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News from and For Friends of River Farm

Fall Friends Day will be "Discovery Day". Dr. Henry M. Cathey, President of the American Horticultural Society, has brought together an exciting varietal display of horticultural subjects for Friends and their guests to enjoy on Sunday, October 12, 1975. We will share these discoveries with you in future issues of American Horticulturist.

River Farm Cottage, AHS's new plant and gift shop, will also be formally opened on Fall Friends Day, featuring some very unusual plants, as well as gift items which are designed and created especially for the Society. Please look for our River Farm Cottage ad in this magazine. The Friends of River Farm Committee has chosen to make a select group of AHS gifts available to you, by mail. Proceeds from the River Farm Cottage will in turn be used for maintenance and development of AHS headquarters as a National Center for American Horticulture.



AMENITY-SURVIVAL WORDS FOR HORTICULTURE

Have you ever had a friend hand you a plant with the comment. "I saw it in the garden shop, I don't know what it's called or how to grow it or even what it will do but, I bought it for you anyway."

A business which produces crackers, tennis shoes, shaving lotion, or ski equipment would have an ad agency to find many noisy ways to inform consumers of their product's potentials and unique characteristics. Yet plant people seldom have the chance to help guide beginning gardeners to appreciate the wide array of plants which can be grown successfully. Often we find that plants have been given many standardized names which tend to block out the potential use of other varieties which do not mimic the recognized standby. For example, try the words Delicious, American Beauty, and Russett on a group of friends. One will usually get back the response, Delicious Apple, American Beauty Rose, and Russett Potato.

The recognized standby may not be the form that is grown today. Apple breeders may have taken advantage of mutations which allow for the propagation of a spur-type flowering form which produces fruit with double red skin and matures twenty days earlier than the original parent. To most of us it is still a Delicious, but the continued updating of the product has completely revolutionized the productivity of the tree. Culture, disease, and insect problems of all forms of the Delicious Apple remain much the same. Thus when we master the growing of a variety, all the other forms of the plant possess similar (or near similar) requirements. Years of experience were required to master these growth requirements and all the noisy ad agencies in the world can do little to provide us with this practical familiarization.

Although experience and familiarization play important parts in the average gardeners' world, it plays an even larger role in the basis of commercial horticulture.

The average home gardener gardens more for pleasure—for the *amenity* involved.

As a point of illustration, remember we left you standing there with your friend's gift of an unknown plant? You have never seen it in the shops before. Perhaps, with great difficulty, you have found a picture and description in a standard reference. This is a moment when the gardening experience has its major impact on the lives of the average gardener. Your mind begins to visualize what the plant will become. You decide on what exposure, growing media, watering, fertilization and pruning schedule you will use. You look over its leaves and stems. You note how well it's anchored in the growing media and ask, "Does it wilt in the summer heat? Is it cold hardy in my area? Is it a host for a particular disease? Can I propagate it by cuttings?" These and countless other questions run through your mind. But why do you ask these guestions? Because you enjoy the challenge, you enjoy the results of your efforts, and you find gardening a pleasurable past-time. You appreciate horticultural amenities.

Meanwhile other forces are working to radically change our gardening experience. The average gardener is becoming more and more aware of them. For example:



Dr. Henry M. Cathey, President of AHS

This summer our cities had the highest recorded level of oxidants in our history. Unless a miracle occurs, pollution will continue to take its toll on all living things.

Our registration procedures for the safe use of pesticides faces challenges. By October, 1976, many of our standby control measures will no longer be marketed for use by gardeners.

We continue to be bilked by offers of "wonder" plants or gardening products which are a waste of money and affront our intelligence.

The advent of "instant landscaping" affects the surviveability of many urban plantings. These brief surviving "cover-ups" do little to ameliorate our urban deterioration.

The fertilizer shortage threatens our ability to supply food and insure our green environment.

As with other things in this world, gardening is undergoing many changes. In spite of these changes, however, gardening will *survive*.

We must identify the impact that plant *survival* can have on individuals, families, communities, nations and the world.

Horticulture must find a way to bring these areas—amenity and survival into full accord. The needs for personal discovery (lets call it one of the amenities of life) is the driving force for all gardeners.

Our horticultural organizations seek to fulfill these needs through publications such as the *American Horticulturist*, its meetings, and the continuing programs in every club, arboretum, botanic garden, garden center, and educational institution. In an age where red meat, grains, and soy beans have the top billing as the saviours of our way of life, we the gardener, have the responsibility of maintaining all of the plants which populate our homes, offices, malls, gardens, parks, freeways, and land-scapes. We must find the words to convey the meaning of horticulture as being somewhere between *amenity* and *survival*.

Write to A.H.S. and express your ideas. They may become part of the theme for our 1976 Congress in Philadelphia. H.M.C.

For United Horticulture . . . the particular objects and business of The American Horticultural Society are to promote and encourage national interest in scientific research and education in horticulture in all of its branches.

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OUR COVER PHOTO-Fall color-Acer circinatum. Photo by Clarence E. Lewis

Wine Growing for the Home Vineyardist

R. deTreville Lawrence, Sr. President, Vinifera, The Plains, VA 22171

New vineyards, with European vines that make the good table wines, are beginning to dot the hillsides in several eastern states thanks to modern cultural methods.

Home vineyardists are toasting their friends with their own "Burgundies" and "Bordeaux's" grown and made for a few cents a bottle and rivalling many imports made from the same wine grapes—Chardonnay, Riesling, Cabernet Sauvignon, and others.

But why has it taken about 365 years to accomplish this since Captain John Smith wrote about the native Virginia varieties, "Of vines great abundance in many parts that climbe the toppes of highest trees...they be fatte, and the juyce thicke...neither doth the taste so well please when they are made into wine"?

Man's oldest horticultural effort goes back to about 3000 B.C., the earliest certain date of the wine industry. "Noah began to be a husbandman, and he planted a vine-yard," the Bible says. In 2100 B.C. mention of grape wine occurs in writings of the reign of Gudea of Mesopotamia, and in 700 B.C. cults of Bacchus and Dionysos developed that were devoted to wine. From 476 A.D. to 1450 A.D., during the Dark Ages, the Church, through the monastic vineyards, preserved the wine industry and good records were kept. Shakespeare often referred to wine.

In London the Lords Proprietors of the Jamestown Company granted special favors to those who undertook wine-growing. And the New World's Assembly in one of its first Acts required each householder to plant and care for 10 grape cuttings of the European variety. But they would sicken and die. The wine made from the local native varieties had a "wild" taste, apparently derived from a chemical substance which is not found in the Vinifera (European) varieties.

Experiments continued on down through Thomas Jefferson's time. He brought highly skilled vignerons to tend a large variety of French, German and Italian wine vines. While serving as Ambassador to France, he wrote his overseer at Monticello in Charlottesville, "How does my vineyard come on? I should like to receive here a few bottles of wine." But alas, there is no record of any being sent to him. We know now that mildew was withering the

vine tops and a tiny louse (phylloxera) was destroying the roots.

In the latter half of the 18th century, Mission Fathers in California planted Vinifera and the premium wine vines prospered. The very dry climate and mild winters created a combination that discouraged fungi and the root louse, and thus a great wine-growing industry was established in that far western state.

Now we have fungicides that protect against mildew and root stocks for grafting that phylloxera will not attack. Because of this, a number of states, heretofore considered non-wine-growing, may become the great producers of quality wine in the future. Huge markets are in the East—and growing. A "new" agri-business may soon take off.



Above—Immature grapes hold promise of future wine. Right—Mature grapes ready for harvesting.















Choosing The Best Wine-Makers

Wine can be made from any grape. But the best wines can only be made from certain varieties. They should be ordered a year in advance to give nurseries time to graft when necessary. Here are the quality levels:

The least expensive wines—usually sweet—are made from table (eating) grapes like Muscadine, Concord and Norton.

The medium level of quality wines are made from the French Hybrids, developed in France about 50 years ago from descendents of the Vinifera. They are hardy, good producers, and make an excellent dry red and white table wine. They can be grown on their own roots but in some cases perform better if grafted. The Foch makes a fine red something like the Gamay Beaujolias which is enjoyed after only a few months aging. For a dry white, the Seyve Villard 5276 or SV 12375 makes an excellent wine of the Chablis type.

The top of the line and most expensive wines are made from Vitis Vinifera varieties. For a red, the Pinot Noir or Cabernet Sauvignon; and for a white, the noble Pinot Chardonnay is unequaled. This is the grape the French Government requires all "Chablis" to be of 100 percent, and the same grape that the famous Moet et Chandon champagne is made from. For German type Rhine wines, the Riesling is the best, with the beautiful pink Gewurztraminer running a close second.

As wine-growing popularity grows, some mail order catalogs feature nursery stock, usually the French Hybrids. These and the Vinifera can be obtained from several eastern nurseries, and they may also be ordered from sources in California and airshipped.

Soils Make Little Difference

Much has been written about the sandy soils of Bordeaux being the only ones for the noble Cabernet Sauvignon, the flinty slopes of the Rhine the best for the Reisling, and that the Pinot Chardonnay is only at home in the loam of Burgundy. American viticulturists today, however, maintain that soils do not make much difference. In fact the wine vine is unique of all horticultural plants...it will thrive in the poorest of soils.

A soil test should be made and average fertility obtained. Too much fertility is worse than too little. Baron Philip de Rothschild says that the vine does best when it has to struggle a little. Heavy clays, very shallow soils, poorly drained land, and too much alkali, salts and toxic substances should be avoided.

A site should be chosen where there is air and water drainage. The vineyard should not be placed in a low frost pocket. There must be good all day sun, and trees, bushes or adjoining other barriers should be removed if possible to allow a free flow of air that will help to dispel mildew. A hillside is best, the southern exposure in the northern states and a northern exposure in central and southern states.

Planting

Prepare a hole 12" to 18" wide and about 12" deep to receive the nursery plant. Remove all canes except one or two on which about six buds are left. For grafted plants, cut back to two buds. Pack top soil around and water. Do not cover graft union because the top scion may root.

As the shoots develop from the buds, allow the strongest two to grow and rub off the others (after danger of frost is past). Supplement rainfall to allow about 1 inch of water per week through the hot summer. The vine throws its roots down deep, and after the first year there is no need to water again where there is an average yearly rainfall of about 35 inches.

During the summer, cultivate the soil about 18 inches around the vine. Clean cultivation between the rows is desirable for the Vinifera to help hold down surface moisture and thus reduce mildew but this is not absolutely essential. Remove grapes that try to form the first two years. Let them bear the third year. Strengthen the roots and main trunk the first two seasons. Remove laterals (suckers) that try to grow between the leaf and stem. Remove sprouts at base of vine. Do not allow any below a graft. Develop one or two shoots the first two years that will form the main trunk or trunks, and tie them to a stake when they are about two feet high. The winter after planting is a good time to put in the trellis and they may be tied to the first wire of that in the second year.

Fungus And Insect Control

Proper spraying is probably the single most important element in wine vine cultivation. For this reason, a planting of no less than 25 vines may be advisable because with a lesser number we may be tempted to overlook a regular schedule. Starting when shoots are two inches long, spraying should be conducted every ten days or after hard rains that have washed off the previous applications.

At the first of the growing season, the vines should be sprayed with Captan and Ferbam to control Black Rot and Downy Mildew. About the first of June, or earlier in the South, Benlate should be added to this for control of Powdery Mildew, perhaps the worst enemy of the Vinifera. When insects appear, add Sevin or Malethion. This may be discontinued when insects are under control. Continue other sprays until two weeks before harvest, and afterwards spray about twice before frost. It is best to spray once too often than once too little. Local conditions vary somewhat from north to south, therefore it is advisable to consult extension agents or other authorities.

Trellising and Pruning

During the first growing season, only a stick or lath about three feet high is needed for the new vine. This may be put in when it is first planted. The next winter is a good time to put in the trellis. The traditional three-wire system is excellent, on posts installed after every three vines.

