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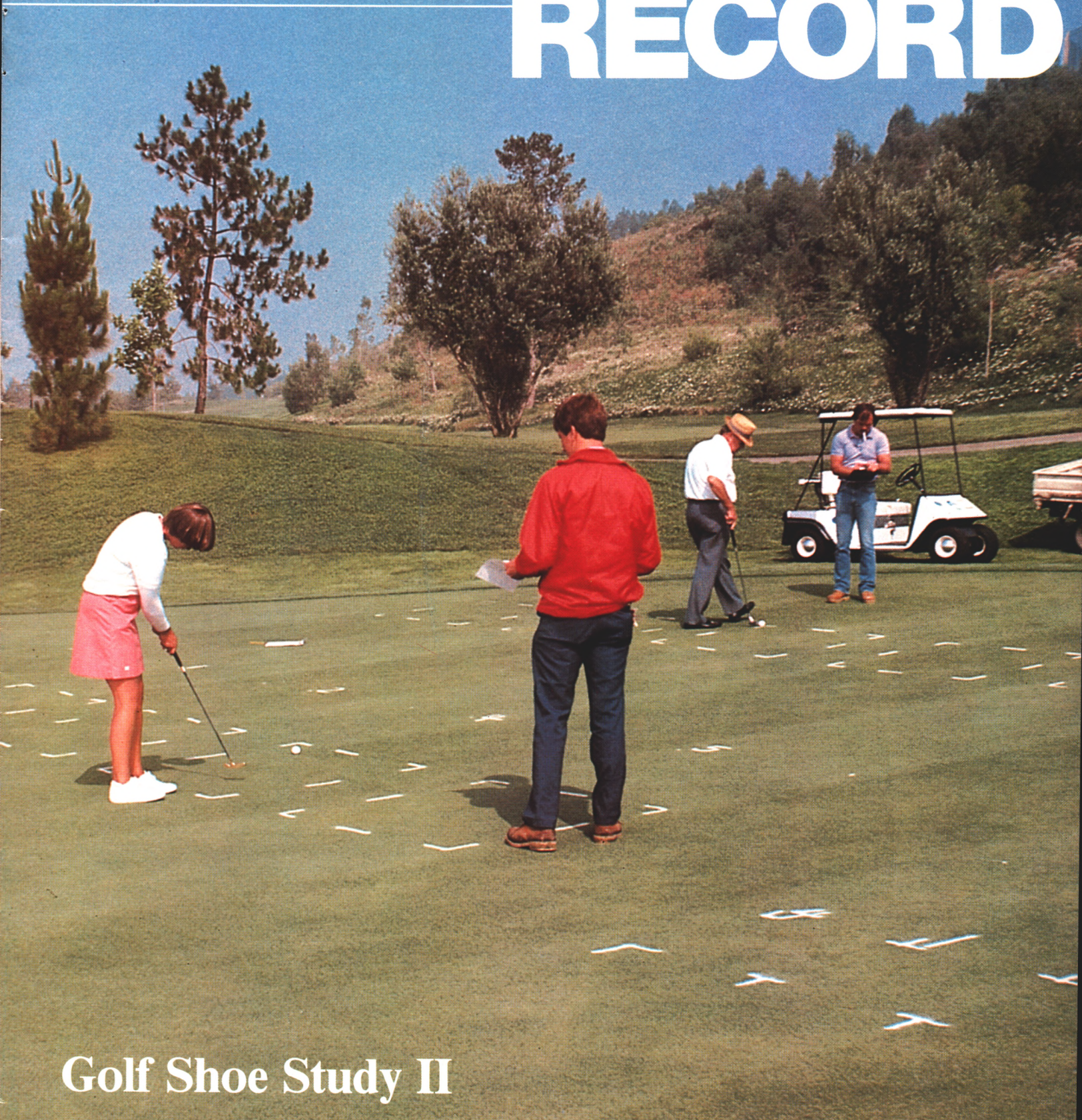

Golf Shoe Study II

USGA®

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Cover Photo:
Paul McGuire (PGA) and Julie Lynd (LPGA) rate the putting quality of the plots.

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(Left to right) Shoe No. 1, Shoe No. 2, Shoe No. 3, Shoe No. 4.

Golf Shoe Study II

by DR. VICTOR A. GIBEAULT, Extension Horticulturist, and
DR. VICTOR B. YOUNGER, Agronomist, University of California, Riverside;
WILLIAM H. BENGEYFIELD, National Director, USGA Green Section

THE SWILCAN Bridge, at the 18th hole of the Old Course, at St. Andrews, Scotland, is over 800 years old. For centuries it has withstood the trodding of townspeople and traders alike, from harbor to town, and it has endured the crossings of St. Andrews golfers since well before Columbus sailed for America. If your mind follows a logical bent, the bridge must be one of golf's greatest contradictions, mysteries and miracles! How has this graceful granite arch held its ground against the onslaught of man, shoe, and club all these years?

One of the reasons for its endurance, at least for the first 750 years, may be that the bridge never had to contend with the conventional spiked golf shoe! Allan Robertson, the world's first golf professional (1815 - 1859), or even Old Tom Morris did not tread Swilcan in them. In fact, the earliest evidence so far of golf shoes with protrusions from the sole comes from an 1893 photograph of players in New Zealand's First Interprovincial Contest between Otago Golf Club, Dunedin, and a Christchurch team. Two of the golfers are shown wearing shoes with hobnails — short nails with large, rounded heads.

In this country, at the turn of the century, red rubber sole shoes were in vogue. In his book, *The Walter Hagen Story,* Hagen describes how he dressed for the 1913 U.S. Open, including his wearing "red rubber-sole shoes" at The Country Club, in Brookline, Mass. The following year he wore the same general getup except for the shoes. "I slid all over the course at Brookline in wet weather (in 1913)," he said, and so he bought a pair of hobnail shoes for the 1914 Open. He won!

We know the Englishman Harold H. Hilton won the U.S. Amateur Championship, in 1911, in sneakers, and that Jerome D. Travers also appears to have worn sneakers in his 1907 victory. But there is no doubt the hobnail shoe was coming into its own. Bob Jones wore them at Merion in the 1916 Amateur, and Jess W. Sweetser (1922 Amateur Champion) remembers "golf shoes with spikes" as standard foot gear by 1919. The trend was established and the boding not good for the growers of grass.

