The NATIONAL HORTICULTURAL MAGAZINE

JANUARY - - - 1928

The American Horticultural Society

A Union of The National Horticultural Society and The American Horticultural Society, at Washington, D. C. Devoted to the popularizing of all phases of Horticulture: Ornamental Gardening, including Landscape Gardening and Amateur Flower Gardening; Professional Flower Gardening or Floriculture; Vegetable Gardening; Fruit Growing and all activities allied with Horticulture.

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Entered as second-class matter March 22, 1927, at the Post Office at Washington, D. C., under the Act of August 24, 1912.

The National Horticultural Magazine

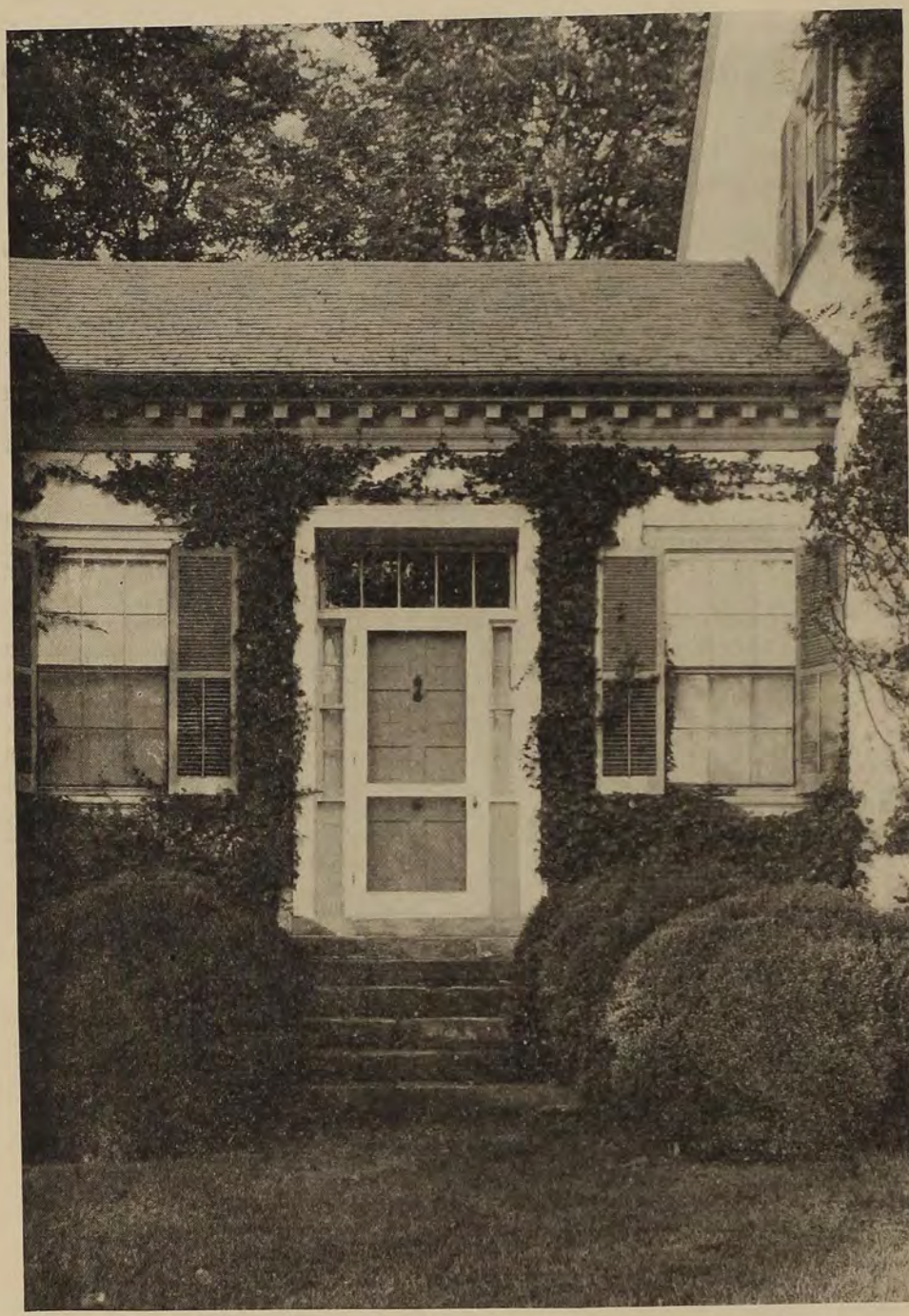
B. Y. Morrison, *Editor*

Sherman R. Duffy, J. Marion Shull, Hamilton Traub, *Contributing Editors*

JANUARY, 1928.

Beginning in this issue, the magazine will carry advertisements of interest to all gardeners. Doubtless it is unnecessary to comment further, but it is expected that members will support the advertisers who are supporting the magazine by their patronage. This is an arrangement for mutual profit and benefit and should not be overlooked. In each issue there will be others we hope and as they come in, new pages will be added to the issue so that the bulk of reading matter will not be decreased but added to by the valuable advertising sections.

Published quarterly by The American Horticultural Society, Washington, D. C. Editorial Office, 116 Chestnut Street, Takoma Park, D. C. Advertising Manager, Margaret C. Lancaster, 6615 Harlan Place, Takoma Park, D. C. A subscription to the magazine is included in the annual dues of all members; to non-members the price is seventy-five cents the copy, three dollars the year.



Lilian A. Guernsey

The Beauty of Formal Balance in Planting

Barberry Species That Spread Stem Rust

By Lynn D. Hutton

Barberries are among the foremost favorites in our ornamental shrubs. They possess many virtues, among them adaptability, beauty of habit, and a great variety of forms. Some are deciduous, some partly so, and others completely evergreen. Many kinds are tall and erect and are valuable as hedge plants; others are low and gracefully spreading and are suitable as a low foreground for higher ornamentals; still others are ground creepers, and are ideal for use as a low dense cover. Most barberries seem to thrive equally well in moderately acid, neutral, and alkaline soils. It is small wonder, therefore, that plant lovers frequently choose members of the Berberis genus as their ornamentals.

Unfortunately this popular genus contains several species which are harmful to other plants of great economic value—the small grains. These species are the only known alternate hosts of black stem rust, the most destructive disease of wheat, oats, barley, and rye in the United States. This disease destroys millions of bushels of grain in the United States each year. For the 12-year period, from 1915 to 1926, inclusive, the estimated losses of all small-grains totaled 564,586,000 bushels in the 13 North-central States of Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin and Wyoming. Small-grain growing has been abandoned in many districts because of stem-rust losses. For this reason these particular species have been condemned, both by law and public opinion, in important small-grain areas.

There is considerable misunderstanding as to the actual relation of these Berberis species to stem rust and as to what species are harmful. The relation of certain barberries to the spread of black stem rust was suspected for centuries but never fully proved until 1865. In that year Anton de Bary, a German scientist, produced stem-rust infection on small grains by placing on their leaves the rust found on the leaves of the common barberry. Here at last was the scientific explanation of the "blasting" of wheat and other small grains near barberries which farmers had noticed for more than 200 years. De Bary's explanation of this phenomenon aroused the interest of other scientists so that innumerable laboratory and field experiments have been made, each proving conclusively that on certain barberries, and on them alone, one of the stages in the life cycle of stem rust may be produced.

There are four stages in the life cycle of stem rust. These are (1) the yellow, cluster-cup or spring stage which develops only on the barberry bush, (2) the red, or summer stage which develops only on grains and grasses, (3) the black, or winter stage which follows the summer stage on grains and grasses, and (4) the colorless, or early-spring stage which develops in the early spring from germinating black winter spores.

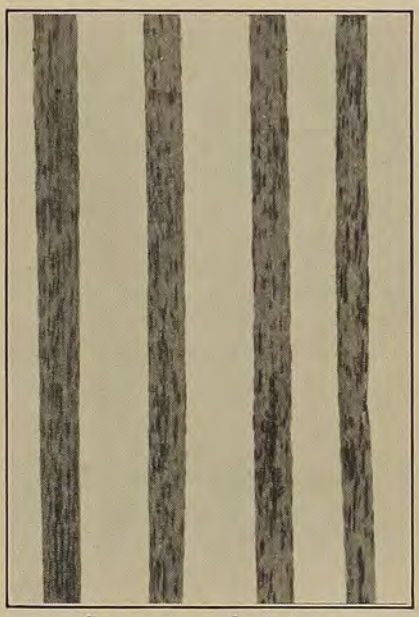
When one of the tiny colorless spores (sporidia) of stage 4 infects a susceptible barberry, the rust fungus produces yellow spores on the leaves, young twigs, or fruit of the barberry in the early spring. These spores are produced in groups of little yellow

Stem rust on leaves of the common barberry

cups. Each little cup contains thousands of tiny yellow spores which are shot out of the cup and are scattered by the wind to grains and grasses. These spores germinate on grains and grasses and each sends a tiny tube into a breathing pore of the new host plant. In a few days pustules of red spores begin to form beneath the epidermis of these plants. Within two or three weeks the development of these pustules ruptures the epidermis and the red spores are liberated. Each pustule contains thousands of tiny red spores. These red spores can infect only grains and grasses. The production of these spores and the spread of rust may continue throughout the growing season.

As the grain ripens the rust fungus produces the black or winter spores, both in the pustules with the red spores and in new pustules. These black spores appear mainly on the stems and sheaths of the grain and grass plants. It is in this, the black stage, that the rust lives through the winter. These spores do not germinate until early spring. At the first signs of spring these black spores germinate and produce tiny colorless spores (sporidia) on thick, jointed hyphae. These colorless spores can infect only certain species of barberries. In the North-central States of our grain-growing area each of these stages absolutely is dependent upon the stage preceding it. If any stage fails to develop, the cycle is broken and the rust of one year can not be carried over to the small-grain crops of the following year.

Of the species of Berberis now to be found in the United States, some are very susceptible and others are very resistant to stem rust. Still other species have varying degrees of resistance. The common or European barberry, *Berberis vulgaris* L., is the most widespread and abundant of the susceptible cultivated species. Some other members of the genus, especially *B. amurensis*, *B. sinensis*, *B. canadensis* (native in Eastern U. S.), *B. fendleri*



Stem rust on wheat stems.