The posts should be eight feet long and placed two feet in the ground. End posts should be braced and somewhat larger. Use about 12 gauge for the bottom wire and staple it about two feet above the ground. Use the longest staples and do not drive down firmly so that the wires can be tightened later by pulling from the end posts. Use about 10 gauge wire for the top and 12 for the middle.

Pruning is not difficult when the basics are understood. The first year it is very simple and the new grower has time to study and go into the next stage. The nice thing too is, if a mistake has been made, it can almost always be corrected the next year. The vine is very hardy. Reasons for pruning are to insure a crop every year, keep the vines under control in the row for ease in spraying, cultivating, and harvesting. Pruning is done in the dormant season.

First Year: During the summer, one or two buds from the new plant have been allowed to sprout and grow about two to five feet high. The first winter they are cut back to two buds again.

Second Year: The two buds sprout in the spring and one is removed when growth is about 6 inches if a single trunk is desired, or both allowed to grow if two trunks for the permanent vine are wanted. Remove grape clusters that try to bear this season. Tie the shoots (canes) to the wires during the summer. When the dormant season is on, if the vine was vigorous, cut the canes back so as to leave a total of about 12 to 15 buds. The third summer's fruit will grow from canes growing from these buds. Try to leave a cane on each side of the trunk on two wires, and also leave a spur (cane cut to two buds) near each of these.

Third and later years: Fruit will bear only from new canes, not from two-year old or older wood. Therefore, it is necessary to cut the canes back every year that have borne grapes, and allow the spurs of the previous year's pruning to produce the canes that will bear the next year's fruit. The third winter the vine is well established and can be allowed to have 20 to 40 buds depending on vigor. Prune the same as the previous winter, leaving canes balanced on each side of the trunk and a renewal spur near each wire. For an excellent pamphlet with sketches, write the American Wine Society, 4218 Rosewald, Royal Oak, Michigan 48073.

Making The Wine

The grape is the only fruit which contains a sufficient amount of its own sugar for alcohol, yeast for fermentation and acid for preservation, to make wine. Crush the grape, put it in a container and nature will do the rest... in a few days you will have wine. Unlike beer and liquor making, wine is a natural process, and a simple one. A few refinements are desirable of course, and one or two steps are essential for multi-year storage. Relatively inexpensive equipment is available in wine supply stores and mail order houses. It can be used year after year.

A juice sample of 20 to 22 Brix sugar using a sacchrometer (hydrometer) signals that time for the *vendange* has

arrived. Red wine grapes are crushed and put in a container, skins and all. The yeast activity releases the color from the skins. It is then pressed and the juice put in a carboy (3 to 5 gallon bottle) or half barrel, depending on quantity, for fermenting. Some metabisulfite can be added to destroy harmful bacteria, and a little Montrachet yeast starter if desired for insurance. In a day or two, bubbles announce the start of fermentation, and about four days later a sugar test will show a drop to about 18. When tests over the next ten days or longer, depending on temperature, show a reading of zero we know that the sugar has turned to alcohol and it is now wine.

It is important at this point to protect the wine from the air which would convert the alcohol into acid-vinegar. The "delectable ferment that maintains man's faith in miracles" is then put into a cask which is filled to the top, or if in a carboy this is filled and an airlock used for a stopper. Every two weeks thereafter until bottling it must be "topped" with a similar wine in order to fill the airspace that occurs from evaporation. After about two months the wine is siphoned (racked) to another container and the sediment discarded. This may be done two or three times before bottling to both clarify and improve the taste. Bottles are put in a 400 degree oven for five minutes before filling. Corks are put in a container with water and heated to about 180 degrees (below boiling) for 15 minutes before bottling. The wine should then keep for several years. "American Wines & Wine-Making" by Philip Wagner, Knopf, is recommended for more details.

Man's oldest medicine—wine—has long been prescribed by doctors to help appetites. A new study at the University of California has found that it does indeed improve nutrition. Who knows, we may one day see on the label, "NOTICE: the Surgeon General has determined that a little wine is good for the health."



Author's "backyard" vineyard near Middleburg, Va.

CRABAPPLES



In the fall of the year crab apples are once again prominent in the landscape, for their myriads of small fruits are outstandingly colorful. All of them are small trees, only a few being as high as 50 feet tall, and they are widely used in home plantings in all the areas where apples prove hardy. Some are natives to North America but these have green fruits and such are not ornamental. Others come from Siberia and the Orient, and it is these and their many hybrids—over 200 of them—that make up the bulk of this decidedly valuable group of ornamental small trees.

They hybridize readily, the reason why new clones are appearing in nursery catalogues all the time. Basically, however, their small, fragrant flowers are white, pink, red or purplish red, all appearing in mid-spring

about the time, or just before, lilacs bloom. Mostly they are rounded, dense trees, one or two being pendulous in habit ('Red Jade'), one decidedly columnar in habit ('Van Eseltine') and one seldom growing over 8 feet tall—*Malus sargentii*.

The flowers are usually single, but 'Dorothea' is blessed with double flowers. The formerly popular Bechtel Crab (M. ioensis 'Plena') has double pink flowers like small roses, but it was extremely susceptible to disease and the fruits were merely green, so it has been superceded by some of the oriental hybrids.

We judge crab apples now on their ability to bloom annually, for some like the popular Arnold Crab will bloom only every other year, and there is nothing much that can be done about it. Also, the flowers of

the once popular Purple Crab were always prone to quickly fade to a dirty light purple, but some of its varieties like the Lemoine Crab will retain a much better flower color. Normally, a crab apple will be colorful in the spring a week or ten days, but during extremely warm weather, like we had this past spring, they open their flowers rapidly and fade very quickly, and there is nothing we can do about that, either.

Studies have been made of their resistance to scab disease and Juniper rust, and some once popular varieties have proved so susceptible to these disfiguring diseases, that crab apples like the Bechtel, 'Almey', 'Crimson Brilliant', and *M. purpurea* 'Eleyi' might best not be grown especially in areas where such diseases are prevalent, it has been noted that



Malus floribunda

some of the most resistant varieties are 'Adams', 'Beverly', 'Burton' and 'Ormiston Roy'. It is hard to eliminate altogether the many other types, and most gardeners are willing to take a chance on growing them. The point should be made, however, that in areas where diseases are prevalent every year, the few disease-resistant types should be sought out and grown.

In the fall, fruits are predominant, and most attractive to the birds as well. I did have an inquiry a few years ago from an individual who "simply loved" crab apples, but heartily disliked the fruits which were always creating a mess on her concrete walks. For such, the seldom fruiting types like 'Royal Ruby' and 'Spring Snow' are available from one or two commercial sources. For most of us, the beauty of the crab apples in flower in the spring, and their vividly colored fruits in the fall are

what makes them an asset in any garden.

There is a sequence in fruiting in the fall, and some varieties will retain their fruits much longer than others. For instance, the once popular 'Dolgo' retains its fruits for only a three week period in August, in Massachusetts. On the other hand 'Bob White' retains its fruits from early September until February, and by that time would be one of the few fruits available to the birds during the cold winter months. Most of the varieties bear fruits starting to color in September, and usually they either fall off the tree or are eaten by the birds by the end of October. Some, like M. baccata 'Jackii', 'Makamik', M. sargentii and M. zumi calocarpa retain their fruits until very near the end of December. Of course the fruits go through a color change so that near the end they would be merely brown, but nevertheless they

would supply food for the birds.

As for foliage color, varieties like 'Makamik', 'Pink Spires' and varieties of M. purpurea have a bronze tinge to the leaves that is retained nearly the entire growing season. The color proves effective especially in summer, and later in the fall it seems to be even more prominent.

Fruits range from the size of a small pea to nearly an inch in diameter of the varieties here mentioned. The edible types of crab apples like 'Trail', of course, have fruits as much as 1-3/4 inches in diameter, but these fruits are so large that if the trees are not sprayed as persistently as most commercially grown apples are, insects disfigure the fruit and make them decidedly unpleasant to observe. On the other hand, trees with smaller fruits, about the size of a very large pea, do not seem to be so troubled, and hence require far less spraying. In the Arnold Arboretum we always had trouble with canker worms and would spray the crab apples once a year for that, but those years when we omitted this one spray, the trees did not seem to be noticeably injured.

Propagation today is almost entirely by asexual means, either grafting or budding. Seedlings seldom have all the desirable attributes of the parent tree. Unfortunately it is extremely difficult to root crab apples by cuttings so that the gardener either buys his trees from commercial sources or else becomes adept at budding or grafting under his own garden conditions.

Good soil, full sunshine and normal moisture result in well grown trees. They should have plenty of room to expand naturally, for, when jammed together or pushed in close to the building they do not have the opportunity to take on the well rounded appearance that most varieties have. An application of fertilizer every year or so, may help trees in poor soils, and pruning is needed at times to prevent too dense growth or crossing limbs, but many a

crab apple survives year after year, in good condition, without such special treatment.

The following crab apples are not "the best" by any manner of means. They have been selected because most are annual bloomers, have good flowers and fruits, and are reasonably resistant to serious infestations of disease in areas where such diseases are prevalent. All have a commercial source, which can be ob-

tained by writing to the American Horticulturist if the variety is not obtainable locally. Some nurserymen grow a few crab apples which they know will do well in their own local area. Others, like a large nursery near me, offer 51 different varieties. With at least 250 varieties being grown in America today, the gardening public can afford to take a little time to select the right variety for the right place.

	Annual bearing	Color of flowers	Size of flowers in inches	Color of fruits	Height of tree in feet	
(A. Innered		0	1.1/	0		Special Notes
'Adams'		P	1 ½ 13/8	R	25	fl. buds red; disease free
baccata 'Jackii' 'Barbara Ann'	A	W R	1 3/4	BR R	30 20	general upright habit double flowers
'Beverly'		P	1 74	BR	30	fl. buds red; disease free
'Bob White'		W	1	Y-DB		
bob white		VV	1	I-DB	30	fl. buds pink; fruits remain unti Feb.
'Centennial'	A	W		R-Y	25	slightly susceptible to scab
'David'	1.1	W		R	20	fl. buds pink; disease free
'Dorothea'	A		1 3/4	Y	15	fl. buds red; double flowers
floribunda		P-W	1	Y-R	20	fl. buds pink to red; rounded habit
hupehensis		W	1 1/2	GY-R		fl. buds pink; vase shaped habit
'Indian Magic'		P	. / 2	R	25	fruit glossy red
'Makamik'	A	PR-R	1%	PR-R	25	fl. buds dark red; bronze foliage
'Mary Potter'		W	11/8	R	25	fl. buds pink
'Ormiston Roy'	A	P	1 1/2	Y	25	fruit lasts Octlan. disease free
purpurea 'Lemoinei'	A	R	1 1/2	R	20	foliage bronze
'Pink Spires'		Р		PR-R	12	foliage bronze in fall; upright habit
'Red Jade'	A	W	1%	BR	15	fl. buds pink; weeping habit;
						glossy red fruits
'Red Splendor'		P-R	1-1 1/2	R	25	foliage purplish red; fr. remain
						to Dec.
'Royalty'		R-PR		R	20	foliage purplish red
sargentii			1	R	10	flowers very fragrant
'Snowdrift'		W		O-R	20	fl. buds pink; foliage lustrous green
'Van Eseltine'		P	1 1/2	Y-R	18	columnar form; double flowers
'Winter Gold'		W	1 1/4	Υ	15	fl. buds deep carmine
zumi calocarpa		W	1%	R	20	fl. buds deep red; fruits remain until Dec.
W-white R -red				O-orange Y -yellow		GY-greenish yellow BR-bright red

SOURCES FOR CRAB APPLES 1, Adams Nursery Inc.

Box 525 Westfield, Mass. 01685 2.Studebaker Nurseries Inc. New Carlisle, Ohio 45344 3.Sherman Nursery Company

Charles City, Iowa 50616 4.Eisler Nurseries

219 East Pearl St., P.O. Box 70 Butler, Pa. 16001

5.Simpson Orchard Co., Inc. 1504 Wheatland Road

Vincennes, Ind. 47591 6.Cole Nursery Co., Inc. Circleville, Ohio 43113

7. Charles Klehm & Son Nursery Arlington Heights, Ill. 60005

8.Boyer Nurseries & Orchards, Inc.

