



SEPTEMBER 1977

USGA GREEN SECTION RECORD

A Publication on Turf Management
by the United States Golf Association

Trees — Something Different





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COVER PHOTO: Even dead trees can make a beautiful contribution to the landscape.

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The graceful elm, like this one at Winged Foot Golf Club, once dominated the fairways. Its demise has taught us an important lesson — diversify your landscape plantings.

TREES – Try Something Different

by **JAMES T. SNOW**, USGA Agronomist

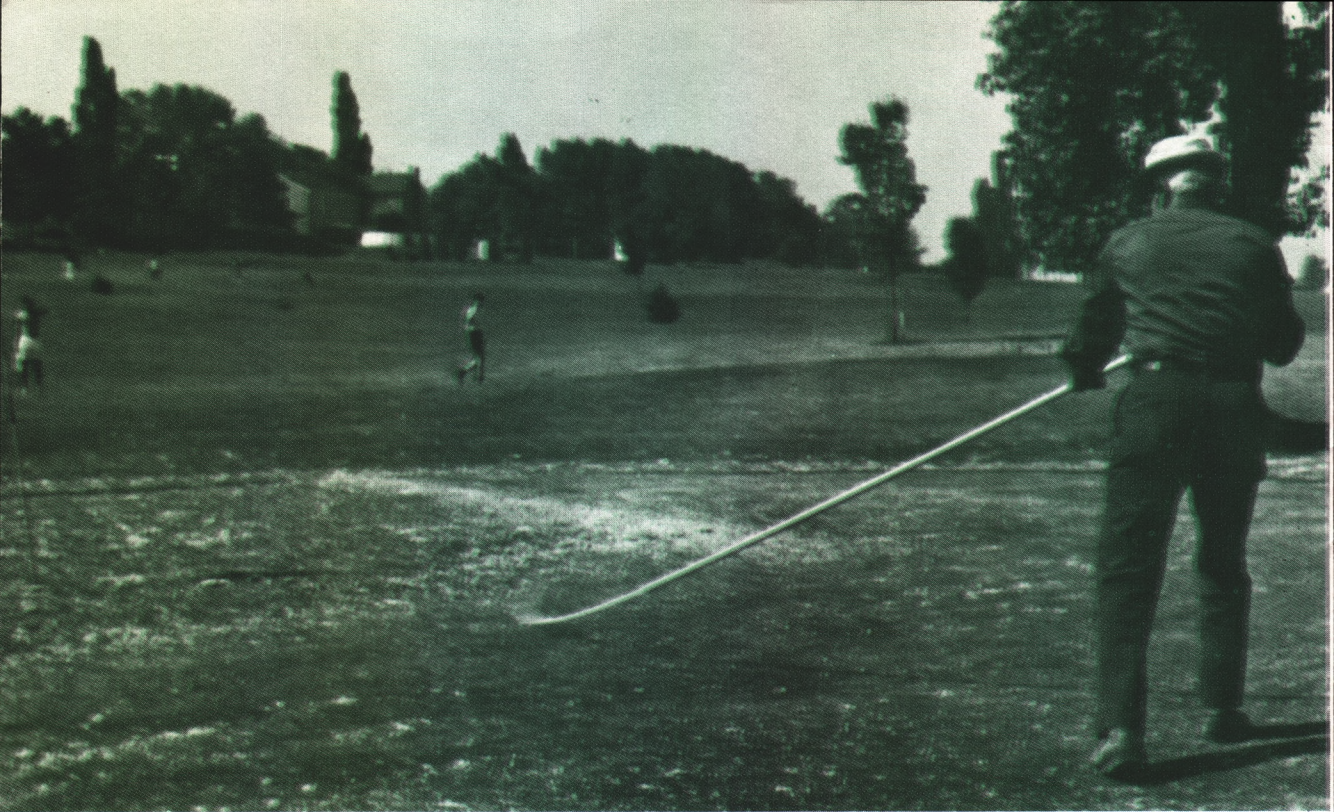
WHAT do golf courses like Southern Hills, Winged Foot, Saucon Valley, Augusta National, Medinah and Olympic Club have in common? They are all great golf courses where trees contribute quite a lot to their playing qualities. Trees have no equal in adding character, beauty, interest and strategy to a golf course. Their functional aspects are often overlooked; they are used for shade, as a screen for protection or privacy, as wind breaks and to improve depth perception and shot definition. The design and layout of a golf course may remain the same throughout its existence, but as trees continue to grow and change each year, they subtly change the character of the course. Tree plantings can be made to improve almost any golf course, provided they are thoughtfully planned, executed and maintained.

Let's take a look at some of the major steps involved in developing a tree planting program and at some of the mistakes which are frequently made.

HAVE A PLAN

Perhaps the most important step in a tree planting program is to develop an overall plan. No golf course superintendent or green committee would rebuild a green or tee without some idea of how it will look after the work is complete. The same consideration should be given to landscaping the golf course.

Begin with a survey of the trees that are already on the course, including their identification, location and condition. This survey will help locate areas where trees are needed, and it will also help



Litter potential is an important consideration when selecting trees for the golf course. Here a cottonwood tree drops its cotton on a nearby green.

you establish priorities for future work. Observing the condition of different species may help you decide which kinds will flourish in your part of the country or certain sections of the course. You may even discover areas where the trees need some additional care.

Other factors to consider in your plan are tree selections, location of nurseries and species availability, cost and labor involved, placement of trees on the course and annual maintenance. Some of these factors will be discussed in more detail.

Who should be responsible for developing a plan? If funds are available, some courses retain the services of a golf course or landscape architect who is experienced in this work. Once a plan is developed, the club may hire an outside contractor or nurseryman to plant and/or maintain the new trees. Often the golf course superintendent and his crew will take responsibility for this part of the operation.

Most clubs are not in a position to hire an outside professional, however, and instead rely on the talents of the superintendent and other staff and club members. One system which usually works well is to bring the superintendent, the golf professional and green committee chairman together (or other knowledgeable committeemen) and tour the course, outlining the plan as you go. The superintendent can provide valuable input based on his horticultural knowledge and maintenance experience and the golf professional often has insight into ways to change and improve playing strategy.

