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of the

UNITED STATES GOLF ASSOCIATION GREEN SECTION

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Contents

	Page
The Bulletin Volumes to be Published in Six Numbers.....	42
Landscape Plants for Northern Golf Courses. By Ralph W. Curtis.....	43
Earthworms and Cutworms Travel Far at Night.....	80
Questions and Answers.....	81

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The Bulletin Volumes to be Published in Six Numbers

In the past few years it has been the policy in the BULLETIN to group related material, as opportunity provided, in single or consecutive numbers. One of the recent examples of this grouping was the discussion of southern golf course problems in the two numbers for September and October, 1931. Instead of scattering the discussions of different methods used in the South through various numbers in one or more volumes they were all put together in two numbers. If a reader is particularly interested in the various methods used on the southern courses it is more convenient for him to refer to these articles if they are printed together. Many of our readers have expressed a decided preference for this method of presenting BULLETIN material. In addition to the southern golf course discussion, which required two numbers in the 1931 volume, there was another grouping which required three numbers. In such instances it seems to be more desirable to have all of the material under one cover rather than grouped in two or more separate numbers even though they be published consecutively. It seems likely that there will be an increasing number of subjects which can be handled best in a single number of the BULLETIN of two or three times the normal size. Financial limitations prevent the issuance of these larger-sized numbers as part of the customary volume containing 12 numbers. It has, therefore, been decided to issue 6 numbers of the BULLETIN a year instead of the 12 numbers which have been published heretofore. It is expected that the same amount of material as formerly will be presented in a volume under the new plan. The numbers will vary in size. In some instances, where the material demands, it will be double the old size and in other cases it will have triple the number of pages contained in the numbers of the previous volumes. Thus if the 1931 volume had been published under this new plan the related material for March, April, and May would have been grouped in a single number and that for the September and October numbers would have been grouped in another single number. The editors feel that this method will prove more convenient to our readers and at the same time will effect certain economies in the cost of publication.

The change in the method of issuing the BULLETIN is being made with the provision that it is to be placed on trial this year. If our readers prefer the old method of issuing 12 numbers a year the BULLETIN will be put back on the old schedule next year. The editors will welcome an expression of opinion from our readers as to which method they prefer after they have received a few of the new numbers.

**STATEMENT REQUIRED BY POSTAL LAWS AND REGULATIONS OF THE OWNERSHIP AND
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Landscape Plants for Northern Golf Courses

By Ralph W. Curtis
Cornell University

The first principle of good golf course design is variety. Those courses are valued most which provide, either naturally or artificially, the widest test of the judgment, skill, and strength of the player. This is the economic side of golf design and golf practice; but as in other professions, recreational or otherwise, there is also the esthetic side. Beauty and use should be inseparable. Humanity needs both. We begin of necessity with the economic and the useful, but life will not be complete until we have added beauty to use by thoughtful plan and loving care.

Why is the Merion Cricket Club so typical of the best group of American golf courses? Because it has the three essentials of a good championship course—variety in design, beauty in environment, and perfection in maintenance. The skill and care of those in charge at Merion are evident everywhere. The result is satisfying and beautiful; and what is more vital still, it is increasing in interest and beauty as the years go by. Man naturally responds to his environment. We all surround ourselves with the best we can assemble. The Merion Cricket Club began with a wonderful site plus a few men who saw the possibilities of that site for human use and enjoyment in the field of golf. The quiet work of these men has stimulated pride in the course and then interest in the environment until now the combination of the two is wonderful. A round at Merion is a test and a tonic, a deed well done and a day well spent.

A second general principle, therefore, as illustrated by Merion is that use and beauty should be combined. The closer these two coincide and work together in harmony, the more perfect and satisfactory is the landscape result. In other words, it is entirely possible to plan and plant our golf courses, just as we do our home grounds, so that they will serve well the practical requirements of use and convenience and at the same time be beautiful and satisfying and a joy to live with. Three common ways in which landscape plantings can combine use and beauty on golf courses are by boundary plantings, by background and framework plantings, and by specimen groups and individuals.

BOUNDARY PLANTINGS

Boundary plantings may serve to hide unsightly objects such as sheds or railroad sidings or to screen buildings and highways which are too near. In this case privacy may be secured and the impression created that one is removed from the objectionable nearness of other activities. The necessity of boundary masses like these is thoroughly recognized in those parts of all well-designed large city parks where the problem becomes one of developing a country landscape in the midst of the city.

While boundary plantings may be very serviceable in some parts of the golf course, they may be unnecessary or even quite objectionable in other parts where beautiful views open up to the outside. In such places a vine-covered fence or a low planting of shrubs with quiet, neutral appearance may be all that is needed. Any objects near a

view line (objects over which you look, like a fence or a shrub border, or objects between which you look, like trees which frame a view) should be quiet and neutral in appearance, so that they will not distract the attention from the view itself. In this case the distant view is the point of interest and not the nearby boundary planting.

Again, a boundary planting of tall trees which are dense and preferably evergreen and are serving well as a permanent screen against outside objects may become also an effective background for attractive shrubs and smaller trees planted on the inside where they may be seen and enjoyed from the course and often from the club house itself.

BACKGROUND AND FRAMEWORK PLANTINGS

This brings us very conveniently to a discussion of background and framework planting. We can all recall the beauty of some old house with its background and framework of trees. Such trees normal in form and color like elm, oak, maple, beech, pine, or hemlock, make the best kind of background because they are neutral and therefore do not distract the attention from the building or other object which is the center of interest.

At this point let me remind you that the great majority of our trees and shrubs have this quiet, neutral appearance. Only a few trees are very definite or positive in form. The Lombardy poplar is the best example of a large tree with positive, upright form. It is the exclamation point of the landscape; and exclamation points should be used carefully and with moderation. They should not be sprinkled all over the golf course. Neither should blue spruces nor any of the other spruces or firs be used to excess. Their form is very pyramidal and therefore unusual and positive and not quiet and restful. Of course, we want variety and interest on the golf course; in fact variety is the very essence of good golf course design. But there is no reason why we should go to excess in landscape planting any more than in dress or language or anything else.

If we stand on any natural golf course which has not been artificially planted and look at the normal landscape masses around us including woodland growth, tree groups, and individual specimens standing out alone, we shall see that at least three-fourths and usually as much as four-fifths of our landscape environment is neutral and quiet in appearance. I am aware that all golf courses are not alike and that some are more rugged and picturesque with more variety and accent than others, but it is a very safe rule to be conservative and not to go to excess in the use of landscape plants which are peculiar either in form, color, or other characteristic. Landscape plantings on golf courses, just as those on any other good landscape job, should fit into the local environment. When the work is done, the plantings should so harmonize with the surroundings, whether these be naturalistic or formal, that they will appear as perfectly natural parts of the landscape. In most cases landscape plantings should consist of native materials or of materials which, cultivated or foreign, are similar in appearance to the natural materials of the locality.

There are exceptions to this general rule especially in the case of plantings about the club house. In these situations near buildings, where things are architectural and more or less artificial, we may use any foreign plants we wish provided they have good form and foliage and sufficient denseness, if denseness is needed, or any other require-

ment, such as height or color, which is appropriate. Landscape plantings should be appropriate and fitting no matter where they are. In the more formal situations about the club house, they may be more regular and formal in appearance and often spaced at regular distances and in regular alignment. But in the more irregular and informal situations on the fairway and the rough the plants should be irregular and informal in appearance; also great care must be used in making the groups to avoid monotonous regularity both in the vertical outline of the group and in the spacing of the plants on the ground.

Increasing Visibility

Another use for background plantings is to increase visibility. A group of pine trees at the back or sides of a putting green will not only make a beautiful setting and background for the green but will



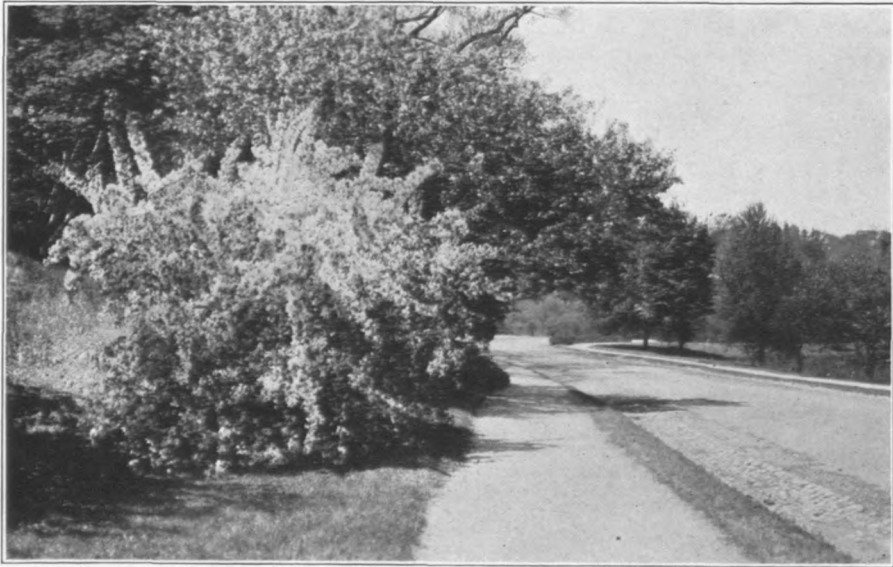
Background and framework planting for a putting green helps a player to estimate distance and more clearly defines the hole. In this illustration is shown the view from the approach to the eighteenth green on the Five Farms Course at the Baltimore Country Club, Baltimore, Md., where the National Amateur Championship will be played September 12 to 17.

also give direction to the line of play and a definite measure for the distance to be played. Deciduous trees (those which drop their leaves in the fall) are less desirable unless placed on the leeward side of the green so that the leaves will naturally blow away and not become a nuisance and extra care on the green. Here again you will notice that I have suggested pines as a background planting for the green rather than the stiffer and more pointed spruce and fir type. It is entirely possible to use these more positive forms occasionally. Even a group of Lombardy poplars now and then in an especially bold situation or where some special accent is desired may be entirely correct. But these strong accents and peculiar effects are not the things we want to live with all the time. They are the exceptions, like the

emergencies and the spicy places in life. A few will go a long way. If there are too many we soon grow tired of them.

SPECIMEN GROUPS AND INDIVIDUALS

Finally, let me speak of one situation, especially on "blind" holes, where tree groups or single specimen trees may be planted either in the rough or at the side of the fairway to serve as direction guides. These positions should be carefully located along the line of play, usually near the end of a shot, so that the tree or the group of trees will serve as a guide to the direction as well as a measure for the distance of the play. In addition to these useful purposes, such plantings will improve the natural appearance of a golf course and also afford occasional shady spots which may be very restful along



There is a large variety of small trees and shrubs from which selection may be made for specimen planting. The Arnold crab (*Malus arnoldiana*, page 72), shown in the illustration, is interesting both in flower and in fruit.

the way. As mentioned earlier in connection with the more formal plantings about the club house, these direction groups on the fairway and rough should be irregular and informal in appearance, and great care must be used in making the groups to avoid monotonous regularity both in the vertical outline of the group and in the spacing of the trees on the ground. In the past, large trees have been used for this purpose in order to keep the ground clear and to prevent loss of the ball. More recently, because of the great attractiveness of several small trees, such as flowering dogwood, tree Andromeda or sorrel tree, Washington thorn, redbud or Judas tree, and even some large bushy shrubs such as red-stem dogwood, goldenbell, Morrow honeysuckle, blackhaw, and flowering crabapples, some golf clubs have started a pioneer movement looking toward a better landscape setting for the course. Since several of these smaller trees and large shrubs just mentioned have abundant

fruits attractive to birds, the planting of them for landscape improvement will not only add beauty to the course but will also contribute to the still newer movement by which it is hoped every golf course will become a bird sanctuary.

How to Arrange Fairway Groups

Since these direction plantings are increasing I want to add a suggestion to help the beginner to lay out these informal groups on the fairway and rough with confidence, whether they be large trees with clear ground underneath or whether they be small ornamental trees or large bushy shrubs attractive in spring, summer, or fall. In almost all cases they should be distinctly natural and informal both in ground plan and in vertical outline.

I recall one situation where a club was very limited for space on one part of the course. At that point the two fairways were practically parallel with each other with only a narrow rectangular rough between them. The situation seemed to demand only one or two scattering tree groups placed strategically to serve as hazards with perhaps a stray tree or two here and there to break up the straight line effect. Instead of this a continuous line was laid down the middle of the rough and at every 50-foot interval a Lombardy poplar was planted interspaced regularly with box elder trees in the middle of the spaces between the poplars. The effect was ordinary and monotonous, and instead of concealing the unfortunate narrowness and straightness of things the planting actually increased it. It is to prevent such mistakes as this that I offer the following suggestion for informal direction groups on the fairway and rough.

It is always easier to avoid monotonous regularity by using uneven numbers of plants and by spacing the plants at unequal distances apart, increasing (but not regularly so) as the plants get further from the real center of the group. And this suggests that all individual plant groups should be individualistic; they should function as individual units and have a center of interest, just as any other composition should have. A safe rule to follow to produce this unity in individual plant groups is to make one plant or one part of the group the dominant part. This can be done first by massing 2 or 3 of the plants close together to make that part of the group appear larger and denser at once and then by scattering the others in the group more widely and irregularly. Secondly, one can make the dominant plant or plants a different kind from the others in the group, either a larger-growing variety or one with a different, more definite form or perhaps a denser, more solid-looking framework or even a slightly different color (but too many colors will make a spotty appearance and destroy the unity of the group). In this way the secondary plants may be larger in number but smaller in size or more quiet in appearance, while the dominant plant will be less in quantity but greater in other respects, such as larger in size, more positive in form, or denser in structure, and the like. In other words, the dominant plant is more or less an accent while the secondary plants are what we call neutral material. In this way the whole group will pull together to form one unit culminating in the dominant plant, which is the largest or strongest part and therefore the real center of interest.

Thus far in this discussion we have stressed general principles, such as the following: variety is fundamental; use and beauty should

be combined; boundary planting will give privacy and screen out undesirable surroundings; background and framework planting will provide a neutral setting for objects of interest; care should be taken not to overdo, especially in the use of emphasis; and finally, we should plan individual groups and specimens to serve mostly for direction by increasing visibility and providing a measure for distance but at the same time to furnish restful shadows along the way and also to add interest and beauty to the course by spring flowers, attractive fruits, autumn tints, and winter colors.

I would like to conclude this discussion of general principles and bring the whole matter home to the immediate problem before us by answering the question "How shall we determine our needs?" In spite of the fact that I shall follow these remarks by lists of plants and by a discussion of their fitness for different situations, still I shall begin to answer this question by saying, Do not *start* with a list of plants nor with an effort to remember the names of certain plants that some one may have recommended to you. The plants must come later; the first step is to face the problem on the ground and analyze it in the abstract without thinking of any particular plants at all.

For example, go out on the course and stand before each situation separately and ask yourself, What is needed here? Do we need trees that are tall or short? Should they be dense enough for a screen, and if so is the situation important enough to demand evergreens that will provide a permanent screen 12 months in the year? If you choose the softer more neutral evergreens, like pines or hemlocks, they will furnish a wonderful dark background for a clump of flowering dogwoods early in May or for a splash of autumn color in the fall. And if you do this at that particular place, will it be seen and appreciated here better than it might be somewhere else on the course? And again, if you put your best foot forward at that place and really create a nice effect, should the place be the only place on the course, or may there not be a few others at strategic points to balance up the interest and distribute it over the whole course?