RD 2, Biglerville, Pa. 17307 9, Boyd Nursery Co., Inc.

Box 71 McMinnville, Tenn. 37110

10.Lake County Nursery Exchange Inc.

Box 122 Rt. 84 Perry, Ohio 44081 11.Deeter Nurseries, Inc.,

Hoke Rd., Clayton, Ohio 45315

12. Weston Nurseries of Hopkinton

Rt. 135 Hopkinton, Mass. 01748 13.Congdon & Weller

Wholesale Nursery,

Mileblock Rd. North Collins, N.Y. 14111

14.Dugan Nurseries, Inc.

3791 Center Rd., Perry, Ohio 44081 15, Hoechstetters Nursery, Inc.

 1000 Indiana Rd., Verona, Pa. 15147

 'Adams'
 1

 baccata 'Jackii'
 10

 'Barbara Ann'
 12

 'Beverly'
 2,3,4

 'Bob White'
 5,11

 'Centennial'
 9

 'David'
 5

'David' 5
'Dorothea' 4,5,15
floribunda 4,6,
hupehensis 6,11
'Indian Magic' 5,7
'Makamik' 3

 'Mary Potter'
 2,5,11

 'Ormiston Roy'
 8

 purpurea 'Lemoinei'
 5,12

 'Pink Spires'
 7

 'Red Jade'
 5,6,14

 'Red Splendor'
 3,13

'Royal Ruby' 5,6
'Royalty' 5,7,14,16
sargentii 4,5,14
'Snowdrift' 5,6,

'Spring Snow 3
'Van Eseltine' 4,5,7
'Winter Gold' 12
zumi calocarpa 4,14,15,

LICKING THEBUG THOBLEIVI 1N 1975

Bill Youngman—Mr. Youngman recently retired as Garden Editor of the Washington Star-News. He is a Past President of AHS.

It was quite commonplace yesteryear when we had a bug problem to go down to the hardware store or a garden supply center and ask the folks there what to use to control the bugs on the sweet corn. The salesperson would reach up on the shelf and say, "Well, I think this will do it," and we would take it home, mix it in the sprayer and go out and spray. Since the bugs on the sweet corn were a rather universal and common problem, it did not take any especial skill on the part of the salesperson or the gardener to lick the bugs.

Today it is a different problem. Today we must identify the bug and then go into the shop and look over the pesticides to see which is *legal* to use on the sweet corn for that particular bug, because today we have a very specific pesticide law (it was enacted in 1972) that puts the entire responsibility on us to use only those materials which have been approved by the Environmental Protection Agency for the control of that particular bug on sweet corn. If we were to use that material (carbaryl) on dahlias when troubled by that bug, it may be illegal as dahlias are not on the label.

This means that today the gardener must become informed as to which bugs are on his flowers, fruits and vegetables. Obviously this is beyond most people, and so it will be necessary to arrange to have the pests, when they appear, identified by a qualified person. Once they have been identified, then we must find which materials have been approved for the control of them upon that particular crop.

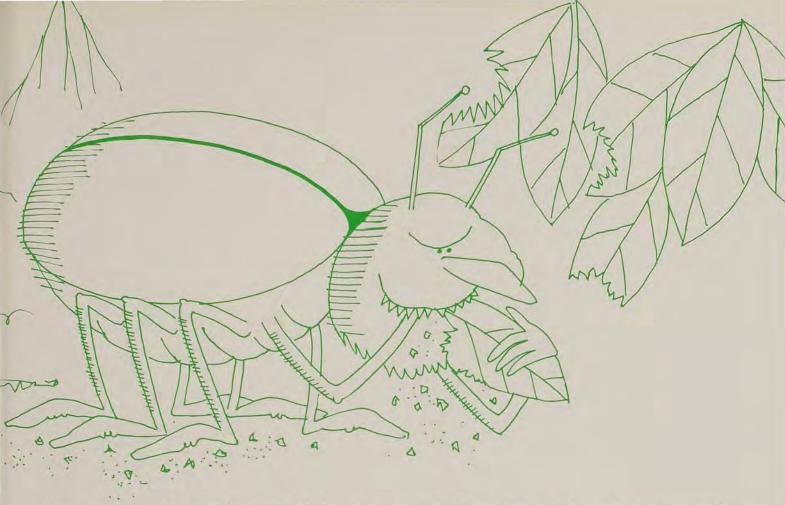
Next year we will find out whether or not we may use them or whether we will have to hire a certified applicator to do the job for us. This new step is being formulated by the EPA and is based upon the relative toxicity of the pesticides. Perhaps you have noted on containers of highly toxic materials there is a skull and crossbones. On those that are moderately toxic, the word "warning" appears. If it is slightly toxic, the word "caution" appears on the label.

By September 1976 it is planned to test and certify qualified people who will do the applying of the more toxic materials. This means that the home gardener, unless he wishes to undertake the training and testing necessary to receive an applicator's license, can only use those materials which are the least toxic. From the present status of this program, it would appear that most of the commonly used pesticides will be available to the home gardener.

A number of gardeners were given a proposed examination to see if they might be qualified for an applicator's license. Most of them, without any previous training or guidance, did not score very high but given a little training they had no difficulty in passing this test.

This year, at least, if we are going to lick the bug problem, we need only to know what the bug or blight is and to find a material that has been approved for its control.

These new developments in the pesticide control field will be discouraging to many gardeners. Undoubtedly many have already been buying ladybugs and praying



mantis and other predators with the hopes that they will be able to harvest a portion of their crops. In a few cases, these natural predators have been effective in reducing insect injury, but by and large they don't lick the problem.

In 1974 reports were received from experimental work as well as field trials in which aluminum foil was used to repel the insects. This project proved that a thin sheet of aluminum spread on the ground beneath squash vines, bush beans and several other crops effectively repelled certain insect pests. A major problem of the home gardener in using this approach is to obtain the thin layer of aluminum mounted on craft paper which can be spread over the surface of the garden and insert seed or plants through the foil into the soil. It is effective on plants up to 3 feet in height and helps to repel such insect pests as the Mexican bean beetle, the striped cucumber beetle, squash bugs, leafhoppers, spider mites, etc. There is no point in using the aluminum foil beneath plants which are not troubled by these or other serious insect pests which are not repelled by the reflected ultra-violet rays of light.

A new material, *Bacillus thuringiensis*, has been approved for the control of a number of common garden pests, such as the cabbage looper, inchworm, etc. This material falls in the same class as the Milky Spore Disease used to control the Japanese beetle. Perhaps others will be forthcoming. In the meantime, we should take as many steps as possible to lick our bug problem. Another way is to seek those kinds and varieties least subject to

pests, then look for the least toxic materials to control the bugs and employ other methods that may become available.

We have been told that an effort is being made to make the EPA regulations more realistic. It was pointed out that in a recent issue of the Federal Register permission was granted for the farmers and others to use certain pesticides at lower dosage rates than are listed on the container. All containers should give the dilution or dosage rates. It is rather pitiful to note how many thousand words appeared in this notice.

It is equally discouraging to see the obstacles which any new pesticide must surmount before it can become available to the gardener. For example, a new material being tried out in the magnolia gardens in South Carolina gave phenomenal results in the control of the azalea petal blight. Obviously every gardener in the areas afflicted by this disease is eagerly awaiting the day when it will be legal and available. The difference between daily spraying and spraying once a week is really something, not to mention far less costly. In this connection we also were very happy to find that Dr. Ralph Webb of the U.S. Department of Agriculture has come up with a control for the rose midge, the tiny insect that tunnels into the neck of the rose and causes it to droop. On the basis of his tests, a simple material commonly available for the control of the billbug in zoysia is equally effective in controlling the rose midge, but the question is how long will it be before it is legal to use it in the rose garden.



Fall Color FROM COAST TO COAST

Americans fortunately live in a country blessed with a climate and native vegetation conducive to brilliant autumn color. As everyone knows, this varies from year to year and place to place depending on climate, native vegetation and altitude. Cool nights (below 45°F.) in the early fall, followed by warm sunny days, make for good autumn coloration if there has been plenty of soil moisture in the right areas. Certain tree and shrub species always turn red, others yellow and when they grow together brilliant color combinations result.

When there has been a long summer drought, or when the fall nights are warm and the days are cloudy, "poor" autumn color results. Often an early freeze (not just a frost) or a high wind storm will kill the leaves or blow them from the trees prematurely. The eastern United States is considered by many to have just the right trees and the right weather for the "best" autumn color. Other areas (western Plain states) may not have such vivid displays.

In general, autumn color starts in the far northern parts of the United States in early September, and rolls relentlessly southward from then, through October and in some places even into November. Nine trained horticulturists have pooled some very brief observations on this phenomenon for the following notes. The Editor regrets that space does not permit the reproduction of all the information so generously sent in, but here, in general, is the picture:

Northeastern U.S.—(Donald Wyman, Horticulturist Emeritus, Arnold Arboretum, Jamaica Plain, Mass.)

Autumn color starts in the extreme northern part (especially the higher altitudes) from Maine to Ohio, in early September, reaching the White Mountains by early October and Virginia and the Skyline Drive by mid-October. There are many coniferous evergreens in this area, showing off the gorgeous reds of the oaks, maples, dogwoods, tupelos, and the gums; the purples of the ashes, the yellows of the birches and the bronzes of the beeches to splendid advantage. It is the large area that is often thought of as "best" for autumn color by many people, probably because of the large amount of hardwood species mixed in with the coniferous evergreens. It is always a well re-



Hydrangea quericifolia

membered experience to view the magnificent display from some distant highway through the mountains, where range after range is covered with the yellows and reds of the trees. However, some years, as I have learned after a long trip through the mountains, the best and most vivid colors can be found right in ornamental plantings in one's own home town. In all these areas, color may last in one place only a few days to a short week, depending on weather conditions. If there are several species of trees involved, as there usually are, good color can be seen over a period of several weeks. "Best" color in New England's mountains is usually during the second and third week of October, and slightly later in Pennsylvania and Maryland.

Southeastern U.S.—(C. Gordon Tyrrell, Callaway Gardens, Pine Mountain, Ga.)

Autumn color is to be seen over a longer period in the Southeast than further north—in fact, there is color from September on, often into November. Among the bright reds and scarlets are Acer rubrum and Acer floridanum, which stand out so well against the dark green of the Loblolly Pine. In more subdued tones are the red-toned dogwoods and the soft yellow of Aesculus parviflora, the

golden yellow of the stately Tulip Tree, *Lirodendron tulipfera*. Darker hues of wines and purples are provided by the Liquidamber, while to complement these same colors, we might add *Vaccinium arboreum* and other species to be found in the open areas of the woods or meadows.

Russets or browns are supplied by the many oaks, the most common being *Quercus coccinea* (Scarlet Oak), *Q. falcata* (Southern Red Oak) and *Q. alba* (White Oak) while in the more northern areas is the Chinquapin Oak (*Q. muhlenbergii*). Among the native shrubs which put in good fall color is *Hydrangea quercifolia* (Oakleaf Hydrangea) with a medley of shades from red to purple, while almost in the same color range is *Itea virginica* (Sweetspire).

Not to be forgotten are the sour gums, Nyssa sylvatica, with its brilliant maroon color in autumn, while a similar tree Nyssa aquatica, with larger leaves, will be found in swamps in the coastal areas.

One of my favorites, the Sourwood (Oxydendrum arboreum), whose light green leaves turn to a brilliant red in early autumn, while the persistent fruit hangs in long racemes to add further interest. In the higher elevations, Sweet Birch, Betula lenta, is a gorgeous yellow and the ever present Magnolia grandiflora, which is to be found everywhere—with the pines, adds that rich green color which sets off all the other autumn tints.

Upper Midwestern U.S.—(Gordon Ware, Ecologist and Dendrologist, Morton Arboretum, Lisle, III.)