Be sure to keep this committee small, however, as faster and probably superior results will be achieved.

After completing plan development, decide at what pace the plan will be carried out and then stick to it. Decide how much money the club can spend on the program and set that amount aside each year for tree planting and maintenance. Break the plan down into steps and set priorities based on the need of any particular area for tree plantings. The fault of many tree programs is that as soon as money is needed for another item in the budget, it is taken from the tree fund and the program fades away for many years. Don't let this happen to your club. Commit yourself to the program!

SELECT TREES FOR QUALITY AND DIVERSITY

One of the more difficult parts of a tree planting program is deciding the species of trees to be used. One valuable lesson in this regard has been learned in the last 15 years. Do not rely too heavily on just one or two species of trees for the backbone of your landscape plan. Golf courses planted to American elm trees many years ago have been devastated by Dutch elm disease. Others have had similar experiences with Norway maples and olive trees because of their susceptibility to verticillium wilt. There is always the potential for this type of disaster with any other species if it is overplanted. You should use a variety of trees in the landscape.

Of course there are other good reasons not to plant just one or two kinds of trees. Think how much more beautiful and interesting any landscape is when it displays a variety of plants with different colors, textures, sizes, etc. Consider, for example, if 500 red maple trees are planted on the course one year, how they will grow, mature and decline all at the same time and leave the course at the end of the cycle much the way it was at the beginning.

This brings us to another point. How often has it been said, "We're getting a huge lot of fast-growing trees at a bargain price from Dead Leaf Nursery which is going out of business!" This is not to say you shouldn't take advantage of such a situation, just don't let this type of approach become the sole basis for your program. After all, the trees you plant today will affect the appearance of your golf course for the next 50 to 150 years! Fast-growing trees certainly have a place on many courses today, but when you recall a visit to a course well-known for its beautiful trees, it is usually the majestic specimens of oaks, beeches and the like which stick out in your mind. So be sure to include a certain percentage of the slower-growing, perhaps more costly specimens in your plan. They will provide the real backbone for the future. And remember, not all "bargain trees" are bargains. They may be root bound or have some other problem which will inhibit proper growth and development.

What specific factors should be considered when selecting trees for the landscape? Following are a few of them:

1) Hardiness and adaptability — Select species which are hardy in your climate zone and adaptable to the respective sections of the course; e.g. wet areas, exposed hillsides, infertile soil areas, etc.

2) Rooting habit — Many trees, such as certain pines, willows, eucalyptus and maples, have extensive systems of surface feeding roots which rob the turf of moisture and nutrients. Remember to consider rooting habit when locating trees in close proximity to greens, tees and fairways.

3) Foliage type — There are evergreen and both large- and small-leaved deciduous types to choose from. Large leaves are sometimes difficult to deal with from a litter and maintenance standpoint. Many different colors, textures and sizes are available.

4) Fruiting characteristics — Interesting fruit can add seasonal color to the course, but it can also be a maintenance headache. For example, catalpa, osage orange, horse chestnut, and certain pines and spruces are best kept in rough areas, if used at all.

5) Crown shape — There are many different shapes from which to choose, from the triangular-shaped little leaf linden and pin oak to the irregular honey locust to the columnar types of Norway maple. The tall, columnar types are particularly well-suited for use as screens.

6) Foliage density and shade potential — Because heavy shade is detrimental to the growth of

turfgrasses, it is important to avoid planting trees with dense foliage too close to tees and greens. Norway maple, beech and certain oaks are notoriously heavy shade producers.

7) Insect and disease susceptibility — While no tree is completely immune to the ravages of insects and disease, avoid overusing species which are susceptible to many pests or diseases. The American elm is one obvious example. Others may include certain willows, poplars and sycamores.

8) Susceptibility to ice and storm damage — Commonly planted trees very susceptible to storm damage include red maple, silver maple, birch, ash, sycamore, poplar, willow and certain species of eucalyptus. In general, trees with weak crotches, brittle wood, shallow roots and those infested with insects and disease are most likely to be damaged by ice, snow or wind.

9) Height — Consideration of mature height can be very important. Tall trees would be useful if planted for shade, visual screen or as strategical hazards, but would be a hindrance if they blocked a scenic view or interfered with play from the tee.

10) Longevity — Among various trees, expected life spans differ dramatically. Certain oaks can live hundreds of years while some poplars may last 20 years or less. If a planting is to be an important and permanent feature of the landscape, the use of trees with greater longevity would be desirable. Every golf course should plan ahead for the eventual loss of older specimens by planting young trees to take their place.

11) Outstanding characteristics — There are many characteristics, in addition to flowering and

Windswept pines at Hempstead Country Club, New York.





A good tree planting program involves replacing dead and dying trees. At Cypress Point Club, California, several young trees have been planted that will someday replace the famous Monterey cypress on the 16th hole.

fruiting habits, which may make a tree worthy of use on a golf course. Among these are fragrance, leaf shape or texture, fall color, bark texture or color, crown shape and branching habit. Don't rely simply on the popular favorites when planting the landscape; look also into using less known but equally outstanding species. At the end of this article we list a number of lesser known but highly outstanding trees deserving greater consideration for use in golf course plantings.

LOCATION AND SITE SELECTION

Some knowledge of the trees you have selected is necessary in order to locate them in areas where they will prosper. As it is with turfgrasses, different trees are more adaptable to certain areas than others. For example, willows and red maples are particularly adaptable to wet areas on the course, while a tree like the red pine would not survive under these conditions. In addition to wetness, the growth of trees may differ according to other environmental factors such as soil texture, pH, availability of light, temperature extremes, exposure to winds, etc. As a plant reaches the limits of its cold hardiness, it needs a more favorable environment in which to grow properly. For example, when a flowering dogwood is planted on an exposed site in New England, it may not survive or else may produce poor growth. When planted in a protected area near other trees or buildings, however, it can be one of the finest ornamental plants.

One of the greatest mistakes in planting trees on the course and near each other is not taking into account the mature size of the plant. Trees can reach heights ranging from 15 to 200 feet and attain shapes from narrow upright to broad-spreading. Too often potentially large trees are located immediately adjacent to tees and greens, which means that some day these often used turf areas will be invaded by roots and shaded during much of the day. Turfgrasses cannot stand up to heavy play under these circumstances.