(native in the Rocky Mountains), and *B.* (*Mahonia*) *aquifolium* are widespread in the United States and are growing in such numbers that their presence in grain-growing areas is a menace to the crops and a danger as a source from which seeds may be carried into grain-growing regions. The transportation of these and other rust-susceptible species into the 13 small-grain States of Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin and Wyoming is prohibited by Federal Quarantine No. 38. The following is a list of barberries included under this Federal Quarantine:

"*Berberis aethensis, altaica, amurensis, aristata, asiatica, atropurpurea, brachybotrys, brevipaniculata, buxifolia, canadensis, caroliniana* (*carolina*), *coriaria, cretica, declinatum, fendleri, fischeri, fremontii, heteropoda, ilicifolia, integerrima, laciflora, lycium, macrophylla, neapalensis, neubertii, siberica, sieboldii, sinensis, trifoliolata, umbellata, vulgaris* including its subspecies and horticultural varieties; *Mahonia aquifolium, diversifolia, glauca.*"

Each of these 13 States also has passed a law requiring the eradication of these harmful species and they are being removed in a systematic campaign which is being carried on by the U. S. Department of Agriculture in cooperation with these States. The removal is being accomplished by actual surveys of every city property and farm in these States. Eradication is effected by the application of salt or kerosene. To date over 15,000,000 harmful barberry bushes have been found and destroyed from this area. Millions undoubtedly still remain.

The Japanese barberry, *Berberis thunbergii* DC., is the most commonly grown of the resistant species. Its propagation and transportation into grain-growing areas is permitted and its use is recommended. This little bush should meet with the fullest approval of all who desire a beautiful ornamental or low hedge plant. It is the favorite of all the deciduous forms of barberry because in the fall its leaves turn red instead of a dead brown or yellow. Its red berries, which remain on the plant well into the winter, give a touch of color to the landscape

when other bushes are dead and barren. Other important members of the genus which have proven resistant to preliminary inoculations of stem rust are: *Berberis aggregata, B. gagnepaini, B. julianae, B. sargentiana, B. verruculosa, B. wilsonae*; *Mahonia japonica, M. pinnata, M. repens.*

Among these are some of the choicest of the evergreen species.

The United States Department of Agriculture and the 13 States in which the barberry eradication campaign is being carried on need the aid of every citizen in ridding these States of rust-susceptible barberries. Horticulturists, because of their more intimate knowledge of the barberry species, are urged especially to cooperate in preventing the shipment of harmful barberries into these States as well as in reporting known locations of harmful barberries. The successful completion of this campaign depends upon complete eradication of every rust-spreading barberry from these States.

Michael Carron

Berberis vernae

This shrub, which is noted on page 33, is growing in mature beauty on Bussey Hill in The Arnold Arboretum, where the present illustration was taken. The small shrubs in the foreground are *Berberis verruculosa,* one of the most beautiful of the evergreen species. The latter is reported to grow to a height of four feet, but most of the plants here are too young to show more than their spreading habit with close set small leaves, shining green with whitish undersurfaces. The berries, like most of the evergreen sorts, are dark blue with some whitish bloom, and do not make the show of the red berried deciduous species. The splendid foliage more than makes up for this.

Agnes Chase

Uniola with Rugosa Roses

Native Ornamental Grasses

By Agnes Chase.

When one speaks of ornamental grasses a mental picture arises of a great clump of eulalia (*Miscanthus sinensis*) like a spouting volcano in the middle of a lawn, or of rather unsightly tussocks of ribbon grass (*Phalaris arundinacea picta*), or at best of fountain grass (*Pennisetum ruppelii*) with its faintly rosy panicles, surrounding circular beds of cannas in city parks. Giant reed (*Arundo Donax*) and pampasgrass (*Cortaderia argentea*) are also commonly grown in great clumps in our parks. None of these, except *Pennisetum ruppelii*, approaches in grace and beauty a large number of our native grasses.

For a bold clump in the open, our perennial Indian grass (*Sorghastrum nutans*) with its stately stems 4 to 5 feet high would be far handsomer than eulalia. It is not so coarse, the clumps are not a dense mass but more open and graceful. The long tapering upright golden-bronze panicles appear in early September and last about a month, turning russet toward maturity. This grass is widespread, from the northern Atlantic States to the foothills of the Rockies. In a garden or park it would be effective toward the back of a perennial border or at the margin of shrubbery, at a corner or sharp curve. This grass does not make rapid growth early in the season, being only about 3 feet high in early August, hence is better adapted to borders or corners than to use in open lawns.

Another native species for borders in such places as ribbon grass is used is wild-rye (*Elymus canadensis*). This is also widespread and hardy from the Atlantic nearly to the Rockies. The stems stand about three feet high and from July to September bear nodding heads 5 or 6 inches long, with long slender curving bristles. The leaves are about half an inch wide, long and graceful.

Purpletop (*Triodia flava*) with very smooth foliage and handsome large drooping purple panicles, blooming during August and September, is found from southern New England to Missouri and southward. It can be used in a sterile bit of soil where other plants do not thrive. It is particularly charming back of Michaelmas-daisies and our other native asters.

The most beautiful of our native grasses is broadleaf uniola (*Uniola latifolia*). It grows in low woods from Pennsylvania to eastern Kansas and southward, but is not nearly so common as the species mentioned above. Though a woodland grass it flourishes in open sunlight. Some ten years ago I brought a clump from near the Potomac and set it in my garden. It has thrived without any care at all and has furnished clumps for neighbors and friends. Its graceful stems, three to four feet tall, broad spreading leaves, and drooping panicles of large very flat spikelets, are charming in a perennial border or at the margin of shrubbery. The plant is also effective in shaded ground under trees or tall shrubs. The panicles appear in early August and last fully two months. A single stem with its graceful panicle or a few in a slender vase, or a greater number arranged in a standard in a broad flat bowl, are very decorative in the house.

For those fortunate enough to have wooded slopes or a bit of rich woods there are several elegant native grasses besides uniola. In the Northern States *Milium effusum*, with tall slender pale stems, broad leaves, and graceful delicate panicles of small whitish spikelets, would add beauty to shaded ground.

Our native woodland bromegrasses (*Bromus ciliatus* and close relatives) are found throughout the Northern States, and southward. They grow in small tufts, the slender stems four to six feet tall, with graceful foliage and drooping panicles of long spikelets.

Woodreed (*Cinna arundinacea*) is found in moist spots in about the same area. It is less slender than the bromes and has a large nodding rather dense grayish green panicle of small spikelets. It would make itself at home along a rivulet or drain or where *Iris pseudacorus* thrives. *Elymus striatus*, one of the wild-rye grasses, growing on banks above streams, with drooping pale heads of spikelets with delicate curving bristles, would thrive in the same situations.

Bottlebrush grass (*Hystrix patula*) is already cultivated to some extent, but deserves wider use. On an open wooded slope a colony of Hystrix with its slender gray stems, spreading leaves, and swaying heads of horizontally spreading long-awned spikelets, suggests a dance of the nymphs.

Any of the broad-leaved panic-grasses (*Panicum clandestinum, P. latifolium, P. Boscii*) produce good foliage effects in perennial borders. In spring and early summer these have simple stems two to three feet tall and small panicles of little round spikelets. In midsummer the stems begin to branch, the upper joints fall away, the branches multiply and by September the effect is that of a minature shrubby bamboo, quite Japanese in effect. They are picturesque beside a flight of two or three steps or at the end of a path. These grasses have the peculiar habit of producing close-fertilized seeds which remain inclosed in the sheaths. The chickadees feast on the seeds in winter.

All the grasses mentioned above can be easily transplanted from woods or prairies. The clumps should be dug with a little ball of earth after they have bloomed, and the tops cut back to not more than a foot high.

The use of small plants grown in pots for the ease of transplanting should be encouraged. Plants so treated are of course more expensive than field grown stock, but often are more reliable.

Michael Carron

The Broadleaf Uniola

Economic Factors in the Development of American Horticulture

By Hamilton Traub

At the opening of the Nineteenth Century, the great majority of the American people still derived their support from the agriculture, over 96 per cent of the people resided in rural districts and in towns of less than 8,000 inhabitants.[1] The means of transportation were backward, and this spelled isolation and independence for the major part of the population. It is true that by 1800, a number of turnpikes and canals of local importance had been constructed in New England and the Middle Atlantic States which "offered a much better and even cheaper means of transportation than the poor roads which they supplanted, but they could not solve the transportation problem over long distances." The greater proportion of the inhabitants living in the rural districts and especially those living on the Western frontier, were unaffected by early improvements. Under the circumstances the wants of the farming population, far from markets, were necessarily simple, and part of the staple food products consumed on the farm, including the more common horticultural products, were produced as incidental to the general farming operations. As a rule every farm had its vegetable garden,[2] and in many cases home orchards were also planted.[3] Even under these conditions, the esthetic appreciation in man was not wholly submerged and elementary attempts in floriculture and ornamental horticulture were met with. A few rose bushes and other old-time favorites were all that the busy pioneer had time to plant. The produce from the farm vegetable gardens and orchards were grown primarily for the home needs, but in many cases there was a limited surplus, especially of orchard products. The apple was the typical orchard product of the North,[4] while the peach was characteristic of farther south,[5] Under pioneer conditions, any domestic and foreign commerce in the bulky and perishable products of horticulture was carried on under considerable difficulties, excepting in and near larger cities, where a considerable trade in such products, including the apple, the peach and derived products,[6] the strawberry, garden vegetables and flowers had arisen.

During the century and three quarters of "Colonial settlement had occurred all the changes from the trading station, the fishing settlement, and the frontier post to the conservative seaboard town of old traditions and the thriving countryside already distressed with a surplus population." It is only natural, therefore, that the horticultural industries received their first stimulus in and near the population centers while the development in the isolated rural districts lagged.

[1]U. S. Census Bureau, A Century of Population Growth, p. 14.

[2]Report of the U. S. Commissioner of Patents, 1848, p. 723; J. G. Boyle, Vegetable Gardening, p. 23. "The farm garden in America dates back to Colonial days. As soon as the first homes were located, garden seeds brought from the mother country were planted. * * * In times past, when farmers were isolated and independent, the vegetable garden was a recognized institution, and the care and attention it deserved were usually given it."

[3]S. A. Beach, Apples of New York, p. 7; W. D. Haley, Harpers Mag. 43: 830–836 (1871).

[4]S. A. Beach, Apples of New York, pp. 9–10.

[5]H. P. Gould, Peach Growing (1918), p. 11.

[6]Dried apples, cider, apple brandy, peach brandy, and apple vinegar.