The coniferous region of northern Minnesota has extensive areas where *Populus tremuloides* and *Betula papyrifera* are abundant. Localized areas of *Acer saccharum*, *Tilia americana*, *Betula lutea*, and *Quercus rubra* also contribute to color which may sometimes begin rather early in September and extend into October. Red Maple (*Acer rubrum*) is scattered throughout the area and often gives vivid red color in contrast to the yellow and orange of most other species. Tamarack (*Larix laricina*) bogs produce beautiful displays of orange foliage.

The deciduous forest area of Minnesota is in the southern half of the state. Forested valleys, much like those of Iowa may have good displays of yellows, oranges, and reds by Acer nigrum, Acer saccharum, Tilia americana, Quercus alba and Q. rubra Throughout much of Minnesota (in sandy areas) Hill's oak (Quercus ellipsoidalis) foliage turns to a striking red color in the fall. Coloration in Minnesota begins in mid-September in the north and extends into October southward.

Along the valleys of the Mississippi and the Minnesota Rivers, one can see not only the fall color of the upland trees but also the color of bottomland trees: Acer sac-

charinum, Ulmus americana, Fraxinus pennsylvanica and Populus deltoides.

Chief contributors to coloration of the valley forests of Illinois are *Quercus alba, Q. rubra, Acer saccharum, Tilia americana,* and *Ostrya virginiana*. Coloration is mostly yellow. The Driftless Area of northwestern Illinois is an especially good place to see color, beginning about the first of October. Various species of sumac add greatly to the landscape with their contributions of red.

Red fall color is generally good along the river valleys and in the hills of southern Illinois. The deciduous trees of northern Illinois are also present, and the list of additional contributors is long. Some of the species are: Nyssa sylvatica, Liquidambar styraciflua, Sassafras albidum, Quercus palustris, Q. shumardii, Q. falcata, Acer rubrum, Diospyros virginiana and Fagus grandifolia. Coloration in southern Illinois may extend through October into November.

Fall color is mostly confined to river valleys of North and South Dakota, where *Populus deltoides, Fraxinus pennsylvanica, Acer negundo,* and *Ulmus americana* contribute yellow color, usually not spectacular, from late September to mid-October in North Dakota, and until late October in South Dakota.

The Black Hills are a forested island with the dark green of *Pinus ponderosa* providing a background for the coloration (predominantly yellow) from *Populus tremuloides*, *Betula papyrifera*, *Populus balsamifera*, *Ostrya virginiana*, *Ulmus americana* and *Fraxinus pennsylvanica*.

The deep valleys of eastern Nebraska near the Missouri River are wooded; however few species produce good fall color with the coloration along the river valleys being similar to that of the Dakotas.

Forested valleys are widespread in lowa, and several species contribute to good fall color throughout October. Black Maple (Acer nigrum) displays rich yellow to carmine color and creates an autumn aura and atmosphere similar to that found elsewhere where Sugar Maple is in full color. Also Quercus ruba (red to orange), Quercus alba (maroon) and Linden (yellow) with red sumacs add greatly.

Kentucky—(Clarence Hubbuck, Jr., Arboretum Supt., Bernheim Forest, Clermont, Kentucky)

With correct weather conditions, the last three weeks of October can usually be counted on for exceptional fall foliage in the mountains of Tennessee and West Virginia as well as Kentucky. The major trees and shrubs contributing to fall color include Sassafras, Sumac, Black Gum, Flowering Dogwood, Oaks, Red Maple, Oakleaf Hydrangea (all reds); and Persimmon, Hickory, Spicebush, and Pawpaw (all yellows). Beech adds the bronze

color and Sugar Maple is of course red and yellow.

Southern Midwestern U.S., Texas - (Edward McWilliams, Assoc. Prof. of Horticulture, Texas A&M University, College Station, Texas)

The best autumn color in Texas is found in extreme East Texas, where there is the most westward extension of the geographical distribution of many North American forest species. In this area, eastern species, including Sugar Maple (Acer saccharum), Flowering Dogwood (Cornus florida), Sweet Gum (Liquidambar styraciflua), Black Gum (Nyssa sylvatica), and various Hickories (Carya spp.) provide most of the autumn color. Lesser species include Virginia Creeper (Parthenocissus quinquifolia) Rhus spp. or Sumacs and various Quercus spp. or Oaks. Fall color along rivers and streams is good where Red Maple, (Acer rubrum) and Black-Gum are abundant.

In the better years, i.e., those with cooler falls, autumn color in extreme northeast Texas may compare favorably with color in the eastern part of the country and late October and early November is generally the peak period. However, during mild winters the leaves may remain on many species until Christmas.

Fall coloration becomes less dramatic as we move from east to central and west Texas. The Texas Oak, Quercus texana, is a brilliant source of color in the Hill Country of Central Texas. Native Pecans, (Carya illinoensis), Cedar Elm, (Ulmus crassifolia) and Soapberry (Sapindus drummondii) provide various shades of yellow along many streams and ravines in central and west Texas. A beautiful Maple, Acer grandidentatum, occurs in canyons of the Edwards Plateau and in the mountains of the Trans-Pecos area.

Another western tree, Populus wislizenii, the Rio Grande Cottonwood, provides bright yellow coloration along rivers and irrigation canals in valleys and canyons of Texas and New Mexico. One of the most widely cultivated trees in the southwest is Sapium sebiferum, the Chinese Tallow tree; this species has escaped in much of south Texas. It has red and purplish leaves in late autumn and early winter. Pistachia chinensis, Chinese Pistach, is commonly cultivated throughout Texas for its brilliant red foliage which remains on the tree until late November or December. Texas plants, however, often do not exhibit the striking autumn coloration noted in the eastern U.S

Arizona and New Mexico—(Fred B. Widmoyer, Head, Dept. of Horticulture, New Mexico State University, Las Cruces, N.M.)

Autumn color is very good in the higher elevations of Arizona and New Mexico, especially in the northern areas. Color is mainly on Aspen (yellow), Oak (red) and Mountain Maple (red). Dependent on the weather the color starts about October 15 through November 10.

Rocky Mountain States-(William G. Gambill, Jr., Director, Denver Botanic Gardens, Denver, Colorado)

In the tremendous area occupied by Colorado, Wyoming and Montana, the autumn color is predominately vellow, given chiefly by the Trembling Aspen (Populus tremuloides). This species is the most predominant in these states and is of course widely distributed from coast to coast. There are other poplars in this area also. like the Narrowleaf Poplar (P. angustifolia) the next most abundant species but limited to the moist areas along the stream beds, not on the mountain slopes themselves. The Trembling Aspen goes up to 11,000 feet elevation, and because of this, covers tremendous areas of mountains. In some places it is a pale pinkish orange to pale brilliant red.

The color occurs between mid-September and mid-October, slightly earlier on the higher elevations. Usually it is prominent in Glacier National Park a week earlier than in Rocky Mountain National Park, yet some years there is only a few days difference.

In the plains areas of these three states, the Cottonwood (P. sargentii) forms ribbons of gold along the streams, and several species of willow will be seen to be vellowish through November into December. The Western Larch (Larix occidentalis) adds intense gold-vellow color, while a little bronze-red is contributed by the Gambel Oak (Quercus gambelii) in the mountains of southern and western Colorado and portions of Wyoming. In the so-called "good" years this is the only abundant Rocky Mountain plant with this color.

Elsewhere in small patches in all three states, the red of Smooth Sumac (Rhus glabra) can be seen, and chiefly at lower elevations the Skunkbrush (R. trilobata) and even the gorgeous reds and yellows of Poison Ivy appear in scattered patches.

Mountain Maple (Acer glabrum) is in the canyons with its dull yellow to sometimes bright red colored foliage, and also Boxelder with its dull yellow.

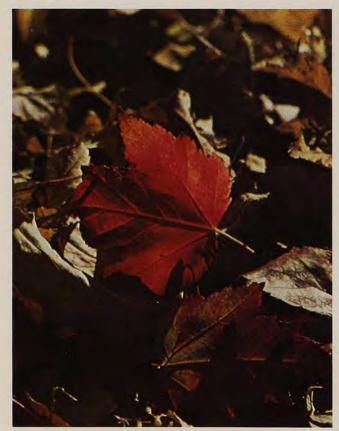
Holly-grape (Mahonia repens) is widely distributed, and although it is under 15" tall, its leaves in fall usually display yellow, orange to bright purplish red colors before they turn brown in the winter. Then too, Black Chokecherry (Prunus virginiana melanocarpa) and the Wild Plum give a red color in the places along the streams where they grow. Several small birches supply more yellow, especially the Bog Birch (Betula glandulosa) are noted in the mountains in bogs, up as high as timberline. There are many other native plants adding to the colors of fall, but in general, these are the most numerous.

West Coast; Central California—(Albert Delisle, Prof. of Genetics, California State University, Sacramento, Cal.)

The best autumn color is from mid-October to the first 17



Quercus alba



Acer rubrum

two weeks in November, especially in the foothills between Sacramento and Lake Tahoe at altitudes lower than 3800 feet. The major plants with autumn color are the maples, oaks and dogwoods, ranging from orange, rose gold to brown. Elsewhere the Bigleaf Maple (Acer macrophyllum), Box-elder (Acer negundo californicum), blackberries and wild grape (turning gold) add splashes of color.

Oregon—(Ruth M. Hansen, Horticultural enthusiast, Portland, Oregon)

In Oregon one may see autumn foliage as a continuous progression across the state, from early September through October. Possibly the finest of all native small trees which produce brilliant red to orange fall foliage is the Vine Maple, *Acer circinatum*. It is an excellent all-round small tree, and from September through October, often into mid-November it provides breathtaking beauty for the traveler. The Sunset and Wilson river highways leading to the coast or the Mt. Hood Loop circuit are a special joy for those who drive these roads.

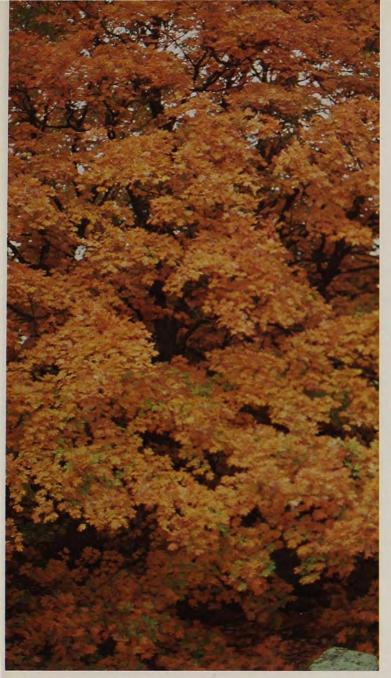
Across the ColumbiaRiver in the state of Washington, Vine Maple is especially beautiful on the lava beds of Mt. Adams. Here it grows as a stunted shrub made into bonsai by Mother Nature. In this harsh environment it seems to mature early and flaunts its red and yellow colors for miles and miles.

The Rocky Mountain Maple, A. glabrum grows in localized areas throughout the state, mainly in the Blue, Siskiyou and Cascade mountains where it colors brilliantly in the fall. However, east of Government Camp, Mt. Hood area, the leaves turn a clear yellow making many lovely compositions against the dark green foliage of the Douglas-fir, Pseudotsuga menziesii.

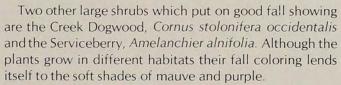
Our Bigleaf Maple, A. macrophyllum is not a flame thrower like the two smaller species. Its large leaves just turn yellow, then a golden brown. Really, nothing spectacular, but from a distance the hills are richly clad in gold-color for a full six weeks or more. When the trees are surrounded by firs and pines it presents a picture of a golden island in a deep green sea.

Large colonies of Quaking Aspen, *Populus tremuloides* exhibit a magnificent splendor unsurpassed for sheer beauty when seen in their fall attire of clear lemon yellow. This tree is widespread in Oregon, but mainly east of the Cascade summits. The Pacific Dogwood, *Cornus nuttallii*, in the fall, clothes the hills in a blending of soft wine colors ranging from near pink to deepest burgandy.