In the modern era, the spiked golf shoe has long been of interest to the USGA Green Section. The first scientific studies were undertaken in 1958-59 by Dr. M. H. Ferguson to determine the effect on wear and putting qualities of putting green turf by different shoes. The conventional metal spike shoe, the "ripple sole" shoe, and a modified golf shoe spike (with recessed or flattened spike shoulder), were tested.*

The conventional golf shoe spike not only caused severe damage to the grass plant, but the rounded shoulder of the spike also caused significant soil compaction and delayed grass recovery for weeks beyond that of other shoes. The ripple sole shoe soon dropped from the golfers' favor (and was banned by some clubs) because of the distortion it caused

*See USGA GREEN SECTION RECORD: November, 1958 & September, 1959 issues.

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Golf Knobs.

Any shoe will make a Golf Shoe by attaching O'SULLIVAN'S GOLF KNOBS of New Rubber.

Practical, durable, satisfactory, economical — just what golf players have been looking for.

They are easily and quickly attached by any one.

A sample set sent (enough for one pair of shoes, soles and heels) postpaid to any address for 75 cents.

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Makers of O'Sullivan Rubber Heels.

A 1901 advertisement for "Golf Knobs" to be attached to any shoe for turn-of-the-century golfers.

to the putting surface. The modified golf shoe spike, with the shoulder either flat with the sole or else recessed within the sole, proved to be less damaging to soils and turf, and it is still manufactured today for golfers who prefer spiked shoes but who are concerned with preserving putting green quality.

Course superintendents and green committee chairmen were also concerned. Charles Cogan, Green Committee Chairman at Irvine Coast Country Club, California, undertook his own study of spiked shoe damage to greens in 1960:

"The average golf shoe has 12 spikes; i.e., 24 spikes per golfer. I have found golfers take an average of 26 full steps (52 paces) per green. Therefore, each golfer leaves (26 x 24) 624 spike marks on each green. On 18 greens, he leaves 11,232 spike marks. If there are 200 rounds of golf played a day, there are 2,246,400 spike marks left behind. If this goes on for 30 days, you have 67,392,000 spike marks per month. And now, you wonder why you can't sink a putt?"

Both the player and the grass grower have a right to be concerned over golf shoes and what they are doing to the playing quality of our turf. But there is another, less visible factor that also deserves attention. There is increasing concern over the added costs in labor, aerifying, topdressing, mowing, weed control, cup changes, etc., brought about by spiked shoes. William H. Bengeyfield, one of the authors of this article, believes that $10 million is a conservative estimate, and he attributes that to course conditioning alone. What of the additional costs in replacing pro shop and locker room carpeting, asphalt and concrete paths, door sills, wooden steps, benches, electric cart flooring, dashboards, tee markers, etc.? Does the spiked shoe cost golf $15 million or $20 million a year? Whatever it is, there is no doubt of its destructiveness.

But who among us is crusader enough, with courage to ask and optimism enough to expect today's golfer to readily give up wearing shoes with spikes?

The golfer has been conditioned. He believes that he needs the spiked shoe and, no doubt, some golfers probably do. The power behind the big drive in golf (250 or more yards), it is said, comes from the legs. Powerful legs need a secure grip. But not everyone who plays this game for the fun of it drives 250 or more yards! Not every golfer has that kind of leg power.

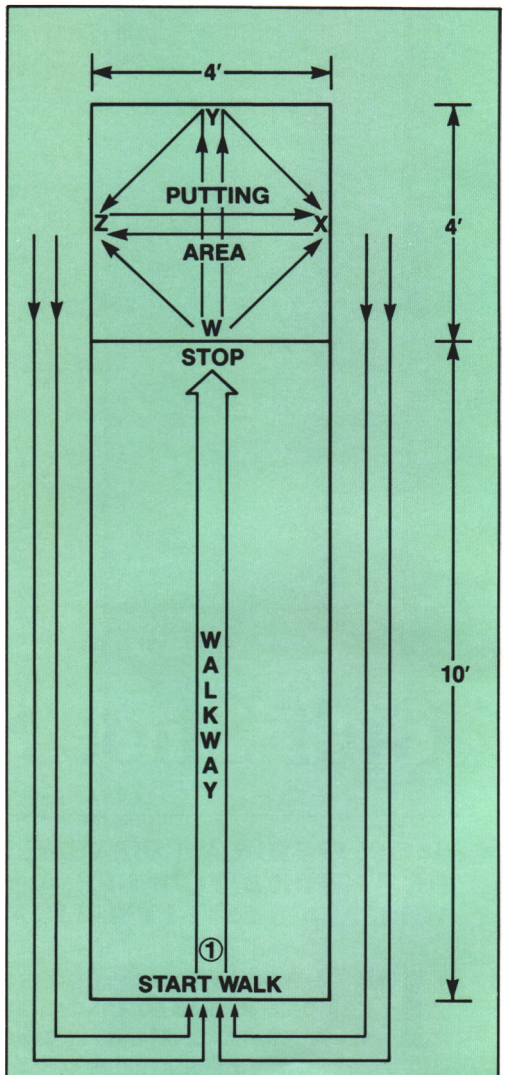


Figure 1. Individual Plot — Phase I.

Furthermore, not every round of golf is played under wet, slippery conditions. Fortunately, there are increasing numbers of golfers today, including many club professionals, who enjoy the game and play it very well in shoes without spike or stud. Indeed, most golfers could easily play and enjoy the game, especially on dry days, in

Photograph by MAX CLOVER, U.C. EXTENSION SERVICE

The Green Section Golf Shoe Study II participants (left to right) W. Bengeyfield, R. Loyland, Dr. V. Younger, M. Huck, R. O'Tee, Kevin O'Keefe, Dr. V. Gibeault at Industry Hills, California.

spikeless shoes. Hooray for them, for they shall lead the way to better putting turf at a lower cost.

The New Shoes

In 1982, a dramatic change in the design of golf shoes took place. New, multi-stud sole shoes were introduced into the United States. The studs are made of either rubber or a composition material. Advertising claims of "better traction" and "no damage to greens" were widely circulated. In one case, it was proclaimed that the new shoes were "USGA approved," a statement with no basis in fact.

As more and more of the new shoes were produced, reports from golf course superintendents indicated that, contrary to the advertising claims, they were significantly damaging greens and adversely affecting putting surfaces, especially wet ones! Claims and counter-claims multiplied. The time was right for Green Section Golf Shoe Study II.

Early in 1983, an experimental plan was developed at the University of California, Riverside, to evaluate the effect of four different types of golf shoes on turfgrass quality and injury to putting green turf. The experiment and lessons from earlier shoe studies were incorporated in this plan. The new study began in May, 1983.

At Industry Hills, Calif., General Manager Bill Bryant offered the use of one of the Penncross bentgrass nursery greens for the experiment. The turf was nearly a year old and had developed approximately a 1/2-inch depth of thatch.