New York, the leading seaport and metropolis[7] took the lead in the domestic commerce in apple and apple products.[8] Foreign commerce in apples "with the West Indies probably developed early in the Eighteenth Century, though we have no records of shipments till 1741, when it is stated apples were exported from New England to the West Indies in considerable abundance. No transatlantic shipment has been disclosed earlier than that of a package of Newtown Pippins of the crop of 1758 sent to Benjamin Franklin while in London. The sight and taste of these brought to John Bartram of Philadelphia an order for grafts of the variety from Franklin's friend, Collinson, who said of the fruit he ate: 'What comes from you are delicious fruit—if our sun will ripen them to such perfection.' Subsequently a considerable trade must have resulted, for in 1775 it was stated by the younger Collinson, that while the English apple crop had failed that year, American apples had been found an admirable substitute, some of the merchants having imported great quanties of them * * * Statistics on the subject are lacking until 1821, when the total export of fruit included in the treasury statement consisted of 68,443 (barrels) of apples, valued at $39,966."[9]

Beginning during the first decade of the Nineteenth Century, peach orchards of considerable size were planted in various parts of the country, but "The first large peach orchard in Maryland appears to have been planted by James Robinson about the year 1800 * * * in Anne Arundel County some 20 miles south of Baltimore * * * This orchard consisted of 18,000 to 20,000 trees, all of which were seedlings. Those were the days of peach brandy, and the entire product of this orchard is said to have been used in making this commodity."[10]

Prior to 1800 only wild strawberries had been marketed in the larger towns, but during the early years of the Nineteenth Century the cultivation of the strawberry for market was undertaken on a small scale. By 1812, strawberries "in very limited quantities" were marketed in the four largest towns—Boston, New York, Philadelphia and Baltimore.[11] The strawberries marketed in New York during the three weeks of the strawberry season were "carried to market in wagons" or were "brought across the river in sailing sloops as often as twice a week, when wind and tide permitted."[12]

At the beginning of the period under discussion, commercial orcharding and small fruit culture, near the larger cities, had assumed some importance as distinct from agriculture. The considerable commercial development in the culture of vegetables or flowers followed at a somewhat later date. With the growth in population in the larger cities, the forcing of vegetables and flowers for market became of importance in 1825, Philadelphia taking the lead as a market for plants, flowers and vegetable products, and Boston, New York, Baltimore, Washington and Charleston following.[13]

The first considerable progress, therefore, in the horticultural industries took place in the vicinity of the larger

[7]New York, Philadelphia and Boston were leaders in population; Boston, from its foundation in 1630 until 1750; Philadelphia and suburbs then took the lead, which it retained until it was surpassed by New York in 1810.

[8]S. A. Beach, Apples of New York, p. 11.

[9]Taylor, U. S. D. A. Year Book, 1897, p. 308.

[10]H. P. Gould, Peach-growing, p. 11.

[11]S. W. Fletcher, Strawberry Industry in North America, p. 12, 67.

[12]Ibid., pp. 13–14; p. 27.

[13]B. T. Galloway, U. S. D. A. Year Book, 1899, pp. 575–590.

J. G. Boyle, Vegetable Gardening, p. 23. "Commercial gardening (in America) had its beginning * * * when the inhabitants began to collect in towns and cities. Growing vegetables for profit began in the districts adjacent to New York City, Boston and Philadelphia. As the population of the cities increased and the demand for vegetables enlarged, more and more capital was invested in commercial vegetable growing."

urban centers in response to a demand for horticultural products created by the growing population. The development, as far as the country as a whole was concerned, was on a limited scale since less than 4 per cent of the population in 1800 resided in the larger towns. The great mass of the population was situated remote from markets. The bulky and relatively perishable horticultural products in remote districts were produced primarily for home consumption, but in some cases there was a limited surplus. In the case of the apple and the peach, such portions as had not been consumed in the home, were fed to the stock, which could be driven to market on the hoof, or made into applejack, peach brandy and other derived products. In these modified forms the surplus fruit eventually entered the channels of trade much as the grain of the mountaineer and backwoods farmer was converted into whiskey to solve the transportation problem. In the case of certain peach orchards in Maryland, the product was sent to market in sailboats and larger wagons,[14] but in most interior districts such means of transportation were not available. According to S. A. Beach,—"a great diversity of varieties of grafted fruit was usually included in this class of orchards (of early settlers),[15] because the object was to furnish the home with fruit from the first of the season through the autumn, winter and spring, and even till early summer. Transportation facilities being crude, there was little encouragement for shipping apples to distant markets. When the farmer went to town he would often take with him a few bushels of apples, to offer in trade for articles which he wished to purchase. The other ways of disposing of surplus apples were in the manufacture of cider, boiled cider, and vinegar, or in drying the fruit."[16] William H. Alderman, in recounting the early horticultural history of West Virginia, cites, among other typical cases, that of an intrepid pioneer, who "undismayed by danger or hardship went to work and cleared and planted fifty acres of apples and peaches * * * his crop (being) devoted to the manufacture of fruit brandies."[17]

Excepting in the case of the marketing of limited quantities of derived fruit products, no commercial development in the horticultural industries, in districts remote from markets, had taken place by the opening of the Nineteenth Century. In predominantly agricultural communities no great demand for the staple food products of agriculture or horticulture existed. The farm was, therefore, in a measure a self-sufficing unit as far as horticultural products were concerned. Since 96 per cent of the population of the country resided in the rural districts or smaller towns, any considerable commercial development of the horticultural industries in the future would be dependent upon the creation of a greater demand for such products in the urban centers and the development of adequate transportation facilities as the minimum prerequisites.

In the present chapter it is not our purpose to construct merely a chronology, but rather to single out the economic factors involved in the development of American horticulture. The key to the situation will, therefore, be sought in an analysis of the general economic tendencies of the period. Any great extension in com-

[14]U. P. Hedrick, et al., Peaches of New York, p. 99.

[15]S. A. Beach, refers to the orchards of New York, but his statement is open to question; seedling trees were the general rule among the early settlers.

[16]S. A. Beach, Apples of New York, Vol. I, p. 10. Ibid., pp. 10–11. In drying fruit "the kitchen stove was usually surrounded with festoons of quartered fruit which had been patiently strung on tow strings, or the prepared fruit was spread on racks above or on papers beneath the stove."

[17]Semi-centennial History of West Virginia (1913) by James Morton Callahan (editor), p. 343.

mercial horticulture, under the conditions, is bound up with the gradual growth of a non-agricultural consuming population in the industrial centers. This leads naturally to a consideration of the factors involved in such a consummation.

Peopled by an energetic race, and blessed with rich natural heritages, the United States experienced a progressive economic development during the entire period. The initial industries during the Colonial period had been necessarily largely extractive, and the colonists looked largely to the mother country for manufactures that were not made in the home. With the westward expansion of the American people in the Nineteenth Century, and the gradual improvement of the means of transportation, the interests of the people after 1820 were being concentrated more and more upon internal commerce. The period of turnpike building was followed up during the first two decades of the Nineteenth Century (1800–1820) and in addition steamboat transportation was gradually introduced on the Hudson, Ohio and Mississippi rivers. During the next two decades (1820–1840), the construction of extensive canal routes was undertaken. The most noteworthy achievement in canal construction was the Erie Canal which afforded a better and cheaper means of communication between the East and the West. During the same period (1820–1840) about 1500 miles of railroad were constructed in the East. Railroad construction after 1837 lagged until 1845, due to the effects of the economic depression.

The increasing intercommunication and trade between the several sections of the country following in the wake of the improved transportation facilities made possible a territorial division of labor. Each of the economic units followed its natural bent and the country became separated into three great economic regions. In the West, the growing of grain and live stock became the leading activity. In the South, cotton culture became the all-important industry, and in the East, agriculture gave precedence to manufacturing, mining and commerce. This sectional division of labor was responsible for the growth of great domestic trade much larger in value than the foreign commerce which in times past had been one of the chief concerns of the Nation.

The sectional division of labor made possible the growth of great industrial centers inhabited by a non-agricultural population almost wholly dependent upon an outside supply of food including the products of horticulture. During the entire period the urban population gradually increased in its relative proportion to the rural population. In 1800 there were only 6 towns with a population of 8,000 inhabitants or more in the United States aggregating a total urban population of 210,873 or 4 per cent of a total population of 5,308.483. By 1830, the number of such towns had increased to 26, with a total population of 864,509 or 6.7 per cent of the total population of 12,866.020; and by the end of the period, in 1850, there were 85 such population centers comprising 12.5 per cent of a total population of 23,191,875.

The improved means of land and water transportation,[18] the territorial division of labor, and the growth of a considerable non-agricultural population intensified the industrial life of the nation, and the immediate effect upon the horticultural industries was highly stimulating.

In the case of the fruit industry, the change was most noticeable. The following item appears in the Annual Report of the Commissioner of Patents in 1845—"Our country, within a few years past, has made great advances in the production of choice fruit. Many in all sections of the United States have turned their attention to this object, and the result has been great

[18]Transportation facilities, however, were far from ideal; many delays in transit were encountered.

improvement in the orchards, and the introduction of better methods of cultivation * * * Our apples already command a high price in England where the palm is invariably awarded to them when brought into comparison with those of home production there."[19] By 1846, there was considerable traffic in fresh and dried apples upon the Ohio canals,[20] and the amount of dried fruit which came to the Hudson River on all canals, in 1847, equaled 1,502,900 pounds, and was valued at $35,261. By 1847, the number of pounds had increased to 3,558,000 and the valuation to $320,364.[21] The value of the domestic fruit imports of a single Middle Western city, Cincinnati, for the year ending August 31, 1847, amounted to $113,438.[22] The export trade in American apples also showed a gradual increase after 1843.

The peach industry in the Delaware-Maryland peninsula also received a great impetus. The following item[23] illustrates clearly the progress of this industry since the early days: "The vast quantities of this fruit (the peach) produced in Delaware by Major Reybold and Sons is well known to almost all in the City of Philadelphia which is their principal market" writes a correspondent of the Commissioner of Patents, in 1845 * * * from the books of Major Reybold and his son were ascertained the following remarkable facts: Quantity of peaches sent to market (to the 29th of August, inclusive) by Major Reybold, from his Maryland and Delaware orchards, 31,145 baskets; John Reybold, 13,300; Philip Reybold, Jr., 6,000; William Reybold, 5,699; Barney Reybold, 7,200; Total number of baskets, 63,344; Number of baskets employed for transit, 40,000 to 50,000; Number of acres of orcharding, 1090; Number of trees in orchards 117,720. The Tribune estimates the whole number of baskets sold in New York during the past season, of forty days, at 12,000 per day, or 480,000 baskets, at a cost of three-fourths of a million dollars."