Second only to Vine Maple for a riot of red and yellow colors are the many deciduous huckleberries, *Vaccinium* spp. Certain varieties are native to the coastal region while others prefer the high mountains, but all put forth a gorgeous fall array, and this, along with delicious berries.



Acer grandidentatum,



The Western Larch, *Larix occidentalis*, is a large tree found mainly in Oregon east of the Cascades where it forms pure stands, but more often in mixed stands of lodgepole pine, Engelmann spruce, white and lowland firs, and Douglas-fir. In late fall, October through November, the one to two inch-long needles turn a bright lemonyellow which distinguishes the tree from all other conifers. The Blue and Wallowa mountains of far eastern Oregon, the Metolius river country, the Mount Jefferson areas of central Oregon and the Mt. Hood National Forest are all well known for the fall beauty of this forest tree.



Rhus typhina

Air Layering

Billings M. McArthur 40 Lake Drive, Killarney Point Winter Park, Florida 32789

Air-layering is a method of obtaining a few true "offspring" of woody or semi-woody shrubs in a relatively short time—six weeks or a few months. Instead of using lopping-shears to prune healthy branches on specimen bushes and trees, air-layering will provide healthy "children" with established roots, which can be cut off and potted.

Choose a branch about pencil size (or larger) and where there is a section about six inches in length available for working (cut off some leaflets, if necessary). Using a sturdy pruning knife, make two girdling cuts down to hard wood, about 3/4 inch apart. Scrape off all the bark and the green cambium layer underneath, between these girdling cuts.

Dust this exposed wound with hormone powder (eg. Rootone), easily applied with an artist's paint brush. It is convenient to have two sizes of "bandage" available, (a) 5" x 7"; (b) 6" x 9" of thin clear plastic (such as is used on newspapers on rainy days).

Laving a square of this plastic on opened hand, place on it a handful of finely-ground spaghnum moss which has been thoroughly moistened in a container of water. Place this poultice of moss over the dusted wound and wrap the plastic around the branch, giving a tug on the end to "snug" it in place, thus squeezing out excess water.

Each of the two ends of this cylindrical wrapping can then be gathered and tied in place with a 'Twist-em' or flat ribbon. They should be tight enough to hold the 'bandage' in place, but not so tight as to act as a tourniquet. A third tie wrapped around the middle will help squeeze the moss into contact with the wound. After tagging this branch, so it can be found weeks later, with plant identification and the date the air-layer was applied, proceed to the next branch to be air-layered.

Because of the water content of the moss in the bandage, this process should be used when danger of winter freezes is over. Having used transparent plastic for the covering, after some weeks, roots can be seen developing in the spaghnum moss. When the ball of moss is visibly well filled with roots, it, with the branch can be cut from the parent shrub. Like handling a new-born baby, use great tenderness at this point, avoiding twisting or sliding the ball of tender roots!

At the potting bench, carefully untie and unwind the plastic bandage without disturbing the root system. Using a "loose" potting soil, pour it around the ball of roots, held suspended in the center of a pot, then gently water the soil into place, avoiding unnecessary tamping of the soil. Stake the newly potted plant so it will not be twisted accidently or by a gust of wind. If it appears that there is excessive foliage to be nourished by the small new root system, some leaves can be trimmed off. In perhaps a month, the roots will expand to fill the pot and then the new plant can be transplanted as desired.

This method of plant propagation has the advantage of producing a living reproduction of its parent in a few weeks or months, as contrasted to growing from seeds—which may require a year or more to reach this size.



1—Notch band around stem. Do not cut through stem.



2-Cover entire notch with ball of spaghnum.



3—Cover spaghnum with plastic sheet and tie both ends...or use a "Twist-em".

Selecting& Breeding Hardy Passion flowers

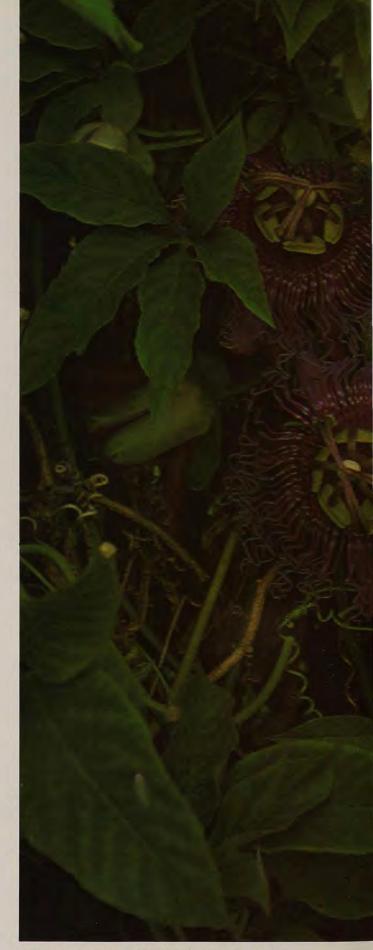
H.F. Winters and R.J. Knight, Jr. Research Horticulturist, Plant Genetics and Germplasm Institute, ARS, USDA, Beltsville, Maryland, and Research Horticulturist, Subtropical Horticulture Research Station, ARS, USDA, Miami, Florida.

Passionflower vines have been favorite conservatory subjects in Europe and America since indoor gardening was first popularized in the late 18th and early 19th centuries. Many hybrids have been produced, but many were lost because of retrenchments in conservatory horticulture during and after the two World Wars. The continued maintenance of conservatory collections of tropical plants again is under examination because of fuel shortages and the high cost of maintenance. In those greenhouses where retrenchment is considered, vines, including passionflowers, often are the first victims, because their space requirements are so great.

Few flowers have a more fascinating structure than passionflowers. This unusual morphology has inspired a close linkage with legend and myth (19). Ayensu (5) and Bailey (6) have described the association of floral parts with the implements and religious symbolism of the crucifixion of Christ.

Although passionflowers are commonly thought to be tropical subjects, several can be cultivated outdoors in temperate climates similar to that of Washington, D.C. Two of these are native species, *Passiflora incarnata* L. and *P. lutea* L. Another is the cultivar 'Incense.' The fourth, *P. caerulea* L., was introduced many years ago from Brazil, probably via Europe.

'Incense' is a true genetic hybrid, raised at the Subtropical Horticulture Research Station of the USDA at Miami, Florida, and released to the public in 1973 (27). It resulted from a breeding program designed to extend the cold-hardiness range of tropical fruits. The seed parent was a vine of the native maypop, *Passiflora incarnata* L., collected in Tennessee. The pollen parent was the Crato



Passiflora cincinnata, the Crato Passion vine Pollen Parent.





Passiflora incarnata L, seed parent.



Passiflora 'Incense', a true genetic hybrid.

Passionvine, *P. cincinnata* Mast., P.I. 298883, introduced and grown from seeds collected in 1964 in Juyuy Province of northern Argentina. At Miami, *P. incarnata* dies to the ground each winter with or without frost. *P. cincinnata* is evergreen. The growth of 'Incense' is somewhat intermediate, slowing during the winter but retaining its leaves. When vigorous growth is resumed in the spring, shoots arise from older stems near the ground level.

Propagations of 'Incense' were sent to the senior author in May, 1973. One was planted in a southwestern exposure near the foundation of a house in Silver Spring, Maryland. It survived the following winter, flowered prolifically during 1974, and survived the winter of 1974-75. Another propagation, planted at the west corner of a porch in Annapolis, Maryland, survived but failed to bloom.

'Incense' is a vigorous, slender, herbaceous, perennial vine in Maryland. The annual growth easily attains 4 meters or more in length during one growing season. The 7-to-15 cm, dark-green leaves are divided into three to five acutely tipped, lanceolate-to-oblong lobes. Leaf margins are shallowly serrate. The patioles bear a pair of prominent nectariferous glands near the apex. New shoots start growth in late April or early May in suburban Maryland, depending on earliness or lateness of the season, and attain full height by July. During 1973 and 1974, early fall frosts caused no damage to the plants. In 1974, they were killed to the ground by a low temperature of —8°C. (18°F.) on November 29-30.

The outstanding characteristic of 'Incense' is the large, colorful, fragrant flowers borne singly at the nodes on peduncles as long as the petioles. The five-angled flower buds are beautifully sculptured, and each keeled lobe bears an erect, green, spur-like appendage just short of the tip. Although larger, the flowers have a striking resemblance to the P. incarnata parent. When fully open, the flowers measure 11 to 13 cm in diameter. The five petals and the upper surfaces of the five sepals are pale violet. The most conspicuous part of the flower is the fringed corona which shades from light verbena violet, approaching blue, at the top to two bands of darker violet toward the center. These dark bands alternate with bands of very pale lilac, approaching white. The corona segments are as long or slightly longer than the petals. The consequent crowding of corona members at late bud stage causes them to crinkle, sometimes almost curl, toward the apex of each member like the P. incarnata parent. Anthers and styles usually are greenish vellow to vellow, although the filaments may be tinted with lavender. The anthers are pollen sterile. The flowers have a strong fragrance suggestive of sweet peas. Flowers open about 9:30 in the morning, remain open for one day, then drop off unless pollinated with compatible pollen.

The edible fruit of 'Incense' is small, egg-shaped, 5 cm long by 4 cm in diameter. It is olive colored until maturity,



Passiflora incarnata in Fruit

when it drops and becomes chartreuse in color. It has a strong rose-like fragrance and sweet-subacid flavor.

'Incense' is a long-day plant. In Maryland, it starts to flower in early July and continues unabated until about September 20. For two to three weeks after this date, an occasional flower may be produced.

The new shoots of 'Incense' emerge from the ground in late April or early May, depending upon spring temperatures. Like the mother, 'Incense' is rather promiscuous. Some of the new shoots may emerge at a distance of 2 meters from the parent plant. Unwanted plants are easily removed by a firm straight tug from just above ground level.

Passiflora incarnata L.

Imparting hardiness and other desirable characteristics to the hybrid 'Incense' is the maypop, apricot vine, or wild passionflower, *P. incarnata* L. Killip (12, 13) gives the distribution for this species as Virginia to southern Illinois and southeast Kansas, south to Florida and Texas, and Bermuda. Because parts of this range fall within Plant Hardiness Zone 4 one might expect the maypop to survive in other parts of the zone. It has, in fact, survived in the central Connecticut valley at Northampton, Massa-



chusetts, at the extreme northern edge of this zone, when planted near a building (23).

The maypop is a tall-climbing perennial vine that may attain 6 to 9 m of growth. The ovate-cordate leaves are three-lobed to about one-half their length. Leaf margins are serrate. The petioles bear two prominent nectariferous glands near the leaf base. The flowers, borne singly in the leaf axils on stiff peduncles, as long as the petioles, are 5 to 6 cm in diameter. They greatly resemble those of the hybrid 'Incense,' though smaller and less intensely colored. The most common flower color is pale lavendar with a slightly darker halo toward the corona base. The authors have not observed flowers of pink or flesh color, as indicated by the specific designation "incarnata." A pure-white-flowered variety from Barry County, Missouri, was strikingly figured recently on the cover of *American Horticulturist* (3).

The fruit ripens yellow during late summer and fall. It is ovoid, about 5 cm long, with 3 longitudinal sutures. The pulp surrounding the many seeds is edible from the time the fruit yellows until it shrivels and turns brown. Captain John Smith observed that Indians in Virginia cultivated the plant for its' fruits (3).

Sometimes the maypop becomes weedy in moist, fertile sites. Formerly it could be seen throughout the South, overrunning fences and bushes along roadsides and railway embankments, often on rather poor soils. It is not as common now, probably due partly to the use of herbicides. One of the earliest memories of the senior author is of these vines covering a fence each summer in Tulsa County, Oklahoma, across the road from the family dwelling. As children, we ate and enjoyed the fruits against the advice of our elders.