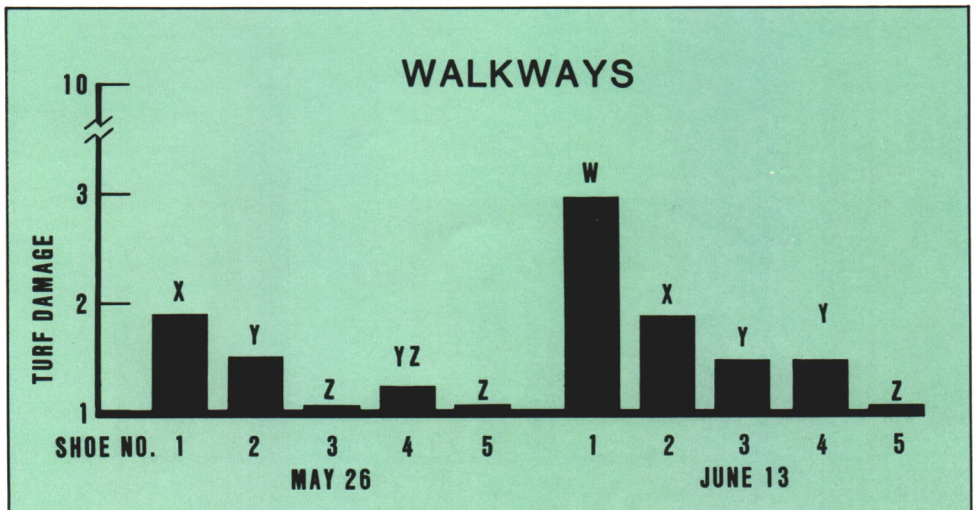


Figure 2. Ratings followed by the same letter are not significantly different, Duncan's Multiple Range Test.

It was mowed daily at 3/16 of an inch. The nursery green itself was built three years earlier to USGA Green Section Specifications. It received no other traffic than that imposed by the experiment, plus normal maintenance procedures. Four types of shoes were used in the study:

Shoe No. 1) The conventional metal spike golf shoe.

Shoe No. 2) One of the popular, new multi-stud sole golf shoes.

Shoe No. 3) A new "spikeless" golf shoe with very small suction-type cleats.

Shoe No. 4) Another one of the new multi-stud sole shoes but with a different sole design from No. 2.

The overall experiment was designed for Three Phases:

Phase I was to evaluate the shoes under normal weather conditions. This phase would require six weeks of testing.

Phase II would immediately follow Phase I and be a subjective test of the putting qualities of each plot. Two golf professionals and one amateur golfer would, in a prescribed manner, individually putt and rate the plots.

Phase III was to evaluate, under extremely wet conditions, the four shoes, as to wear injury effect over a period of three weeks.

PHASE I

After a brief preliminary investigation, the study commenced on May 2 and continued through June 13, 1983. Each plot measured 4 feet by 14 feet and was separated from adjacent plots by a 2-foot path. There were five randomized plots (one for each shoe type plus one check plot) in each replication, and four replications used in this experiment.

Four men, wearing a different type of golf shoe each day (in a predetermined order), walked and putted the plots designated for that particular shoe. They followed a prescribed walking and putting traffic pattern as shown in Figure 1. Each completed pattern was considered to be one treatment and each plot received four treatments daily. The men, wearing a different shoe type each day (in the predetermined order), carried out the treatments for four days, took the fifth day off, and so continued throughout the six-week span. Ratings were taken every two weeks using a scale of 1, equaling no visible damage, to 10, equaling bare ground.

TABLE 1.
Putting Surface Quality as Affected by Shoe Type (Normal Weather Conditions)

SHOE	AVERAGE PUTTING RATING
1	6.8 a*
2	3.9 b
3	3.6 b
4	4.4 b
CHECK PLOT	3.9 b

*Rating of 1 being excellent and 10 being extremely poor. Ratings followed by the same letter are not significantly different, Duncan's Multiple Range Test.

The Walkway Ratings

Turf damage to the walkway areas was rated on May 26 and June 13 and is shown in *Figure 2*. Since there was no visible damage to the walkways on May 10, no ratings were made.

On May 26, 24 days after beginning the experiment, Shoe No. 1 (spiked) showed the most damage to the walkway area. Shoes No. 2 and 4 (studded) showed slight damage. Shoe No. 3 (suction cleats) and the check plot had no visible damage.

On June 13, the turf damage on walkways was more severe. Again, damage from Shoe No. 1 was clearly more severe than the other shoes, followed by No. 2. No. 3 and No. 4 shoes were about alike in damage. All shoes showed statistically greater damage than the untreated check plot.

The Putting Area Ratings

Turf damage ratings to the putting areas on May 10, 26, and June 13 are shown in *Figure 3*.

Apparent damage to the putting plots increased throughout the duration of the study. Shoes No. 1, No. 2, and No. 4, in that order, caused the most damage. Shoe No. 3 caused some wear, but considerably less than the other shoes. On the final day of these ratings, all shoe plots showed significantly more damage than the check plot.

An example of damage caused by Shoe No. 1 on June 13, is shown in *Figure 4*. The Penncross creeping bentgrass had poorer color, decreased density, and a scruffy, ragged appearance, showing mechanical damage. These plots also had a noticeable surface depression and overall unevenness.

PHASE II

Immediately at the conclusion of Phase I, the subjective determination of the putting qualities of each plot was made. Paul McGuire (PGA), Julie Lynd