Perhaps you have a hole with a dog-leg turn in the fairway. A clump of trees on the inside of the turn would make a good direction guide and serve as a hazard to prevent short cutting. As you look at the situation, must the trees be tall with a high head under which you can see (like the graceful American elm), or may the trees in the group be dense and low branching and thus afford a splendid background for a little Judas tree or redbud planted on the side from which you are looking? A clump of dense trees with an accent in front of it like this would make a delightful picture twice a year, once with purple flowers in spring and once with yellow leaves in autumn.

This is the way to approach the problem. Figure it out in the abstract first. State the requirements and then lay down the specifications by asking your local nurseryman or other plant authority what specific plants will meet these specific requirements. Better still, let me urge all who can do so to seek the advice and service of a good landscape architect. Mistakes are costly. Often what seems like expensive service at the start is the cheapest in the end.

If you must be your own doctor it is better to go slowly and gain confidence with experience. Don't forget to look over the entire

course before you jump into the first job that you see. Determine what are the most urgent needs and concentrate on those first. Also enlist the help of the best men and women in the club. There are usually some members in every club who are interested and public-spirited enough to talk these matters over. Pick two or three who are best fitted and go over the situation with them, if possible separately and at different times. Perhaps follow this by a joint meeting for general discussion, but at all times reserve final judgment for yourself. Keep an open mind; but when the decision is made go ahead as best you can. The way to do things is to do them!

Classified List of Selected Plants for Northern Golf Courses

The purpose of this list is to show size, density, and special peculiarities of northern plants.

All plant names in the list follow *Standardized Plant Names*, the official code of the American Nurserymen's Association, except those in parenthesis, which follow Rehder's *Manual* (1927) or Bailey's *Hortus* (1930). The botanical name, which is in Latin, is printed in italics. It usually consists of two words, the first designating the genus and the second the species, as *Lonicera japonica*; when a third word is added the third word designates the variety within the species, as *Lonicera japonica halliana*, which we all know as Hall honeysuckle. Where the name of the genus is repeated in a description it may then be represented simply by its initial letter. Occasionally a fourth word may be found in a botanical name, representing, as a rule, a sub-variety.

This classified list is divided into seven "size groups," as follows:

Group 1	Climbing vines	Page 51
Group 2	Ground cover (6-12 inches)	Page 53
Group 3	Dwarf shrubs (1½-3 feet)	Page 54
Group 4	Small shrubs (4-5 feet)	Page 56
Group 5	Medium shrubs (6-8 feet)	Page 63
Group 6	Large shrubs and small trees (10-25 feet)	Page 70
Group 7	Large trees (50-100 feet)	Page 76

These size groups, especially group 4 (below the eye level) and group 5 (above the eye level), have been fixed at certain limits for convenience only. A large number of the plants listed in group 4 will, in time, grow into group 5. Such plants, as explained below, are indicated in the list by the two group numbers "4-5" after the name. In the majority of cases the two size groups 4 and 5 might be thrown together as far as the final size of most of the plants is concerned. But most plants vary in size according to favorable or unfavorable conditions, also some vary more than others, and some grow more slowly than others and therefore may remain in the smaller size group for a longer time. Still others are very easily restrained by proper pruning, so that actually we may utilize them in a smaller size group than they would finally attain. For practical purposes, therefore, these arbitrary size groups have been established, and each plant assigned to a group, either because the plant belongs there permanently or because it may be used there successfully with a minimum of trouble on our part.

The letters in front of the names indicate the following:

D Dense.

E Evergreen.

P Peculiar. This means that one should pause before using the plant. It may be too positive in form or color, too particular because tender (needing protection), weak-wooded or much troubled with insects or diseases, or requiring acid soil or unusual growing conditions.

S Semi-evergreen.

In the discussion it will be found that many plants are described as requiring acid soil for their best growth. By acid soil, we mean a soil which is quite deficient in lime, usually sandy, well-drained, and comparatively low in plant food.

A simple test to determine soil acidity can be made by using color indicators which are on the market. These are fairly accurate and can be purchased for a low price. They are almost indispensable in general soil work on the golf course.

In order to correct a soil which is alkaline in reaction we should preferably remove the alkaline soil and develop pockets or areas of acid soil by bringing in woodland soil which is acid, or we may incorporate with the existing soil a small amount of aluminum sulphate (about 1 pound to a square yard), tannic acid, sulphur, acid peat, or other acid-producing substances. By all means test the soil before and after treatment, and do not apply an excess of any of these materials.

Besides having an acid soil it is well to have considerable organic material incorporated with the soil. Also maintain a mulch of oak leaves, pine needles, or similar material to reduce surface evaporation, and eliminate cultivation, as these plants are very shallow-rooted. Never add lime, bone meal, wood ashes, or other alkaline materials to the soil around these plants.

Numbers after a name indicate that the plant may vary in size between the two size groups represented by the numbers. Thus "4-5" means that the plant may vary between "size group 4" and "size group 5."

Formal and gardenesque are two words added to the description of a plant to mean the following: *Formal* means that the plant is so even and regular in form (and often so dense and compact in growth) that it becomes too definite and positive for the usual informal and natural planting on the course. *Gardenesque* means that the plant is either such a distinctly flowering type or has been cultivated so long in gardens and home grounds that it would look out of place in any other situation.

Planting Distances (distances apart to plant) depend upon size and vigor of the plants and upon the purpose of the planting. For more or less specimen planting, as on streets and driveways, in open picnic groves, ample park and golf groups, and the like, the spacing should conform quite closely to the size groups used in this classified list. All degrees of smaller spacing are used, ranging from the wide specimen planting just mentioned to windbreak, screen, and close hedge planting. In the latter case large hedge materials are spaced 2 to 3 feet apart, medium hedges (below the eye level) 15 inches apart, and dwarf edgings 4 to 6 inches apart. For extra dense effect, double

rows are used, with the plants alternating in the rows so that the plants of the back row will stand opposite the spaces between plants of the first row. Vines on a fence are spaced 5 to 10 feet apart. For slow-growing ground cover, a 12-inch spacing is good, and for more vigorous, long-trailing varieties 2 to 3 feet is about right. Wide spacing should always be mulched to keep down weeds and prevent the soil from drying out.

Pruning.—It is easy and often desirable to restrain many of the shrubs in these lists into a smaller size group. This is done simply by pruning out a few of the oldest stems close to the ground each year. This practice will stimulate new stem growth from the base, which will keep the plant not only smaller but also more vigorous, and at the same time perfectly natural in appearance. This kind of pruning is really a thinning-out process, often called gradual renewal. This is practiced very heavily with garden roses where even the young stems which remain after thinning are cut back so that only a few buds are left near the ground. In this case the purpose of such heavy thinning out and cutting back is to force the plant into unusual flower production. With hardy landscape shrubs, however, no pruning is required except that which is necessary to keep the plant free from disease or injury and strong and vigorous in appearance unless we wish to restrain it to a smaller size. In this case, prune moderately to produce gradual renewal each year, and also root-prune if the top growth is stronger than desired.

Group 1. Climbing Vines

- DS *Akebia quinata*. Twiner. Fiveleaf Akebia
 More hardy than *Lonicera japonica halliana*, for which it often may be substituted as a screen plant. A graceful vine with small leaflets which are thick, leathery, and semi-evergreen.
- DP *Ampelopsis (Parthenocissus) quinquefolia*. Virginia Creeper
 Ampelopsis (Parthenocissus) quinquefolia saintpauli. St. Paul Creeper
 Ampelopsis (Parthenocissus) tricuspidata. Japanese Creeper
 All three of these creepers will climb on a solid surface by tendrils ending in discs, but the St. Paul creeper has also rootlike holdfasts on the stems. The Japanese creeper, often called Boston ivy, makes such a tight and even covering for brick and stone that it becomes monotonous in appearance. It also winterkills to the ground occasionally in northern New York State.
- P *Bignonia (Campsis) radicans*. Trumpet Creeper
 This is a southern plant which winterkills some in middle New York. The rootlike holdfasts do not hold well and dead wood also accumulates. For these reasons this plant should be confined to low situations where it can be fastened and pruned easily. Red trumpet-like flowers in late July and August.
- P *Celastrus orbiculatus*. Oriental Bittersweet
 P *Celastrus scandens*. American Bittersweet
 Both are twiners with orange-colored berries in fall and winter. The sexes are separate, and both male and female plants must be used in order to develop fruits. The berries of the Oriental bittersweet are more abundant and always in lateral clusters, but the yellow-colored capsule (outer covering of the fruit) splits into three parts as it dries in the fall and soon falls off, leaving only the red-colored pulp which encloses the seeds. The berries of the American bittersweet are less abundant and always in terminal clusters (at the ends of the branches), but they are more graceful and also more permanent, since the capsule of the fruit does not fall off in winter even when the branches are cut and used for interior decoration.

- D *Clematis paniculata*. Sweet Autumn Clematis
Best fall-blooming vine. Flowers dense, white, and fragrant, in September. All clematis vines climb by twisting of the leaf and leaflet stalks.
- E *Euonymus radicans vegetus*. Bigleaf Wintercreeper
An evergreen vine for brick and stone which is a little more hardy than English ivy and in addition has orange-colored berries like those of bittersweet described above.
- DEP *Hedera helix*. Brick and stone. English Ivy
Best evergreen vine, but not always hardy. Is worth special care. It climbs by rootlike holdfasts and will stand shade. Is very appropriate, and often safest in New England and New York when used as a ground cover instead of climbing on a solid upright surface.
- DE *Hedera helix baltica*.
This is a hardy small-leaved variety, with all the other good qualities of English ivy.
- S *Lonicera sempervirens*. Twiner. Trumpet Honeysuckle
Slender scarlet trumpetlike flowers in terminal clusters attractive all summer. A southern plant but nevertheless one of the best vines at Ottawa, Canada.

Rambler Roses

Somewhat gardenesque but very effective in the open if informally used in more or less parklike situations and not placed too far out in the wildest and most naturalistic parts of the course. None of these are real climbers. All must be attached to the support. A brief selection should include the following standard varieties:

- American Pillar. Deep pink, single.
Dorothy Perkins. Pink, double.
Dr. W. Van Fleet. Light shell pink, double, beautiful in bud.
Hiawatha. Deep crimson, single.
Memorial Rose, White, single, very late, dark glossy foliage.
Paul Scarlet Climber. Scarlet, semi-double.
Tausendschon. Pink, flushed rose, semi-double.
White Dorothy Perkins. White, double.

Wisteria

There are two main types, the Chinese, *W. sinensis*, and the Japanese, *W. floribunda*. In the Chinese wisteria the flower clusters are about 1 foot long and all the flowers of one cluster open about the same time. In the Japanese wisteria the flower clusters are about 1½ feet long and the flowers of one cluster open gradually from base to tip. Both types have purple flowers blooming at lilac time and both have white-flowered varieties. The Japanese type is more hardy and often has been called *Wisteria multijuga*, but correctly this name should be restricted to a long-flowered variety of the Japanese wisteria called *Wisteria floribunda macrobotrys*. In this variety the flower clusters are 2 to 3 times as long as the type, i. e., 3-4½ feet long, and the effect of such long clusters with the flowers opening slowly from base to tip is not so pleasing as in either the Chinese wisteria or the normal Japanese wisteria. However, the Chinese wisteria is not so hardy and the flower buds are quite regularly injured in northern New England and New York. At Ottawa, Canada, *Wisteria chinensis* will not bloom unless laid down and protected over winter.

Both Rehder and Wilson have spelled "Wisteria" with an "a" (Wistaria) but *Standardized Plant Names* retains the original spelling as used by John Nuttall in 1818. Bailey in his new *Hortus* also uses "Wisteria" and explains the matter fully on page 8, *Hortus*, 1930.

Other good climbing vines are the following:

Actinidia arguta, a twiner with bold foliage and very vigorous growth. It is tall-growing but has winter-killed at Ottawa. *Aristolochia sipho*, a very dense twiner with large leaves. *Clematis jackmani* and variety *alba* (gardenesque) and *C. montana rubens*. *Hydrangea petiolaris*; another vine for brick and stone, deciduous and very hardy, with white flowers in early June. *Lonicera japonica*

halliana (Hall honeysuckle) and *L. henryi*. *Polygonum auberti*, the China fleecevine, which is a good twiner for screening and also produces a mass of white flowers in light, airy clusters on the ends of the shoots in September and October.

Group 2. Ground Cover (6-12 inches)

DE *Alyssum gemonense*. Gardenesque.

DE *Alyssum saxatile*. Gardenesque.

Goldentuft

These two plants are very similar, but *gemonense* has broader and shorter leaves and more deeply notched petals. Both have dense, white, woolly foliage and make excellent low masses for the rock garden or dooryard. They are literally covered with yellow mustardlike flowers at the same time as the early white candytuft (*Iberis tenoreana*). This and the later-blooming *Iberis sempervirens* are also evergreen and of similar habit, so that the two (*Alyssum* and *Iberis*) make a very good yellow and white combination in May.



Ground-Cover Plants and Rock Garden

This is one of the views presented to the player as he stands at the 18th tee of the Scarsdale Golf Club, Hartsdale, N. Y. In the foreground is seen a portion of a rock garden with its ground-cover plants. The club house is seen in the distance.

EP *Arctostaphylos uva-ursi*.

Bearberry

Grows best in full sun and in a poor soil usually containing much sand, gravel, or stone.

EP *Gaultheria procumbens*. Acid soil.

Wintergreen

Tolerates shade but bronzes beautifully in winter sun. Berries red.

DEP *Hedera helix*.

English Ivy

A vine which is not quite hardy and which normally climbs by rootlike holdfasts on a solid surface but which is often safer and very appropriate as ground cover especially in shade if not too dry.

DE *Hedera helix baltica*.

This is a hardy small-leaved variety, with all the other good qualities of English ivy.

DE *Iberis sempervirens*. Gardenesque.

Evergreen Candytuft

DE *Iberis tenoreana*. Gardenesque.

Tenore Candytuft

These two little candytufts and the two *Alyssums* mentioned above

make an interesting color combination both in flower and foliage. All four are dense and evergreen and very effective in the rock garden or low border. The flowers are so abundant that they make a perfect mass of color, yellow in *Alyssum* and white in *Iberis*. The foliage is also contrasting for it is silvery in *Alyssum* and dark green in *Iberis*.

- EP *Juniperus conferta*. Shore Juniper
Requires sun. Vigorous grower with lively green foliage and informal, uneven growth. Not hardy in Canada.

- EP *Mitchella repens*. Partridgeberry
Acid soil, tolerates shade, grows slowly and close to the ground. Leaves small, berries red. Excellent plant for the rock garden.

- E *Pachysandra terminalis*. Japanese Pachysandra
Best in shade and good under trees where grass does not grow provided soil is not dry. It also makes a fine background for spring bulbs which come up through it.

- Rosa wichuriana*. Memorial Rose
Dainty single, white flowers in July and wonderful dark, glossy foliage. Most effective when running over a stone pile or other soil mulch which keeps down the competing grass and weeds.

- E *Vinca minor*. Common Periwinkle or Blue Myrtle
Endures shade just as pachysandra does, but in addition it will grow better in the sun and has blue flowers in middle May and a darker, denser foliage.

Other ground-cover plants are the following, all being evergreen except *Cytisus beanii*, *Vaccinium pennsylvanicum* and *Zanthorrhiza apiifolia*:

Cotoneaster dammeri, also called *C. humifusa*; not quite hardy north of New York City. *Cytisus beanii*. *Euonymus radicans acutus*. *E. radicans minimus* (dwarf like *Mitchella* but not requiring acid soil). *Juniperus chinensis sargentii*. *J. horizontalis* and variety *douglasii*, which has permanent blue foliage. *J. procumbens*. *Mahonia repens*. *Phlox subulata*; makes a perfect sheet of color in the rock garden in early May. *Rubus hispidus*, requiring moisture and acid soil and doing well in shade. *Vaccinium pennsylvanicum* (lowbush blueberry), which is a little bush 12 inches high requiring acid soil and spreading slowly by underground stems; it makes excellent ground cover in open woods, helps to hold the leaves, provides food for the birds, and colors red in the autumn. *Zanthorrhiza apiifolia* (yellow-root).