The dried plant tops are used in preparation of *tincturae* passiflorae (29), which Deming says is mildly sedative (11). The authors' question, however, that the delectable drink served to Deming at Fort Myers, Florida, was prepared from this fruit. Perhaps it was from the related tropical species, *P. edulis* Sims. Medical uses of *P. incarnata* are summarized by Vogel in his book, *American Indian Medicine* (28).

P. incarnata appears to hybridize fairly easily with other species of the genus. In 1825, Sweet (26) described its use as seed parent in a cross with P. caerulea. The hybrid was named P. xcolvillii Sweet after Colvill's Nursery of England where itwas raised (18, 19, 26). In regard to hardiness, Sweet stated, "The present plant will grow freely in the common garden soil, and only requires to be covered with a mat or two in very severe frost and a little dry litter put about its roots." Lawrence (19) lists P. xcolvillii among the hybrids and species known to be cultivated in the United States in 1960.

Passiflora lutea L.

This native herbaceous perennial may attain 1-1/2 to 3 m of growth annually. It probably is the most cold-hardy species of the genus, since it has been collected in the wild from Pennsylvania. It also ranges south and west to Florida and Texas (6). When not in bloom, it may be distinguished by the leaves. They are broader than long, shallowly and bluntly three lobed, and cordate at the base. Old leaves may exhibit a silvery, marbled pattern. The petioles are without glands. The greenish yellow to yellow flowers are produced singly or in pairs during late summer. Although the flowers contain the same beautiful structure that has intrigued so many gardners, they are only about 2 cm in diameter and are apt to escape notice. The fruit is a globose berry, 1 cm in diameter, dark purple at maturity. Previous authors have considered it of little significance as an ornamental plant (1). Nevertheless, it may eventually prove of value in breeding programs.

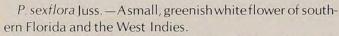
Additional U.S. Species

Small (24) lists five additional species for the United States. Probably none would contribute much in the way of hardiness to hybrids, but their breeding potential is unknown.

P. pallens Poepp. ex. Mast.—A small to medium, white or greenish white flower of southern Florida and the West Indies.



Passiflora coccinea.



P. warmingii Mast.—A small, pale yellow flower with white-hairy fruit. It is native to Brazil, but it has been naturalized near Clemson, S.C.

P. suberosa L. (syn. P. pallida L.)—A small, greenish flower with a corky stem. It is native to peninsular Florida and the Keys, West Indies, and Central and South America.

P. multiflora L.—A small, yellow-green and white flower of southern Florida, the Keys, and West Indies.

P. caerulea L.

Much of the literature about ornamental passionflowers pertains to this species (5, 6, 9, 12, 19, 21, 25, 26). It is the species most commonly cultivated in greenhouses and is one of the hardier tropical species. It can be grown in the South and in California as far north as San Francisco. Although Washington, D.C., is borderline for this species, Mrs. Etta Babcock of nearby Brandywine, Maryland, has plants growing outdoors. They flower during the summer if she lets down the vines during the winter and protects them with a heavy mulch. *P. caerulea* produces strong, slender vines. The leaf is divided nearly to the petiole into 5 (sometimes up to 9) entire, sharp-pointed segments. The stipules are ovate and leaf-like. The two to four petiole glands are supported by short stalks. Various color forms



Passiflora quadrangularis, 'Giant Granadilla'

have been described in the 8- to 11-cm, slightly-fragrant flowers. The classical form was figured in color in a recent article by Ayensu (5). Usually the upper surface of the sepals is greenish white, but it may be tinted with lavender. The petals are greenish white, pinkish, or lavender. Filaments of the corona are usually straight and are shorter than the sepals and petals. They usually are bluish at the tips and shade to violet and to purple below the halo of white spots. Anthers and stigmas usually are yellow-green, but the styles may show a purplish tint. One of its large-flowered cultivars is sometimes listed by nurserymen as 'Grandiflora' or erroneously as 'P. grandiflora.' 'Constance Elliott' is a pure white, fragrant cultivar.

Various hybrids of *P. caerulea* with other species have been reported (6, 18, 19, 26) but there is no reason to expect that any of them besides P. x 'Colvillii' would be more cold-hardy than the parent.

Discussion

The possibility of breeding cold-hardy passionflowers has not been without its advocates. Writing about *P. incarnata* in 1942, the columnist (probably B.Y. Morrison) for "The Gardener's Pocketbook" in *The National Horticultural Magazine* wrote, "Someday, perhaps, some Californian with pollen of more brilliant species at his disposal may trouble himself to fertilize this plant and rear



Passiflora 'Incense'

a host of seedlings some few of which may give us a combination of the relative hardiness of *incarnata* with the brilliance of the more southern species and then?" (2).

The apparent ease with which the two cold-hardy hybrids P. x colvillii and 'Incense' were produced, even some 125 years apart, would seem to indicate that a concerted breeding effort with P. incarnata might result in a new series of ornamental or even edible-fruited vines. P. incarnata is reported to have 9 pairs of chromosomes (10, 25). The same basic chromosome complement was reported for at least 13 additional species and hybrids, all with tropical American origin. At least primary hybrids could be expected between each species and P. incarnata. To perform the actual crosses, however, would require manipulation of the plants to secure blooms at the same time. All of the species except those native to the eastern United States and possibly P. caerulea would require greenhouse protection throughout most of the United States. To the knowledge of the authors, pollen storage studies have not been reported.

Longwood Gardens at Kennett Square, Pennsylvania, has started a program to breed passionflowers for cold hardiness. Emphasis in this program is placed on crosses with the brilliant-flowered *P. coccinea* Aubl. and related species.

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Micro Condens Deni Scibert Longwood Gardens



Today's world tells us that smaller is better—smaller families, houses, and cars. There is nothing startling about this to the horticultural crowd for we discovered the joys of microgardens in glass containers a long time ago.

With our busy lives and apartment living, we may not have the opportunity for outdoor digging but we can create a mini-world of green in a terrarium for indoor pleasure with minimal maintenance. All you need is a bottle, fish-bowl, or even a hurricane lamp. Place a few pebbles in the bottom, cover with a rich soil, and plant your favorite miniatures.

These tiny settings need little care. With a lid they provide their own rain by condensation. My brothers made a bottle garden thirty years ago and it is still green and has never been watered. (This is a 20 gallon demi-john, planted with Pilea microphylla, Sansevieria species, a moss and Philodendron hastatum variegatum; the latter still in good health). If the bottle fogs up too much they just open the lid for a short time. Terrariums fare best in a bright light without direct sun.

Only your imagination limits what to plant in your terrarium. A jungle look appears with miniature ferns, gesneriads, begonias, and geraniums. Or try a fool-proof desert garden with baby cacti and succulents.

A fern led the way to this Victorian innovation in the plant world. An English physician, Dr. Nathaniel Bagshaw Ward, had a passion to grow ferns and mosses in his London garden. A century and a half ago he wrote in his book, On the Growth of Plants in Closely Glazed Cases, "Being, however, surrounded by numerous manufactories and enveloped in their smoke, my plants soon began to decline, and ultimately perished...."

In the summer of 1829, he buried a Sphinx caterpillar in leafmold to

pupate at the bottom of a glass jar which was tightly sealed with a lid. One day he found a sporeling fern and a blade of grass sprouting from the leafmold. He observed that in the heat of the day moisture rose from the mold, condensed on the glass, and then returned from where it came maintaining constant humidity.

The fern flourished untouched in the bottle for four years and died only when the lid rusted and water seeped into the jar. Dr. Ward concluded that the success of the fern growth was due to conditions free from soot, constant moisture, controlled heat, light, and a quiet atmosphere.

Hetookhis knowledge and applied it to growing other plants. He designed small glass boxes made in the shape of little greenhouses and began experimenting with growing methods. He found that all plants did well under these conditions.

In 1833, he filled two of his glazed glass boxes, which had become known as "Wardian cases", with ferns and grasses and sent them to Sydney, Australia, with his friend Captain Charles Mallard. The plants arrived six months later in perfect condition. The cases were refilled with rare and tender plants for the return trip to England. Although they were packed in temperatures of 100°, sailed around Cape Horn under a foot of snow at 20°, passed by Argentina at temperatures of 120°, they reached England eight months later in a healthy state.

This experiment revolutionized plant collecting and transporting which dramatically improved the world of horticulture.

Tea seeds were planted in "Wardian cases" by Robert Fortune and shipped in 1848 successfully for the first time from China to India to initiate a new economic culture. Cinchona trees, the only source of quinine, moved from South America

to India and Java to improve health in Asia. By way of Kew Gardens, rubber was sent to Ceylon, cork oaks to Australia, and tobacco to Natal.

During the Victorian era growing the elusive fern and other tropicals in little glass houses became a mania. Charles, sixth Duke of Devonshire, with money as no object, sent his collector with "Wardian cases" to Calcutta to bring back the first Amherstia nobilis, that superlative tree used as a floral sacrifice in its homeland.

In the 20th century, another gentleman took up the challenge. My father, George H. Pring, who was Superintendent of the Missouri Botanical Gardens in St. Louis, recalled in his youth at Kew Gardens packing "Wardian cases" of rubber plants. He decided to introduce this skill of the professional to the amateur gardener.

In the late 1920's, he planted a glass garden to accompany a lecture at the St. Louis Horticultural Society. He demonstrated how to plant these little gardens with "hills and valleys to represent a natural woodland landscape" stressing the importance of design and color in the use of plants. Among the list of plants he suggested, his favorite was the Cocos weddelliana which looks like a little coconut palm.

Mr. Pring challenged members to use their imagination in choosing containers. The idea took fire. The next month at their flower show, fifty competed for a special prize offered by the Botanical Garden. Every shape bottle, aquarium, even an old light bulb were used.

The Ladies Home Journal (Dec. 1931) asked Mr. Pring to write on his "Glass Gardens" and it was reprinted in Europe. The wave spread around the plant world.

Today we are experiencing a revival of this art. Terrariums suit our urban lives as a space saver—instant centerpiece—no care gardening.



LawnBasics

Dr. Robert W. Schery, Director THE LAWN INSTITUTE

The concept of a grassy sward to grace the home—the lawn-is a relatively recent horticultural innovation. Domesticated food plants have underwritten civilization since man first began his sedentary way of life millenia ago, and biodynamic plants (for ritual and medicine) were part of humankind's lore before the written word. Certainly by the middle ages non-essential plants, prized for beauty rather than utilitarianism, were widely appreciated. But only centuries later was a grass lawn, as distinct from animal pasture, paid much attention. When America began moving from the city to the suburbs after World War I, the die was cast; still, there was little understanding of lawn behavior. Rather, as with pastures and meadows before them, lawns were simply open spaces kept that way by mowing. The informed suburbanite might court the rose, the tulip, the iris and the peony, but "lawngrass" remained just anything that could withstand ceaseless decapitation by mowing. Many lawns were little else than crabgrass and prostrate Dicots.

So it is only recently—within the last two decades, for the most part, that lawn care has become something of a science, with cultivars chosen to fit the peculiar ecosystem that a lawn is. The change has been evolutionary, all but unnoticed as we scurry through a lifetime; but probably the "best" lawn on the block in my youth, would be a home owner embarrassment today.

Yet, with all the modern refinements, lawn basics are relatively few, principally: kind of grass, mowing, fertilization, and usually weed control. We have motorized our mowers, and learned that it is good for the grass not to clip it too closely; but we still must mow. We favor attractive cultivars as our lawn companions, and improve their chances by fertilizing with plant foods designed for fine turf rather than cropland. The experienced lawnsman uses a gradual-release fertilizer for steady growth, thus avoiding cyclical succulence conducive to disease, alternating with off-color "starvation." He knows the time of year when fertilizer will do the grass the most good and confer least advantage upon competing vegetation ("weeds"). He no longer digs out weeds by hand, having at the ready those marvelous selective herbicides

stemming from studies on plant growth hormones. One can't control all weeds in the lawn, yet, but we're coming close; broadleaf weeds like dandelion, plantain, dock; creepers such as chickweed, knotweed, spurge and ground ivy; annual grasses such as crabgrass, goosegrass and barnyardgrass; even nutsedge and rushes, are all safely discouraged in today's lawn. Perennial grasses of unwanted type, quite similar in their physiology to turfgrass, remain a problem; but even here there are tricks for favoring the turf over the weed.