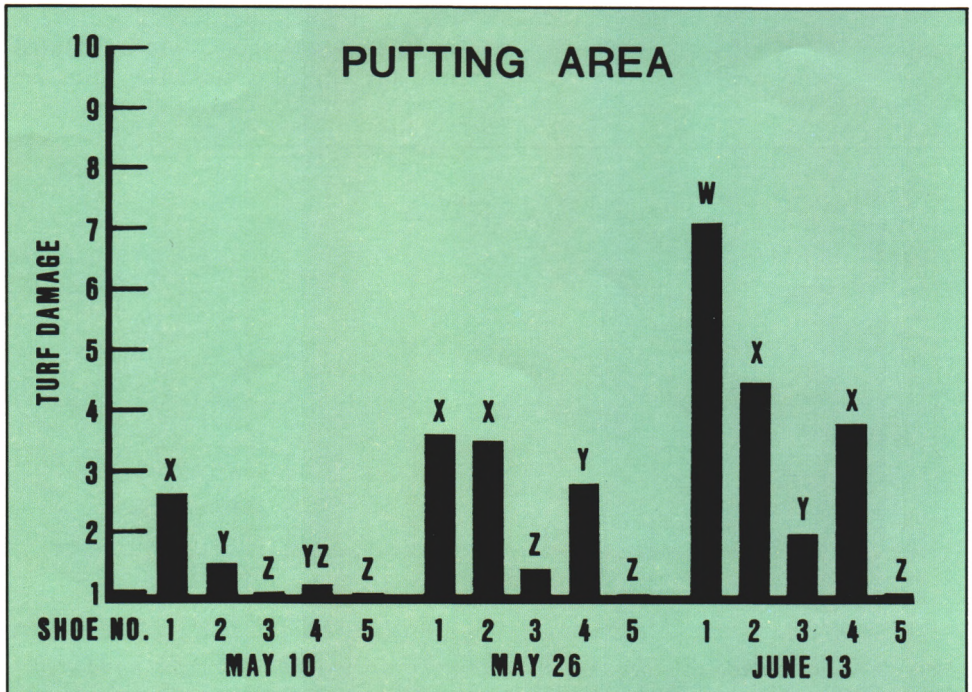
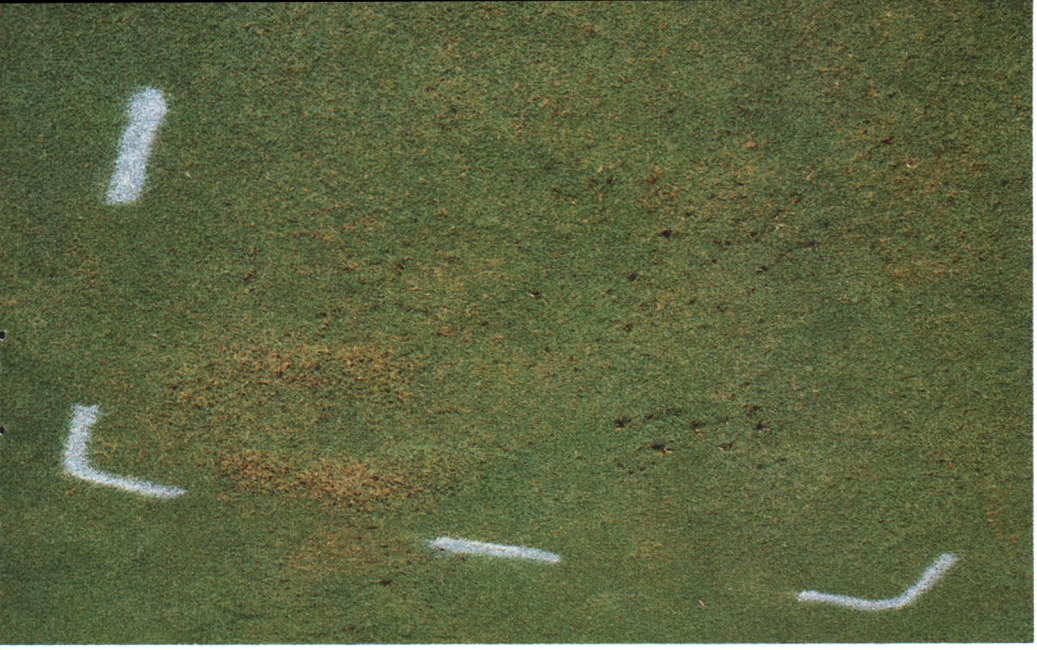


Figure 3. Ratings followed by the same letter are not significantly different, Duncan's Multiple Range Test.



Photograph by Max Clover, U.C. Extension Service

Figure 4. Conventional spike shoe wear to putting area.

(LPGA), and Ross O'Fee (amateur golfer) cooperated in this experiment. They followed the putting pattern shown in *Figure 5*. Ratings were made from 1 (excellent putting qualities) to 10 (totally unsatisfactory putting qualities).

Putting ratings were made on the walkways as well as the putting areas of each plot. The only noticeable shoe influence, however, was observed on the concentrated putting areas, and these results are presented in *Table 1*.

These results show that, when putting across plots where Shoe No. 1 was worn, a decidedly poorer quality putting rating was given by the golfer. On the plots of the other shoes, there was no noted statistical difference between them under the conditions of this experiment, i.e., normal weather.

PHASE III

This study was to evaluate the effects of the four shoes on putting green turf under very wet conditions. Earlier reports indicated that the multi-stud shoes caused considerable damage to wet putting surfaces. In some cases they have actually been banned from golf courses in this country.

In Phase III, the individual plots measured 2 feet by 10 feet, and consisted of straight walkways over which 25 round trips were completed each day for three weeks. There were no putting areas in this test. All plots were replicated four times, and, again, the four men changed to a different type of shoe (in a predetermined order) each day and walked only those plots designated for that particular shoe.

Every day, just before walking began, the test area was heavily and thoroughly hand watered. The surface area was saturated until water was standing on it. It was allowed to drain, and the plot was again irrigated to saturation and standing water. Immediately following the second drainage, walking began. At the end of three weeks, the plots were rated on the same scale as before, 1 equaling no damage and 10 equaling bare ground.

The results are shown in *Figure 6*. They are similar to those in Phase I except the damage is greatly accentuated. The ratings show that damage from Shoe No. 1 is greater than the damage from Shoe No. 2, and Shoe No. 2 caused more damage than Shoe No. 4, and Shoe No. 4 caused more damage than Shoe No. 3.

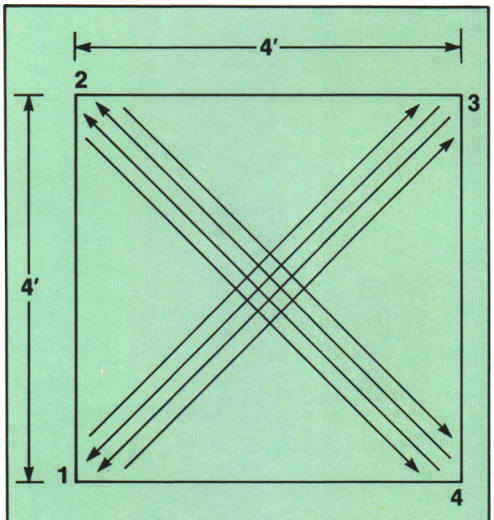


Figure 5. Putting Pattern — Phase II. Each golfer putted from Stations 1, 2, 3, and 4.

Discussion and Conclusion

From an overall view, the results obtained on turf damage and putting quality confirmed those of the Golf Shoe Study 25 years ago!