Just as often, trees are planted too closely to each other. Imagine what happens to specimens capable of growing 30 to 50 feet in width, when they are planted 5 to 10 feet apart! Close planting may be appropriate when the trees are to form a windbreak or screen, but when specimens are to be developed to their best potential, they should not be planted closer than their potential width. For example, if oak trees will be 50 feet wide when mature, they should be planted at least 50 feet apart. Trees should also be spaced so that maintenance equipment can easily pass between. Economically, close spacing means more trees will be needed initially and more money will be spent on maintenance in the future.

There are times, however, when it is desirable to overplant trees. For example, a dense planting of small trees may be needed to achieve a certain effect. Nevertheless, it must be recognized that thinning will be needed as they grow. Unfortunately, it is sometimes like pulling teeth to have even one tree removed from an overcrowded stand.



Framed by trees at Sleepy Hollow Country Club, New York.

If thinning is not done at the proper time, the appearance and health of all the trees will be in jeopardy.

PLANTING THE TREE

Sometimes the most overlooked aspect of the tree program is the actual planting operation. Improper planting can result in poor growth or in the premature death of the tree. Planting is most successfully done during the spring, fall and winter months. Though it can be done, summer planting is best avoided. In northern areas, most arborists agree that early spring is the safest time to plant, especially the deciduous types. Following is a brief outline of how to plant a tree:

- 1) Dig a large hole twice the size of the root ball, especially if the soil is poor.
- 2) Modify the soil if necessary, usually by adding organic matter.
- 3) Install drainage if necessary.
- 4) Place tree in the hole and fill, firming the soil and watering gradually as you progress.
- 5) Mulch three inches deep.
- 6) Stake the tree if necessary.

CARE AND MAINTENANCE

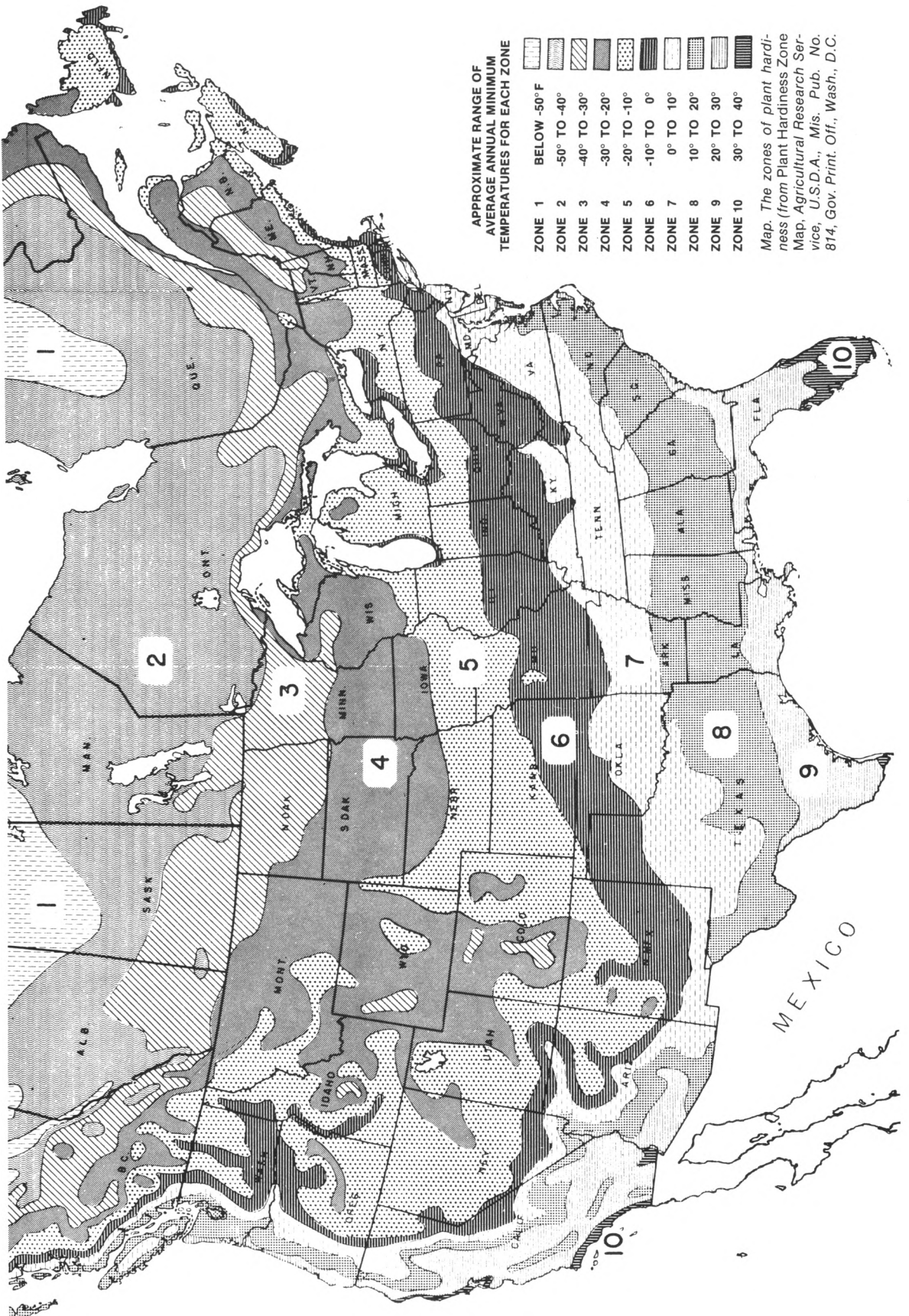
All the efforts and expense in planning your golf course landscape will be in vain if proper attention to care and maintenance is overlooked. Though most trees can survive for many years

with some neglect, few will develop to their full potential. Close attention is especially important during the first few years after transplanting, until the tree is well established. An expensive annual program of tree maintenance is impossible on most golf courses today, but one should constantly observe the trees on the course and learn to recognize symptoms of trouble, just as you do with turf-grasses.