The small fruit industry was also greatly stimulated by the changed conditions. From a mere beginning in 1825, the commercial strawberry industry had developed to such an extent that in the City of Cincinnati, for instance, during the 25-day strawberry season, in the 40's, 4,000 quarts were brought to the market daily on an average selling at an average price of 8 cents per quart,—the total of 100,000 quarts selling at $8,000.[24]

The increasing demand for plants, flowers and vegetables after 1830 made necessary the adoption of improved methods of growing them.[25] C. M. Hovey, in 1837,[26] observes after a trip to Philadelphia and New York,— "The progress of gardening particularly in that department generally termed floriculture, has been extremely rapid the past two years: indeed we have been astonished at its increase in New York and Philadelphia * * * we are exceedingly happy to perceive the great prevalence of a real love for flowers, which exhibits itself n the cultivation of plants, in parlors, in New York and Philadelphia; pots of flowering plants, and of many fine kinds make their appearance in the windows of the houses much more frequently than in Boston * * * The number of gentleman's country residences, with green-houses, etc., attached, have increased very rapidly within the past two years. In Brooklyn, the number of beautiful gardens, is, we venture to say, greater in proportion to the population than in any city in the Union; we were surprised to

[19]P. 307.

[20]Annual Report of the U. S. Commissioner of Patents, 1847, pp. 630–632.

[21]Ibid., 1847, p. 578.

[22]Ibid., 1847, p. 646.

[23]Report of the U. S. Commissioner of Patents, 1845, pp. 307–308.

[24]Ibid., p. 308.

[25]B. T. Galloway, U. S. D. A., Year Book, 1899, pp. 575–590. Hovey, Magazine of Horticulture, 1837, p. 6.

[26]Magazine of Horticulture, 1837, pp. 121–122.

find so many elegant places where, a short time since, scarcely more than one existed."

While the horticultural industries during the entire period showed a progressive development, there were, however, ups and downs in response to the fluctuations in the general prosperity of the country. While it is true that, as in the case of the staple food products of agriculture, any great commercial demand for the products of horticulture is dependent upon a non-agricultural consuming population in the industrial centers, there is a difference, however, in the absolute fluctuations of the demand in times of economic depression.

The industries of horticulture, in common with those of general agriculture, suffered a decline during the War of 1812, but an eager interest in horticulture manifested itself soon after the conflict was over.[27] In 1819, however, and again in 1837–39, the country experienced serious economic crises. In commenting upon the development of commercial horticulture in the United States immediately before the crisis of 1837–39, Hovey observes—"The rapid advancement which horticulture has made within the past two years can not be more apparent than by a comparison of the present business of the nurseryman with that two years since. New commercial gardens have sprung up in all parts of the country, and in scarcely one instance have any one of the old establishments had their trade diminished, but on the contrary, increased."[28]

The picture of the progress in ornamental horticulture is equally encouraging[29]—"New gardens have sprung up in all sections of the country. The West—the great West—where soil and climate are so much more adapted to vegetation—where, a few years since, a cultivated garden did not exist—already abounds in beautiful residences. The South, too—though it has not kept pace with the middle and Eastern States—has improved in its taste for horticulture and a more frequent intercourse with the cultivators of the North will enable her to enrich her beautiful plantations with all the fine fruits and beautiful flowers which abound in their gardens."

The marked decline in the interest in horticultural pursuits and in the demand for horticultural products brought on by the economic crises is vividly portrayed by the following commentaries: "We can not but remark upon the depressed state of business, which has tended, in a very great degree, to influence and retard the progress of gardening," observes Hovey in 1838, "* * * had not the unexpected embarrassments in commercial affairs, which have been experienced throughout the country, taken place, there would have been a much deeper interest taken, and many new gardens laid out. * * * such a state of things is very injurious to the florist or nurseryman; as, his articles being in a great measure fanciful and luxurious, they are not wanted, and his stock consequently remains upon his hands through the whole season. We need but instance the dahlia to show the correctness of our remarks; double the number of which were sold in 1836, to what were disposed of in 1837."[30]

By 1840 there was little or no improvement: "At the commencement of the year (1839) we had the gratification of announcing that horticulture was in a much more flourishing state," writes Hovey, "than it had been the preceding year; and it was our hope that it might continue to advance without again being so suddenly checked as it had been in 1837. But commercial affairs, upon the prosperity of which horticulture is, in a degree, dependent, have been again plunged into embarrassments in the mercantile community, affect seriously the interests

[27]History of The Massachusetts Horticultural Society, p. 44.

[28]Magazine of Horticulture, 1837, p. 213.

[29]Ibid., 1837, p. iv.

[30]Magazine of Horticulture, 1838, p. 2.

of horticulture, and improvements which would have taken place, but for the recurrence of such a state of things are postponed, until an opportunity to carry out and complete that which had long been contemplated."[31]

As the depressed business conditions were protracted over a period of years Hovey is moved to remark, in 1841,—"A taste for plants and flowers continues to spread throughout the country, and a desire to possess fine gardens is becoming more and more apparent everywhere. But not so much has been effected during the season, as had been anticipated from the attention which has been given the subject in previous years. This had resulted from various causes, the principal of which (has) undoubtedly been the embarrassed state of commercial affairs."[32]

An horticultural enthusiast, M. B. Bateham, living in western New York, bewails the sad effect of the business depression upon horticulture,—"A few years ago, it was thought that this section of the country would make rapid progress in scientific and ornamental horticulture: but a cloud of adversity came over our prospects, and we were compelled to confine our attention to the *necessaries*, and neglect the luxuries of life. * * * There have been no horticultural exhibitions in western New York this fall except in connection with the agricultural fairs."[33]

The years of hard times were finally ended, and Hovey is relieved to comment on the fact in the Magazine of Horticulture in 1843,—"With the return of greater commercial prosperity, and we hope continued, there seems to be a more general taste for rural life. Villa residences are objects which more and more engage the attention of gentlemen of wealth; and the possession of a cottage residence, even by individuals of limited means, is looked forward to with eager interest. This general desire for gardens and grounds has created a steady demand for trees, plants, shrubs, etc., and a renewed zeal on the part of our nurserymen has been exerted to keep up with the advanced conditions of improvement."[34] An enthusiast in the West, writing of the progress of horticulture in the vicinity of Rochester in 1843, however, observes, * * * progress is exceedingly limited, characterized by no startling advances, but slowly and steadily wending onward, as if fearful of attracting public notice. Such is our progress in horticulture."[35]

It would appear, therefore, that while the staple food products of agriculture are prime necessities and find a relatively universal market among non-agricultural population, the products of horticulture in a great measure are not in the same category, and the demand is dependent to a relatively greater extent upon the general prosperity of the country.

The returning prosperity brought with it renewed activity in the horticultural industries.[36] With the great increase in total population, and the concentration of over 12 per cent of the people in urban centers by 1850, and the consequent increase in the actual demand for horticultural products, the stage was set for the second act in the drama of American horticultural development. In spite of the fact that there had grown up a considerable commerce in horticultural products by the middle of the century, the entire period, like the two preceding centuries, was characterized by the fact that horticultural products as a general rule commanded only a limited market. The chief reason for this is to be found

[31]Magazine of Horticulture, 1840, p. 1. Hovey proceeds,—"Commercial gardening though in a flourishing condition in the early part of the season has fallen off considerably at the present time. * * * the embarrassed state of affairs combined with some other causes, has depressed the price of trees, as well as the zeal of the growers, and for the present, they are not much in demand." Ibid, 1840, p. 13.

[32]Ibid., 1841, p. 1.

[33]Ibid., 1841, pp. 14–16.

[34]Ibid., 1841, p. 1.

[35]Ibid., 1844, p. 15.

[36]A. J. Downing, Horticulturist, 1851, pp. 537–538.

in the inadequate transportation facilities.[37]

After 1845 railroad construction went forward with renewed energy and by 1850 there were 9,021 miles of railroad in the United States. By 1860 the mileage had increased to 30,626. Soon after 1850 the transportation facilities had reached a stage when effective communication was established between various sections of the country, and an era of sectional competition was ushered in. The high quality applies of western New York were now shipped elsewhere to compete with the local product, and due to an early start and a superior article, the growers of western New York were able to undersell the local producers in other districts.[38] The period of limited marketing of horticultural products had come to an end in case of the apple crop.[39] It was only a matter of time when the relatively more perishable horticultural products also entered the lists as competitors over a wider field with the development of rapid transportation and the refrigeration service, the canning and dehydration processes during the following period of competitive marketing of horticultural crops.

Mr. C. Z. Nelson, of the Galesburg Horticultural and Improvement Society, reports a rapid growth both in membership and in activity. The towns of Knoxville, Cameron and Abington have joined with Galesburg in developing one large society. Stronghurst, Roseville and several other towns have combined in joining the Monmouth Horticultural Society. A new garden club has been organized through the assistance of Mr. Nelson and Mr. Bursk of the Galesburg Society in Macomb.

The Third Annual Flower Show of the Galesburg Society was held August 20th with a schedule containing forty-nine classes including bulbs, perennials, annuals and house plants. Judging from the schedule, the show has the enthusiastic support not only of the members of the society but of the entire town. This is the only way to really "put over" a successful campaign for town improvement, and the Galesburg Society is to be congratulated for all its successes during the past year.

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[37]The process of hermetically sealing food in containers as an aid in the preservation and transportation of food products did not become a factor of great importance in horticulture until after 1850. On the whole the bulky and perishable nature of the horticultural products put these at a disadvantage as compared with certain relatively non-perishable products of general agriculture. The products of horticulture may be broadly grouped into three great classes on the basis of relative perishability: (1) Those products which are quickly perishable and require rapid transportation or refrigeration, or both; (2) those products which are relatively less perishable and admit of some delay in marketing, but with a definite time limit; and (3) those products which are relatively non-perishable over a long period. In the first class fall such products as the small fruits, cut flowers, certain succulent vegetables; in the second class such products as winter apples, certain root crops, and in the third class such products as the nut fruits. The difficulties inherent in the perishable nature of these crops may be overcome in whole or in part by (1) rapid transportation, (2) preserving, (3) dehydration, (4) refrigeration, and (5) the changing of the nature of the products by a process of manufacture.

[38]S. A. Beach, Apples of New York, p. 13.