Basic care receives many assists. Lawn spreaders make it easy to apply the product instantaneously. Irrigation keeps the lawn green during drought, though perhaps at the expense of encouraging water-loving weeds, and forgoing the disease therapy that dryness provides. Underground systems activated by a time clock reduce the burden of watering, but not the need for timing judgments. Machines that thin, thatch and punch holes in the soil (aerification) are commonplace today. Fungicides can prevent spread of disease if applied in time. Insecticides prevent bug devastation that can severely weaken turf; and aids such as wetting agents, chemical edgers, pH correctives, even growth restraints (not yet very practical), have found their way to the garden center shelves. Fortunately, not much in the way of extra assistance is needed if the basics are properly covered. So let's look at our basics in a bit more detail.

The Lawngrasses

"Breeders' Rights," protecting seeded cultivars as well as the traditional vegetative clones, became law in the United States in 1971. This triggered release of many new lawngrasses such as are found among acceptances by the Lawn Institute's Variety Review Board (boxed insert). Some selections are simply discovered in the "wild," but increasingly they are bred by the crossing of pedigreed bloodlines proven for such desiderata as low growth, disease resistance, attractiveness, and so on. Some of today's selections no doubt will be replaced by still better cultivars, but the state-of-the-art at present does provide many desirable candidates even if no "perfect" turfgrass. Blending several cultivars, or mixing species that have

like habits, broadens a lawn's genetic base and extends the turf's adaptibility. Kentucky bluegrass (Poa pratensis) provides most turf for the northern two-thirds of the nation and Canada, abetted by fine Fescues (Festuca rubra) for dry shade and poor soil, with up to 20% of the attractive (but competitive) new perennial ryegrasses (Lolium perenne) permissible for quick cover. Bentgrasses (Agrostis spp.) dominate in moist climates, such as the Pacific slopes of the Northwest. The elegant bents are non-pareil for golf greens everywhere. Turf-type perennial ryegrasses do well in equable climates, such as in middle latitudes along both coasts; and because of quick establishment they are much used for athletic fields that get chewed up in play, and for overseeding dormant southern grass in winter. In the South most improved grasses, especially the bermudagrasses (Cynodon spp.) and Zoysia, but also some St. Augustine (Stenotaphrum secundatum), are planted vegetatively because they do not come true from seed. Bahia (Paspalum notatun) and centipede (Eremochloa ophiuroides) seed is available, but not as select cultivars.

Establishing the Grass

Lawns can be started by sowing seed directly into the soil, or by laying sod (with which a pro has nursed the grass through its seedling stages for you). In either case seed of top quality, of grasses suited to the locality, should be insisted upon. Lawnseed should contain little other than the cultivars you specify, although there will always be a bit of "inert" (chaff and suchlike), fractional percentages of "weeds" (seldom serious), and perhaps some "crop" (often perennial field grasses, to be avoided). Reliably-grown sod contains no unwanted off-types, although a possible residuum of weed seeds in the soil will sprout should the grass thin and not keep them suppressed. Whether for a new seedling, or for the laying of sod, the soilbed should be properly prepared.

The best soilbeds are cultivated, fertilizer being mixed in according to need. If you are not familiar with your soil's condition, (does it grow thriving weeds?), a soil test will help tell what nutrients to provide. Adequate phosphorus (at least 30 lbs/A by soil test) is vital for seedling growth, though nitrogen will become more important

LAWNGRASS CULTIVARS ACCEPTED BY THE VARIETY REVIEW BOARD OF THE LAWN INSTITUTE

KENTUCKY BLUEGRASS—great on good soil and in open locations:

Adelphi — A dark green, diminutive hybrid from Rutgers. Aboretum—A durable selection for tall-mowed turf in the traditional mold.

Arista—An improved variety from Holland, mostly used in mixtures.

Baron—A workhorse from Holland, unassuming but strong and reliable.

Bonnieblue—One of the darkest green Rutgers hybrids, great in winter.

Cheri—A Swedish variety with virtues like Baron. Fylking—Low-growing and delightfully graceful for

elegant lawns.

Galaxy—Another decumbent Rutgers hybrid, with

lengthy season.

Glade—A dark, sturdy, low-growing selection good in shade or sun.

Majestic—A diminutive Rutgers hybrid making excellent sod.

Merion—Still the "Cadillac" of improved bluegrasses though not new.

Nugget—A dense, very attractive variety, from Alaska, good in shade.

Pennstar—Refined at Penn State from good European ancestry.

Plush—A broad-bladed selection from Rutgers, which seems widely adapted.

Prato—A compatible Dutch selection prized for mix-

Sodco—Four pedigreed lines from Purdue provide this low, dark stalwart.

Sydsport—A highly thought-of variety from Sweden, bold in texture.

Touchdown — Top-rating at Rutgers, tolerating leafspot and stripe smut.

PERENNIAL RYEGRASS—quick cover, "turf" varieties as attractive as bluegrass:

Compas—A Dutch selection, especially for mixtures and as a nursegrass.

Derby—A dark, dense polycross of excellent pedigree. Manhattan—The heralded synthetic from Central Park sources, low, dark, hardy.

NK-100—A cross between famed English S-23 and a domestic selection.

NK-200—An attractive domestic cultivar with exceptional winter hardiness.

Pelo—A reliable variety from Holland, moderately dark.

Pennfine — A top-rating Penn State cultivar, hardy and neat mowing.

Yorktown—An attractive Rutgers polycross with some Manhattan bloodlines.

FINE FESCUE—good for shade and poor soil, excellent bluegrass companion:

Highlight—A brilliant cultivar of the Chewings type, from Holland.

Jamestown—A low-growing, domestic Chewings, dark, holding up in summer.

Koket — Another Chewings fescue from Holland, giving top performance.

Ruby—A spreading fescue, fairly open and well-suited to mixtures.

BENTGRASS—adapted to humid climates; low, dense turfs "like a golf green":

Emerald—Topflight creeping bent from seed, inbred from famed Congressional.

Exeter — A colonial bent honed to perfection at Univ. of Rhode Island.

Highland—The incomparable "all-purpose" colonial ecotype from Oregon.

Holfior—Another highly uniform colonial selection from Europe.

Kingstown—An elegantly textured velvet bent, adapted to acid soils.





Top—The dense root & rhizome system of an improved cultivar (sod overturned & washed free of soil.) This is Majestic.

Bottom—The elegance of Creeping bentgrass. This is a sod section of Emerald (Smaragd in Europe), only 10 months from seeding.

later. Potassium is generally adequate, and using a complete fertilizer will keep levels up. Only under unusual circumstances are minor elements like iron deficient, such as on the highly alkaline soils of the western plains, or a few sandy ones of the southeastern coastal plain.

Fertilizer is evenly and easily distributed with a spreader. Follow recommendations on the fertilizer bag for rate, usually 5-10 pounds per thousand square feet (M) for average-strength fertilizers. Cultivate at least 2 or 3 inches deep to break up compaction. Sandy soils may need no more than a surface scratching, but loams and clays will probably require plowing-discing, or rotary tilling, at a dry enough stage so that they crumble nicely. Don't overcultivate; the best soilbeds consist of aggregates about as big as the tip of your finger. Seed settles into a medium of this type, but remains at the surface prone to loss if the soilbed is dusty fine.

Bluegrass mixtures are sown about 3 lbs/M, preferably with half the seed cast in one direction, the other half at right angles, to assure against coverage gaps. Here, again, a spreader makes light of a tedious job. Fluffy seedbeds may need some restoration of capillarity, but a soaking ordinarily settles soil sufficiently about the seed, and rolling would only recompact the surface making it less receptive to insoak. A mulch of clean straw, fragmented twigs, pine boughs, woven nettings, or similar loose covering, protects the surface from puddling and

wash, and prevents the seedbed from drying out so quickly. Warm, humid soil brings quick sprouting. Ryegrass germinates in only a few days, and other species not much later. But if weather remains cool, or the seedbed dry, seedlings may not show for weeks. Soak the seedbed, and keep it moist by subsequent syringings—daily if need be. As the seedlings root more deeply watering can taper off.

Lawn Mowing

Mowing descrives more forethought than it generally receives. No other lawn activity takes up so much of an attendant's time, ergo, the more comfortable the "fit", the lighter will seem the burden. Even if some extravagance may be involved, secure mowing equipment that: 1) has capacity enough to take care of the lawn quickly; most yards should be mowable in a half-hour without a lot of exertion, 2) is powerful enough to handle the grass at its season of most robust growth, usually Spring with northern species, Summer with southern ones, 3) is sturdy, reliable, and can be serviced locally (nothing is more frustrating than to be stalled by broken down equipment during the rush season). Pros and cons about mowing equipment can go on endlessly; a few of the considerations you may want to weigh are these:

Mowing will be facilitated if: 1) overhang (such as bulky wheels) is minimal, permitting closer approach to borders and structures; 2) blade speed is independent of forward motion, so that you can dawdle over toughto-mow turf though not sacrifice speed where the going is easy; 3) adjustment of mowing height is quick, simple, and covers a reasonable range (at least from 1-3 inches with rotary mowers); 4) weight and maneuverability are suited to the situation (maybe a big mower is needed for the main job, a light weight unit for "trimming"); 5) heavier units, such as the riding mowers, have flotation tires so as not to rut a soaked lawn; 6) a reverse gear allows backing away from corners; 7) design is good, such that the mower is easy to start, handy to use, and simple to fuel and lubricate.

Whether clippings are collected is a matter of preference. Clippings contribute rather little to thatch, since they are seldom ligneous and decay readily. Yet, at certain seasons they may be too abundant to settle obscurely into the turf; they become unsightly, then, as they turn brown. The mineral value of clippings is appreciable, probably equal to a couple of fertilizations during the year; nutrients recycled through clippings surely make some contribution to lawn fertility. Lawns mow better when dry than when damp; afternoon or evening mowing will generally find less dew on the grass.

Fertilizing The Lawn

A lawn fertilization program should consider the soil quality, climate and type of grass. Without some fertilization grass becomes less competitive, loses color and tends to thin, becoming weedy. Except on soils that are very

fertile, at least one or two well-timed feedings annually are in order, at the "normal" rate of about 1 pound of nitrogen (N)/M. Bermudagrass in the south, a few bluegrasses such as Merion, and creeping bentgrasses, are heavy feeders; they will probably require at least 4 pounds N/M annually. At the other extreme are centipedegrass and fine fescues, "poor soil" grasses, needing no more than a pound or so of N.

Northern lawns benefit most from fertilization in Autumn, a time of year when the grass accumulates food reserves and no longer suffers competition from Summer weeds. Southern grasses "enjoy" fertilization the growing season long, but too-heavy feeding in Summer makes mowing burdensome. Southern grasses hold their color later into Autumn if well fertilized, but in colder regions then become less Winter-hardy.

As noted earlier, "gradual-release" lawn fertilizers such as those incorporating ureaform have advantages, especially for warm weather and for sandy soils that hold nutrients poorly. Soluble fertilizers are best used lightly and more frequently.

Nitrogen is the nutrient responsible for leaf formation and color, and is the main consideration in choosing a fertilizer. But in most instances nutrient balance is best maintained with a complete fertilizer; one containing in addition to the nitrogen, the other major nutrients, phosphorus (P) and potassium (K). Phosphorus fixes in the soil, while potassium leaches somewhat, and nitrogen becomes quickly exhausted. Generally a lawn fertilizer rich in nitrogen, low in phosphorus, and intermediate in potassium best meets grass needs. (30-5-8 is a good ratio.)

Keeping Weeds Out

If the basics already covered are well attended to, weed problems should be few. The grass polices the lawn, suppressing those weeds that mowing does not eliminate. But a few globally ubiquitous weeds seem to get a foot in the door whenever the defense weakens. They are primarily warm-weather annuals such as crabgrass, knotweed and spurge; or rosette perennials such as dandelion and plantain. No soil seems entirely free from their seed. Chickweed and rosette crucifers may be trouble-some in cooler weather.