A good tree care program would include most of the following: disease and insect control, irrigation, fertilization, pruning, bracing or cabling, thinning, removal of dead trees, etc. There are many details on planting and maintenance of trees, but not all can be mentioned here. If you have questions regarding these practices, contact your State University or local cooperative extension office. Their experts can help you or put you in contact with someone who can.

TRY SOMETHING DIFFERENT

Following is a list of selected trees capable of successful planting in different areas of the country, including many little-known or unusual trees worthy of greater use. Some of their outstanding characteristics and peculiarities have been listed. Our purpose is to point out that there are dozens of species of trees which could be used on your golf course and that each has something different to offer. For this reason, many of the well-known and often overplanted species, e.g. maples, wil-



lows, birches, pines, have not been specifically mentioned, and due to space limitations, other equally useful trees have had to be omitted.

The list is arranged alphabetically by scientific name and includes the following for each tree: common name, scientific name, ultimate height, maximum hardiness zone, and a brief description. To use the plant hardiness zone number and accompanying map, the reader should locate the climate zone in which he lives. Then, if the zone number listed for a particular tree is the same as or smaller than his climate zone number, the plant is judged to be cold hardy in his locale. This system has several obvious limitations, so check with your local nurseryman or County Cooperative Extension Office for specific information on tree culture and availability. Despite the limitations, however, the point remains — TRY SOMETHING DIFFERENT!

NORWAY MAPLE — *Acer platanoides* 70', Zone 3.

Widely adapted, noted for its fast growth and large attractive leaves which turn yellow in the fall. Perhaps overplanted but is available in varieties which differ considerably in size, shape and leaf color. Shallow roots, heavy shade and susceptibility to verticillium wilt limit its use on golf courses.

SERVICE BERRY — *Amelanchier canadensis* 30', Zone 4. A fast-growing tree with showy white flowers in early spring, a beautiful orange or red fall color and interesting gray bark. Single or multiple stemmed.

NORFOLK ISLAND PINE — *Araucaria excelsa* 100', Zone 10. Picturesque evergreen conifer, also useful as tub specimen. It is pyramidal and open, with horizontal tiered branches and sharply pointed leaves.

BIRCH — *Betula* sp. 80', to Zone 2. Fast-growing trees, with interesting bark and brilliant yellow fall color. Several species have white bark. Bronze birch borer, birch leaf miner and canker often shorten the lifespans of the birches. Weak-wooded.

BOTTLE TREE — *Brachychiton populneum* 50', Zone 9. A stout and often swollen trunk gives this tree its name. Foliage resembles poplars and flutters in the breeze as poplars do. A deep-rooted tree, it can withstand drought.

GUMBO-LIMBO — *Bursera simaruba* 60', Zone 9. The ornamental bark and interesting branching habit are this tree's outstanding characteristics. Acceptable as seaside tree.

BOTTLE-BRUSH — *Callistemon citrinus* 25', Zone 9. Bright red 6 inch flowers are clustered together along the stem to produce a bottle-brush appearance. Three inch leaves are copper colored when they first come out and turn bright green when they mature. Single or multiple stemmed.

INCENSE CEDAR — *Calocedrus decurrens* 80', Zones 5-10. Noted for its neat, dense, narrow pyramids of foliage which also add a distinctive, pungent fragrance to the air. Also has attractive, red-brown furred bark. Drought

tolerant if watered deeply and infrequently when young.

HORSETAIL TREE — *Casaurina equisetifolia* 50', Zone 9. A fast-growing tree with a pyramidal growth habit, its drooping gray-green branchlets give it a graceful appearance. Drought and wind tolerant, this tree also does well in wet and seashore areas.

DEODAR CEDAR — *Cedrus deodara* 120', Zone 7. A very graceful evergreen tree with a pyramidal habit and pendulous branches. Variable color, from green to blue-green to blue-gray. Several varieties available.

KATSURA TREE — *Cercidiphyllum japonicum* 60', Zone 4. Outstanding tree with exfoliating bark, interesting branching habit and beautiful blue-green heart-shaped leaves which turn yellow or red in fall. Single or multiple stemmed, relatively pest free and deserving of greater use.

REDBUD — *Cercis canadensis* 30', Zone 4. Beautiful small, purple-pink flowers cover the branches and twigs in early spring. Moderately large heart-shaped leaves turn a showy yellow in the fall. Has interesting dark colored bark and is useful as a foreground tree.

YELLOW-WOOD — *Cladrastus lutea* 50', Zone 3. Bright green compound leaves, fragrant clusters of white flowers in late spring and a rich yellow fall color are this tree's outstanding features. Relatively free from pests and diseases.

FLOWERING DOGWOOD — *Cornus florida* 25', Zone 5. Showy white bracted "blossoms," bright red fruit, brilliant red or purple fall color, interesting branching habit and platey bark are among its outstanding features. Perhaps overplanted as dogwood borer, crown rot and canker limit its longevity. Kousa dogwood (*Cornus kousa*) and Cornelian-cherry (*Cornus mas*) are other outstanding dogwoods deserving of more use.

WASHINGTON THORN — *Crataegus phae-nopyrum* 25', Zone 4. Best of the hawthorns, this tree has white flowers in late spring, attractive red persistent fruits and a showy red fall color. Can be troubled by fire blight, borers and scale, but more tolerant of these problems than other hawthorns.

ROYAL POINCIANA — *Delonix regia* 40', Zone 10. Spectacular yellow-tinged red flowers, 4 to 6 inches across, appear in early summer and last for a month or more. A fast-growing tree with graceful fern-like foliage, 1 to 2 foot woody pods give added interest for the remainder of the year.

PERSIMMON — *Diospyros virginiana* 50', Zone 5. Handsome, trouble-free trees with 3 to 7 inch leaves that are coppery when they first open, dark glossy green in summer and turn yellow, pink or red in fall. Both male and female plants must be present to produce fruit.

LEMON-SCENTED EUCALYPTUS — *Eucalyptus citriodora* 70', Zone 9. Handsome tree with powdery white to pinkish trunk, crowned with

feathery billows of foliage. The narrow, golden leaves smell like lemons when crushed. Weak-trunked when young but lacks invasive root system of its relatives.