Group 3. Dwarf Shrubs (1½-3 feet)

- DEP *Azalea amoena*. *A. kinodegiri*. *A. ledifolia alba*. See Azaleas (group 4).

- DP *Azalea poukanensis*. See Azaleas (group 4).

- DP *Berberis thunbergii minor*. Formal. Box Barberry
Excellent low hedging. Does not carry the wheat rust.

- E *Berberis triacanthophora*. Three-spine Barberry

- DE *Berberis verruculosa*.
For discussion of the best four evergreen barberries, including the two just mentioned, see group 4.

- DEP *Buxus microphylla koreana*. Formal. Korean Box
This little box may be kept lower by clipping and is a little more hardy than the older dwarf box from Europe, but it has a lighter, more yellow-green color.

- DEP *Buxus sempervirens suffruticosa*. Dwarf Box
This is the standard evergreen edging for garden paths but it is not hardy in the North without special care.

- D *Cotoneaster apiculata*. 3-4.
Forms a broad hummocklike mass with abundant large orange-red berries. This is one of the most promising of Wilson's new Chinese cotoneasters.

- Cotoneaster horizontalis perpusilla*. Rock Cotoneaster
Broad and flat with red berries.

- DEP *Daphne cneorum*. Rose Daphne or Garland Flower
Neat little shrub with fragrant pink flowers blooming with Japanese quince and *Spiraea prunifolia plena*. Requires poor, well-drained soil.
- DP *Deutzia gracilis*. Slender Deutzia
White flowers (with lilacs). A favorite dwarf shrub but not always hardy north.
- DE *Euonymus radicans*. Wintercreeper
DE *Euonymus radicans carrierei*. Glossy Wintercreeper
DE *Euonymus radicans vegetus*. Bigleaf Wintercreeper
All three forms of this euonymus will become bushy when no climbing surface is available. The two varieties have larger leaves than the type. *Carrierei* is the glossy one and also has leaves which are longer, i. e., more oval than those of *vegetus*, which are dull and often quite round. Both *carrierei* and *vegetus* fruit freely, but the smaller-leaved plant which we call *E. radicans* will not fruit except on those branches which develop the larger leaves of the varieties *carrierei* and *vegetus*.
- DP *Hydrangea quercifolia*. 3-4. Oakleaf Hydrangea
This is a southern plant with bold foliage which is rusty hairy beneath. It seldom blooms in the North but if pruned to the ground each spring it will produce a very handsome dense foliage mass, 3 to 4 feet high.
- E *Juniperus communis*. Common Juniper
This is the low wide-spreading juniper of New England pastures. The lowest form is variety *depressa*. From this it varies to an upright, columnar plant of which there are two well-known varieties, the Irish and the Swedish junipers. See group 4.
- E *Juniperus horizontalis plumosa*.
This is a relatively new juniper with flat top, horizontal spreading branches, and characteristic reddish-purple winter color. It makes a distinct winter accent. By some catalogues it has been called *J. communis depressa plumosa*.
- DE *Juniperus sabina tamariscifolia*. Tamarisk Juniper
This is neat and solid with short horizontal branches which produce wonderful highlights and shadows. It is one of the most attractive dwarf types.
- EP *Leucothoe catesbaei*. Drooping Leucothoe
A broadleaf evergreen which on Long Island turns a beautiful bronze purple in open sun, but should have partial shade farther north. Requires acid soil.
- DP *Ligustrum lodense*. Formal. Lodense Privet
This is a horticultural name for a new dwarf variety of the English privet (*Ligustrum vulgare*). It is neat and compact, but is subject to the same twig blight which troubles the English privet, which see in size group 5.
- EP *Mahonia aquifolium*. Oregon Hollygrape
Foliage is dark and usually glossy and ordinarily suffers unless it has winter shade.
- DEP *Pieris floribunda*. 3-4. Mountain Andromeda
Very neat little evergreen, broad and rounded with a mass of white flowers in early May. The flower buds are greenish white in small, attractive, upright clusters all winter. Requires acid soil.
- Prunus glandulosa sinensis*. Gardenesque. Flowering Almond
Flowers double pink before the leaves appear in spring and coincident with the old bridalwreath (*Spiraea prunifolia plena*).
- Rosa rugosa repens alba* (*R. Paulii*).
A hybrid of *Rosa rugosa* with characteristic Rugosa thorns and foliage (dark, glossy and wrinkled) but special, low, moundlike growth with trailing stems and attractive, large, white flowers.
Two other Rugosa hybrids of similar habit are Max Graff (pure pink) and Lady Duncan (deep salmon pink). The latter is an old cross between *R. rugosa* and *R. wichuriana* by the late Jackson Dawson, first superintendent of the Arnold Arboretum. Both have the

same *Rugosa* foliage, and combined with the White Pauli should make a wonderful low landscape group, very hardy, with good foliage, and large attractive flowers.

- DP *Spiraea bumalda* Anthony Waterer. Formal. Anthony Waterer Spirea
Red flowers in flat clusters in July, blooming with Jackman clematis and Dorothy Perkins rose.

- D *Symphoricarpos vulgaris* (*S. orbicularis*). 3-4. Coralberry or Indian Currant
A tough plant for holding banks. It grows in poor soil and spreads by underground stems and by branches which bend and take root. Red berries all winter.

- EP *Taxus baccata repandens*. Spreading English Yew
Hardest variety of English yew but needs some protection in middle New York. Arching branches produce broad rounded mass.

- DE *Taxus cuspidata nana*. Formal. Dwarf Japanese Yew
All *Taxus* tolerate shade and have a very dark green foliage, almost black. The berries are red and the sexes are separate; therefore it is advisable not only to select female plants but also to have some male plants nearby. Very hardy.

- DE *Thuja occidentalis* "Little Gem." Formal. Little Gem Arborvitae
Twice as wide as high and much softer in appearance than the globe arborvitae.

- E *Yucca filamentosa*. Common Yucca
This and a more narrow-leaved form called *Y. glauca* make bold tufts or rosettes of swordlike leaves which are 1½ to 2 feet tall. The stems are short and usually underground. The flowers are creamy white in clusters on an upright stalk 4 to 5 feet tall in July.

Other dwarf plants in size group 3 are the following:

Deciduous.—*Amorpha canescens*. *Cydonia maulei superba*. *Diervilla trifida* (*D. lonicera*) dwarf bush-honeysuckle; spreads rapidly by underground stems into solid patches which are excellent for holding banks and for low plantings along rocky trails where views must not be obstructed.

Hypericum aureum; formal. *H. prolificum* (3-4). *Lonicera syringantha wolfei*. *Philadelphus coronarius nanus*; formal. *Potentilla fruticosa* and the white variety *veitchii*. *Ribes alpinum*; formal; neat and dense, with good foliage; should make a good hedge. *Rosa arvensis*. *R. foliolosa alba*. *R. spinosissima*. *Salix tristis*. *Symphoricarpos chenaultii*. *Viburnum opulus nanum*; formal.

Evergreen.—*Calluna vulgaris*; 12 to 15 inches, because it must be kept low and vigorous in the north by heavy pruning in early spring; acid soil. *Chamaecyparis obtusa nana*; called dwarf Hinoki cypress; formal. *Cotoneaster microphylla thymifolia*. *Erica carnea*; 6 to 8 inches; acid soil. *Lavandula officinalis*; gardenesque; prune to the ground each spring. *Pachystima canbyi*. *Picea excelsa gregoriana* and *maxwellii*; both formal. *Rhododendron arbutifolium*; acid soil. *Rhododendron myrtifolium*; formal; acid soil. *Taxus canadensis*; keeps a good green color only in shade. *Thuja occidentalis globosa*; formal and gardenesque.

Group 4. Small Shrubs (4-5 feet, i. e., below the eye level)

- EP *Abelia grandiflora*. Glossy Abelia
Not hardy north of New York City but very graceful, making good neutral "filler," with glossy foliage and small but abundant fragrant white flowers through July and August.

- Aronia arbutifolia*. 4-5. Red Chokeberry
Red berries in winter.

Azaleas

These azaleas are here listed in order of bloom from middle April to middle July, or in terms of plants from forsythias to snow-hill hydrangea and *Rosa setigera*, the prairie rose.

Our three best authorities, Rehder *Manual of Cultivated Trees and Shrubs* (1927), Bailey *Hortus* (1930), and *The Species of Rhododen-*

drons by the Rhododendron Society, Edinburgh (1930), all class the azaleas in the genus *Rhododendron*. The common hardy azaleas for the North are all deciduous, but we do use four evergreen azaleas of varying hardiness as follows: *amoena*, *hinodegiri*, *ledifolia alba*, and *kurume*. In the following list the names accepted by the above authorities will be added in parenthesis. The size group follows the name.

All azaleas require acid soil with considerable humus and a surface mulch to keep the roots cool and moist. Also the evergreen types require shelter from drying winds and some shade from the morning sun while the roots are still frozen. None of the evergreen azaleas in this list are very hardy north of New York City. *Amoena* is the most hardy and *kurume* is the least hardy. All azaleas in this list bloom before the leaves appear except *Azalea arborescens*, *A. calendulacea*, and *A. viscosa*.



Korean Azalea (*Azalea poukanensis*)

A beautiful azalea from Korea, as hardy as a Japanese barberry.

- P *Azalea dahurica mucronulata*. 4. Rosy purple. Middle April.
(*R. dauricum mucronulatum*). At least two weeks earlier than the others in this list.

The next six types, i. e., the four evergreen azaleas and *poukanensis* and *schlippenbachii*, bloom together in early May.

- DEP *A. amoena*. 3-4. Reddish purple. Early May. Formal. *Amoena Azalea* (*R. obtusum amoenum*.) This is closely related to *A. hinodegiri* and *A. kurume*, but the leaves are smaller, plant is denser like the greenhouse azalea (*A. indica*), is more hardy and has been cultivated longer, but not so long as *A. ledifolia alba* described below, and finally the color is the poorest because it contains too much magenta. It is the hardiest of the evergreen azaleas, but even then it is not safe in the North unless sheltered, and therefore can not rate with *Kalmia latifolia* or any of the three native rhododendrons (*Rhododendron carolinianum*, *R. catawbiense*, and *R. maximum*) in hardiness.
- DEP *A. hinodegiri*. 3-4. Scarlet. Early May. *Henodegiri Azalea* (*R. obtusum japonicum*.) This is second to *A. amoena* in hardiness and requires a protected situation in the North, but the color is a good bright red.

- DEP *A. kurume*. 3-4. Delicate shades in many colors. Early May. Kurume Azalea
(R. obtusum japonicum.) Third in hardiness of these three *R. obtusum* varieties and not safe above New York City. A wonderful group with a wide range of delicate pastel colors.
 The leaves of all three forms of *R. obtusum* (*amoenum*, *hinodegiri*, and *kurume*) are thin and glabrous (non-hairy) above, and shining with flattened, rusty hairs on the leaf stems and on the veins on the underside of the leaves.
- DEP *A. ledifolia alba*. 3-4. White. Early May. Snow Azalea
(R. mucronatum.) About as hardy as *A. hinodegiri* and blooms at the same time. Leaves dull and usually grayish hairy above and below.
- DP *A. poukanensis*. 3. Lavender-purple. Early May. Korean Azalea
(R. yedoense poukanense.)
- P *A. schlippenbachii*. 4-5. Beautiful large pink. Early May. Royal Azalea
(R. Schlippenbachii.) This combines beautifully with *A. poukanensis*.
- P *A. vaseyi*. 4-5. Delicate pink, almost white. Middle May. Pinkshell Azalea
(R. vaseyi.)
- P *A. kaempferi*. 4-5. Orange-red. Middle May. Torch Azalea
(R. obtusum Kaempferi.) Flowers often bleach in the sun but it is the best red azalea for the North.
- P *A. nudiflora*. 4-5. Pale pink. Late May. Pinxterbloom
(R. nudiflorum.)
- P *A. rosea*. 4-5. Bright pink. Late May. Downy Pinxterbloom
(R. roseum, Rehder.) By some authors still considered a variety of *R. nudiflorum*.
- P *A. japonica*. 4-5. Salmon-pink to salmon-red. Late May. Japanese Azalea
(R. japonicum.) This is a vigorous type with large funnel-shape flowers.
 Both the Ghent and Mollis hybrids begin in late May and continue for three weeks or more according to variety. The Ghent azaleas (often called *A. gandavensis*) are a mixture of *A. calendulacea* and other American species with *A. pontica* (*R. luteum*) from Europe and Western Asia. The latter is tender, and therefore some of the Ghent azaleas are hardy and some not. The same is true regarding the Mollis hybrids (often called *A. kosteriana*), which are a cross between the hardy *A. japonica* (*R. japonicum*) and the tender *A. mollis* (*R. molle*) from China. Azalea Louisa Hunnewell is one of these hardy Mollis azaleas.
- P *A. kosteriana* variety Miss Louisa Hunnewell. 4-5. Orange-yellow to salmon. Late May
(R. Kosterianum variety Miss Louisa Hunnewell.)
- P *A. calendulacea*. 4-5. Yellow to orange-red. Early June. Flame Azalea
(R. calendulaceum.) Flowers with the leaves.
- P *A. arborescens*. 4-5. Fragrant white. Late June. Sweet Azalea
(R. arborescens.) Flowers after the leaves.
- P *A. viscosa*. 4-5. Fragrant white. Middle July. Swamp Azalea
(R. viscosum.) Flowers after the leaves.
- D *Berberis thunbergii*. 4-5. Formal. Japanese Barberry
 The good qualities of this deciduous barberry are already well known. It is dense and round with small foliage, fiery autumn color, and scarlet berries all winter. It is the best of hedge plants to 6 feet and does not carry the wheat rust. Too formal and too cultivated for general planting on the course. Excellent near buildings, entrance drives, and gardens.
- E *Berberis* (evergreen species).
 The best four evergreen barberries for the North are *B. julianae*,

B. sargentiana, *B. triacanthophora*, and *B. verruculosa*. The first two are in group 4 and have leaves green beneath. The last two are in group 3 and have leaves white beneath. All have blue-black berries with blue-gray bloom.

B. julianae has young twigs, yellowish and somewhat ridged, and fruit with a short but distinctly projecting style at the blossom end.

B. sargentiana has young twigs, reddish and round, and fruit with a very short style which does not project.

B. triacanthophora is open and graceful, with leaves which are normal green above and less white beneath, and young twigs which are smooth and reddish.

D *B. verruculosa* is dense, with leaves which are very dark and glossy above and very white beneath, and young twigs which are warty.

B. triacanthophora is the most hardy, with *B. julianae* next. *B. sargentiana* and *B. verruculosa* are not safe in middle New York State without special care, but all four species are handsome, broad-leaf evergreens and are well worth trying.

DEP *Buxus japonica*. 4 plus. Japanese Box
(*B. microphylla japonica*.)

DEP *Buxus sempervirens*. 4-6. Common Box

The Japanese box and its dwarf variety the Korean box (see group 3) are a little more hardy than the common box and the foliage is more yellow green. For best results in northern plantings all forms of box should be given as much consideration as possible. They are all formal and gardenesque.