SHOE No. 1 (spiked shoe)

Under all conditions, this was the most damaging shoe tested. It also caused the longest lasting damage. In fact, four weeks after concluding the Phase I experiment, turfgrass damage was still apparent on all Shoe No. 1 plots (*Figure 7*). The length, shape and metallic nature of the spike, as well as the limited number of metal spikes on each shoe, are factors that account for most of the observation of this study. The effect of compaction, caused in large part by the weight-bearing shoulder of the metal spike, as well as the limited number of bearing surfaces (i.e., 11 or 12 spikes per shoe) was pointed out in the 1958-59 studies. The contention that the metal spike helps aerate the upper soil surface is without factual basis.

SHOES No. 2 and No. 4 (studded shoes)

Shoes No. 2 and No. 4 were the second and third most damaging shoes in this study. The **slightly** less grass damage caused by these shoes seems attributable to their greater total surface contact area (i.e., more, wider studs or nubbins) on the shoe soles. The studs are shorter than metal spikes, more blunt and tend not to pierce the plant tissue.

Conversely, however, these shoes, under wet and certain other conditions, have a marked tendency to ruffle or disrupt otherwise smooth putting surfaces and cause a waffle-like imprint. Because the studs are blunt, with approximately 108 of them per shoe, they each cause a larger area of depression than the metal spike (with 11 or 12 per shoe), which slices through the surface and into the ground. How long the multi-stud imprint remains on the grass depends on many factors, including the type of grass, how wet the surface, general drainage characteristics of the green, thatch density and depth, height of cut, rooting depth, and soil types heavier than those encountered in this experiment.

SHOE No. 3 (suction cleats)

Shoe No. 3 was the least damaging of all to the turf and putting surface. Again,

Hand watering the "wet plots" before walking.

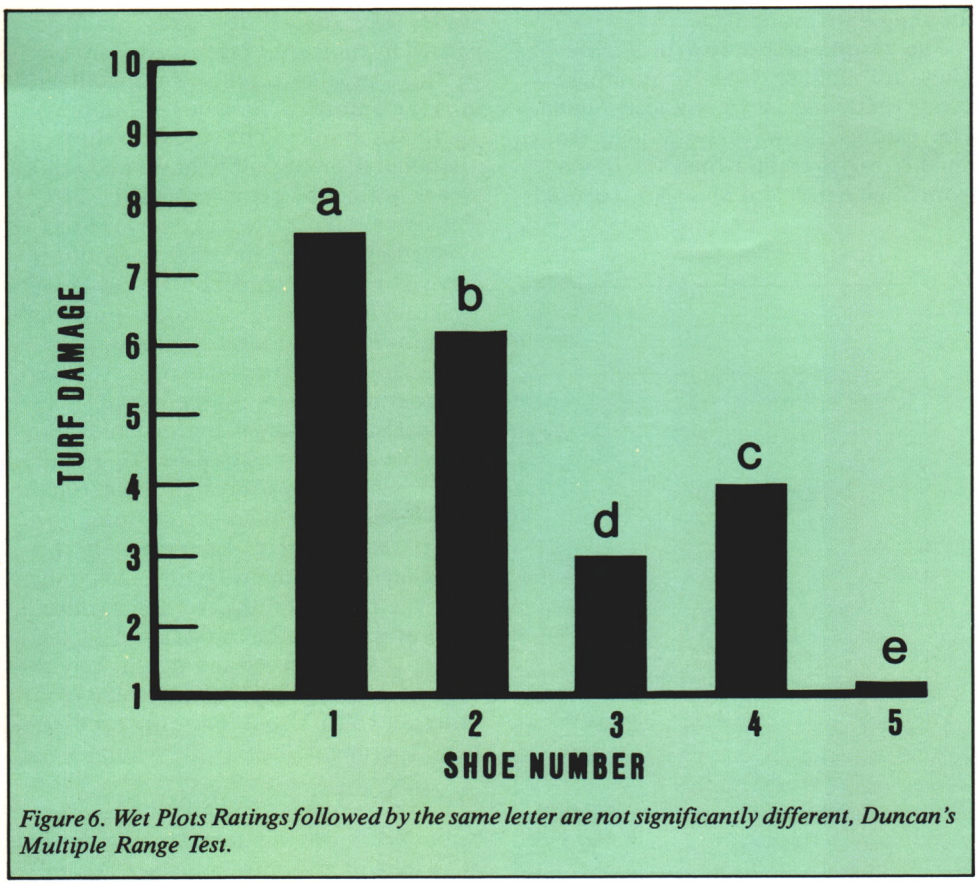


Figure 6. Wet Plots Ratings followed by the same letter are not significantly different, Duncan's Multiple Range Test.

this seems attributable to the very high surface contact area, no great protruding spikes or studs and a non-metallic sole composition. The sole is comprised of approximately 750 small rubber cleats.

Some Concluding Thoughts

The standard golf shoe spike, or any shoe with nobs, studs or protrusions of any kind, unquestionably causes greater damage to the grass and adversely affects putting qualities more than flat type shoes. Golf is one of the few games, perhaps the only one, where the player's own equipment — spiked shoes — directly, undeniably, and significantly affects the most critical playing surface of the game — the putting green. Even baseball and hockey smooth over their playing surfaces halfway through the contest! Golfers can't do that, and day after day, step after step, the spiked golf shoe takes its toll.

Is there a compromise? Is there some way out of this dilemma? In this technical age, a new idea for golf shoes may be lurking somewhere. Surely it is

(Left) Figure 7. Damage from metal spikes was still evident four weeks after discontinuing the experiment.

(Below) General view of experimental shoe trial area.

Photograph by Max Clover, U.C. Extension Service

possible to develop a sole that will grip the ground without tearing the grass plant asunder.