[39]J. J. Thomas, in Annual Report, U. S. Commissioner of Patents, 1850–1851, p. 101, summarized the situation: "The great number of (fruit) trees which have been set out in all parts of the country, have led to the inquiry, 'will prices be maintained? Will not the market be surfeited?' * * * Perhaps, the only instances which have already occurred of a fall in prices, are the peaches of the Eastern cities and the strawberries of Cincinnati. But these are both perishable fruits—they must be consumed as soon as purchased or else lost. Fifty times the amount of keeping fruits would find consumers for it may remain on hand for a month together. But a single city no longer becomes the limited market for long keepers; the whole country is open; and no night-and-day labors are needed to bring them into market before decay seizes them. Railroads and canals will carry them to any part of the Union—steamships will transport them to the millions of Europe. The only requisite is so to cheapen the supply that all may enjoy them."

Michael Carron

The Rock Garden at Lowthorpe School

Rock Gardens

On the evening of November eighth, Mr. Montague Free, of the Brooklyn Botanic Garden, addressed the Society on the subject of Rock Gardens. Mr. Free, who has had charge of the development of the rock garden there, is a graduate of Kew, and has had wide experience in his field both in this country and abroad.

As the speaker pointed out, rock gardening in this country is a matter of the last ten or fifteen years, a period in which the interest has increased steadily until the present, when it has all the appearances of a fad. This might seem regrettable if it were not for the fact that in England, where this type of gardening has been popular for a much longer time, the interest also seemed to reach a point where further development appeared unlikely many years ago, and yet the progress of the work has continued in fineness and interest. Undoubtedly this has come about from the fact that there is probably no type of gardening which permits so wide a field for the gratification of the collector's instinct and no field of plant material to which plant explorations have added so richly. Here the plants are often so tiny that they require little room and as one progresses in skill and experience, plants of greater and greater difficulty of culture can be attempted until the garden will display not only the charm of any fine garden, but will represent triumphs of cultural skill.

Rock gardens were devised primarily for the cultivation of alpine plants

Courtesy Brooklyn Botanic Garden

Saxifraga macnabiana

found by early experience to be unsuccessful under ordinary border conditions. It was quickly discovered that their first requirement was a porous, gritty soil of great depth, perfect drainage and the necessary coolness for the roots. Rocks which the beginner may consider as mere stage settings have a far more important rôle. They obviously assist in the drainage and provide the desired cool root run for the plants that spread their roots out under the stones. The other points less understood are that the rocks should be throughout the entire mass of the soil so that they assist in the deeper drainage of the garden; that the soil should not be too rich, a condition which ruins the health of the plants and causes them to overgrow the beautiful small scale of their mountain homes.

The slides shown included pictures of the rock garden in Brooklyn, during construction and in later years, pictures of great interest as the type of garden there is that of a rocky boulder strewn slope. Since this garden is in a public park, it was necessary that the construction be on a large scale with bold mass plantings and larger paths through the whole than might be needed in an amateur's garden. The rocks available for this construction were not considered ideal since they are somewhat too uniformly water worn and are of a type that is not especially absorptive of water, but there, as in many cases, it was necessary to use the material available.

Other types of rock gardening that were illustrated by slides, Mr. Free characterized as of the "ravine" type in which an artificial ravine was created

by excavating and the earth from the digging used with specially constructed rockwork to build up the sides. Several slides illustrating this form showed scenes from the Hanbury rock garden at Brockhurst, Sussex, England. Also slides were shown of the famous rock garden of the late Sir Frank Crisp at Henly-on-Thames, near London, England. This garden which represents the unstinted enthusiasms of a wealthy Briton, is perhaps one of the most famous in the world, as it is on a huge scale with an enormous amount of rock work of magnificent proportions.

In striking contrast is the tiny backyard rock garden of the late Reginald Malby, famed through the garden world for his splendid plant photographs. This garden, which is but 30 by 70 feet, has, of course, little to offer in the way of landscape effects, or simulations of alpine scenery, but it does furnish proof that within a very limited area, the enthusiastic gardener can accomplish the successful growth of an astonishing number of alpine species.

Other gardens shown were those of Miss Willmott, famed through all the horticultural world, the garden at Childerly Hall, which is not a pure rock garden type, but employs with the rockwork a certain amount of dry wall gardening, pavement planting and combinations with perennial borders; the rock garden at Aldenham House, in which the rockwork is against buildings, a rather unfortunate location, in that there is too harsh a contrast between the informal rocks and the very formal architecture.

Of the endless list of plants that may be grown in rock gardens, omitting all such easy things as the alyssums, arabis, aubretias, phlox and the like, Mr. Free showed two sets, those which are relatively easy and those which are more or less cultural triumphs for their owners.

The first slide showed the charming *Anemone pulsatilla*, a relative of our native Pasque flower, not a rock plant, but one in scale with rockwork and thriving under such conditions.

A group of saxifrages followed: the amazing *Saxifraga cotyledon* with its precisely formal rosettes of narrow leaves growing in the crevices of a vertical rock face and throwing down its pendent sprays of white bloom; *S. cochlearis*, with smaller upright stalks of flowers; the mossy saxifrages, with their tufts of delicate leaves and starry upright blooms; *S. macnabiana*, which is a name covering many garden hybrids of the Euaeizoon group; and finally the autumn-flowering *S. fortunei* from Japan which resembles the old-fashioned strawberry geranium of our grandmothers, neither a strawberry nor a geranium, but with runners like the first and rounded leaves like the second.

The pinks furnish endless species for the rock garden, but all rank growing forms should be avoided, and such delicate beauties as *Dianthus neglectus*, which was illustrated, should be cherished. It is easiest to raise such plants from seed. Then if one selects the best forms and ruthlessly pulls out all inferior plants, a stock of fine flowers will be secured.

The familiar *Saponaria ocymoides* makes a fine easy plant for the rock garden but in our climate should be renewed occasionally by fresh plants from seed, a practice to be applied to many alpines.

Gypsophila cerastioides is utterly unlike the familiar gypsophila of the perennial border as it is scarcely 3 inches high, forming mats of close rosettes of fine foliage with starry white flowers over the carpet. Of larger growth is the more familiar *G. repens*, and even larger, and therefore more valuable for the larger rock garden, is its variety *monstrosa*.

Beside the familiar and over planted *Iberis sempervirens*, one should learn the more delicate and refined *Iberis saxatilis*, a minute candytuft of limestone hills from the Pyrenees to Sicily.

Other easy plants are the sempervivums, especially the delicate *Sempervivum arachnoideum*, with its cobwebs;

Courtesy Brooklyn Botanic Garden

Mossy Saxifrages

the romantic but not too lovely edelweiss, which should be raised from seed and kept starved to beauty; the lovely campanula-like *Nierembergia rivularis;* all the sun roses or helianthemums; the sometimes too spreading aster "Mauve Cushion"; all the familiar smaller campanulas, especially *C. portenschlagiana, rotundifolia* and *carpatica* with its many forms and color variations; the delightful seapinks or thrifts and their kin the acantholimons, especially *A. venustum* rather than the more common *glumaceum;* the lovely *Gentiana septemfida,* as a solace for the more lovely but more difficult *acaulis;* and many more that can not be named.

An annual, *Mesembryanthemum tricolor* and *Anthirrhinum asarina,* Mr. Free recommended for use in covering bare spots in the rock garden where early foliage or flowers had gone by.

In the rock garden there is room also for such bulbs as the autumn crocuses, which spear through light mats of trailing foliage in the autumn, adding bloom to the dullest season in the rock garden and displaying themselves to advantage against the protecting sheet of foliage.

There are of course no limits to the plants for the gardener who desires difficulties, but among those shown were the exquisite *Anemone vernalis* which Reginald Farrer describes with great enthusiasm; the tiny *Campanula allioni* with its great goblets borne on tiny stems, close to the ground; *Arenaria balearica,* which furnishes a most delicate carpet of green for rock and moraine; the ramondia with its fine rosettes of leaves and nodding violet flowers; a host of saxifrages; *Ranunculus montanus,* a delicate mountain buttercup; *Primula marginata,*

only one of a myriad primroses, flowering well in a rocky ledge; *Armeria caespitosa*, unbelievably delicate as compared with its coarser brethren; *Asperula suberosa*, a difficult beauty whose woolly leaves make trouble in winter; *Anemone blanda*, not so hard and very lovely in shady spots, with delicate nodding flowers of white and pale lavender; *Cytisus kewensis*, a hybrid broom of small scale with spreading fountain-like growth and hundred of small creamy white flowers; and finally, *Schizocodon soldanelloides*, a remarkably lovely plant from Japan, suggesting our native Shortia, with enough of beauty to atone for its terrific name and the difficulty of its culture.

As an aside in the discussion, Mr. Free spoke of the use of the so-called moraine, which proves an ideal home for some of the more difficult alpines. This is an excavation, about two feet deep, with perfect drainage from beneath, filled with a soil mixture composed of one part sand, one part leaf soil and five parts of finely crushed stone. The plants are planted in this in spite of the fact that it appears to be almost entirely stone, and afterwards in the case of woolly leaved plants, a further mulch of crushed rock is added! For such places the water supply must be carefully managed, for while the inhabitants demand perfect drainage, they will not tolerate any dryness.

For the beginner in this country the books of Mrs. Wilder were recommended. For the advanced worker, the books of the late Reginald Farrer, particularly "The English Rock Garden," will prove an endless inspiration and delight leading on from one difficulty to another, each welcomed and embraced in its turn by the enthusiastic rock gardener.

Grapes

Mr. E. C. Powell, whose family has been identified with fruit growing matters, addressed recently the society on the subject of grapes, the fruit which he feels offers as large and as varied a reward to the home grower as any other, since in a minimum of space and with a minimum of effort the home gardener can have a variety of flavors, a long season of fruiting and an easy routine of cultivation. There are sorts to be chosen specially for use in all climates from Canada to the tropics and for all soils imaginable, from sandy gravel to heavy clays.

To be sure, like any other plant, the grape does best of all in a soil to its liking, a deep, loose, moderately moist soil.

Passing almost at once to a discussion of varieties, Mr. Powell reported that Moore Early, Concord, Niagara, Delaware and Catawba were the foolproof sorts for the beginner and for the most part were the commercial varieties in spite of the fact that some, like Moore Early particularly and Concord, were not of the highest quality.

After these the amateur will begin to cast about for new flavors and types to satisfy the collector's interest or even the gourmand's taste in this instance! The varieties that follow are some that should come to the attention of any grower.

Delaware should head the list for color, flavor, aroma and hardiness, but is a small vine with small bunches and rather slow growth.