DEP *Chamaecyparis pisifera plumosa*. 4-6. Gardenesque. Plume Retinospora
This evergreen is not quite hardy North. It is soft and feathery in appearance provided it is kept young and vigorous by regular pruning each year. It is one of the most common plants used in the much-overdone "foundation planting" about city homes. It is really a small tree, but is listed here, instead of with the other Japanese retinosporas in group 5 or 6, because it can be restrained easily and, in fact, is much better in northern plantings if kept low and bushy by regular pruning. If this is not done some of the foliage will begin to brown and die and produce a very unsightly appearance.

D *Cornus paniculata*. 4-5. Greystem Dogwood

This has the smallest leaves and the most slender twigs of any of the shrubby dogwoods. It also spreads by underground stems and soon develops into dense, billowy masses which become covered with white berries on pink stems and later take on beautiful reddish-purple autumn tints.

DP *Cotoneaster divaricata*. Spreading Cotoneaster
EP *Cotoneaster salicifolia floccosa*. Willowleaf Cotoneaster

Cotoneasters are near relatives of the crabapples and hawthorns and are subject to the same diseases and pests. The worst of these are San Jose scale, apple-tree borer, and pear or fire blight. A winter spray will cure the scale but sanitary pruning, i. e., continual removal of old and affected parts, will be required for the borer and the blight. However, these two new cotoneasters and others mentioned elsewhere in these lists are well worth the trouble and care.

Both of these plants have attractive red berries in fall and early winter. *C. divaricata* also has wonderful red color in autumn and a good dense framework all the time. In this respect it resembles Japanese barberry, but it does not have such an even, formal shape as the barberry. *C. salicifolia floccosa* is the hardiest evergreen cotoneaster grown in the Arnold Arboretum at Boston. The habit is light and graceful, the foliage dark green and glossy (willowlike), and the fruits are orange-red in great profusion and of long duration. At the Hodenpyl estate in Locust Valley, Long Island, this plant has proved to be the most attractive of any cotoneaster in fruit.

Deutzia kalmiaeflora. Gardenesque. Kalmia Deutzia

A very graceful shrub with a mass of rather large pink flowers, light inside and darker outside, blooming with garden lilacs. It is one of the best deutzia crosses (*D. purpurascens* x *D. parviflora*) made by the French hybridizer, Lemoine of Nancy.

- D *Deutzia lemoinei* and *D. "Avalanche."* Gardenesque.
 The latter is a cross between *D. lemoinei* and *D. purpurascens*. Both *D. lemoinei* and "*Avalanche*" have white flowers in profusion at the same time as *D. kalmiaeflora*, making a good pink and white combination. They resemble a large *D. gracilis*, but are hardy, whereas the latter is not quite satisfactory in New England and New York.
- Hydrangea arborescens grandiflora.* Gardenesque Snowhill Hydrangea
 This is the best small shrub for white flower in summer. Treat it as an herbaceous perennial and cut the stems to the ground each fall. It will be more sturdy and bloom just the same.
- E *Juniperus chinensis pfitzeriana.* 4-5. Pfitzer Juniper
 A broad evergreen bush with flaring branches clothed with loose, feathery branchlets, making a very handsome, irregular effect. It fits well into rugged and picturesque situations, and always provides a fine play of light and shade because of its uneven foliage. In regions of heavy snow and ice the branches must be freed during storms because the large, loose foliage collects snow and ice quickly and may result in serious splitting of the wide-spreading branches. This has proved to be one of the best junipers for hard city conditions.
- DEP *Juniperus communis hibernica.* 4-5. Irish Juniper
 DEP *Juniperus communis suecica.* 4-5. Swedish Juniper
 Both of these junipers are formal and gardenesque and are simply narrow, columnar forms of the more bushy common juniper (*J. communis*). They are like small exclamation points in the landscape. Also they are structurally weaker than similar narrow forms of either *J. chinensis* or *J. virginiana* (described in group 5) because they do not have a sturdy central stem. The branches of the Swedish and Irish junipers start near the ground and are simply folded up in an upright position. Wherever there are severe ice and snow storms these separate upright parts must be held together in some way to prevent bad bending and breaking. The Swedish juniper is a trifle more hardy than the Irish and is not quite so even and compact in outline. Both are apt to burn in the winter on the sunny side.
- EP *Kalmia latifolia.* 4-5. Mountain Laurel
 This is the finest broadleaf evergreen for the North. The leaves do not roll up and look miserable in cold weather as those of so many hybrid rhododendrons do. It requires the same special conditions recommended for azaleas. The flowers are abundant and beautiful, white with pink bud, in middle June, with *Philadelphus coronarius* and *Rosa multiflora*.
- D *Ligustrum ibota regelianum.* 4-5. Regel Privet
 (*L. obtusifolium Regelianum.*) Very interesting horizontal growth and a mass of blue-black berries all winter. It should be grown from cuttings and not from seed, in order to preserve the special horizontal growth. It is the most attractive of all deciduous privets, and very useful in landscape planting because of its neutral horizontal habit of growth.
- D *Myrica carolinensis.* 4-5.
 An old favorite, native from Massachusetts to Florida near the coast. The entire plant is fragrant. The attractive gray berries furnished the wax for the original bayberry candles. The sexes are separate and to secure good fruiting both male and female plants must be used. The plant is dense enough to be used in semi-formal situations but is not objectionable anywhere. It does best in acid, sandy soil.
- D *Philadelphus lemoinei* in variety. Gardenesque. Lemoine Mockorange
 A wonderful group of dainty shrubs with graceful branches, small leaves, and a wealth of small, usually fragrant flowers. Common varieties are "*Avalanche*," "*Boule d'argent*," "*Candelabre*," "*Mont Blanc*," and "*Pavillon Blanc*."
 Virginal is a very popular Lemcine hybrid, but it is very different from the dainty types above. It is taller (5) with a loose, open habit of growth and abundant large, fragrant, semi-double, white flowers. It is not a good permanent type for landscape planting but is best grown in quantity in the garden for cutting.

- DE *Pinus montana mughus.* 3-6. Mugho Pine
This is the best bushy pine, dark green and dense. Some individuals are much more dwarf than others, and therefore plants needed for small rock garden situations or for other special effects should be selected in the nursery.
- Prunus triloba plena.* 4-5. Gardenesque. Doubleflowering Plum
Called for a long time flowering almond, but now this name is restricted to varieties of the smaller-growing *Prunus glandulosa* described in group 3. The doubleflowering plum is an old favorite in New York State. In Ottawa, Canada, it has been perfectly hardy and has bloomed profusely provided it is grown on its own roots from soft-wood cuttings and not top-grafted on European stocks.
- DEP *Rhododendron carolinianum.* Acid soil. Carolina Rhododendron
This is the smallest and earliest of our native rhododendrons. The flowers are rosy pink at the same time as pinxterbloom (*Azalea nudiflora*) and garden lilacs. The leaves look more cheerful in cold weather and do not roll up so much as the leaves of many hybrid rhododendrons do. See group 5 for rhododendron planting table showing size, color, and time of bloom.
- Rhus canadensis.* Fragrant Sumac
This is the lowest sumac. The leaves have 3 leaflets like a big clover leaf and take on a gorgeous red color in autumn. The plant has spreading stems which rest upon the ground producing a broad mass of good foliage below the eye level. The twigs are aromatic when broken.
- Rosa lucida (R. virginiana).* Virginia Rose
This blooms in middle June with *Philadelphus coronarius*. It has pink flowers and glossy foliage and red stems. The winter attractiveness is increased by cutting the stems to the ground in spring every 3 or 4 years, which removes disease and scale and also stimulates vigorous growth. This is a regular practice in the roadside borders in the Arnold Arboretum. At that time the border can be easily cultivated, weeded, and top-dressed with manure before new growth starts.
- P *Rosa rugosa.* Rugosa Rose
Very hardy, upright-growing rose with large flowers, handsome dark-green wrinkled foliage, large red fruits, and rich orange-yellow autumn color. It blooms in early June, with the Scotch rose (*Rosa spinosissima*) and the late lilac (*Syringa villosa*). The following varieties and hybrids are good: *Agnes*, double orange-yellow; *alba*, single white; *Amelie Gravenaux*, double carmine blooming through the season; *Blanche Double de Coubert*, double white blooming through the season; *Sarah Van Fleet*, pink. For best results and to avoid disease and scale, vigorous renewal pruning should be practiced by cutting out some of the old stems each year. If this maintenance can not be given, one should not plant Rugosa roses in quantity.
- Rosa setigera.* Prairie Rose
This has large pink flowers and rather coarse, bold foliage with wide, arching stems, making a broad, informal mass, usually below the eye level. It blooms in middle July, a month after *Rosa lucida* but at the same time as the white, low, trailing *Rosa wichuriana*.
- Rosa spinosissima altaica.* Altai Rose
The Altai rose is early (with garden lilacs and *Rosa hugonis*) and white with dainty foliage. It is simply a larger variety of the Scotch rose listed in group 3.
- Spiraea arguta.* 4-5. Gardenesque. Garland Spirea
Spiraea billiardi. Gardenesque. Billiard Spirea
Spiraea trichocarpa. Gardenesque. Korean Spirea
Three small spireas usually below the eye level. The garland spirea is the first spirea to bloom, with tiny white flowers similar to but earlier than those of *S. thunbergi*. The latter is not quite hardy North, and has narrower leaves and very slender twigs producing the most dainty and feathery effect of any spirea. (See additional list following.) The Korean spirea is medium in time of bloom with arching branches and dainty white flowers blooming just after the larger

and more commonly planted Van Houtte spirea. *S. billiardi* is an old reliable for pink flowers in summer at the same time as the snowhill hydrangea and the prairie rose just mentioned. The flowers of the Billiard spirea are in narrow, upright spikes similar to those of *S. tomentosa*, the steeplebush of New England, which however is the last of all spireas to bloom and appears later in the additional list.

E *Taxus cuspidata*. 4-5. Japanese Yew

DEP *Taxus media hicksi*. 4-5. Formal. Hicks Yew

These two yews are very similar except in form. Both are hardy and slow-growing, with very dark foliage, and red berries only on fruiting plants because the sexes are separate. They are the finest narrowleaf evergreen shrubs for northern planting. *T. cuspidata* has wide-spreading branches which, however, can be clipped easily into any form desired. Hicks yew is narrow and upright, like the older Irish yew, which is not hardy North, and also like the Irish juniper, which is used in the North although its foliage usually burns some on the sunny side. Hicks yew will probably grow 10 feet tall in time and is, of course, very positive both in form and color. Where ice and snow are troublesome it should be pruned to one stem to prevent bending and breaking.

DP *Thuja occidentalis wareana*. 4-5. Formal. Ware Arborvitae

This is the old Siberian arborvitae. It is narrow-oval and dense and therefore positive in appearance. But it has good color and is slow-growing and easily restrained, and is one of the most hardy and satisfactory varieties for the North.

DE *Tsuga canadensis*. 4-7. Canadian Hemlock

This is the most graceful northern evergreen. It is a tree, but grows so slowly and has such small foliage and such close branching that it can be clipped into hedges or restrained regularly into beautiful bushes, either small, medium, or large, as the case demands. I have such a planting at my door step, a bushy little hemlock with a clump of English lavender set in front of it. The gray green of the lavender against the dark green of the hemlock is interesting every day in the year.

DE *Tsuga caroliniana*. 4-7. Carolina Hemlock

All the good things said about the Canadian hemlock are true of the Carolina hemlock, and more too. It is just as hardy north, and even more beautiful because the foliage is not so flat. The leaves spread more uniformly all around the twig, as in spruce, which with the drooping branchlets makes the whole effect more soft and feathery.

DP *Vaccinium corymbosum*. 4-5. Highbush Blueberry

This is the commercial blueberry. It has dense growth, good foliage, and gorgeous red color in autumn. Acid soil is necessary.

Viburnum acerifolium. Mapleleaf Viburnum

A very useful plant for shade, and especially natural as under-planting in woodlands. The berries are black. The autumn color ranges from bronzy purple to pale rose.

P *Weigela hybrida* "Eva Rathke." Eva Rathke Weigela

P *Weigela rosea* (*Diervilla florida venusta*). Pink Weigela

These shrubs are gardenesque types for flower. *W. rosea* is pink at lilac time and "Eva Rathke" is red a month later. The flowers of both are tubular and very abundant. The general form and appearance of these shrubs must be improved yearly by considerable renewal pruning immediately after flowering to keep the plants young and vigorous. Some winterkilling may require a little pruning in early spring also.

Additional deciduous plants in size group 4 are the following:

Buddleia davidi magnifica. Gardenesque. Best treated as an herbaceous perennial. Cut the stems to the ground each fall. Flowers are rose purple with orange eye in long, dense, nodding spikes in late July and August, with *Bignonia radicans* and *Clethra alnifolia*. *Calycanthus floridus*; gardenesque. *Caragana frutex grandiflora*. *Cydonia japonica grandiflora*; 4-5; gardenesque. *Daphne mezereum*; this is

quite regular in outline and also dense and therefore somewhat formal, but it has escaped from cultivation in middle New York and become a welcome feature in the spring landscape because of its early purple flower before the shadbushes (*Amelanchier*) or redbuds (*Cercis*) are in bloom. *Kerria japonica*; 4-5; gardenesque; this has dainty yellow flowers in middle May with *Cornus florida*, *Malus floribunda*, and *Rhodotypos kerrioides*, the jetbead, sometimes called white kerria. The stems are slender and bright green all winter but they winterkill partly in the North and require regular spring pruning. Unless this care can be given one should not plant kerria in quantity in the North. There is a double variety (*K. japonica plena*) that looks like a small garden rose. *Ligustrum ovalifolium*; 4-5; formal; this will grow much larger farther South, but it is continually killed back in the North and therefore can function only in the smaller-size groups. *Lonicera canadensis*. *Ribes alpinum*; 3-4; see group 3, additional list. *Robinia hispida*; rose acacia; loose, sprawling shrub, often sprouting objectionably from underground parts. *Rosa hibernica*, hybrid of *R. spinosissima*, the Scotch rose, and similar but taller with flowers pink instead of white. *Rubus odoratus*, 4-5; coarse shrub for moist shade. *Spiraea thunbergi*; 4-5; somewhat tender; gardenesque. *Spiraea tomentosa*; last spirea to bloom, with pink flowers in dense steeplelike clusters in August; loves wet soil. *Tamarix pentandra*; 4-5; light, airy foliage and large, feathery clusters of pink flowers in summer; it usually winterkills some, but the necessary spring pruning does not interfere with the summer flowers. *Viburnum carlesii*; this is from Korea, with small, white flowers, pink outside. It is both fragrant and early and has sometimes been called the first viburnum to bloom, but is really the third to bloom because it comes about ten days after the little-known native *Viburnum alnifolium* (hobblebush), 5, and about twenty days after the newly introduced *Viburnum fragrans*, 5, from China. This last one is not quite hardy in middle New York except in sheltered situations and well-drained soil.

Additional evergreen plants in size group 4 are the following:

Ilex glabra; inkberry; fairly hardy, sexes separate, berries black. *Juniperus excelsa stricta*; Spiny Greek juniper; plant is both dense, conical, and upright, and therefore very positive and formal. *J. sabina*; Savin juniper; plant has a wide, upward, flaring habit of growth that makes it quite positive and picturesque. *J. virginiana kosteri* and *tripartita*. *Pieris japonica*; not quite hardy but more handsome than *Pieris floribunda*, mentioned in group 3. *Rhododendron boule-de-neige*; formal. (See group 5 for rhododendron planting table.) *Rhododendron micranthum*; Manchurian rhododendron; this is an old, little-used but perfectly hardy type, with small white flowers and small leaves which are brown-dotted and aromatic; it is interesting, although not showy, and should prove valuable in the future breeding of hardy American rhododendrons.

Group 5. Medium Shrubs (6-8 feet, i. e., above the eye level)

DP

Acer palmatum sanguineum. 5-6.

