

87-0149 *Mazus reptans* 'Alba' - Bob Wilder, Apex, NC - Divisions - 4/15

87-0150 *Magnolia* x *watsonii* (Seedling 1293-84 from Polly Hill Plant) - Amer. Mag. Soc. Nat. Meeting Plant Sale - 2" - 4/25

87-0151 *Magnolia delavayi* - Amer. Mag. Soc. Nat. Meeting Plant Sale - 1', 1 Gal - 4/25

87-0152 *Magnolia* x 'Jon-Jon' (Gresham Seedling from Glochester Arb.) - Amer. Mag. Soc. Nat. Meeting Plant Sale - 1' - 4/25

87-0153 *Magnolia* x *loebneri* (Tom Dodd Nursery 6789267) - Amer. Mag. Soc. Nat. Meeting Plant Sale - 6" - 4/25

87-0154 *Magnolia* x *loebneri* 'Pink Stardust' - Amer. Mag. Soc. Nat. Meeting Plant Sale - 6" - 4/25

87-0155 *Actinidia kolomikta* - Amer. Ma. Soc. Nat. Meeting Plant Sale - 3" - 4/25

87-0156 *Illicium floridanum* 'Halley's Comet' - Magnolia Nursery, Chunchula, AL - 4" - 4/25

87-0157 *Rhododendron* x 'Patty Bee' - Rhododendron Farm, Mountain Home, NC - 3 Gal - 4/26

87-0158 *Rhododendron* x 'Yaku Queen' - Rhododendron Farm, Mountain Home, NC - 3 Gal - 4/26

87-0159 *Sorbaria sorbifolia* - Andre Viette Farm & Nursery, Fisherville, VA - 1 Gal - 4/28

87-0160 *Sorbaria aitchinsonii* - Andre Viette Farm & Nursery, Fisherville, VA - 3 Gal - 4/28

87-0161 *Daphne burkwoodi* - Andre Viette Farm & Nursery, Fisherville, VA - 4" pot - 4/28

87-0162 *Clematis* x 'Mme. Le Coultre' - Andre Viette Farm & Nursery, Fisherville, VA - 4" pot - 4/28

87-0163 *Aster novae angeliae* 'Fellowship' - Andre Viette Farm & Nursery, Fisherville, VA - 3" pot - 4/28

87-0164 *Deschampsia caespitosa* - Andre Viette Farm & Nursery, Fisherville, VA - 3" pot - 4/28

87-0165 *Liriope* 'Samantha/New Wonder' - Andre Viette Farm & Nursery, Fisherville, VA - Division - 4/28

87-0166 *Triteleia* 'Koningin Fabiola' - Creative Gardens, Greenville, NC - Bulbs - 4/29

87-0167 *Premna microphylla* - Coles Nursery, Furlong, PA - Seedlings - 5/1

87-0168 *Sorbaria sorbifolia* - Coles Nursery, Furlong, PA - Liner - 5/1

87-0169 *Morus alba* 'Holicong Weeping' - Coles Nursery, Furlong, PA - Liner - 5/1

87-0170 *Magnolia* x 'Peppermint Stick' - Gossler Farms Nursery, Springfield, OR - 6' - 5/7

87-0171 *Cercis griffithii* - Dr. Hans Simon, West Germany - 6" seedlings - 5/11

87-0172 *Cercis yunnanensis* - Dr. Hans Simon, West Germany - 2' seedling - 5/11

87-0173 *Fagus sylvatica* 'Swat Magret' - Dr. Hans Simon, West Germany - 2' grafts - 5/11

87-0174 *Dasyliirion texansis* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0175 *Dasyliirion leiophyllum* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0176 *Yucca baccata* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0177 *Yucca elata* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0178 *Yucca campestris* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0179 *Yucca louisianensis* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0180 *Yucca arkansana* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0181 *Agave stricta* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0182 *Agave bracteosa* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0183 *Hesperaloe parviflora* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0184 *Washingtonia filifera* - Lone Star Nursery (seed), San Antonio, TX - Seedlings potted - 5/15

87-0185 *Cercidiphyllum japonicum* - AHS seed distribution (AHS 138), Mt. Vernon, VA - Seedlings potted - 5/15

87-0186 *Iris germanica* 'Chaste White' (reblooming var.) - Andre Viette Farm & Nursery, Fisherville, VA - Division - 5/20

87-0187 *Dahlia imperialis* - Greenway Nursery, Charlotte, NC - 5', 5 Gal - 5/30

## **THE SIX STAGES OF A PROJECT**

1. ENTHUSIASM

2. DISILLUSIONMENT

3. PANIC

4. SEARCH FOR THE GUILTY

5. PUNISHMENT OF THE INNOCENT

6. PRAISE AND HONORS FOR THE NON-PARTICIPANTS