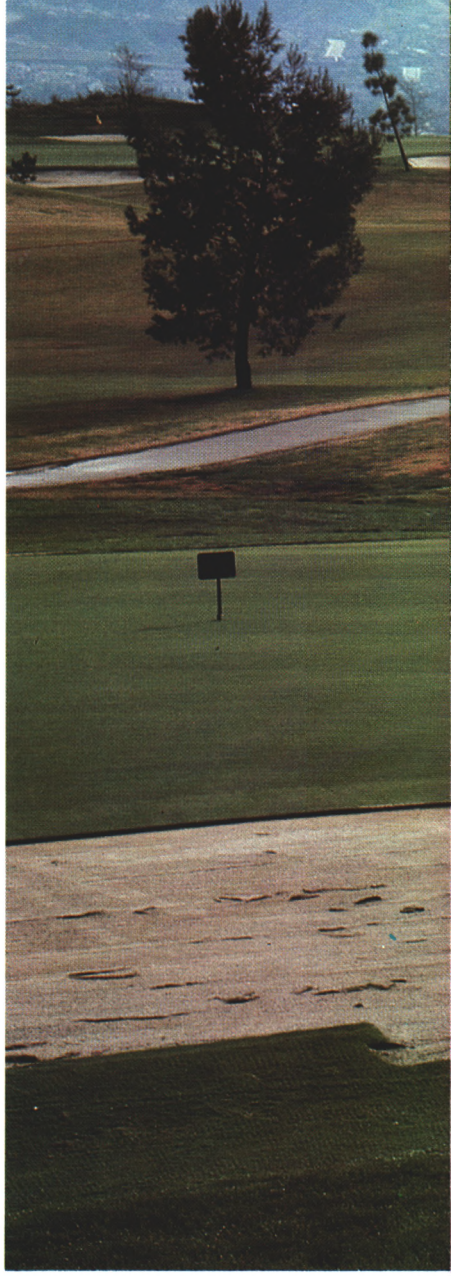
Perhaps instead of one pair of shoes for all seasons, golfers should have two pairs of shoes for two seasons; a spikeless shoe for normal weather conditions and a spiked shoe, if necessary at all for the golfer, for wet days. Oh! What a relief THAT would be! It would save our putting greens, our clubhouses and our maintenance budgets millions of dollars a year. And, yes, it could mean at least another 800 years for the Swilcan Bridge. That along would make it worthwhile!

IN SUMMARY

SHOE No. 1	Metal spikes Long, pointed spikes Mechanical tearing, piercing Low surface contact area 11 or 12 spikes per shoe Spikes with shoulders	**HIGH TURF DAMAGE**
SHOE No. 2 & No. 4	Composition sole Shorter, blunt studs Medium surface contact area Approximately 108 studs per shoe	**MEDIUM TURF DAMAGE**
SHOE No. 3	Composition sole No spikes High surface contact area 750 small rubber cleats	**LOW TURF DAMAGE**

Nursery Rhymes

by CHARLES B. WHITE
Director, Southeastern Region, USGA Green Section



CHURCHES HAVE nurseries, hospitals have nurseries, health clubs have nurseries and shopping centers have nurseries. We have child nurseries, animal nurseries, ornamental nurseries, and even tree nurseries, but not often enough do we have good golf course nurseries! Why is that?

Too often a golf course nursery doesn't exist, or it is in a sad state of repair. If one does exist, seldom does it reflect the quality of turf found on the golf course itself, particularly if it's a putting green nursery. It may have been originally seeded to the same grass as the regular greens, but it is usually neglected with time, and a sod of poorer quality results. In that state, the nursery's chief use is as an occasional lunch time practice area for the crew, or an experimental testing ground to kill grass. These are not really the functions of a sod nursery in a top flight operation.

A true golf course nursery, defined in the purest sense, is a turfgrass area where sod is grown and kept readily available for use on putting greens, collars, tees, and fairways. It is managed exactly as the intended "use area" on the course. It requires this kind of maintenance so that it will be completely functional when installed. There is little value to a putting green sod nursery maintained at ½-inch height of cut. If it is ever needed on the course, it will take weeks to become acclimated to actual putting green conditions. Unfortunately, this type of situation is more often the rule than the exception when so-called "nursery areas" are established and maintained on many golf courses today.

If a putting green nursery is established, it should be mowed, watered, treated with pesticides, and culturally managed just as a regular green. Later, when sod or plugs are transplanted onto the putting surfaces of the golf course, there is no shock factor to contend with, other than the actual movement process of the grass itself.

To do it right, a putting green sod nursery should be established with the same soil as that found in the existing greens. This prevents soil layering at a later date whenever the sod is used. If heavy or poor soil conditions exist on the greens, however, then a root zone may be established in the nursery, having a slightly higher sand content without creating an extremely sandy condition. Mixing a quality topdressing sand and soil similar to that of the putting green profile is one suggestion. This may not produce the most desirable root zone, but it will be more compatible with the particular greens, especially if a long range aerification and topdressing program is instigated.

When establishing a tee or fairway nursery, a slight rise or fill of 10 to 12 inches above normal ground level with a quality soil is suggested for a proper root zone to become established, and so the area will not be subjected to surface runoff from adjacent areas. If raising the height of the nursery is not possible, then it should be plowed deeply to remove any compaction or hardpans. If soil and nutritional amendments are necessary, they should be added to the final soil mix and thoroughly incorporated into it.

Soil sterilization is especially important on putting green nurseries, since it is the only method of insuring complete eradication of foreign grasses and weed seeds. Methyl bromide is widely and carefully used at the rate of one pound per 100 square feet for effective weed control. If the putting green sod nursery is not free of weeds, how can it improve the golf course on a long term basis?

SOUND CULTURAL programs are essential on nursery areas to promote the most actively growing turfgrass possible. This is *not* accomplished with *nitrogen*! Nursery areas are not usually subjected to traffic, and, therefore, thatch accumulation is a serious problem. Traffic, especially on greens, can reduce thatch buildup. If an area is not subjected to traffic, lower nitrogen rates and rigorous vertical mowing, aerification and topdressing programs are the main means of thatch control. Sod with excessive thatch is most difficult to install properly, prevent from scalping, and establish in its new location. Proper installation sometimes is virtually impossible, and so keeping thatch under control in the nursery is extremely important.

Other critical management factors include the maintenance of proper soil pH and nutritional levels. This will insure optimum growth and vigorous stolons, rhizomes and root systems. If these growing areas of the grass plant are maintained in an active state, the sod nursery will be at maximum aggressiveness and recuperative potential.

How large should a nursery be? Answers vary from individual to individual, but ideally a putting green

(Above) A large bentgrass putting green nursery and systematic removal of sod.

(Right) Example of systematic removal of plugs.

nursery should be as big as the two largest greens on the golf course. This provides a workable size for sod removal to offset unexpected disasters, vandalism, loss due to chemical burn, insect or disease invasions. A good rule of thumb for tee nursery size is to keep an area about the equivalent of the three largest tees if the tee grass is different from the fairway grass. If the turf is the same on tees and fairways, then 1 to 1½ acres will provide an excellent source of sprigs, sod or plugs for all of the areas. Such a nursery would most economically be maintained under fairway conditions, since a strong, healthy turf can quickly adapt to teeing surfaces, if necessary. It is important to stress again that a large enough area is needed to be feasibly workable in the removal of sod and rejuvenation of grasses.

Sod removal from a nursery should not be in a random or "stealing" pattern of sod plugs from all over the area. The process should begin at one side of the nursery and removal accomplished in a systematic order from one side to the other. If random removal of plugs or sod is allowed, great quantities of quality sod are wasted, uneven surfaces quickly develop, and regular maintenance practices (mowing, fertilization, etc.) are made more difficult. The practice also prevents a large, untouched uniform area of quality sod from being available when and if large sod quantities are needed.