Scarlet Japanese Maple

Often the older catalogues have listed this Japanese maple under the name *Acer polymorphum*. This variety *sanguineum* has bright red leaves with 5 to 9 deep lobes, and is the most commonly planted form. There are many others, varying in depth of lobing, and in color from green to dark purplish red. A closely related form is *Acer japonicum parsoni*. This is called the fernleaf maple and has almost completely-divided leaves with 9 to 11 narrow lobes which are bright green turning red in autumn. The bloodvein maple is quite similar to the preceding, but the leaves are dark red all the time. All these varieties are small, dense, slow-growing trees with quite regular, rounded outline, slender twigs, and delicate foliage. They are too "cultivated" or at least too "parklike" in character for general planting on the course.

Aesculus parviflora. 5-6.

Bottlebrush Buckeye

This is a southern plant with coarse growth like sumac. It is most

valued for its white summer flowers, which appear in narrow, upright spikes, like candles, above the bold foliage.

Aronia arbutifolia. 4-5. See group 4.

- DEP *Chamaecyparis pisifera filifera*. 5-6. Thread Retinospora
This is a variety of the Sawara cypress from Japan. It has minute leaves on dense, pendulous branchlets, and has proved perfectly hardy at Ottawa, Canada, where the other species and varieties of Japanese *Chamaecyparis* have not been satisfactory. It is gardenesque but excellent for hedges.

- P *Clethra alnifolia*. Summersweet
Best in moist, acid soil. Interesting because of its white, fragrant, summer flowers in narrow, upright spikes.

Cornus alba. Tartarian or Redstem Dogwood
A very vigorous shrub growing in broad, moundlike masses. It has strong foliage, white berries, and red stems, which make it one of the best shrubs for red color in winter. Remove old stems and encourage new growth, for this has the brightest color. Our native red-osier dogwood (*C. stolonifera*) is just as good if not better, both in color of twigs and broad habit of growth. It has a golden-twig variety (*C. stolonifera flaviramea*), which combines well with the red types.

- D *Cornus paniculata*. 4-5. See group 4.

- D *Euonymus alatus*. Formal. Winged Euonymus
(*Evonymus alata*.) This shrub is broad and rounded in outline, has dense growth, and is ablaze in the fall with bright rosy autumn color and scarlet fruits resembling the berries of bittersweet (*Celastrus*). The twigs are conspicuously marked with thin ridges or "wings" of cork.

Forsythia intermedia spectabilis.

Showy Goldenbell

- D *Forsythia suspensa*. Drooping Goldenbell
Both types have showy yellow flowers in middle April and are hardy, although some flower buds may be injured in severe winters just as those of flowering dogwood (*Cornus florida*) are winterkilled sometimes. The variety *spectabilis* is the best of all forsythias for flower, both in abundance and in deep yellow color. A related form called the greenstem goldenbell (*F. viridissima*) is not quite hardy and will require yearly pruning of winterkilled twigs. The drooping goldenbell (*F. suspensa*) has the most graceful, drooping form and makes an ideal "facer"; it will even hang over a wall, and is excellent for planting on a slope at a corner to "absorb" a change in grade from one level to another.

The forsythias are very welcome shrubs because they make the first big show of yellow color in spring. Although they are all foreign types (natives of China) yet they are neutral enough in form and foliage and also tolerant enough of shade to be planted more generally both in the open and scattered through the edges of the woods except in the really wild parts of the course where, of course, only local or native plants should be used.

- DP *Hibiscus syriacus*. 5-6. Formal and gardenesque. Shrub-Althea
This is not quite hardy in northern New York, but elsewhere is a desirable, dense, upright shrub often used for hedges but mainly for its large hollyhocklike flowers in many colors, according to variety, in late August and September.

Hydrangea paniculata. 5-6.

Panicle Hydrangea

Hydrangea paniculata grandiflora. 5-6. Gardenesque.

Peegee Hydrangea

- P *Hydrangea paniculata praecox*. 5-6.

The first of these three hydrangeas is the original single-flowered type. It has handsome pyramidal flower clusters composed of small fertile flowers which are creamy white mixed with some larger pure white sterile flowers, just as in the better-known European cranberry-bush or Guelder rose (*Viburnum opulus*).

The Peegee hydrangea has pyramidal clusters of nearly sterile flowers (i. e., flowers that do not develop fruits) which are first white

and then pinkish as they mature. It is distinctly gardenesque and is probably the most commonly planted shrub in the North. It is so common in dooryards, gardens, cemeteries, and parks that one grows weary at the sight of it, and, yet in spite of this commonness and cheapness, it is a very showy flowering shrub for late summer when other blooms are scarce in the shrub border.

The variety *praecox* is similar to *H. paniculata* but blooms at least a month earlier than either of the other two (i. e., in middle July) about the same time as the small snowhill hydrangea (*H. arborescens grandiflora*).

All these hydrangeas are tall and rather coarse both in framework and in foliage, and therefore they are usually planted most effectively with small shrubs in front, like *H. arborescens grandiflora* or *H. quercifolia*, to make a good "facer," and small dense trees behind, like crab-apples (*Malus*) or thorns (*Crataegus*) or yellowwood (*Cladrastis*) to give a proper setting and background for the showy flowers in summer.

P *Ilex verticillata*. Common Winterberry

This is a native of swamps and therefore succeeds best in wet places. Its red berries are very attractive all winter until blackened by zero weather. The sexes are separate and to secure good fruiting both male and female plants must be used.

DEP *Juniperus chinensis*. 5-6. Formal. Chinese Juniper

DEP *Juniperus virginiana*. 5-6. Formal. Red Cedar

Each of these is normally a dense, pyramidal, slow-growing tree with many varieties ranging in size from groups 3 to 6. In the larger sizes (5-6) there is one Chinese variety called the Column Chinese juniper (*J. chinensis pyramidalis*) which is particularly narrow and can be secured from nurseries in both a blue and green form. The red cedar also has similar varieties as follows: *J. virginiana cannarti*, which is dense, pyramidal, and dark green; *J. virginiana glauca*, which is pyramidal with blue foliage; and *J. virginiana schottii*, which is narrow with blunt, scalelike leaves which are bright green. All of these types of junipers are positive in form and sometimes in color also and are almost sure to produce a spotted, disjointed effect unless thoughtfully massed together in an informal way. The sexes are separate and the beautiful blue-gray berries can be secured only by selecting fruiting plants. The flowers are wind-pollinated, and good fruits will develop on the female plants as long as one or two male plants are present to furnish the pollen.

Kolkwitzia amabilis. Beauty Bush

This is a graceful bush with open arching branches and beautiful pink flowers in spring just after the pinkster flower (*Azalea nudiflora*) and garden lilacs and just before the mountain laurels are at their best. It is a recent introduction from China by the late E. H. Wilson, keeper of the Arnold Arboretum, and, like other introduced flowering types, is still new and somewhat gardenesque. But the plant is neutral in appearance and not essentially different from the pleasing growth of the Chinese forsythias which we have already welcomed to our park plantings and even to still more natural landscape plantings. In fact, the beauty bush is not any more unusual in appearance than our dainty pinkster flower or wild honeysuckle (*Azalea nudiflora*), whose pink flowers are so beautiful in late May. The beauty bush has pink flowers, which are later, and prolong the interest into early June. Lastly, the beauty bush will grow equally well in acid or alkaline soils, and so really it is destined to a wider range of usefulness than the azalea, which is limited to soils which are acid.

D *Ligustrum amurense*. Formal Amur Privet

DP *Ligustrum vulgare*. Formal. European or English Privet

Both of these ligustrums are standard, hardy, dense, upright-growing hedge plants for the North. The European privet is the more handsome of the two. It has thick, glossy leaves which hang late in the fall, and black, shining berries in attractive upright terminal clusters. But unfortunately the European privet is subject to a serious twig blight called *Glomerella cingulata*, for which no satisfactory control measures have been developed to date. The blighted areas

show the usual brown, sunken appearance, and spread rapidly and soon girdle the stems. The only treatment is sanitary pruning (cutting out of diseased parts) together with frequent spraying with Bordeaux mixture. In bad cases this often results in the cutting out of the entire hedge. On the other hand, the Amur privet, which has duller leaves and hairy twigs (just as in Regel privet), is immune to this disease and therefore becomes the best privet for tall hedges in the North.

DPS *Lonicera fragrantissima*. Winter Honeysuckle

About as hardy as Hall honeysuckle.

D *Lonicera morrowi*. Morrow Honeysuckle

D *Lonicera tatarica*. 5 and over. Tatarian Honeysuckle

Honeysuckle bushes are planted not only because they are relatively cheap and quick-growing but also because they are dense, with normal form, good foliage, and attractive red berries in early summer. The winter honeysuckle is not quite hardy North (about the same as Hall honeysuckle vine), but it has firm, leathery, semi-evergreen foliage and very fragrant, small, white flowers in early spring even before forsythias are in bloom. Morrow honeysuckle is a particularly broad type with branches facing to the ground, making beautiful mounds twice as wide as high. The foliage is gray-green (hairy underneath) and the berries are abundant and dark red in early July at the same time as Dorothy Perkins roses and the red flowers of Anthony Waterer spirea. The Tatarian honeysuckle is more upright and is the tallest of the three. It has foliage and twigs which are glabrous (non-hairy) and berries which are bright red following abundant flowers which may vary from white to pink or rose according to variety. The other two honeysuckles have flowers which are only white or yellowish and not showy. The Tatarian honeysuckle is an old reliable type and has been planted in New York State as commonly as lilacs and the old-fashioned sweet syringa or mockorange (*Philadelphus coronarius*). The best varieties for flowers are *elegans* and *alba grandiflora* (white) and *parvifolia* and *speciosa* (deep pink to rose). The best type for berries is a hybrid between *L. morrowi* and *L. tatarica* called *Lonicera bella rosea*. It has pink flowers, and its fruits so heavily that the branches are weighed down and the whole bush is red with crowded berries.

D *Magnolia stellata*. 5-6. Formal. Star Magnolia

This is the first magnolia to bloom, just after the forsythias and the old-fashioned *Daphne mezereum*. The flowers are white and more dainty and starlike than those of the more common, later-blooming, tulip-flowered magnolia. The leaves also are smaller and more closely crowded together, producing a foliage condition which is often characterized as possessing "fine texture." The star magnolia slowly grows into a large bush, solid and stately, with a rich, elegant appearance somewhat resembling a big, dignified boxwood.

D *Malus sargentii*. Sargent Crab

This is the lowest crabapple. Like Morrow honeysuckle, it is twice as wide as high, "faces" almost as well, and is so dense and twiggy that it makes an ideal nesting site for birds. The flowers cover the bush in a perfect sheet of white. For discussion of other flowering crabapples see group 6. All crabapples are subject to scale, borer, and blight, as mentioned earlier under Cotoneaster in group 4. Eternal vigilance is necessary, but they are worth it.

D *Philadelphus coronarius*. Gardenesque. Mockorange

This is an old favorite in American gardens since Colonial days and by many has been called sweet syringa. The plant is dense and vigorous and has succeeded even under very trying city conditions. It is still the most fragrant and satisfactory of all the large-growing *Philadelphus*. Its flowers are creamy white and very fragrant in middle June with *Kalmia latifolia* and the Tausendschon rose. A golden-leaved variety called *aureus* is the best deciduous shrub with yellow foliage.

Philadelphus virginal (*P. virginalis*).

Hybrid between *P. lemoinei* and probably *P. nivalis*. See note under

P. lemoinei, group 4.

Prunus triloba plena.

Double-flowering Plum

See group 4.

Rhododendrons

Planting Table of Fifteen Hardy Types

Size 4 (4-5 feet). Size 5 (6-8 feet). Size 6 (10-15 feet).

Early means late May with garden lilacs (*Syringa vulgaris*).

Medium means early June with late lilac (*S. villosa*) and *Rosa rugosa*.

Late means middle June with *Kalmia latifolia* and *Robinia pseudo-acacia*.

Hybrid rhododendrons and also *R. carolinianum* are covered with a mass of bloom before leaf growth starts; but *R. maximum*, which is our largest native rhododendron, blooms so late in June that leaf growth reduces the flower effect considerably.

Rhododendrons require the same conditions mentioned for azaleas in group 4. All in this list are thick-leaved and evergreen.

Color	Name	Size	Season
White	Album elegans	6	Medium
	Boule de neige	4	Early
	Catawbiense album	5	Medium
Pink	Carolinianum	4	Early
	Henrietta Sargent	4-5	Medium
	Lady Armstrong	5	Early to medium
	Mrs. Charles Sargent	5	Medium to late
	Roseum elegans	5-6	Medium
Red	Atrosanguineum	5	Early
	Caractacus	6	Medium to late
	Charles Dickens	5	Early to medium
	H. W. Sargent	5	Late
Purple	Everestianum (very light purple) ..	5	Early
	Purpureum elegans (dark purple) ..	5	Medium to late
	Purpureum grandiflorum (light purple)	5	Medium to late

Rhus copallina, 5-6.

Shining Sumac

Best of the sumacs because foliage is glossy and also brilliant red in autumn.

Rosa harisoni. Deep yellow. Gardenesque.

Harison's Yellow Rose

Rosa hugonis. Light yellow.

Hugonis Rose

Rosa multiflora. White.

Japanese Rose

Rosa multiflora cathayensis. Pink.

Cathay Rose

All four are early single roses but *R. hugonis* is first in late May, with garden lilacs. *R. harisoni* is second in early June, with *R. rugosa* and *Azalea calendulacea*. The other two bloom in middle June, with *Kalmia latifolia* and *Philadelphus coronarius*.

R. multiflora grows into great moundlike masses covered with abundant white flowers and a mass of small red fruits all winter. Its pink variety *cathayensis* is the parent of crimson rambler and is really more handsome than *R. multiflora*.

Sambucus canadensis.

American Elder

This is very happy and effective near water. The broad, flat flower clusters are creamy white in late June with Pride-of-Rochester deutzia and *Rhododendron maximum* just when the red berries of *Sambucus pubens* and *racemosa* are at their best. The white flowers and red berries of these different elderberries make a good combination. The black berries of *S. canadensis* make good bird food in late summer.

Spiraea arguta, 4-5. See group 4.

Spiraea prunifolia plena. Gardenesque.

Bridalwreath

Spiraea vanhouttei. Gardenesque.

Van Houtte Spirea

All are favorites for white flower in spring. Bridalwreath blooms

in early May very shortly after the Thunberg spirea and with the old-fashioned flowering plum or almond (*Prunus triloba plena*). The flowers are double and no seeds follow to disfigure the glossy foliage which turns a beautiful red in autumn. Van Houtte spirea blooms in late May with garden lilacs and the little pinkster flower (*Azalea nudiflora*). It is still the most graceful and best spirea.

DEP *Thuja occidentalis*. 5-6. Formal. American Arborvitae

This and the cedars (*Juniperus chinensis* and *virginiana*) are the best slow-growing, narrow evergreens of large size for the North. See *T. orientalis* in additional list. Thujas will stand shade, such as crowding against each other or against the house, without losing their leaves, and therefore are better for hedges and for close planting against solid objects than any *Juniperus*. However, the Thuja is a swamp type and loves cool, moist soil. If not so located it will require water in the hot summer time. Also a soil mulch to prevent drying of the roots will be very helpful.

There are many varieties in addition to the dense, slow-growing Ware arborvitae mentioned in group 4. One of the best and most narrow types is *Thuja occidentalis douglasi pyramidalis*. Another variety, called *spiralis*, has handsome, dark green foliage better than the type.