Eucalyptus microtheca (no common name) 40', Zone 8. Bushy, round-headed form with 8 inch ribbonlike leaves, blue-green in color. Single or multiple stemmed. Drought and wind tolerant.

SILVER-DOLLAR EUCALYPTUS — *Eucalyptus polyanthemos* 70', Zone 9. Interesting round, gray juvenile foliage accounts for its name. Mature foliage is lance-shaped and its bark is attractively mottled. Single or multiple stemmed. Poor in wet soils.

EUROPEAN BEECH — *Fagus sylvatica* 90', Zone 4. Outstanding specimen tree has very dense, glossy foliage with beautiful smooth gray bark and a golden bronze fall color. Its slow growth, shallow roots, dense foliage and need for lots of room limit its use on golf courses. Many varieties available.

EVERGREEN ASH — *Fraxinus uhdei* 65', Zone 9. Fast-growing evergreen with compound leaves, it is narrow-upright in growth when young but becomes more rounded when mature. Water deeply and infrequently when young to encourage deeper rooting.

GINKGO — *Ginkgo biloba* 80', Zone 4. Prized for its picturesque growth habit and light green fan-shaped leaves which turn bright yellow in the fall. Pest free and tolerant of poor sites. Slower growing and irregular branching when young.

HONEY LOCUST — *Gleditzia triacanthos* 60', Zone 4. A fast-growing tree with fern-like foliage which turns a lovely yellow in the fall. Its fine foliage allows sunlight to filter through for strong turf growth below. One of the best. Purchase only thornless and seedless varieties.

HOLLY species — *Ilex* sp. to 40', to Zone 5. Available in many varieties, the hollies are most noted for their beautiful dark green foliage and attractive red berries. Some can be trimmed as hedges. Leaf miner and wind burn are common problems.

JACARANDA — *Jacaranda mimosaeifolia* 30 to 50', Zone 9. Fast-growing tree with fine-textured, large fern-like leaves, smooth bark and dense clusters of blue fragrant flowers. Can be trained to single or multiple stem and a white flowering variety is available.

GOLDENRAIN TREE — *Koelreutaria paniculata* 35', Zone 5. Large, showy clusters of small, bright yellow flowers cover this tree in early summer. Relatively pest free and adaptable to a wide range of environmental conditions.

GOLDEN CHAIN TREE — *Laburnum watereri* 25', Zone 5. A deciduous tree with fine-textured compound leaves. Twenty-inch chains of golden flowers in mid-spring highlight its seasonal interest. Fast growing.

LARCH — *Larix* sp. 70', to Zone 2. A deciduous conifer with horizontal pendulous branching habit and fine-textured leaves which turn a

showy yellow in the fall. Woody cones which persist on the tree give additional interest.

SWEETGUM — *Liquidambar styraciflua* 60', Zone 5. Fast growing with beautiful dark green, shiny foliage which turns yellow, orange, bronze and scarlet in the fall. Pest free and tolerant of wet soils.

TULIP TREE — *Liriodendron tulipifera* 80', Zone 4. Tall-growing tree with unique foliage which turns dark green in the summer. Leaves turn a clear, golden yellow in the fall.

MAGNOLIA — *Magnolia* sp. to 70', to Zone 4. Noted most for their showy white or pink flowers. Many species and varieties are available which differ in size, shape, color, etc. There are deciduous and evergreen types. Excellent in foreground when planted in groups with other trees.

FLOWERING CRABAPPLE — *Malus* sp. 20 to 40', Zone 4. Many outstanding varieties of different sizes, shapes, flower and foliage color, etc. Excellent in foreground when planted in groups with other kinds of trees (e.g. Pines). Very versatile flowering trees.

MAYTEN TREE — *Maytenus boaria* 50', Zone 9. Evergreen tree with long, drooping branchlets which give it the appearance of the weeping willow. Single or multiple stem. Drought tolerant once established.

DAWN REDWOOD — *Metasequoia glyptostroboides* 90', Zone 5. A fast-growing deciduous conifer. Its pyramidal symmetry is striking and the light green feathery foliage provides pleasing texture. Has an attractive reddish-brown fall color.

SOURGUM — *Nyssa sylvatica* 60', Zone 4. Outstanding in early fall when its 2 to 5 inch shiny green leaves turn a warm orange or red. Relatively pest free and very tolerant of wet soils.

SOURWOOD — *Oxydendrum arboreum* 35', Zone 4. All-around outstanding tree with small, lustrous leathery leaves, 6 to 8 inch drooping clusters of white flowers in mid-summer and rich red fall color. Relatively pest free.

CANARY ISLAND DATE PALM — *Phoenix canariensis* 60', Zone 9. Popular and stately palm with 15 to 20 foot arching feathery leaves and a trunk up to 3 feet in diameter.

SPRUCE — *Picea* sp. 70 to 150', to Zone 2. Their pyramidal shape, tiered branching habit and evergreen character make the spruces valuable landscape plants. Adaptable over a wide range of environmental conditions. The Norway spruce (*P. abies*), white spruce (*P. glauca*), Serbian spruce (*P. omorika*), Colorado spruce (*P. pungens*), Sitka spruce (*P. sitchensis*) and their varieties are available and are popular on golf courses.

PINES — *Pinus* sp. 30 to 150', to Zone 2. Most widely adapted evergreen with numerous species and varieties which differ in size, shape, branching habit, environmental tolerances, etc. In the east the white pine (*P. strobus*), red pine (*P. resinosa*), Austrian pine (*P. nigra* var. *austriaca*) and Scots pine (*P.*

sylvestris) are favorites on golf courses. The Aleppo pine (*P. halepensis*), Canary Island pine (*P. canariensis*), Monterey pine (*P. radiata*), Italian stone pine (*P. pinea*), and Swiss stone pine (*P. cembra*) give western courses a variety to choose from. There are many other pines throughout the country.

CHINESE PISTACHE — *Pistacia chinensis* 50', Zone 9. Fast-growing tree with compound leaves which turn a beautiful orange or red in the fall. Relatively pest free and grows well in both desert and seaside locations.