Sod from a nursery should be cut as thin as possible (usually between ½-inch to ¾-inch), so long as it holds together when carefully handled. This allows it to be laid down in the smoothest conditions. Thick sod is much more difficult to handle. The layering from thick sod is also more difficult to remove with aeration than layering from thin sod. Thin sod also saves money, because less fill soil is needed to refill the area from which the original sod was removed.

Putting green sod should never be rolled up for transportation or handling purposes. This stretches and opens the sod. There is frequently a loss of soil, causing an uneven surface (requiring more topdressings). Putting green sod should be transported in a flat condition.

If proper fertilization practices are maintained (providing adequate phosphorous and potassium to produce vigorous root systems, the new sod will begin its root system rejuvenation about 24 hours after it is placed in its new location. Even so, an application of 16-20-0 or an activated sludge incorporated in the new sod bed, prior to the laying of the sod, will prove beneficial. This fertilizer application should be watered in lightly. Thus, in a period of about one week, the new sod will have pegged down fairly well.

SODDING IS a very tedious and time consuming task. It should not be rushed. Proper sodding techniques include fitting the sods together as tightly as possible and then smoothing, rolling and/or tamping the sod as necessary. Filling all remaining cracks between the sod strips with soil will reduce wilting and drying out of sod edges. It will also help produce a smooth and uniform surface as rapidly as possible. Careful follow-up irrigation practices will also be necessary for several days after completing the sodding job.

It should be no surprise that, once a good source of sod is available on any golf course today, the superintendent will find increased uses for it. Thin and worn areas, once impossible to improve, will be rapidly repaired Scars from vandalism and other causes will no longer be an eyesore and distraction for weeks on end. Such situations are not pleasing to members, and if they are corrected, the membership soon recognizes the golf course superintendent for setting things right as soon as possible.

Consider the importance of a properly planned and managed sod nursery at your golf course. It holds benefits for the course, the membership and, equally important, for the golf course superintendent as well. It's good management. Your golf course needs a nursery!

Maintaining a vigorous turf ensures rapid healing after systematic removal of plugs.

The first hole on the Ocean Course, Olympic Club, San Francisco, California.

The Golf Course Superintendent and Maintaining the Integrity of the Course

by JOHN FLEMING, Superintendent,
Olympic Club at Lakeside, San Francisco

THE OLYMPIC CLUB in San Francisco, has been the site of four United States National Championships. The memories of the 1958 U.S. Amateur and the U.S. Opens of 1955 and 1966 were certainly equalled in excitement and drama by the 1981 Amateur Championship, which was decided on the 37th hole of match play. I remember the gallery climbing the hill behind the 18th green to the first tee, with the match even at the end of 36 holes, and my own little moment of drama when I finally realized I'd assigned the course ranger to pick up the flagsticks following the afternoon round. Anyway, we found the flagstick for the first hole, and as you all know, Nathaniel Crosby won the Championship.

The decision to conduct a USGA Championship brings with it an enormous commitment on the part of a club, its membership, and staff. Our commitment was extended to include both the Ocean and Lake courses because of the size of the field at 282 players. The seven-day event included two days of practice rounds, two days of qualifying by stroke play, with the field cut to 64 players for the final four days of match play on the Lake Course.

Certainly, much has been whispered about the USGA philosophy of course operation and the stringent demands placed upon a club and its superintendent in preparing for a championship. Contrary to that belief, my two years of involvement with the Green Section Staff and Championship Committee offered an unusual opportunity for professional advancement and insight

on "championship conditioning." I found Al Radko, Billy Buchanan, and Don Hoos to be true professionals with a wealth of knowledge, realism, and good common sense.

Let me take a minute to extract from the course preparation reports a few of these so-called stringent demands I received during the two-year preparation period:

1. Establish firm, keen greens. Do not overwater.

2. Establish firm, dry, level turf on tees. Do not overwater.

3. Eliminate hard and soft spots on fairways.

4. Avoid high applications of nitrogen. One-third to one-half pound per month should be sufficient.

5. Avoid fluffiness.

6. Fertilize rough only where necessary.

7. Sand on faces of bunkers should be shallow and firm. Remove excess.

8. Avoid overuse of fungicides. Integrate applications of potassium to aid in root development and increase disease resistance.

9. Apply light but frequent applications of topdressing to create firm and true putting surfaces.

10. Remove any artificial direction or distance markers.

11. Tee signs need not be elaborate; they need only provide the necessary information in a neat, clean style.

SOUNDS MORE like a lesson in fiscal responsibility than an agronomic report. If one were to view these recommendations as stringent demands, he certainly would need to take a closer look at his operation. There's a great lesson for all of us to learn here, particularly in this age of rising costs and inflation.

"Overgrooming really is overspending." If moderation is the key to successful preparation for a major championship, surely moderation should play a key role in developing our philosophy on everyday course maintenance. Our major responsibility as superintendents is the daily preparation of the stage on which the game of golf is played. We must never forget that the game is what counts, and that all else is secondary. Nowhere is this statement more true than at a USGA event.

There is an old adage that states, "Get involved with the people involved." The week of the Championship allows ample time to meet with officials, staff and contestants, and to seek their comments on course conditioning.

Nathaniel Crosby winning the 1981 United States Amateur Championship at the Olympic Club, San Francisco, California.

You'll find the USGA Committee members and staff to be a hardy bunch, on the job early in the morning and in the evening after the matches have ended. The superintendent assigned to a championship site would do well to note that his time to relax is while the competition is in progress. The early morning and late afternoon are sacred to course preparation.

Perhaps it was the size of the field, which required starting times beginning at 7:00 a.m. through 2:30 p.m., but I found much of the planning for the course set-up was accomplished on the evening before the matches, and finalized the next morning. Following the last match of the day, I would join up with the Green Section representatives and Championship Committee officials on their rounds. Tees were checked and the selection of tee placement made and marked. Greens were checked for firmness and resilience to foot traffic. Hole location was given considerable attention and discussion. The criteria was based on the following:

1. Length of the shot to the green and how it would be affected by probable conditions (i.e., wind, fog), and also by the holding quality of the green.

2.The opportunity for recovery if a reasonably good shot just missed the green.

3. Changes in the degree of slope on the green.

4. Balance of hole locations for the entire course with respect to left, right, center, front, and back positions.

5. And last, selection of six difficult hole locations, six that are somewhat less difficult and six moderately difficult.

After selection was made, each cup location was measured, marked with a golf tee, and verified the next morning before the cup was moved.