DE *Tsuga canadensis*. 4-7. See group 4. Canadian Hemlock

DE *Tsuga caroliniana*. 4-7. See group 4. Carolina Hemlock

D *Viburnum dentatum*. 5-6. Arrowwood

D *Viburnum dilitatum*. Linden Viburnum

Viburnum opulus. 5-6. European Cranberrybush

Viburnum opulus sterile. 5-6. Gardenesque. Common Snowball

Viburnum tomentosum. 5-6. Doublefile Viburnum

Viburnum tomentosum plicatum. 5-6. Gardenesque. Japanese Snowball

D *Viburnum venosum canbyi* (*V. pubescens canbyi*). 5-6. Canby Viburnum

This is a very interesting group of seven *Viburnum* types. Three are dense enough for screen planting (*dentatum*, *dilitatum*, and *venosum canbyi*); two have bright red berries (*dilitatum* and *opulus*); two have attractive flat flower clusters with an outer ring of showy sterile flowers (*opulus* and *tomentosum*); two have these flat flower clusters modified into "snowball" varieties (*opulus sterile* and *tomentosum plicatum*); one has a broad habit of growth with characteristic horizontal branches in picturesque layers on which appear the showy flat flower clusters referred to above (*tomentosum*).

By all means use *tomentosum*, because of its fine form and branching as well as attractive flower. The berries are red when fully grown but finally turn black at maturity.

For big, dense, billowy masses with good shiny foliage and gorgeous autumn color use *dentatum* and *venosum canbyi*. Either will do for, while not identical, they are very similar.

For red fruits choose *dilitatum* if you can not use both *dilitatum* and *opulus*, because the berries of *dilitatum* are more abundant (although smaller) in neat upright clusters. The growth of *dilitatum* is denser and more compact and the foliage is never troubled by aphids (green fly), which sometimes infests *opulus*, although not so badly as it infests *opulus sterile* referred to below. Both *opulus* and its variety *sterile* differ from the other five types in two ways as follows: first, they are the tallest and coarsest growing; second, their leaves are lobed like a maple leaf while the leaves of the other types are round oval with toothed edges.

For a "snowball" effect choose *tomentosum plicatum* instead of *opulus sterile*, because the latter is badly troubled by aphids (green fly), which curls the leaves and even the young twigs so much that often the whole plant presents a miserable appearance. For this there is no easy remedy except early sprayings with nicotine sulphate and soap as the buds are opening and the aphids hatching, or later dustings with a 3 per-cent nicotine-lime-dust on warm days when the temperature is above 75 degrees Fahrenheit. By choosing the Japanese snowball all these sprayings and dustings are avoided.

Additional deciduous plants in size group 5 are the following:

Acanthopanax pentaphyllum for good foliage which tolerates shade. *Berberis vulgaris*, also *B. verna*, which is a new Chinese barberry with dense, moundlike growth crowded with delicate red berries. *Cotoneaster dielsiana*, with red berries; *C. foveolata* and *C. moupinensis*, both with black berries; and *C. racemiflora* variety *songarica*, with coral-red berries in great abundance in September and October. For explanation of the troubles of cotoneasters see *Cotoneaster* in group 4. *Deutzia scabra plena*, gardenesque; the tips winterkill and deadwood accumulates unless pruned each year after flowering. *Enkianthus campanulatus*, requires acid soil, has dainty bell-like flowers which are yellow with red veins. *Fothergilla major*; 5-6. *Hamamelis vernalis*, with small, yellow, fragrant flowers which open and shut with the weather in February. *Hibiscus moscheutos*, a tall herbaceous shrub for the water's edge with large pink flowers like hollyhock in August. *Hydrangea bretschneideri*, which blooms in middle June on last year's wood and therefore should never be pruned except immediately after flowering; the flowers are small and creamy white in a broad, flat cluster surrounded by a ring of large, white sterile flowers as in *Viburnum opulus*. *Lycium halimifolium* (matrimony vine), a very vigorous shrub with arching habit like *Forsythia suspensa*; the small purple flowers and the abundant red berries appear on the plant all summer. *Philadelphus purpurascens*, gardenesque. *Philadelphus virginianus* (see note under *Philadelphus lemoinei* in group 4). *Physocarpus opulifolius*; coarse, rapid-growing shrub with loose, shreddy bark. *Polygonum cuspidatum*, a very vigorous herbaceous shrub, springing up new each season, with good foliage and abundant creamy white flowers in short side clusters in August and September; it makes a wonderfully quick growth of foliage but spreads tremendously by underground stems and has overrun parts of Central Park in New York City. *Prunus tomentosum*, *Rhodotypos kerrioides* (jetbead); has white flowers like single roses and hard, jet black, shiny berries all winter. *Ribes odoratum* (flowering currant); carries the white-pine blister rust but is a tough shrub for dry soil. *Rosa rubrifolia* (red-leaved rose); may become objectionable because of its positive red color. *Rubus odoratus*; 4-5 (see group 4, additional list). *Sambucus pubens*; 5-6; for wet soil; also tolerates considerable shade. *Sorbaria arborea* 5-6; the best of the sorbarias; makes a broad fountainlike mass with leaves like a sumac and white flowers in large, terminal, feathery clusters in August; it is most happy in rich, moist soil. *Spiraea henryi*, *nipponica*, and *veitchii*; gardenesque; the last named being the last of the spring-blooming spireas just before *Spiraea bumalda* Anthony Waterer. *Syringa persica*. *Vitex negundo incisa*; not quite hardy but may be pruned to the ground each spring to stimulate strong new growth from the base; the foliage is dainty, each leaf being palmately 5-lobed and each lobe deeply cut; the flowers are small, blue, and verbenalike in August in terminal, pyramidal clusters.

Additional evergreen plants in size group 5 are the following:

Chamaecyparis obtusa; 5-6. *C. pisifera*; 5-6. *C. pisifera squarrosa*, 5-6. These *Chamaecyparis* are from Japan and are often called *Retinospora*. They are not quite hardy in all situations. It is best to give them, and also the *Ilex* which follows, a sheltered situation and a warm, congenial soil, and to encourage healthy, vigorous growth by a little pruning each year. The most striking variety is the moss *retinospora*, which has soft, feathery foliage with gray-green, almost blue color; it is gardenesque. A close relative is the plume *retinospora* (*Chamaecyparis pisifera plumosa*), which is the most-commonly planted of all *retinosporas* and is described in group 4. The hardest of the whole group is the thread *retinospora* (*Chamaecyparis pisifera filifera*), described earlier in group 5. *Ilex crenata microphylla*; 5-6; not quite hardy, but variety *microphylla* is more hardy than the type. See statement under *Chamaecyparis* above. *Thuja orientalis*, 5-6, formal; this is similar to *T. occidentalis* but is both more handsome

and more tender. It has many varieties and is much planted in the South, but will succeed in the North only in sheltered situations and in well-drained soil unless grown by cuttings from individual plants which have proved to be more hardy than the type.

Group 6. Large Shrubs and Small Trees (10-25 feet)

Acer ginnala.

Amur Maple

Quite dense and bushy like a thorn-apple (*Crataegus*). Planted mostly for its early bright red autumn color. Very hardy.

DP

Acer palmatum sanguineum. 5-6. See group 5. Scarlet Japanese Maple

Acer pennsylvanicum.

Striped Maple

Slender tree which tolerates shade. Large leaves with shallow lobes like a goosefoot. Yellow autumn color. Green stems with white stripes attractive in winter.

Aesculus parviflora. 5-6. See group 5.

Bottlebrush Buckeye

Amelanchier canadensis. White.

Downy Shadblow



Flowering Dogwood (*Cornus florida*)

On the 11th hole of the Scarsdale Golf Club, Hartsdale, N. Y., the flowering dogwood brightens the spring landscape with its wealth of bloom. More than 200 of these low trees have been added to the woodland borders of this golf course in the last three years.

Amelanchier grandiflora. White.

Apple Shadblow

Amelanchier grandiflora rubescens. Pink.

Pink Shadblow

Amelanchier laevis. White.

Allegheny Shadblow

Amelanchier oblongifolia. White.

Thicket Shadblow

The first four of the amelanchiers are slender and treelike, but the last one is dense with many stems from the base which make a large, lila-like clump. All five types bloom in early May with dainty white flowers (pinkish in one variety) just as the leaves are unfolding. The common name shadblow or shadbush was first given in New England, because the shad run up the streams to spawn when these little gray-stemmed trees are in bloom. They should be set against a good background both for the misty white flowers and for the red autumn color.

Benzoin aestivale.

Spicebush

Especially good in wet soil and shade. The flowers are small and yellow before the leaves. The autumn color is also yellow and the berries scarlet. The whole plant is spicy.

Cercis canadensis.

Redbud

Also called Judas tree. The flowers are rosy purple crowded close on the dark-colored branches before any leaves appear. The autumn color is yellow.

DEP *Chamaecyparis pisifera* and varieties. See group 5.

Cornus florida. White.

Flowering Dogwood

Cornus florida rubra. Pink.

Redflowering Dogwood

Cornus kousa. White.

Kousa Dogwood

Cornus kousa chinensis. White.

Chinese Dogwood

D *Cornus mas*. Yellow.

Cornelian Cherry

D *Cornus officinalis*. Yellow.

Japanese Cornelian Cherry

This is a wonderful group of dogwoods. All are small trees and all have attractive flowers and red berries.

C. mas and *C. officinalis* are the first to bloom, with small yellow flowers before the leaves in early April with *Daphne mezereum* and *Lonicera fragrantissima* and just before forsythia and spicebush. The two species are almost alike except in their bark characteristics. *C. officinalis* has reddish brown bark which peels and curls on the young branches, while *C. mas* has dark gray bark which does not peel but finally flakes off in small patches.

C. florida and variety *rubra* also bloom before the leaves, but the flowers are large and showy, at least a month later, usually in middle May with the crabapples (*Malus*) and just before the garden lilacs. These two native trees are so handsome and characteristic of our Northeastern landscapes that they become almost indispensable in ornamental plantings.

C. kousa and variety *chinensis* also have large showy flowers, but they appear after the leaves in middle June with the mountain laurel (*Kalmia*) and the mockorange (*Philadelphus*) and the two roses *R. lucida* and *R. multiflora*. In *C. kousa* the petals are pointed, but in *C. florida* they are notched at the tip. The variety *chinensis* has broader petals than the type and they actually overlap at the base.

Crataegus cordata.

Washington Hawthorn

D *Crataegus crusgalli*.

Cockspur Hawthorn

D *Crataegus oxyacantha*.

English Hawthorn

D *Crataegus oxyacantha pauli*. Double scarlet.

Paul Double Scarlet Hawthorn

D *Crataegus oxyacantha rosea*. Single rose.

Rose Hawthorn

D *Crataegus pruinosa*.

Frosted Hawthorn

In this group of hawthorns, *C. oxyacantha* and its varieties are the only forms with brightly colored flowers. The English hawthorn has also been an old favorite for hedges, but like all *Crataegus* as well as all crabapples (*Malus*) and cotoneasters, it is subject to the same three troubles, blight, borer, and scale mentioned in group 4 under cotoneaster. There is a closely-related species, called *C. monogyna*, which is quite similar to the English hawthorn except that the fruit has only one stone instead of two and the leaves are often with 5 to 7 lobes instead of 3 to 5 and the lobes are deeper, i. e., longer and more narrow and usually toothed only at the apex.

C. cordata is most valuable for its abundant small red fruits which last almost all winter. It is also quite different in form from other *Crataegus*, being taller and more upright and at the same time free and graceful with good red autumn color.

C. crusgalli is almost the opposite of *C. cordata*. It is broad and flat-growing, full of horizontal lines and interesting shadows, with very dark glossy foliage.

C. pruinosa is selected simply to represent the dense rounded form so characteristic of the majority of native hawthorns. It is bushy from the ground up, and the young leaves are reddish as they unfold in the spring.

Euonymus atropurpureus.

Wahoo

Euonymus bungeanus.

Winterberry Euonymus

S *Euonymus bungeanus* var. *semipersistens*.

Midwinter Euonymus

- DP *Euonymus europaeus*. Formal. European Burningbush
 These large shrubs are valued mostly for their attractive fruits, which resemble those of the climbing bittersweet (*Celastrus*). The autumn color of these three *Euonymus* is reddish and is especially bright in the Wahoo. *E. bungeanus* is loose and graceful with a great mass of pink berries, while *E. europaeus* is dense and upright, almost formal, with smaller leaves and red fruits if the variety *atrorubens* is secured. The leaves of *Euonymus* are often much curled by aphids, just as in *Viburnum opulus*. The same control measures are necessary.
- Hamamelis mollis*. Chinese Witch-hazel
Hamamelis virginiana. Common Witch-hazel
 These witch-hazels tolerate shade and have yellow autumn color and small yellow flowers with narrow, ribbonlike petals. They are quiet, neutral types and can be planted in almost any quantity. In the Chinese witch-hazel, the flowers bloom in March before the leaves. The sepals are reddish and the petals larger than in *H. virginiana*, and deeper yellow and also reddish towards the base. In the common witch-hazel the flowers bloom in the fall—the last shrub to flower, sometimes after the autumn leaves have fallen.
- Hibiscus syriacus*. 5-6. See group 5.
Hydrangea paniculata in variety. See group 5.
- DEP *Ilex crenata microphylla*. See group 5, additional plants.
 DEP *Ilex opaca*. American Holly
 This is a favorite native plant from Cape Cod to the Gulf of Mexico. It is much used in the South but will not grow satisfactorily in the North unless it has a well-drained soil. The sexes are separate and the attractive red berries will not form unless some male plants are in the neighborhood. Its near relative, the English holly (*Ilex aquifolium*), is not hardy north of New York City, and always has its berries on two-year twigs instead of one-year twigs as in *I. opaca*.
- DE *Juniperus chinensis*. 5-6. See group 5.
 DE *Juniperus virginiana*. 5-6. See group 5.
Laburnum alpinum. Scotch Laburnum
 This is a hardy relative of the older *L. vulgare* (goldenchain) so much planted farther South. The flowers are yellow in early June, in hanging clusters like those of wisteria.
- D *Lonicera tatarica*. See group 5.
Magnolia cordata. Yellow Cucumbertree
Magnolia glauca. Sweetbay
 D *Magnolia soulangeana*. Saucer Magnolia
 Common varieties of *M. soulangeana* are as follows: *spectabilis*, white; *alexandrina*, white with purple outside the base; *speciosa*, white with purple outside the base; *rustica*, bright rose; *lennei*, dark reddish purple. The last variety blooms in late May but the others in middle May in middle New York.
- D *Magnolia stellata*. 5-6. See group 5. Star Magnolia
Malus.
 Flowering crabapples bloom just before garden lilacs, except *M. angustifolia* (Southern crab) and *M. ioensis plena* (Bechtel crab), both of which bloom at the same time as lilacs. The following is a good selection in order of bloom: *arnoldiana*, *floribunda* and its variety *purpurea*, *atrosanguinea*, *theifera*, *spectabilis riversi*, *halliana parkmani*, *sargentii*, *coronaria*, *toringoides*, *ioensis plena*.
 The largest, with large semi-double pink flowers like small roses, is *ioensis plena* (Bechtel crab); the smallest is *sargentii* (Sargent crab), with a mass of white flowers making a broad, twiggy bush to 8 feet; the densest are *arnoldiana* and *floribunda*, they are also most regular in outline making a broad, rounded mass to 20 feet with white flowers and beautiful rose-pink buds. The most irregular and picturesque is *theifera* (tea crab), with white flowers and beautiful rose-pink buds. The most graceful with the deepest rose-colored flowers is *halliana parkmani*. The most beautiful in fruit is *Malus toringoides*; it has white flowers, foliage which is bluish green and deeply notched, and fruits which are very abundant in clusters on

slender stems and large ($\frac{1}{2}$ inch in diameter), red on the sunny side and orange-yellow on the other. The fruits make a wonderful sight during August and September and are much appreciated by birds long after frost.