LONDON PLANETREE — *Platanus acerifolia* 80', Zone 5. Commonly planted shade tree which is more disease resistant than common sycamore. Exfoliating bark and small fruit balls provide landscape interest.

ORNAMENTAL CHERRY — *Prunus* sp. 20 to 50', to Zone 4. Many outstanding varieties of different sizes, shapes, flower and foliage color, etc. Excellent in foreground when planted in groups with other kinds of trees (e.g. Pines).

BRADFORD CALLERY PEAR — *Pyrus calleryana* 'Bradford' 30', Zone 4. Beautiful dark-green foliage, a symmetrical conical shape, white spring flowers and a deep red fall color make it an outstanding ornamental tree.

OAK sp. — *Quercus* sp. 50 to 100', to Zone 3. Outstanding for their majestic proportions, autumn color and foliage characteristics. Evergreen and deciduous types; usually slower growing. Excellent specimen plants on golf courses. Among species used in western and southern areas are the coast live oak (*Q. agrifolia*), cork oak (*Q. suber*), pin oak (*Q. palustris*), holly oak (*Q. ilex*), live oak (*Q. virginiana*) and water oak (*Q. nigra*). In northern sections the black oak (*Q. velutina*), northern red oak (*Q. borealis* var. *maxima*), pin oak (*Q. palustris*) and white oak (*Q. alba*) are popular golf course trees.

ROYAL PALM — *Roystonea regia* 70', Zone 10. Very graceful palm with 15 foot feathery, dark green leaves. The whitish trunk is often swollen at the base or in the center and small, fragrant white flowers are borne at the leaf-sheath base.

COAST REDWOOD — *Sequoia sempervirens* 100 to 300' plus, Zone 8. Fast-growing tree with typically pyramidal form and graceful, soft-looking foliage, it also has an attractive red-brown trunk and fibrous bark.

JAPANESE PAGODA TREE — *Sophora japonica* 50', Zone 4. Feathery, dark green compound leaves are relatively pest free. Large, loose clusters of small cream-colored flowers appear in late summer and last for about a month and are followed by handsome yellow-green pods which last well into winter.

MOUNTAIN ASH — *Sorbus aucuparia* 30', Zone 3. Noted for its heavy crop of white flowers in early summer followed by large clusters of red-orange berries in the fall. Long, fern-like compound leaves give it a fine-textured appearance and turn orange and red in the fall.

MAHOGANY — *Swietenia mahogani* 65', Zone 10. Popular, hardwood evergreen tree with leathery compound leaves. Excellent specimen and shade tree, it is also tolerant of seaside conditions.

BALD CYPRESS — *Taxodium distichum* 130', Zone 4. Deciduous conifer with feathery foliage, a pleasing light green in color turning reddish-brown in fall. Widely adapted, tolerant of very wet or dry soils. Native to the south.

LITTLE-LEAF LINDEN — *Tilia cordata* 60', Zone 4. Shiny, dark green heart-shaped leaves turn a pretty yellow in the fall. Fast growing and very symmetrical in shape, it is tolerant of difficult sites.

BRISBANE BOX — *Tristania conferta* 60', Zone 9-10. Leathery, oval, bright green 4 to 6 inch leaves are clustered toward the branch tips. It has creamy white flowers, woody seed capsules and reddish-brown exfoliating bark.

HEMLOCK — *Tsuga* sp. 90', to Zone 3. The fine texture and graceful habit of these evergreen trees make them outstanding in the landscape. All species are shallow rooted so will not tolerate drought or strong winds. Can be clipped at any height for use as a hedge and will grow in shade. Several species and many varieties are available.

MEXICAN FAN PALM — *Washingtonia robusta* 90', Zone 9. Tall palm with compact crown and fan-shaped leaves. The thin, often curved trunk is usually partly covered with a thatched skirt formed by the dead leaves.

SAWLEAF ZELKOVA — *Zelkova serrata* 80', Zone 5. Graceful elm-like growth habit and fast growth characterize this shade tree. Leaves turn red-brown in fall. Rounded to arching when mature.

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How Fast Are Your Greens?

by **ALEXANDER M. RADKO**, National Director, USGA Green Section

WHEN viewing play in tournament competition, one thing stands out above all else — the variability of greens between courses and some times between greens on the same course. This could be caused by many things — variability in terrain, slope, turf cover, grain, thatch, fertility and management programs, height of cut, cutting frequency, etc. In order for any course to be a super test, greens should be uniform! Superior greens reduce the element of luck to a minimum and putting becomes a true test of skill — the player's ability to read the green, and his ability to stroke the putt as his mind dictates. This is as it should be!

How can speed be measured? Simply! With a device called the USGA Speedstick, a variation of the Stimp Meter, originated by Edward S. Stimpson. In an article that appeared in the April, 1974, issue of *The Golf Journal*. Mr. Stimpson stated his reasons for developing his Stimp Meter as follows:

"The Rules of Golf define the ball, the hole, and the form and make of clubs. Yet no standard is set for the speed of putting greens. A large percentage of strokes are taken on the green and there is great variation in the speed of greens where competitive golf is played. There is also great variation in the condition of greens where holes are placed. I believe there is a need to establish quantitative *limits* to certain conditions, still recognizing that growing grass can never be given an absolute measurement."

"The Stimp Meter is a device that quantitatively measures the speed of putting greens. Numbers can be assigned to the speed of greens on the level, and numbers can be given to the uphill and downhill conditions where holes are placed. After numbers are known, conditions can be compared, experience discussed, and goals established. Perhaps limits can be defined, sought, and attained."

The USGA's Speedstick is designed to achieve some of the above very legitimate goals.

The Speedstick is a simple device. It is a carefully honed piece of wood with a "v"-grooved runway and a notch which serves as the starting point of roll — extremely simple, consistent and it can be used by anyone. It provides a quick representative speed reading of a green. All that is required are three regular-size-dimpled or small-dimpled golf balls, a measuring tape and the USGA official Speedstick; then follow this procedure:

- 1) Select what appears to be a level area on the putting surface approximately 10 feet square and representative of the green's texture.
- 2) Roll three balls in one direction from the same starting point.
- 3) Measure the average distance.
- 4) Reverse direction 180 degrees and repeat steps (2) and (3) from a point close to where the first three balls stopped.
- 5) Average the speed figure for each direction.