Fortunately, we have today highly effective, selective (i.e., kills the weed but not the grass) herbicides; hand digging or massive applications of soil "preventives" such as arsenic are largely a thing of the past. Herbicides used for lawns fall primarily into these categories: 1) broadleaf controls, 2) annual grass preventers, and 3) selective compounds for specific weeds. Non-selective herbicides have already been mentioned for lawn renovation; they include an array of materials ranging from soil sterilants (such as methyl bromide and metham) to comtact compounds (viz.—kerosene, paraquat, phytar, ami-

trol, dalapon, glyphosate, etc.). The first three contact materials are little taken up by the plant, but the latter three are systemic—i.e., the chemical translocates to distant unsprayed parts of the plant. Paraquat, phytar and glyphosate are quickly immobilized by the soil, while others may be toxic to a new seeding for days or even months. Their breakdown and dissipation is quickest in warm, humid weather.

The summarization which follows has northern lawns chiefly in mind. Weed control in the South is complicated by great diversity in the weed population, and by the intensified biological tempo of a subtropical environment.

The phenoxy chemicals (2, 4-D group) have proven outstanding for controlling broadleaf species (Dicotyledons), the more discordant weeds of turf. MCPP, silvex, and dicamba are often mixed with 2, 4-D to broaden its effectiveness. About 1 lb./A of phenoxy herbicide will cause most broadleafs to weaken and die, without injury to most grasses. Proper combinations of the chemicals mentioned are synergistic, becoming more effective at lighter rates than when used individually. Silves-2, 4-D, and MCPP-dicamba-2, 4-D (the patented Trimec formulation) control weeds that are notoriously hard to handle. Trimec works even in cool weather when 2, 4-D is not very effective. Thus broadleaf weeds such as dandelion, plantain, dock, ground-ivy and chickweed are really no longer serious problems, thanks to the phenoxy herbicides.

Crabgrass no longer strikes terror, thanks to improved lawn culture and chemical preventers. The preventers (i.e. bensulide, DCPA, siduron, etc.) kill the seedlings of annual grasses as the seed sprouts, without injury to growing turfgrass. They are spread on sunny sections of lawn having a history of crabgrass, early in spring before the pest germinates (typically when soil warms above 60°F). They are effective for a number of weeks. Siduron, though controlling crabgrass, does not hinder many other species, and is the only preventer that can be used at the same time lawnseed is sown (but never use sideron on bermudagrass).

Other chemicals have specific uses. Organic arsenicals (arsonates) kill older crabgrass when sprayed a couple of times to the foliage. It is also useful for nutsedge control, although a new chemical, basagran, may soon usurp this role. Dalapron and glyphosate are helpful against perennial grass weeds, although, like paraquat and phytar, they kill any turfgrass contacted, too. Reseeding or sodding must follow. Incidentally, activated-charcoal products are becoming available, which can "turn off" most herbicides if applied soon after a mistaken application.

Discussion here is unavoidably abbreviated, but Dr. Schery's views are more fully developed in the book *A Perfect Lawn*, (Macmillan).

Ruth Katzenberger 197-04 58 Avenue Flushing, New York 11365

New is not necessarily better. Newness has been brought to its zenith by commercial interests to feed the mania of African-violet growers. The result is a miriad of look alike plants having different names with no particular merit or advancement in the Saintpaulia genus

Unfortunately these same interests are perpetrating the same offenses on the genera Episcia, Columnea and the miniature Sinningias all in the pursuit of something new. It is a short sighted view of a wonderful family of plants, the Gesneriaceae. With 120-125 genera there is no need to glut the marketplace with hybrids that offer the grower so little. The discerning will limit their collections to the best and ignore the rest.

The best new plant material comes to us through the introduction into cultivation of species from the wild, and the early hybridizing done with them. Often intergeneric hybrids offer outstanding new materials. There is one such intergeneric hybrid soon to be released by Lyndon Lyon of Dolgeville, N.Y. He will be selling a hybrid of Seemannia latifolia by Gloxinia gymnostoma. At the moment a correct intergeneric name is holding up the release. It will be worth watching for. Plant habit is like Seemannia with a flower color of cherry red.

Hans Wiehler, of the Marie Selby Botanic Gardens in Sarasota, Florida,



Gloxinia, a familiar Gesneriad.

has collected many new species recently which will find their way into the marketplace. Some have already reached the collectors and hybridizers. We should soon see a flow of lovely gesneriads from these sources. Armyn Spies collected a yellow flowering Aeschynanthus in New Guinea which is in the process of being studied and used in hybrid-

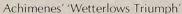
Available right now are a few prizes worth mentioning. To top the list are two miniatures; the species Codonanthe carnosa and a hybrid Streptocarpus using the charming S. cvanandrus.

The C. carnosa is a small basket plant with tiny succulent leaves hanging on graceful pendulant stems. The tiny creamy wax-like flower resembles a small pealing bell. There is rarely a large number of flowers open at one time but it flowers continually once maturity is reached. Codonanthe forms berries and C. carnosa forms bright orange berries smaller than a pea. It is easy of culture asking only not to be allowed to dry out in spite of its succulent tendencies.

The miniature Streptocarpus hybrid is nearly unifoliate as the second leaf is only a vestige. The small strap leaf produces scapes along the midrib each having as many as seven lilac colored flowers with a throat of dark stripes. The species parent, S. cyanandrus, is temperamental in cultivation and is an annual requiring the collecting of seed before the plant dies. The hybrid has not died after flowering but is continuing to grow and flower. Most important cultural requirements are high humidity. It can be allowed to dry out. Experience has found they do well in continually moist longgrained sphagnum moss which is constantly fed. This is not the only way they can be grown for they will also do well in any loose highly organic growing medium that is well fertilized.

For a new standard sized Streptocarpus there is the 'Maasen's White' 35







Aeschynanthus elliptious

to rival the 'Constant Nymph' introduced several years ago. The stark whiteness of the flower is broken only by the sunny yellow tinge in the tube of the corolla. 'Maasen's White' flowers freely and continuously if given sufficient light.

Those people who like challenging larger shrubs should look into Drymonia striggosa. D. striggosa cuts back severely to a trunk showing eyes and comes up again more bushy and beautiful than before. The long petioled medium green leaves have a glistening pubescense. Axillary flowers occur either solitary or in clusters. The funnel-shaped lemon yellow corolla emerges from a fancy frilled pink calyx which opens wide. The flowers readily form an oblong berry beginning white and turning orange upon maturity. Drymonia stenophylla has been in cultivation for several years and is a good shrub companion although not as colorful. The flowers are creamy yellow and the calyx while fluted is a tannish color. Drymonias are thirsty.

William Saylor of Brewster, Mass. has been producing some fine hy-

brids of Nemathanthus over the last few years. Due to his work the genus Hypocyrta has been eliminated and these plants are all now known as Nemathanthus (thread flower). His early hybrids, N. 'Black Magic' and N. 'Tropicana' have been steady favorites among the blue ribbon winners. 'Black Magic' refers to the dark glossy foliage on small woody stems with flowers hanging from deep red threads. 'Tropicana' has small pouched flowers with stripes. Further work has produced newer forms showing improvement in the plant habit. His new hybrids now released are N. 'Bijou' and N. 'Cheerio'

Columnea tricolor is a sport of the small leaved *C. microphylla*. It has variegated foliage showing green, white and pink on the new growth. This makes an interesting basket even without flowers. To get the red blossoms it will be necessary to give it the chill treatment down to at least 50° to set buds.

Achimenes are always popular. There is a new one small enough to become a windowsill favorite. It might even be used in a terrarium

because it is smaller and prettier than most. Achimenes andrieuxii cv. tincocama has tiny lilac flowers emerging from the axils of bright red hairy stems. Several rhizomes in a three inch pot present a diminutive hanging basket of rare beauty.

To locate the gesneriads mentioned it will be necessary to order from the specialists in this family. The miniature *Streptocarpus* hybrid and the new *Seemannia* cross are products of the Lyndon Lyons Green-Houses, 14 Mutchler Street, Dolgeville, N.Y. 13329. All the others can be purchased from Michael Kartuz, 92 Chestnut Street, Wilmington, Mass. 01887 and from Easterbrook Greenhouses, 10 Craig Street, Butler, Ohio 44822.

To enjoy the exotic and varied family of Gesneriaceae it would help to join the *American Gloxinia* and Gesneriad Society and receive their bi-monthly publication. The annual dues of \$7.00 should be sent to: Mrs. Charlotte Rowe, Dept. RK, Box 174, New Milford, Conn. 06776.

My Favorite Plant AlöeVera

Gayle Gates Phoenix, Arizona



To most people, the word desert brings to mind a wasteland of sand—scorched by the sun and wind, waterless and void of shelter. These factors create enormous problems to anything trying live there. Plants that grow in temperate climates could never survive these harsh conditions. Still, there are a great variety of species that have developed the ability to thrive in the desert. This harsh setting is the home of an unusual plant called *Aloe Vera*.

It seems fitting that the word desert comes from a latin word meaning 'abandoned'—because that's exactly how I found my Aloe Vera, abandoned in an alley.

After many seasons of unsuccessful attempts to grow even hardy annuals in a desert setting, I was overwhelmed when I literally laid these plants in my desert garden intending later to plant them properly. However, a sudden onset of bad weather and busy activities kept me from my good intentions. Therefore, you can imagine my pleasure and surprise when I happened to notice flower buds swelling among the foliage and thorns. Where all else had failed, this plant was growing successfully. I was determined to find out why it would thrive, blossom and become one of my most spectacular plants.

After consulting several texts and horticulturists, I found that my plant fell in a category called, "drought resisting succulents." Nearly everything about the *Aloe* is designed to help it survive the desert terrain.

First, it is capable of storing up large quantities of water in its pulpy leaves during wet periods while gradually shrinking during dry spells, living on its stored water.

Second, it has a web of wide ranging roots that fan out close to the surface where 97% of the moisture in desert gardens remain.

Last, its leaves are edged with thorns; a primary defense against animals that would eat the pulpy leaves, thereby depriving the plant of its stored water source.

Primarily a South African plant, it is just one of over 200 different *Aloe* species ranging in height from an eighteen-foot tree to dwarfs—3 to 4 inches high.

Culturally, the *Aloe Vera* for centuries has been used for medicinal purposes. The leaves when broken, emit a jelly substance capable of killing pain. More recently, doctors are using this substance to aid in the healing of severe burn cases. Experiments are also being carried out in the cosmetic field where it is used as a conditioning agent in makeups and shampoos.

Aloe Vera's base foliage forms a rosette that remains a lovely jade green in frost-free areas. Where winters are cooler the tips of the leaves will turn a coral color. The bud spikes spring from the center of the foliage and rapidly grow to a height of 24 to 36 inches with the flower heads branching out in a "bottle brush" manner.

The Aloe Vera blooms off and on throughout the 12 months with the blossoms bursting into a myriad of tiny orange trumpets that last for weeks. The flowers become favorite haunts for humming birds.

For propagation, all you have to do is snap off the new offsets that grow abundantly near the base of the plant and place them in moist potting soil. Remember to wear gloves and avoid the thorns.

After the new plants have set up a good root system, reduce watering. When the offset succulents are ready to be transplanted, place them in rapidly draining soil containing sizable amounts of sand and pebbles. Fertilize once a year with a light solution and don't expose the new plants to direct sunlight for about a month.

The Aloe Vera, my mystery plant, turned out to be fascinating and spectacular. This succulent gives both beauty and pleasure. Just remember not to "rub it the wrong way."

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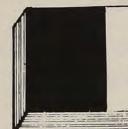
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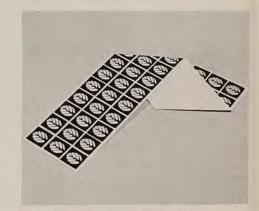
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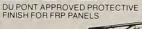
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