P *Oxydendrum arboreum*. Sourwood

A small, graceful Southern tree hardy North if given light, well-drained soil. Nodding clusters of creamy white flowers (like lily-of-the-valley) in summer and gorgeous red, peachlike foliage in the fall.

DE *Pinus cembra*. 6-7. Swiss Stone Pine
Prunus. Japanese Flowering Cherries

General height is 20-25 feet, but Naden (*P. sieboldi*) is about 15 feet, Fugenzo and Yoshino are 30-40 feet, and the Yama or Sargent cherry (*P. serrulata sachalinensis*) is a standard tree 60-80 feet.



Courtesy of the Arnold Arboretum

Higan or Spring Cherry (*Prunus subhirtella*)

This early, broad, and bushy cherry produces the greatest mass of flowers of any of the single Japanese cherries.

The general form is upright with spreading branches, but the Yama or Sargent cherry is compact and oval resembling the cultivated sweet cherry (*P. avium*). The Higan or spring cherry (*P. subhirtella*) is dense, broad and bushy, with branches often facing the ground and producing the greatest mass of flowers of any of the single Japanese cherries, while the weeping rosebud cherry (*P. subhirtella pendula*) is really picturesque and the oldest variety planted in the United States. It has weeping branches, slender leaves and a light airy effect that makes it the most distinct and graceful of all Japanese flowering cherries. The duration of bloom, including early, medium, and late varieties, is about three weeks, depending upon weather conditions. A brief selection of hardy varieties should include the following:

Early.—*P. subhirtella*, single light pink; *P. subhirtella pendula*, single light pink; Yama, single pink.

Medium.—Jo-nioi, semi-double white; Ichiyo, double pale pink; Naden, semi-double pink.

Late.—Shirotae, double white (tips of the petals faintly tinged

- pink); Fugenzo (Kofugen), double light pink; Kwanzan, double deep pink.
- DP *Quercus robur fastigiata*. Formal and narrow. Pyramidal English Oak
This is positive in form, like Lombardy poplar, but is small, slow-growing, and tough-wooded.
- D *Rhus copallina*. 5-6. See group 5. Shining Sumac
Rhus cotinus. Gardenesque. Common Smoketree
Rhus glabra. Smooth Sumac
Rhus glabra laciniata. Cutleaf Sumac
Rhus typhina. Staghorn Sumac
Rhus typhina laciniata. Shredded Sumac
- Most sumacs are planted for their autumn color. They do well in poor soil and often have very attractive fruits. In smoketree the fruits develop into large, feathery clusters which are purplish in late summer.
- Salix caprea*. Goat Willow
Salix discolor. Pussy Willow
Salix purpurea. Purple Osier
- P *Sorbus decora*. Showy Mountain-ash
This is a small native tree of bushy habit not more than one-half or two-thirds as large as the more commonly planted European mountain-ash. It has the same red, showy fruits in winter and is subject to the same trouble from borers in the trunk near the ground.
- D *Syringa chinensis*. Gardenesque. Chinese Lilac
This old familiar hybrid is one of the most satisfactory of all lilacs because it combines the gracefulness of one parent, the Persian lilac, with the strong foliage of its other parent, the garden lilac. It is dense but not stiff and produces great masses of bloom in nodding clusters at the same time as the garden lilac, either rosy color, pink-lavender, or almost white, according to variety.
- Syringa henryi* variety *lutece*. Gardenesque.
This is a hybrid derived from the late lilac, which is better with larger and looser flower clusters. The flowers vary from pinkish-lilac to light purple as they open.
- Syringa japonica*. Formal and gardenesque. Japanese Tree Lilac
This is of special interest, first because it is really a small tree to 30 feet with dense, rounded form, large bold foliage, and characteristic cherrylike bark, and second because it blooms a month later than the garden lilac, with white scentless flowers in large, handsome, broad, pyramidal clusters at the ends of the branches.
- Syringa oblata dilutata*. Gardenesque. Early Lilac
There are several forms of *S. oblata*, but all have broad, leathery leaves which turn violet-red in the fall. This is the only lilac which has autumn color. The Rochester parks consider variety *dilutata* to be the most satisfactory form of *S. oblata* in the Highland Park collection. The flowers are lilac-pink, and like all such early types may be injured by late frosts.
- Syringa pubescens*. Gardenesque. Hairy Lilac
While the flowers are only a pale lilac and only medium in size, they are the most fragrant of all lilacs. For this reason alone we should include it in any representative collection of lilacs.
- D *Syringa villosa*. Gardenesque. Late Lilac
This and its hybrid *S. henryi lutece* bloom just after the garden lilac and will prolong the interest for at least another week. The flowers vary from pinkish-lilac to light purple as they open.
- D *Syringa vulgaris*. Gardenesque. Garden Lilac
There are many varieties from which the following is a brief selection:
White.—Edith Cavell, double; Reine Elizabeth, single and a strong bloomer.
Pink to rosy lilac.—Lilarosa, early, beautiful creamy pink; Lucie Baltet, delicate pink, salmon in bud.
Lavender to purple.—Charles X, single reddish in bud, late, an old favorite; Philemon, single dark purple, reddish in bud.

Deep purple red to reddish.—Congo, single, deep purple red, the finest dark lilac; Diderot, late single, claret purple.

The bloom of garden lilacs is short and lasts only a week or ten days, therefore it is worth while to consider such other types as the early lilac and the late lilac to extend the season of bloom of the garden lilac.

- E *Taxus cuspidata capitata*. See groups 3, 4, and 5 for lower types.
This variety *capitata* develops a central stem and becomes treelike. The foliage and fruits are the same as in the other varieties.
- DEP *Thuja occidentalis*. 5-6. See group 5. American Arborvitae
- DE *Thuja occidentalis douglasi pyramidalis*. See group 5.
- DE *Thuja occidentalis spiralis*. See group 5.
- DE *Thuja occidentalis wareana*. See group 4.
- DE *Thuja orientalis*. See group 5.
- DEP *Thuja plicata*. 6-7. Giant Arborvitae
This is a giant timber tree of the West Coast which is coming more and more into ornamental planting in the East. The foliage is more glossy than the Eastern arborvitae and it assumes a more attractive, bronzy color in the winter. It is faster-growing and more open at the top, but apparently is not quite so hardy. It will need more pruning than the slower-growing kinds, but its better foliage may be worth the additional care.
- DE *Tsuga canadensis*. 4-7. See group 4.
- DE *Tsuga caroliniana*. 4-7. See group 4.
- D *Viburnum dentatum*. 5-6. See group 5. Arrowwood
- D *Viburnum lantana*. Wayfaring-tree
- Viburnum lentago*. Nannyberry
- Viburnum opulus*. 5-6. See group 5. European Cranberrybush
- Viburnum opulus sterile*. 5-6. See group 5. Common Snowball
- D *Viburnum prunifolium*. Blackhaw
- Viburnum tomentosum*. 5-6. See group 5. Doublefile Viburnum
- Viburnum tomentosum plicatum*. 5-6. See group 5. Japanese Snowball
- D *Viburnum venosum canbyi*. 5-6. See group 5. Canby Viburnum
- Of the three large viburnums, *lantana* is distinctly the dense, round type with large, bold foliage. *Prunifolium* is broad and dense but with more horizontal-growing branches; it is quite distinctly thornlike in appearance. *Lentago* is more neutral and upright-growing, being neither round and formal like *lantana* nor dense and picturesque like the horizontal-growing *prunifolium*. The fruits of all these viburnums are very attractive in their changing colors from yellow-green through pink and red to blue-black.
- Additional deciduous plants in size group 6 are the following:
- P *Albizia julibrissin rosca*. New and probably tender in many situations, but very promising as it has developed at the Arnold Arboretum in Boston. Foliage delicate and unusual with showy flowers, which are pink and of long duration in late summer.
- P *Amygdalus (Prunus) persica*, especially the double white variety *albo-plena* and the double red variety *rubroplena*. Not much used in ornamental work because so much troubled with peach borer.
- Caragana arborescens*. Very hardy, also endures dry soil.
- P *Catalpa bignonioides nana*. For a long time the trade has called this plant *Catalpa bungei*. It is weak-wooded, like all catalpas, and when grafted, as it usually is, 6 feet high on the upright stem of the tree catalpa it becomes very formal, stiff, and round in appearance. If grown naturally on its own roots it will make a large, broad, dense, rounded mass.
- Elaeagnus angustifolia*. Leaves are narrow, willowlike, and silvery. Planted mostly for its gray foliage, which is light and airy and produces the effect of greater distance.
- Halesia tetraptera*.

- P *Hippophae rhamnoides*. The sexes are separate and both male and female plants must be present to produce the fruits, which are very handsome orange berries. Plant is also very good for seaside planting.
- P *Koelreuteria paniculata*. Not quite hardy; showy yellow flowers in summer in large clusters above the foliage.
- Lonicera maackii podocarpa*. Berries red, attractive in late September.
- P *Photinia villosa*. Attractive red fruits on warty stems. Subject to fire blight and scale, just as are plants of Cotoneaster and Crataegus.
- Quercus ilicifolia*. The common native in poor sandy soil of the sea-board states.
- Rhamnus cathartica*. Tough and resistant, often used for hedges.
- Symplocos paniculata*. Especially valuable for its brilliant blue berries.

Additional evergreen plants in size group 6 are the following:

- DE *Chamaecyparis obtusa*. See group 5. These are slow-growing small trees, but usually function in group 5 or even smaller by pruning.
- DE *Pinus nigra*. Included here because it can be restrained by pruning to form a large bush or small tree. Very tough and hardy, excellent for exposed seashore planting.

Group 7. Large Trees (50-100 feet)

Smaller trees are included, with the height indicated.

- DEP *Abies concolor*. White Fir
This is silvery green, sometimes quite bluish. It is a wonderful tree in the landscape, plenty strong enough for accent but softer and more refined than the stiff blue spruce which it somewhat resembles.
- DEP *Abies homolepis*. Nikko Fir
A distinct habit of branching makes this the most picturesque of all firs.
- DEP *Abies nordmanniana*. Nordmann Fir
This has wonderful dark glossy foliage.
- DEP *Abies veitchii*. Veitch Fir
Probably the best of all firs. Foliage dark and lustrous above and very white beneath.
(All *Abies* are here marked with the letter P because of their positive, pyramidal form. One should pause before using many *Abies* or *Picea* either. They are stiff and spiky, excellent for specimen accents but usually too emphatic for neutral backgrounds or quiet boundary plantings. Pines and hemlocks will be much safer in these latter situations.)
- D *Acer platanoides*. Round. Formal. Norway Maple
Very round, dense, and low-branched.
- Acer rubrum*. Red Maple
Trunk and limbs gray and attractive like beech in winter.
- D *Acer saccharum*. Sugar Maple
Betula lenta. Sweet Birch
Betula papyrifera. Canoe Birch
This is the best of the white birches. It is not often troubled by the borer.
All birches have wonderful yellow autumn color.
- Cladrastis lutea*. 40-50 feet. Yellow-wood
Flowers white in hanging clusters like wisteria, but later, after the leaves appear, making good contrast with the dark foliage. Trunk and limbs gray and attractive like beech in winter.
- D *Fagus americana* (*F. grandiflora*). American Beech
- D *Fagus sylvatica*. Round-oval. Formal. European Beech
- D *Fagus sylvatica asplenifolia*. Fernleaf Beech
- P *Fagus sylvatica pendula*. Weeping Beech
This is irregular and picturesque.
- DP *Fagus sylvatica riversi*. Round-oval. Formal. Rivers Purple Beech
This is dense and also conspicuous because of its deep purple foliage.

- P *Ginkgo biloba*. Maidenhair-tree
This is an excellent tree with distinct foliage little troubled by insects or diseases. But the sexes are separate, and since the fruits are oily and bad-smelling only male trees should be planted. Selected trees can be propagated easily by patch budding.
- Hicoria (Carya) ovata*. Shagbark Hickory
Rugged and picturesque.
- Juglans nigra*. Black Walnut
- P *Larix europaea (L. decidua)*. European Larch
Form is pyramidal and therefore conspicuous and definite, but the early spring foliage is a wonderful fresh green and very effective.
- D *Magnolia conspicua (M. denudata)*. 40-50 feet. Yulan
Flowers large, white, and tuliplike, before the leaves. This is one parent of the hybrid group that we know as *Magnolia soulangeana*.



On the right, Red Pine (*Pinus resinosa*); on left, Sargent Hemlock (*Tsuga* sp.)

In winter the evergreens alone remain to lend cheer to the landscape.

- Nyssa sylvatica*. Tupelo, Pepperridge
Form and branching is very irregular and picturesque. Autumn color is a wonderful red.
- DEP *Picea engelmanni*. Engelmann Spruce
Resembles the Colorado blue spruce but the foliage is softer and not so wide-spreading.
- DEP *Picea omorika*. Siberian Spruce
- DEP *Picea orientalis*. Oriental Spruce
- DE *Pinus nigra austriaca*. Austrian Pine
- E *Pinus resinosa*. Red Pine
- E *Pinus strobus*. White Pine
- P *Populus nigra italica*. Narrow and emphatic. Lombardy Poplar
- Populus tremuloides*. Trembling Aspen
This is the least coarse of the poplars; foliage is dainty, autumn color yellow, and the limbs and trunk in winter are silvery green.
- D *Prunus serrulata sachalinensis*. Yama or Sargent Cherry
A handsome, hardy, early-flowering cherry from Japan, single and pink in late April with *Magnolia stellata*. It is compact and oval, resembling the mazzard (*Prunus avium*).
- DEP *Pseudotsuga douglasi*. Douglas Spruce
This is a pyramidal tree but the color of the foliage is a quiet, neutral green and the habit of growth soft and graceful. Therefore it is safer for most landscape planting than the stiffer firs and spruces.

- Quercus alba.* White Oak
Quercus coccinea. Scarlet Oak
Quercus imbricaria. Shingle Oak
P *Quercus palustris.* Positive because pyramidal. Pin Oak
Quercus prinus. Chestnut Oak
Quercus rubra. Red Oak
P *Salix vitellina.* Golden Willow
All willows are weak-wooded and rapid-growing.
P *Sorbus aucuparia.* 40-50 feet. Mountain Ash
Much planted because of its handsome orange berries in winter,
but it must be protected against borers in the trunk near the ground.
D *Tilia cordata.* 40-50 feet. Small-leaf European Linden
D *Tilia petiolaris.* Weeping Silver Linden
This does not have pendulous branches and therefore it is not a
real weeping tree. The stem of the leaf is simply more drooping,
with the result that this fine linden is more graceful than the ordinary
types.
D *Tilia tomentosa.* Formal. Oval. Silver Linden
DE *Tsuga canadensis.* See group 4 for description. Canadian Hemlock
DE *Tsuga caroliniana.* See group 4 for description. Carolina Hemlock
Ulmus americana. American Elm
One of the grandest and most graceful of trees for large-scale and
open-landscape planting. It is tall and vasselike and will give good
shade and not interfere with the circulation of air.
Additional deciduous plants in size group 7 are the following:
P *Acer dasycarpum* (*A. saccharinum*). Handsome and rapid-growing but
weak-wooded and easily broken. The roots are near the surface and
cause much disturbance to sidewalks, curbs, and water pipes in street
plantings.
Acer pseudoplatanus.
D *Aesculus carnea brioti.* Flowers red.
D *Aesculus hippocastanum.* Formal. Flowers white.
P *Ailanthus glandulosa.* Rapid-growing and weak-wooded but flourishes
better under hard city conditions than any other tree.
P *Betula alba.* A beautiful tree and very graceful but so infested by the
bronze birch borer that it becomes useless for permanent planting.
There are several varieties, such as *pendula* which is weeping and
laciniata which is both weeping and cutleaf. All are infested by the
same borer, for which there is no remedy.
P *Betula lutea.* Requires cool, moist location.
Betula nigra. The limbs and upper trunk have attractive reddish-brown
bark in winter.
Betula populifolia. Little troubled by the borer.
P *Catalpa hybrida.* 40-50 feet. Flowers white.
P *Catalpa speciosa.* Flowers white.
All catalpas are rapid-growing and weak-wooded.
D *Cercidiphyllum japonicum.* 30-40 feet. Formal.
Fraxinus americana. A vigorous grower which seeds so freely that it
often becomes a nuisance and requires continual cutting out.
Fraxinus excelsior.
P *Fraxinus excelsior pendula.*
Gleditsia triacanthos.
Gymnocladus dioica.
Hicoria (Carya) cordiformis.
Juglans cinerea.
Larix laricina.
Larix leptolepis (L. kaempferi).
P *Liriodendron tulipifera.* The wood is very brittle and not safe for play-
ground planting. The foliage is excellent and color a beautiful yellow
in fall, but the tree may kill back in severe winters in northern New
York and New England.
D *Magnolia acuminata.*

Morus (mulberries). 30-50 feet. Excellent bird food, but the sexes are often separate on different trees, in which case both sexes must be planted.