If the difference of the averages measured above is greater than approximately 25 per cent of the shortest distance or if the balls had a curving path prior to coming to rest, it would then be advisable to repeat steps (2), (3) and (4), rolling the ball at 90 degrees to the original path and across the middle of it. If this is done, the measurements in all four directions can be used to determine the average speed of that green. This takes into account a number of the variables which should be considered in this type of measurement.

The above should be performed on each green of the golf course, including the practice green, and accurate records kept regarding the time, date, and when, how, and at what height was the previous cutting.

The USGA Green Section, with the cooperation of course superintendents in more than 35 states, measured more than 750 greens in 1976. Analysis of this data has resulted in the development of a

As the Speedstick is slowly raised the ball is released to travel down it and across the putting surface.



USGA Comparison Chart of green speeds considered to be in regular membership play condition, as follows:

**USGA GREEN SPEED TEST
COMPARISON TABLE**
(Regular Membership Play)

FAST	8' 6"
MEDIUM-FAST	7' 6"
MEDIUM	6' 6"
MEDIUM-SLOW	5' 6"
SLOW	4' 6"

A provisional table has also been developed for courses in tournament condition. This chart may require revision at some future date as the data used to develop it is limited and insufficient to be considered totally reliable. However, this is being printed for general information purposes.

**USGA GREEN SPEED TEST
COMPARISON TABLE**
(Tournament Conditions)

FAST	10' 6"
MEDIUM-FAST	9' 6"
MEDIUM	8' 6"
MEDIUM-SLOW	7' 6"
SLOW	6' 6"

The reason for the differences in the two tables is that fast greens are considered to be a better test of one's skills and in general eliminate some of the many variables one experiences on a putting surface. However, to consistently maintain a green in championship or tournament play conditions is an extremely time-consuming and costly project. One would therefore not expect to find greens on a particular course to be in tournament shape throughout the season.

It should be clearly emphasized that this instrument and test procedure is not for use by the golfer, but purely to be used by the course superintendent to assist him in maintaining consistency among the greens on his course and provide him with numerical data against which to compare and measure his greens. The Speedstick is your speedo-

meter! With it, you can set your green speed at any level that your membership desires.

The by-products of having an instrument to measure a green condition may be very far-reaching. Seasonal changes may be observed and the effects of various management programs can be measured. This may also provide an early warning system as to a potential problem arising on a particular green. This continual monitoring may be of great assistance to USGA Green Section agronomists who visit the course.

An obvious benefit from the use of this instrument and accurate record keeping would be in assisting the green superintendent or green committee in their choice of hole location. A hole should be placed in such a position that no matter where the golfer is putting from, assuming continuous putting surface between himself and the hole, it should be possible to stop the ball within approximately two feet of the hole. Thus a hole location which presented a fair challenge when the green speed was approximately six and one half feet may quite possibly be a very bad position when the green speed is eight or nine feet, assuming, as an example, this position to be on or at the bottom of a sloping portion of the green.

Faster greens are generally truer greens. However, maximum speed should not be the ultimate goal of the course superintendent if to obtain this speed one forfeits consistency among greens on the course. Putting, in itself, is a challenge, it doesn't need the element of surprise; the surprise of being presented with a lightning fast green immediately after coming off one which required a bold stroke to reach the hole. It is considered that medium to fast greens which are consistent around the course is indicative of the course's condition and attention given by the individuals responsible for its care.

The eight USGA Green Section Agronomists will continue their speed tests throughout 1977. Their total survey for regular and tournament conditions for the two years will be reported in the spring of 1978.

The author and Green Section Staff would like to extend their thanks and appreciation to USGA's Technical Director Frank Thomas and to all golf course superintendents and green committee chairmen at USGA Member Clubs who participated in the 1976 tests and development of this program.



"Yes! There is Something New Under the Sun"

by **BOB SANDERS**, C.G.C.S., Golf Course Administrator, City of Tucson, Arizona

IHAVE experienced it twice in the past five years and I like it! It really works and it is easy and inexpensive and saves work and saves money and makes people happy and makes work easier and more fun.

First, before I tell you what it is, answer one question. Can you count the number of times you have heard an irrigation designer or architect say, "I had a good design but the contractor fouled it up?" Put the shoe on the other foot and you have heard the contractor state, "I followed the plan correctly, it's the fault of the designer and architect."

Who in your estimation profits from this "buck passing." Yes, you are correct, *No One!* The person who eventually loses in every single case is the owner, and we are talking about all types of outdoor facility construction, including golf courses, parks, lakes, shooting ranges, industrial lawns or plants for shopping malls.

The answer is *quality control* in outdoor construction. And it works! The procedure is as follows:

1) Develop a good set of written specifications. Of course, writing specifications is an exacting science. The architect will help because he has something to gain if the job is accomplished according to his thoughts (thus specifications). If something is overlooked in the specs, be flexible enough to write a change order. This flexibility is obtained by budgeting construction monies to include a percentage for change orders. If it does not have to be spent, you have gained a few dollars for post-construction expenses. Manufacturers are also very cooperative in helping with specifications because their reputation is also enhanced by proper construction and installation. The object is to spell out in writing every detail of the entire job.

2) Set up a pre-bid meeting with prospective contractors to discuss the specifications, the job and their qualifications. Be totally honest! A qualification statement at this point is desirable. In other words, have the prospective contractors list their previous experience in the type construction of your interest. Do this in writing and make an effort to check out their statements.

3) After a contractor is selected, have a pre-construction meeting. Again go over the job and its specifications. Clear up any questions and make any necessary changes at this point. Do not try to trick the contractor. Don't hide anything. After all, if he loses money on the job, the owner has an

excellent chance of not getting his money's worth. Be sure to point out that change orders requiring additional money will be held to an absolute minimum and all requests must be approved by the owner, in writing, before the change is accomplished.