Brilliant, resulting from a cross of Lindley x Delaware, shows color and size like its first parent but in all other respects resembles Delaware, and in spite of unfavorable first reports should

be valuable. Same season of ripening as Delaware.

Brighton is superior in New York State. This is a *vinifera* x *labrusca* hybrid with Diana, Hamburg representing the vinifera blood and Concord the labrusca.

Captivator is a red grape, one of the Munson hybrids ripening early with Delaware and Brilliant.

Catawba is a southern grape, originated in 1823 by John Adam of the District of Columbia. It is too late in the North where it would be important if it could be gotten to ripen with Concord. In the South it is more useful as it will keep late, even to Christmas if stored cool. For its best quality it must be well matured.

Diana, a seedling from Catawba, is excellent when in good condition, but it is likely to ripen unevenly, especially when young. It has a delicate flavor and is two weeks earlier than its parent.

Iona, which was formerly raised commercially for wine making, rivals the Delaware in quality, combining both sweetness and acidity. It makes a loose bunch and its berries are uneven both in size and in ripening. It prefers a dry, sandy or gravelly clay.

Moyer is the earliest sort to ripen here, being edible even if not fully matured, early in August. Its clusters are poor, however, and it ripens unevenly so that it should not be included in the first dozen.

Concord is still the most popular of the black grapes because it ships and keeps well. For its best flavor it must be fully ripened. Valuable for making grape juice.

Worden is excellent for home use, but not valuable for shipping as the skin cracks easily, especially in wet seasons.

Moore Early is a standard black grape but not of fine enough quality for home use.

Isabella was the leading black grape before the advent of Concord. It has a thin skin and a rather musky flavor.

Pierce is a seedling of Isabella with better quality and larger in size.

Downing, originated by J. H. Ricketts at Newburg, N. Y. At the Maryland Experiment Station it makes a large bunch that will keep till February.

Eumelan is a sort not often met, but is above the average in all points for home use. It ripens early but will keep well.

Niagara, of all the white grapes, is the best known and most widely cultivated. It is a seedling of Concord.

Diamond is better in quality but is a little less productive than Niagara. It is early, hardy and vigorous.

Duchess grows well and anywhere, not particular as to soil.

Lady is the best Concord seedling, making a small compact bunch, but the skin of the berries cracks easily, especially in wet weather.

Winchell or Green Mountain is the best early white of good quality, making small, heavily shouldered bunches.

The "Roger's Hybrids" were produced by E. S. Rogers in Salem, Massachusetts, in 1871. He pollinated Carter or Mammoth Globe, not now grown, with Black Hamburg and White Chasselas. Forty-five vines were saved which were very uniform in their good and poor qualities, the good predominating. None were discarded; all were numbered and thirteen named. The chief fault came from the fact that the stamens reflexed so that fertilization was irregular and fruiting uneven.

Agawam is the only one of the lot which is self-fertile and so of commercial importance.

Gaertner (No. 14) and Lindley (No. 9) came from the White Chasselas cross. When conditions are good, Girtner is the better, but ordinarily Lindley is more tolerant.

No. 1, Goethe, shows *vinifera* characters.

Massasoit is one of the earliest and should be picked before it is entirely ripe on the vine.

Salem (No. 22), later No. 53, is a dark red fruit not always true in the trade.

Wilder (No. 4) is black, nearest of the lot to Black Hamburg.

Barry (No. 43) is the latest keeper in New York, lasting even till February.

Herbert (No. 44) is better than Barry, which it resembles. Hedrick considers it near perfection for a table grape.

No. 32 is a rich dark red, a good keeper, even better than Agawam.

The Munson varieties are essentially grapes for the South and Southwest. Some, like Brilliant and Captivator, are satisfactory in the North.

Grapes are propagated either by cuttings or grafts. The former are made in lengths with 2 to 4 eyes, in the fall, tied in bundles, buried in the soil or in a cool cellar and lined out in the nursery rows in the spring. In two years they should be good vines. Layers are occasionally used, laying down a one-year branch which will root in one year and be ready for moving the second. Grafting is used as a protection against phylloxera, which will destroy own-root *vinifera* varieties. *Riparia* stocks are used for these sorts. A cleft graft is used on the stock, which is cut off close to the ground and allowed to bleed two or three days before the scions are inserted. These should have two eyes. They are not waxed but the union is covered with earth. The scions, however, should not be allowed to form roots of their own later in the season after the union has been made.

If plants are purchased they should be two years old. Plant them eight to ten feet apart in the rows with the rows six to eight feet apart. On arbors there should be at least six feet distance each way. In planting, shorten the roots and cut back the top to two or three eyes. Dig a broad hole and spread out the roots horizontally so they will feed in the upper six to twelve inches of soil. Do not intercrop. Stake at planting time in order immediately to secure a straight stem which will bear a good top. If a good growth is made the first season, cut off the shoot at the top wire, but if not, cut it all back to three eyes to induce the formation of a straight, strong stem. Rub off all the side branches except where you want them.

In building arbors, use either cedar or locust posts ten to eleven feet in height or galvanized pipe, ten feet high with three feet under ground. Set the posts first and then plant vines. The trellis itself need not be built until the next season. There should be two vines between each post. The Munson trellis, which is a T-shaped trellis bearing three parallel wires across its top on cross arms two feet long is the best sort to use.

Pruning should be practised in late winter, before there is any danger from bleeding and should be supplemented by summer pruning of the fruiting branches, pinching them off at the third leaf beyond the last cluster of fruit. Every branch should be carefully tied and trained into position. The winter pruning will determine the location and direction of the new growths that are to bear the summer crop.

Arsenate of lead is used as an insecticide spray one week before the blossoms open, and two weeks later spray again, adding nicotine sulfate and resin or fish-oil soap. Ten days later give a spray with Bordeaux mixture and repeat in two weeks to protect from black rot and mildew. Another spraying about two weeks later is advisable where these fungous troubles are prevalent.

Wintersweet.—This shrub is one of the many plants that are "hardy as far north as Washington." Probably it would survive further north in sheltered places. At any rate it is worth growing in the South, where light frosts will not injure its delightfully scented yellow flowers that come in November and December.

A BOOK OR TWO

"The Spirit of the Garden," by Martha Brookes Hutcheson, should be read by every garden maker, no matter how humble his plot or how limited his materials. While the gardens that are used to illustrate the book, to enforce the vivid text, are for the most part gardens on a rather pretentious scale, they are used not to display their charms, which are many and varied, so much as to drive home by repeated example the essentials of garden planning with which the author is concerned. In discussing garden design it is difficult to present to the non-professional reader the essentials in such a form that he will grasp them, for his knowledge usually comes from the field of plant materials. In the present text this is happily avoided for there is really very little of plant material discussed, and yet by the use of many illustrations the beginner who is familiar with plants does not feel remoteness from the part of gardening with which he is familiar and so is in a happier frame of mind to press on to the consideration of the more structural phases of garden design.

The chapters include: The Flower Garden, The Importance of Axis, The Use of the Hedge, Arbors and Gateways, Greenhouses, and Water in the Garden.[1]

"Shrubs." By F. F. Rockwell. This small volume, one of the Home Garden Handbook series published by Macmillan Company, should prove of great value to the amateur who is learning to garden, and especially to the amateur who is confronted with the problem of laying out his home grounds. It is designed "to be used with your seed, bulb and nursery catalogs." This advice should hearten the veriest beginner. It is clearly and lucidly presented, and not only covers the field of plant material but gives pertinent advice on purchasing, planting, maintenance, pruning and general care.[2]

"Iris in the Little Garden." Among the many delightful books and papers that have appeared in praise of the iris, surely this book, from the hand and garden of Mrs. McKinney, will find a special place in the heart and affections of its readers. In it there is that happy blending of fact and fancy which does not obscure or alter the first nor weight the second with unreasoning masses of detail. The book is the fruit of ripe experience and outlines all the steps in growing and collecting the important species of this plant. There are lists for the cautious and invitations for the adventurous; specific instructions for cultivation, battles against insect enemy and disease; suggestions as to calendars of bloom and of work; hints for climatic variations and for garden arrangements in general; a short chapter on hybridization for the enthusiast and a shorter bibliography for the student. We are to be complimented on having such a book for our shelves, and Mrs. McKinney is to be acclaimed for having made it so expertly and delightfully.[3]

Some one should make a collection of all the tints that can be found among the crepe myrtles. For safety, nurserymen usually offer only white pink, deep pink and red or crimson. If one looks about, he will discover many of the maligned lavenders and magentas, which are really very beautiful if kept away from their more brilliant neighbors. There are many gradations of pink which might also be saved to the greater enrichment of southern gardens.