Phellodendron amurense. 40 feet.

Platanus acerifolia.

Platanus occidentalis.

Platanus orientalis.

- P *Populus alba*. Will stand hard, dry city conditions very well.
All poplars are quick-growing and weak-wooded.

- P *Populus eugenei*.
Prunus avium and *serotina*.

- P *Pseudolarix kaempferi*.
Robinia pseudoacacia. Badly troubled by borers.

- P *Salix blanda* (weeping form).
All willows are weak-wooded and rapid-growing.

- DP *Salix pentandra*. This is the best of all willows for rich dark foliage.
It is large, glossy, and peachlike.

- P *Salix vitellina pendula*.
Sophora japonica.
Tilia americana.
Ulmus campestris (*U. procera*).

- P *Ulmus pumila*. This is the fast-growing elm so widely advertised for hard, dry conditions of the South and West. In the Northeast there seems little need for it, since we have so many better trees to choose from.

Zelkova serrata. This is a near relative of the elm and is the most important timber tree of Japan and Korea. With us it is merely a curiosity of botanic gardens and a few private places.

Additional evergreen plants in size group 7 are the following:

- DEP *Abies cephalonica*.
DEP *Abies cilicica*.
DEP *Abies fargesii*. One of Wilson's promising Chinese introductions.
DEP *Abies fraseri*. A Southern tree hardy in the North. It looks like the balsam fir but succeeds much better in cultivation.
DEP *Abies numidica*. Very much like Nordmann fir.

All *Abies* are here marked with the letter P because of positive, pyramidal form. One should pause before using many *Abies*, or *Picea* either. They are stiff and spiky, excellent for specimen accents but usually too emphatic for neutral backgrounds or quiet boundary plantings. Pines and hemlocks will be much safer in these latter situations.

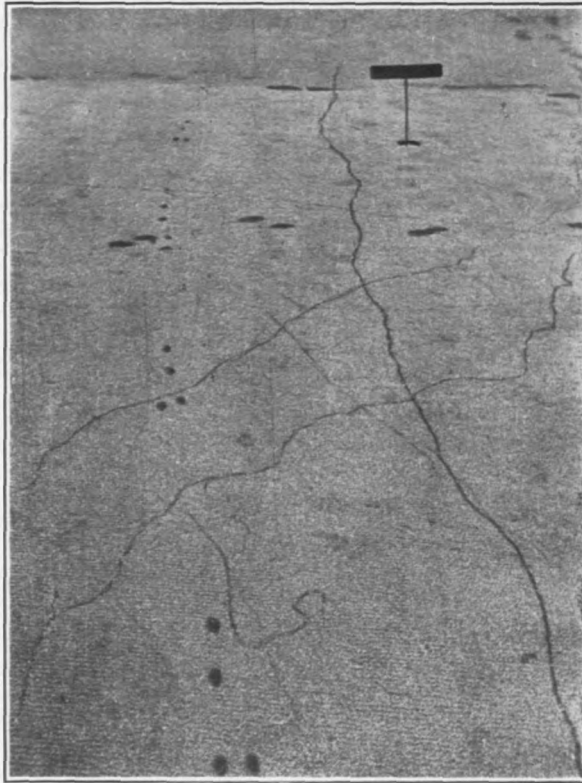
- DEP *Picea canadensis* (*P. glauca*).
DEP *Picea excelsa* (*P. Abies*).
DEP *Picea glehnii*.
DEP *Picea pungens*.
DEP *Picea pungens glauca*.

All *Picea* are here marked with the letter P for the same reason that *Abies* are. See note under *Abies*.

- E *Pinus banksiana*.
DE *Pinus cembra*. See group 6.
E *Pinus densiflora*.
E *Pinus excelsa*.
E *Pinus koraiensis*.
E *Pinus peuce*.
E *Pinus ponderosa*. This has the longest and boldest foliage of any Northern pine.
E *Pinus thunbergii*.
E *Pinus sylvestris*.
DE *Tsuga diversifolia*.
DE *Tsuga sieboldii*.

Earthworms and Cutworms Travel Far at Night

One frequently hears discussions as to how far earthworms and grubs travel on the surface of putting greens during the night. These pests frequently leave their trails in the dew which indicates that they travel long distances. The accompanying photograph was taken on velvet bent on the Arlington turf garden in 1928, when the grass was covered with a heavy dew after the dew had accumulated on the turf. Cutworms and earthworms moving across it rubbed off the dew and left the dark, irregular streaks shown in the photograph.



Tracks of earthworms and cutworms on dew-covered turf

The rabbit tracks running vertically across the picture and the dog tracks running horizontally about two-thirds up the picture serve to bring out the size of the area included in the photograph. The long distances which many of these turf pests travel during the night, as is evidenced in this photograph, emphasize the need for protecting the borders of putting greens with poisoned treatments in order to make effective any remedies which are used on the putting greens themselves. At certain seasons these pests travel much farther than at others. Frequently an apparent reinfestation of a putting green which is sometimes blamed on the sudden ineffectiveness of chemical remedies may in reality simply indicate that the earthworms or cutworms have moved in from turf surrounding the putting area and as yet they have not been exposed to the poisons long enough to be injured.

Questions and Answers

Value and use of peat and muck.—We have just purchased an acre of muck land of a uniform depth of about 8 feet. We are sending you four samples of this muck each taken from a different depth. Please test these samples for acidity and advise what fertilizing value they possess and how suitable they would be for top-dressing putting greens. (New York)

ANSWER.—Peats and mucks contain some nitrogen, but it is in an unavailable form and hence the material can not be used as a source of nitrogen for fertilizing purposes. They contain phosphoric acid and potash only in traces or comparatively small amounts which can not be considered of value. The surface sample is very well decomposed reed muck derived from the material below, which is still in the peat form. At the depth of 2 feet the material is more fibrous and is mixed with woody debris. At the depth of 5 feet the material is only slightly decomposed. At the 7-foot depth the material is still peat, somewhat similar to that at the 5-foot depth. The material at the 5-foot depth is very acid, testing pH 4.5. The sample from the 7-foot depth is less acid, testing pH 6. A deposit such as this, procured at a reasonable price, would provide an excellent source of organic matter, which can be put to good use by mixing it with soil so as to provide good, open, friable soil for seed beds and excellent soil for top-dressing purposes.

Applying lime to putting greens in brown-patch control.—On several of our greens the soil shows an acidity of pH 4.5. At what rate should limestone be applied on soil of this character to aid in checking brown-patch? (New York)

ANSWER.—On soil you describe limestone should be applied at the rate of 25 to 50 pounds to 1,000 square feet. This is for spring application. If you want quicker results during summer months hydrated lime may be applied at a rate not exceeding 10 to 15 pounds to 1,000 square feet at any one time. Usually it is safe to use much larger quantities, but during hot weather occasionally burning results, and therefore lower rates of application are advisable, repeated when necessary. Hydrated lime should not be applied at the time when nor for several days after sulphate of ammonia or other fertilizers containing ammonia are applied. This is because the hydrated lime reacts chemically with ammonium salts and liberates ammonia gas, which is poisonous to turf. The effect of lime in brown-patch control is discussed at some length in the Bulletin for May, 1929.

Agricultural slag as a substitute for ground limestone.—We can buy ground limestone for \$6 a ton and agricultural slag for \$1.30 a ton. The latter is claimed to contain 82 per cent carbonate of lime and 3.1 per cent carbonate of magnesia. Which would you recommend us to purchase for use in reducing acidity on bluegrass fairways? (Pennsylvania)

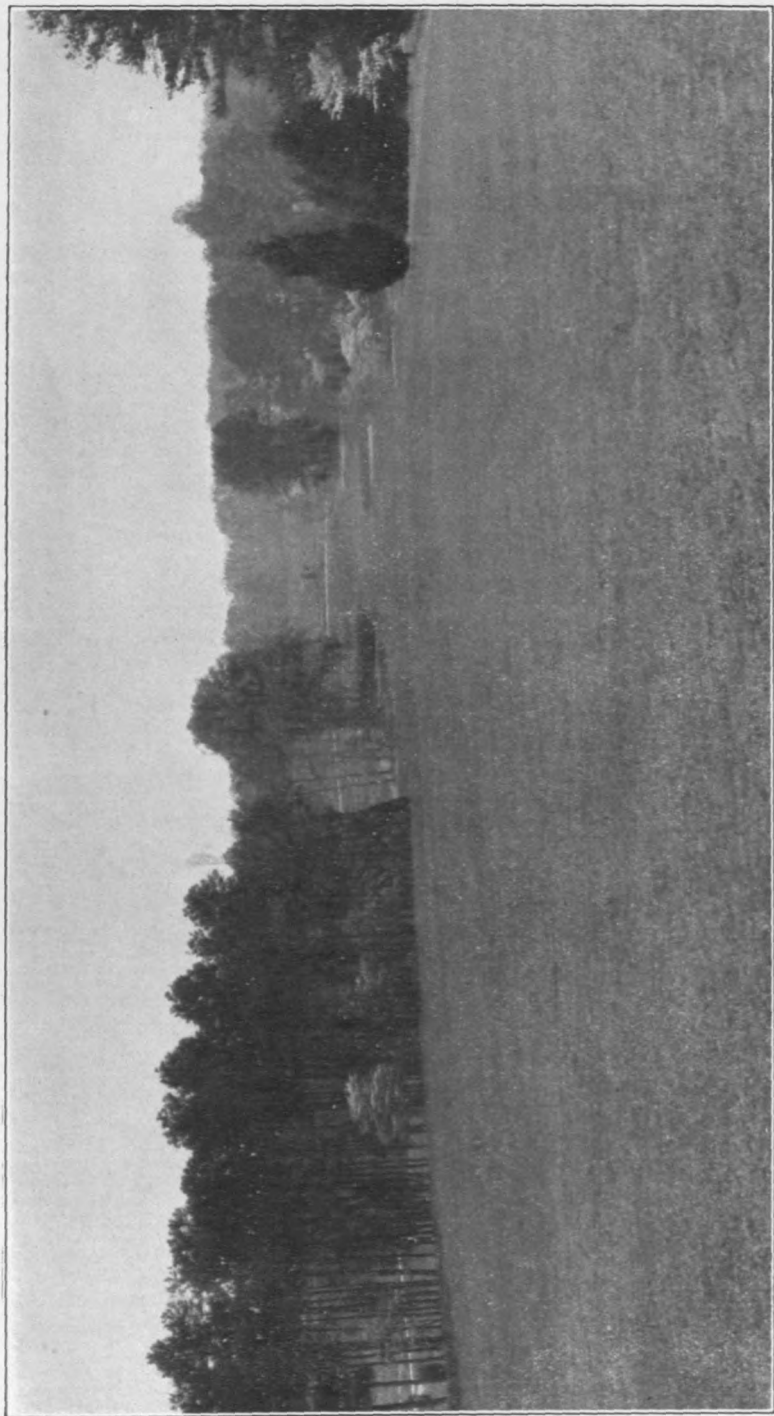
ANSWER.—In Bulletin 220 of the Pennsylvania Agricultural Experiment Station, State College, Pa., entitled "The Agricultural Value of Specially Prepared Blast Furnace Slag," agricultural slag is given, on the whole, a favorable comparison with limestone. Considering the lower price of the slag, it is worthy of a trial.

Controlling annual bluegrass (*Poa annua*).—Some of our greens are now (May) infested with annual bluegrass. This is the first season it has appeared. As it grows in patches all over a green, the putting surface is practically ruined. Our greens are of bent grass. We are informed that in a few weeks the annual bluegrass will die and we may then expect good greens. Your advice will be appreciated. (New Jersey)

ANSWER.—It seems that in your section annual bluegrass will eventually invade any putting green regardless of the grass that is used. It does not stand the hot summer weather well and much of it will die during summer. Your bent grass will probably take its place as fast as it dies. However, much annual bluegrass seed will remain in the turf and germinate the following autumn or spring. In order to reduce annual bluegrass in a putting green it is desirable to prevent as much of its seed as possible from getting into the green. This can be done in various ways. Greens that are subject to washes should be protected by having grassy hollows or sand traps on the hillside to catch these washes, since otherwise much seed of annual bluegrass may be washed upon the green from higher elevations. Also the material used for top-dressing should be examined carefully to see whether or not it contains annual bluegrass seed. This may be done by setting out a flat of the top-dressing material, watering it, and observing what germinates in it. Where the infestation of a green is in scattered spots, the patches of annual bluegrass may be removed with a hole cutter and replaced with good turf. We know of no chemical or fertilizer treatment which will keep annual bluegrass from invading a green. It gets in much more easily if there are poor spots of turf such as may result from disease or lack of adequate care. If turf is kept healthy and closely knit at all times there is less likelihood of annual bluegrass becoming established in a putting green.

Ridding greens of *Dichondra*.—We are sending you a piece of turf containing a cloverlike weed which is gradually showing itself on our Bermuda grass greens and smothering out the Bermuda. What is the weed and how can we get rid of it? (Louisiana)

ANSWER.—The piece of turf you send is infested with a weed, common to your section of the country, called *Dichondra*. This weed is rather difficult to remove and it may eventually be necessary to remove the turf and resod with pure Bermuda grass or plant with Bermuda grass seed. Before going to that extreme, however, you may have some success by sprinkling the infested area with sulphate of ammonia early in the spring when the Bermuda commences to grow. Pure sulphate of ammonia should be placed in a canister or salt shaker and dusted on the infested areas early in the morning when the dew is still on the ground. Within a few hours after a light dusting it will be noticed that the weed is being burned and is turning yellow. At that time the putting green should be watered in order to wash the chemical into the soil and prevent injury to the grass roots which may be in the weedy area. This direct application of sulphate of ammonia to the weedy area serves two purposes; it temporarily destroys the weed and it stimulates a new growth of Bermuda grass in these areas by its fertilizing action. Several of these treatments may materially decrease the amount of the weed in your greens.



Eighteenth hole (480 yards), Sedgefield Country Club, Greensboro, N. C.



A SONG THE GRASS SINGS

The violet is much too shy,
The rose too little so;
I think I'll ask the buttercup
If I may be her beau.

When winds go by, I'll nod to her
And she will nod to me,
And I will kiss her on the cheek
As gently as may be.

And when the mower cuts us down,
Together we will pass,
I smiling at the buttercup,
She smiling at the grass.

Charles Granger Blanden