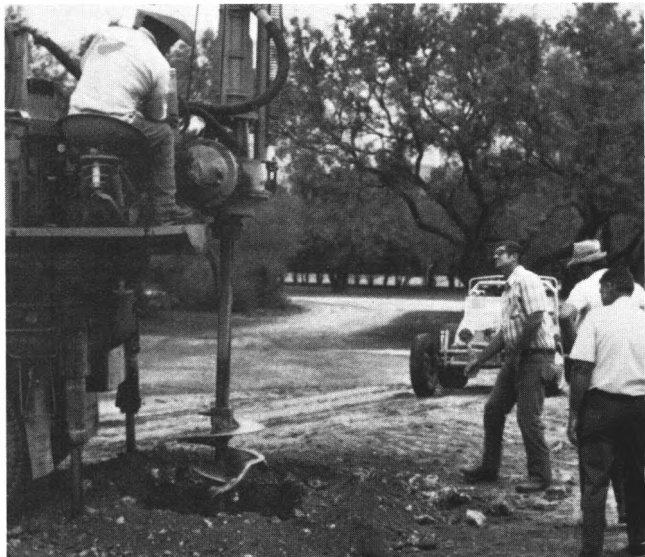
4) Hire a quality control person. This is *new* in outdoor recreational facility construction. It is common in road construction, dam construction, and the building industry, but not in recreation areas. It should be! It will result in millions of dollars being saved and most facilities being of higher quality.

The quality controller need not be a graduate engineer. However, he should be familiar with the operations and the desired outcome. Two things he must be: 1) able to read specs and drawings, and 2) willing to be firm, demanding and take the abuse.

The quality controller should work when the contractor works. Keep very explicit records. He can design his own work forms to fit the job. He must document everything. He should be willing to stick by his guns, if required to accomplish those jobs as described in the specs and drawings. He must keep a very precise, correct, legible, intricate and detailed set of "as built" drawings.

Fees currently being charged by firms in the Tucson area involved in quality control are between 2 per cent and 5 per cent of the contract cost. This is a very small payment for insuring quality workmanship. In the desert Southwest, it is a relatively new concept and it does work.

Unless the contractor does the job properly, it's hardly worth doing at all.



The Turfgrass Service of the USGA Green Section

DIRECT turfgrass advisory visits to USGA Member Clubs started in June, 1952. In the 25 years since then, the Green Section Staff has increased to eight specialists, and it has made over 25,000 golf course visits! Every USGA Member Club should be a subscriber, for you have information other clubs need and can use. Why not put this highly trained team to work for you on your course?

Every club subscribing to the Green Section Turfgrass Service receives the following benefits yearly:

1. Several direct conferences with a Green Section agronomist, in this manner:
 - A. A scheduled half-day, on-the-course consultation, followed by a written report from the agronomist to the Course Superintendent and Green Committee Chairman or club representative. A second visit will be made if necessary, upon request.
 - B. Consultation with the agronomist at local group meetings and turf conferences.
2. Assistance by correspondence and telephone.
3. A subscription to the *USGA Green Section Record*, dealing with golf turf affairs, six times a year, addressed to the Golf Course Superintendent. (This is in addition to the subscription sent to the Green Committee Chairman in connection with USGA Membership.)
4. A voice in the direction of turf research whose results benefit golf courses. The subscription fee covers all services and expenses; there are no extra charges for travel. (The fee for the Green Section Turfgrass Service is additional to dues for USGA Membership.) A list of regional Green Section offices can be found inside the front cover.

APPLICATION FOR TURFGRASS SERVICE OF USGA GREEN SECTION

(Open to USGA Members only)

Date _____, 19____

Full Name of Club or Course _____

Permanent Mail Address (Street or Box) _____

Post Office _____, State _____ Zip _____

Application authorized by _____ Title _____

Course Superintendent _____

We hereby apply for the Turfgrass Service of the United States Golf Association Green Section and certify that we are eligible for the class checked below.

We enclose the fee (see schedule below) for the current year ending December 31. The *USGA Green Section Record* is to be addressed to our Golf Course Superintendent. (This is in addition to the subscription sent to our Green Committee Chairman in connection with USGA Membership.)

This application is automatically continuous from year to year unless interrupted by advance resignation.

Check Proper Class:

☐ Less than 18 holes \$280.

☐ 18 to 27 holes \$360.

More than 27 holes:

☐ 36 holes \$385.

☐ Per regulation course in addition to 36 holes \$ 75.

Total number of courses _____. Total amount enclosed \$ _____.

Please send receipted invoice.

For the third or more requested visits within the year, an additional charge of \$200 each will be made.

TURF TWISTERS

WEATHER

Question: We understand there is a telephone number we can call to receive information about how the weather will affect our contemplated maintenance operations. Do you know of this? (New Jersey)

Answer: Yes, it is called the Farmers Forecast Telephone, a relatively recent service offered in New Jersey and certain other states by the State Department of Agriculture cooperating with the USDA and the U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Such information as surface spraying conditions and drying conditions, in addition to forecasts of rain, frosts, etc., is given for periods ranging up to 72 hours. In New Jersey call 201-828-3091.

WATER

Question: We have a green that is located close to a creek in which water flows continuously. If the green were tiled to permit good drainage, we are of the opinion that an objectionable anaerobic odor and sour soil condition could be avoided. The green is high enough above the creek to permit good drainage. Do you have any other suggestions? (Illinois)

Answer: Should you decide to tile the green, fall and early winter are good times. The freezing and thawing of the soil will help create large pore spaces for the water to reach the tile. Also check on the air drainage around the green to make sure trees and underbrush are not interfering with circulation. Avoid overwatering the green.

AND WHEELS

Question: Our club is planning to purchase a new pick-up truck. Do you have any suggestions on how legally to avoid using unleaded gasoline? We now only have one tank for regular leaded gasoline that all our other equipment uses and would like to avoid having to put in another tank just for this purpose. (Massachusetts)

Answer: Perhaps you may want to look into a relatively new weight class of standard pick-up trucks. These vehicles, by being rated at just a few pounds over the 6,000 GVW (Gross Vehicle Weight) class, are not required to meet the same regulations as are passenger vehicles (as regular light duty pick-up trucks are classified). Because of this exemption, such things as catalytic converters (which necessitate the usage of unleaded gasoline) are not required on the vehicle. Because of this, you can then continue using your regular gasoline.