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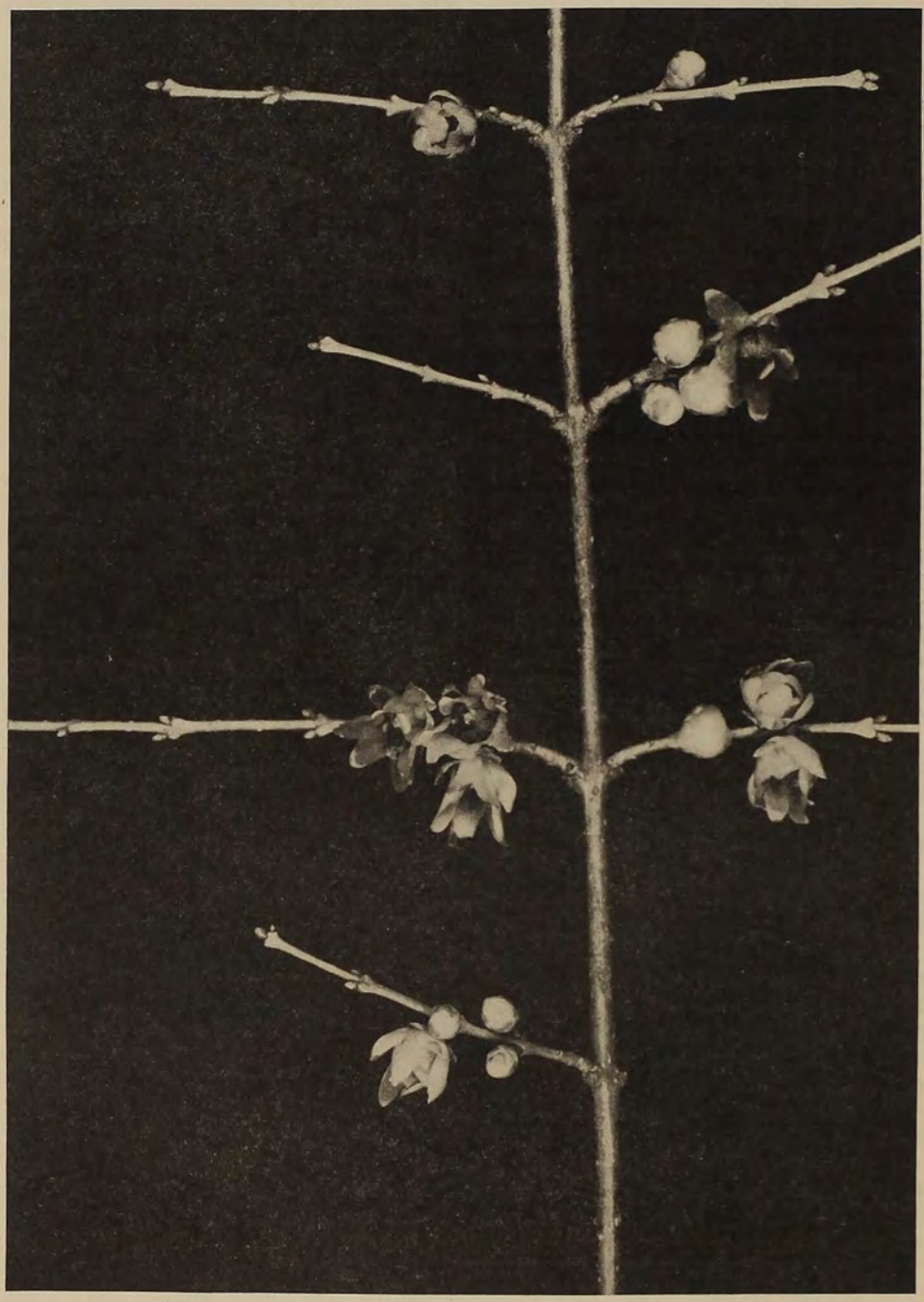
[1]Hutcheson, Martha Brookes. The Spirit of the Garden. An Atlantic Monthly Press Publication. Little, Brown & Co., Boston, 1927.

[2]Rockwell, F. F. Shrubs. The Macmillan Company, New York. 1927.

[3]McKinney, Ella Porter. Iris in The Little Garden. An Atlantic Monthly Press Publication. Little, Brown & Co., Boston. 1927.



Lilian A. Guernsey

[*See page 26*]

Wintersweet

The Gardener's Pocket Book

In every magazine there are the endless small items that are too small to dignify with titles of their own, and the spacing that such treatment would require, which, nevertheless, are of value to other workers. Last year very carelessly we gathered these together under the heading "Gardener's Miscellany," not discovering until we were in print that this was the heading used in the bulletins of The Garden Club of America.

To Miss Marjorie F. Warner, who has a special interest in historical garden books, we owe the suggestion for the title given this month. This, too, is a copy! It is taken from a book published by R. S. in England in 1754, in which the author set out "the Kitchen, Fruit and Flower Garden Displayed in Alphabetical Order * * * with many curious Hints toward the Improvements of Trees, Fruits and Flowers." His book, like our department, is filled with many small bits not all in alphabetical order nor of equal importance. It, too, is a slim affair, a state that often characterizes garden pocket books, but which can be obviated in part, at least, if our members will send in the items that make the harvest of their garden years.

GROUND COVERS

When one is driven to search for a ground cover that will simulate grass, the usual survey of periwinkle, pachysandra and ivy is not very satisfactory, for even when these form wide stretches they do not present a grass-like sward. There is a small Japanese plant, however, that should have a general trial, to discover the limits of its hardiness, which then might be added to the list of evergreen ground covers. It bears the rather appalling name of *Ophiopogon japonicus* and is not much in the trade in this country. It is a tufted grass-like plant, spreading slowly and compactly by underground roots and bearing small spikes of not conspicuous flowers in midsummer, followed by a few rather brilliant blue berries. According to Bailey's Cyclopedia it is much used as a ground cover in Italy and southern France, as well as California, but surely this is no complete statement of its range for there are old patches of it in the Botanic Garden in Washington.

GARDEN CHRYSANTHEMUMS

Garden chrysanthemums have proved such a delusion in middle western gardens, failing to bloom year after year until freezing weather has set in, that a majority of gardeners have given up trying to grow them with the exception of the faithful Normandie, which comes early enough to be relied upon. And then comes a favorable fall and there is great regret that they have been thrown away.

There are very few of the listed hardy chrysanthemums that can be relied upon to come into bloom much before November, and those listed as coming into bloom October 15 are not dated for the latitude of the middle western States. However, there are now listed early flowering strains from seed which may be grown as annuals with much success. One of these offered by Barr & Sons, of London, has proved altogether successful in producing plenty of chrysanthemums in time to elude the freezes.

The difficulty with this strain is that in its second year it insists on blooming too soon, budding in July, and despite pinching it will start blooming in August, and by the time late September and October have arrived the best of its bloom has gone, coming at a season when it isn't particularly desired and in competition with the perennial asters which are sufficient for garden display during September.

The old-fashioned yellow, which has no other name that I know of and which has survived for years, is as hardy as an oak apparently and this year was seen blooming with great freedom. The old "artemisia," a dingy rose purple, also has been much in evidence.

The Lilian Doty type this year had a chance, the first time in five years it has managed to get into bloom. It is well worth giving a place in the garden on the off chance of a favorable fall.

The early flowered seedlings are a solution of the chrysanthemum problem, starting them in March. They have given very satisfactory bloom and the singles have been unusually good.

S. R. DUFFY.

AMARYLLIDS

Among the many pleasures of this season has been the flowering of several plants of the amaryllis family which are now established in the garden and appear to be content even in this climate.

From Virginia were sent a handful of bulbs of *Sternbergia lutea*. Planted promptly in early autumn, they soon sent up their clusters of dark green leaves which looked as tender as those of any amaryllid but which survived all the freezes and thawings of our winter. The second season, however, when new roots had been made and the bulbs had recovered from their journeying, autumn found much more vigorous tufts of foliage and from each one or two stalks, about six inches high, bearing a flower about the size and general shape of a large crocus. The striking thing about these flowers is their amazingly brilliant yellow color, which is enlivened by the same satiny gloss that gives the common buttercup its brilliance. Planted near broad leaved evergreens with dark leaves like box or aucuba, or with the darker yews the effect is startlingly shining.

Flowering earlier by a week or so, *Amaryllis belladonna* lifts its naked stalks crowned with delightfully scented flowers at the foot of a warm terrace. This lovely plant was first learned in California, where the climate is so much to its liking that it forms with age great clumps from which rise veritable sheaves of bloom.

There are many color variations, but in all the base of the petals is white, more or less deeply flushed with the rosy pink that comes down from the tips, a pink of singular quality and clarity, tending neither to lavender nor to yellow.

The scent is delightful, sweet and pungent, as befits an exotic beauty.

The bulbs have been out of doors now for four years, planted deeply at the base of a rough bank. The leaves push up early in the spring and should be protected from late frosts by a pine bough or two. Escaping this misfortune they grow vigorously until mid-June and then die away completely, so that the flower stalks of September shoot up from the bare earth, fat red stems crowned with a shining red sheath, from which finally burst the starry trumpets of pink and white.

Related to these but not yet planted out of doors, are some bulbs of *Nerine sarniensis*. These like the sternbergia have the custom of making an autumn growth of leaves which remains through the winter, but after that they follow the customs of the amaryllis and abandon their foliage in June to produce flower stems in autumn. So far my bulbs have been kept in a pit where they have had freezing temperatures, not enough to hurt the foliage, but enough I fancy to check their flowering.

Some one in the South should make these nerines his adventure, for the family has been widely developed abroad and the English lists have a prodigious number of named varieties in every hue from pure and tinted whites to deep crimsons and blazing scarlets. The flowers themselves have a singular charm with the revolute petals and the long stamens and pistil shooting far out as in our native azaleas or the old-fashioned fuschia.

Indeed some one in the South should investigate all the amaryllids, except, perhaps, the immense hippeastrums, so gorgeously displayed in very early spring. Surely there are other crinums than the milk and wine lily of Florida which would grace the gardens there, for even here *Crinum Powelli* is hardy in a well drained, warm soil and there are far more showy plants in the family than this. Such investigations might well be encouraged by the paper written by Sir William Lawrence in The Journal of The Royal Horticultural Society (Vol. LII, part 2) in which there is a general garden review of the order and the most interesting suggestion of some of the lines of intergeneric hybrids than can be had between many of the well known species. In fact this family is one of the few conspicuous examples in which intergeneric hybrids may be obtained.

In California, there has recently been offered a cross between *Amaryllis belladonna* and *Crinum Moorei* developed by Howard and Smith which should serve as an inspiration for other workers in this field. B. Y. M.

CHINESE ONIONS

Among the interesting new plants that flowered from seed this season are two small onions from China. They are still too small to know just how they will appear in the gardens when they are established clumps, but they do show a very distinct and pleasant variation from the other alliums. *Allium yunnanense* has been entirely deciduous so far but makes small tufts of typical garlic-like foliage and bears small umbels of erect, rather large pure white flowers. It is far less charming, however, than its relative from Sikkim, which has nodding heads of small flowers of a delicate, clear, blue lavender. If this can be induced to become even one-half as robust and vigorous as some of the other garlics, even as the rather decorative chives, it should be a very fine addition to the small plants of the border and doubtless will be requisitioned by the rock gardeners for their paradises.

B. Y. M.

VEGETABLES

Late summer and fall shows have evidenced a decided revival of interest in home vegetable growing, one of the most healthful of horticultural signs. Vegetables of unusually high quality, so fine that they attracted a full share of attention in competition with the display of flowers, were frequent. The revival is rather natural following a reaction after the war garden propaganda which developed more vegetable gardeners than were ever known before in world history.

Those who proved poor gardeners were glad to drop the effort at the first opportunity. Others gave up as they found it took too much of leisure time from other pursuits, but there was a very substantial gain after all the desertions from the ranks. One fact was learned which has been brought home and is the basis of the revived interest,—that is the impossibility of getting as high quality vegetables in the market as can be produced in the home garden, due to the fact that the exigencies of transportation and storage until sold make it impossible to retain their fine freshness even with the best of care and most up-to-date cold storage facilities.

The reason for growing home vegetables is quality. There is little actual saving in cash, if any, if time is figured on a money basis, but the quality of freshly gathered vegetables can not be bought over the counter and rarely from the itinerant huckster with his own garden.

The two vegetables that must be grown at home to realize the best quality are peas and sweet corn, and many gardeners are specializing in these two and letting the rest go, as it is too much trouble to grow string beans which are in the market the year round, as are also cabbage, spinach, young onions, radishes and lettuce.

It is a real art to develop a fine head lettuce in the home garden and the market always has them.

The pea now offers a wide diversity of choice and the vegetable gardener usually grows several varieties, starting with the earliest hardy smooth-seeded varieties and following with the extra fine quality wrinkled sorts which English experts have developed in a wide range, and finishing with tall brush peas for the late crop.

The old-fashioned method of sowing the peas thickly so that the plants were touching in the rows has been abandoned by the more up-to-date gardeners although it still prevails in the great majority of gardens. It is a waste of seed and does not give the crop that the thinner seeding, letting the plants stand two inches apart, furnishes. Eight pods to a plant is a big crop. Three or four is the most ever harvested from thick planting.

There will be a great deal of pea planting this year, and it might be recorded here that the dwarf peas, usually allowed to go unsupported, will give much better account of themselves if furnished narrow width poultry fencing to support them. It is also an economy of space in the small garden, leaving room between the rows for early crops of radishes or young onions, or to set out tomato plants to occupy the space when the peas have passed their season.

For late season gardens, lima beans are a luxury crop, always high priced in the market and never plentiful. It is a fine home garden crop. The pole limas are the more satisfactory, give a larger crop and over a longer season Carpinteria is a favorite variety. The bush limas need plenty of room and double or triple the crop can be realized from pole beans in the same space that the bush beans would require.

The perennial caution about lima beans is that they must be planted eye down and shouldn't be planted until the ground is warm.

S. R. DUFFY.

COLD GREENHOUSES.

The idea of a frost free but yet unheated winter house even better than that in which the nerines now live is one with which to conjure. In the oldest days, the frost-free houses served to carry over plants from one summer to another without so much thought for forcing them into unnatural seasons of bloom. With the improvement of heating systems and of glazing, the idea of having flowers in bloom every month has run away with all other phases of winter gardening.

The writer looks forward to the day when he can have a house which will approximate in service some of the old orangeries, but there will be no oranges in his house, rather huge tubs of rhododendrons, the more tender sorts that will not survive our winters with their brilliant sunlight. In this way it may be possible to secure pollen to cross with some of the hardy forms which we can have out of doors but which lack some of the brilliance of the more tender species.

Against that time, some small seedlings of *Rhododendron arboreum*, a species which has furnished much of the brilliant red color of some of the hardy *catawbiense* hybrids, have lived happily through three winters in a deep pit roofed over with hotbed sash. Here they are frozen each winter but the rigor of freezing is lightened by lath shades overhead which break the strength of the winter sun.

For neighbors they have had innumerable Kurume azaleas, both named sorts and seedlings raised from commercial seed. Here these plants are unbelievably happy and come into flower a little ahead of the season, their flowers fading, just as the plants of Kampfer's azalea open out of doors. This makes them even earlier than the blooming of the familiar Hinodegiri and its relatives. After flowering the plants should be repotted if necessary, the tops trimmed a little to stimulate growth and the development of new wood. It is most im-

perative that pruning should be done at this time, for if it is postponed until later in the summer a vigorous growth of non-flowering wood is all that will result. When the weather is settled the plants can be bedded out of doors in semi-shade, but not in shade, since they like sunlight. They can be taken from the pots or the pots sunk to the rim in the soil. The essential thing to watch is that there should be an even water supply and abundant food. B. Y. M.

BARBERRIES.

The long and fairly frost-free autumn has given some of the barberries from China a wonderful opportunity to develop their fruits without injury. *Berberis wilsonae, subcaulialata, aggregata, polyantha* and their allies all have small berries with a very thin skin of translucent quality so that the sap that fills them is lit by the sun shining through. The berries start out a delicate pearly green color and are first tinted to rose and then to red as the weather grows colder, but one severe frost will ruin their beauty and leave the shining fruits shrivelled and dull. As compared with the thick-skinned berries of the Japanese or the common barberries these have a very transient beauty, usually so injured by frost that except for the South all these species are more valuable for their foliage and habits of growth than for the fruiting or the somewhat inconspicuous flowers of midsummer.

This same transitory beauty characterizes the fruits of *Berberis vernae.* This shrub is rather unattractive in the earliest years of its life, but when it comes into maturity its arching branches have great beauty and in midsummer are transformed by the myriad clusters of small round berries, just the color of old coral, so much resembling it, that one thinks of the old jewelry in which coral clusters of grapes hung in earrings and brooches. But these fruits perish long before frost and hang brown and shrivelled through the autumn. B. Y. M.

RASPBERRIES

Many a housewife paid her gardening expenses last season from her raspberry patch. It was a fine season for berries in many sections, particularly for red raspberries and there were none left to go to waste. A red raspberry patch is one of the easy possibilities even on the small place, where they can be grown in a row along the back fence with a minimum of space and a liberal crop of berries over a long season.

There are many failures to realize on raspberries because they are regarded as too easy and the roots of new bushes are chucked into the ground with the roots doubled up and left to shift for themselves. They take hold slowly with this careless handling and it will be some time before there are good crops. The raspberry has a dual root system, a spreading fibrous system that extends close to the surface, within six inches of the top, and a few tap roots that strike fairly deep.

If strong, thrifty canes bearing liberal quantities of berries are desired and vigorous enough to withstand drought, plant carefully spreading out the fibrous roots, and firming the soil after planting. They want good, rich soil, plenty of sun, and liberal moisture in the early part of the season. Plant the canes two feet apart, three would be even better, and cut the canes back when they are set out. The object the first year is to produce good canes for next year's crop. There will be no first year crop.

As the great majority of the feeding roots of the raspberry are close to the surface it is a plant that benefits greatly by mulching with stable manure or synthetic manure or by the application of commercial fertilizer to the surface. It should not be cultivated deeply, a better plan being to let a mulch keep down the weeds during summer.

Thin shoots should always be removed and the fruiting canes should be cut out as soon as done bearing.

S. R. DUFFY.

FALL COLOR

There will undoubtedly be an unusual amount of ordering of berried shrubs this spring as a result of the beautiful displays which the late fall of 1927 made possible, and among them is likely to be a decided revival in planting of an old favorite that during the present generation has largely disappeared, although twenty years ago it was a favorite tree in door yards. This is the mountain ash, *Pyrus aucuparia*, with its great clusters of orange berries and handsome pinnate foliage. The few mountain ash trees remaining aroused much admiration this fall as they drooped with their handsome clusters of fiery fruit.

It was a remarkable season for brilliant fruit display. The thorns burned in the woods with their loads of crimson to orange miniature apples. The bittersweet wreathed the hedgerows and fences in the country with its brilliant berries, and the Wahoos or burning bushes, euonmyus, with their rosy ear drops were brilliant spots in the landscape.

The Japanese barberries and the new red-leaved variety took on unusual brilliance, and the cotoneasters, or quince berries, which are slowly making their way in popularity with their crimson leaves and wreathes of red berries, aroused much admiration. These are unusually handsome shrubs and worth a place in every garden. The variety *divaricata* is most generally planted, and with its fine, glossy foliage and its tiny rosy bloom looks like embroidery when used as a decoration for tables. The flat fronds which its peculiar style of branching, dichotomy, produces are unusually effective when cut.

There are a number of varieties, not all hardy, however, which furnish a wealth of beauty in the fall, notable among them being *soongarica*, and *hupehensis*. These shrubs seem to like a rather dry situation and are neat and attractive all season.

The old high bush cranberry outdid itself with its wealth of scarlet clusters, and a new yellow fruited variety is now in commerce to add to the display.

There is much trouble in inducing the burning bushes, euonymuses, to fruit. Apparently they take their time about it, and the native burning bush, *E. atropurpureus*, is one of the worst of the lot. Many gardeners have planted these shrubs only to find that they bloom each year but do not form fruit. Their relative, the bittersweet, celastrus, does not bear perfect flowers and vines of both sexes must be planted to insure fruiting, but the burning bushes apparently have perfect flowers and the presence of several bushes does not seem to produce any effect. There is a legend that they must reach a certain age before fruiting, but what that age may be I have no idea. I have had a thicket of wahoo for years which is covered with its tiny four-cornered dingy purple stars each year, but never an eardrop in the fall. The winged burning bush, *E. alatus*, with peculiar corky growths upon the branches, seems a more certain fruiter, but it does not fruit as freely as the native or the European burning bushes when they fruit.

In the perennial garden the scarlet ground cherry or Chinese lantern plant, *Physalis Franchetti* and *alkegeni*, with their scarlet husks so valued for winter bouquets, make a brilliant late fall display. This is a very easy plant to grow, but it is an inveterate spreader by underground stems and should be placed carefully.

The witch hazels in the woods with their great sheets of golden yellow have been an encouragement to move them into the garden. They are well worth it and peculiarly valuable because they will grow in shade and underneath the branches of trees.

S. R. DUFFY.

MEMBERS ATTENTION

If every member will make it his personal business to secure ONE new member for 1928, very obviously our membership will be doubled! The increased income, however, will more than double the opportunity for enlarging the magazine and for making it more valuable as an advertising medium. We begin the year with 36 pages and 10 illustrations; with your help we can close the year with 64 pages and 25 illustrations. Will you do it? As a special inducement to NEW members, we will offer FREE until April first, copies of our bulletins Nos. 2, 3 and 4. Who will be first?

The American Horticultural Society

A Union of The National Horticultural Society and The American Horticultural Society

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The Society publishes The National Horticultural Magazine, a quarterly journal issued in January, April, July and October to all its members. It publishes special bulletins from time to time as material warrants special issues.

Former bulletins of the Society may be secured from the secretary as long as copies are available.

Number 1. The Effect of Aluminum Sulphate on Rhododendron Seedlings, by Frederick V. Coville $1.00
Number 2. Roses for America, by F. L. Mulford 50
Number 3. Insect Pests of Our Garden Plants and Their Control, by C. A. Weigel 50
Number 4. Soil Reaction in Relation to Horticulture, by Edgar T. Wherry 50

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Individuals or Organizations desiring to be admitted to membership in the American Horticultural Society should forward their request and remittance to the Secretary, D. Victor Lumsden, 1629 Columbia Road, Washington, D. C. Checks should be made payable to the American Horticultural Society. The address to which publications and notices are to be mailed should be stated.

Press of
H. L. & J. B. McQueen, Inc.
Washington, D. C.