Post play maintenance in the afternoon included fairway, tee and collar mowing, plus daily mowing of the six-foot wide intermediate rough surrounding fairways and greens. Divot repair on the par 3s and the drive areas of the par 4s and 5s was also an afternoon assignment.

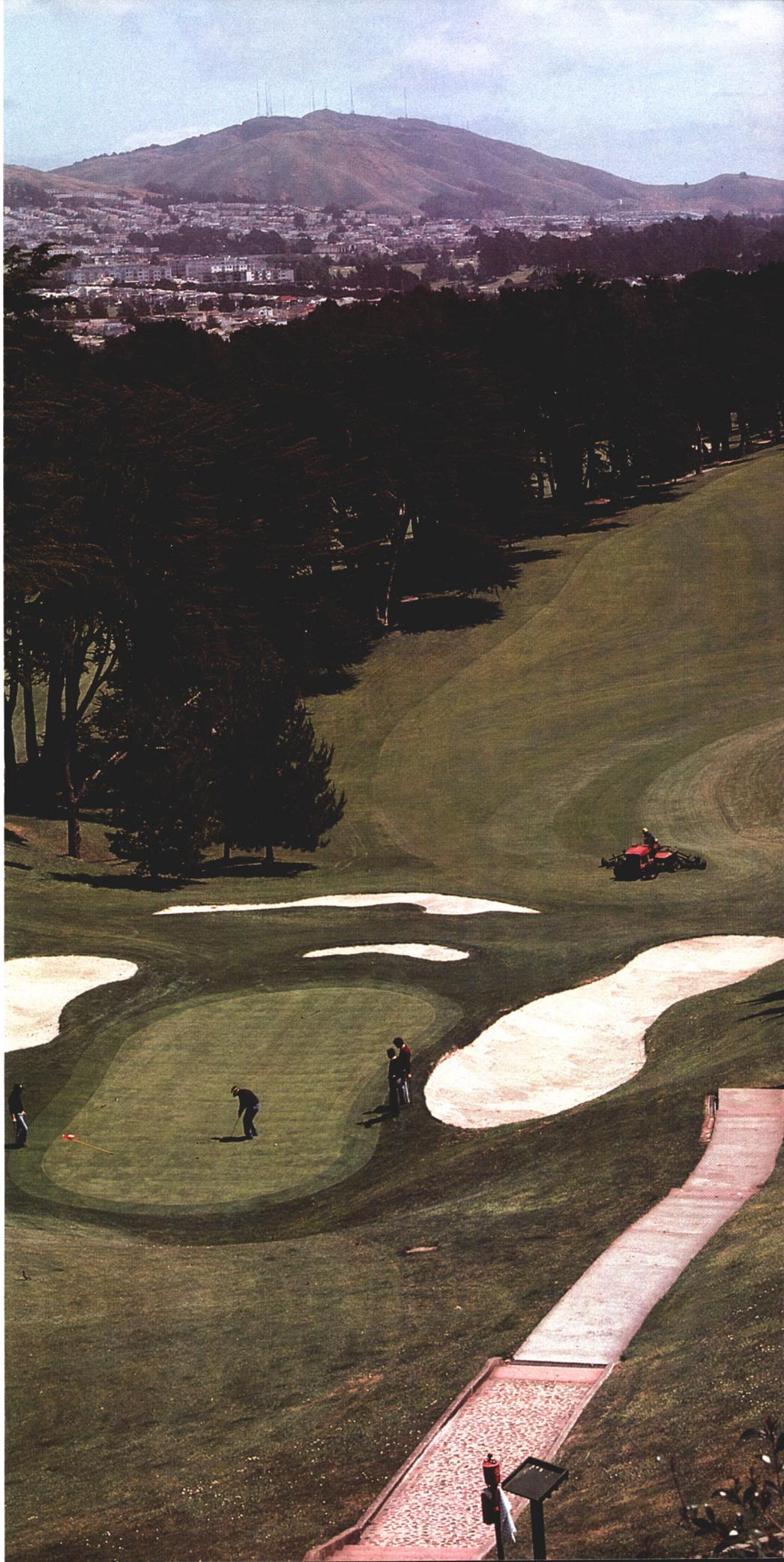
Morning duties included dew removal on the fairways, double mowing of the greens, plus practice putting greens, recording of green speed, maintenance of the bunkers, and a final check on hole locations to insure that the hole is cut as near vertical as possible and that the hole liner is at least one inch below the putting green surface. During the week of the Championship, fairways were cut to ½-inch, putting greens to ⅛-inch, intermediate rough at 2 inches, primary rough at 4 inches, and tees and collars at ⅜-inch. Width of the

fairways varied from 28 to 40 yards in the drive area, depending on the difficulty of the hole.

A FEW COMMENTS on green management during the tournament are in order. The first and most important requirement is consistency (i.e., consistency from one green to the next). Greens should putt at approximately the same speed and receive a well-struck ball with the same action. Herein lies the basic need for firm greens. Consistency was the main reason for the development of the Stimpmeter. It is a very simple but precise instrument for measuring green speed, and a very useful tool in preparing for a tournament and maintaining consistency during play. During the Amateur, green speed approached 10 feet during the practice and qualifying rounds, and leveled out at a reading of 10 feet, 6 inches, for the four days of match play.

Mention should also be made of the very fine line that exists between firm and hard. I recall the first day of qualifying. Visibility was so bad on the Ocean Course that we had an hour delay because of the fog. Then conditions changed rapidly and the winds blew to 30 miles per hour. What proved to be firm in the morning became hard as the day progressed. The officials debated the idea of watering the greens. The final decision was for no water and it proved to be the correct one. The next day normal San Francisco weather prevailed. It would have been easy to put the water on, but hard to take it off. So, we can draw from this analogy that just as the tools are available for the superintendent to deal with adversity, the shots are in the bag for the golfer to deal with it as well. The reward in both cases goes to those who make their choices wisely.

I've written briefly about grooming a golf course; not overgrooming, but grooming to develop quality playing conditions. There is no need for one-upsmanship in our business. The rule is simple: maintain the integrity of the golf course. It is certainly one of the duties of the golf course superintendent. Perhaps it can best be summed up by saying the goal of any golf course is to have but one rule, and that is, "USGA Rules apply."



The famous 18th hole, Lake Course, Olympic Club, San Francisco, California.

TURF TWISTERS

AFTER 20 YEARS OF EXPERIENCE

Question: I have sent putting green soil mixture components to the USGA Soils Laboratory and to another soils laboratory in my region. I have received two somewhat different recommendations regarding the best mix. What is my next step? (Alabama)

Answer: First, let us correct a misunderstanding and state that it is *not* the "USGA Soils Laboratory." Rather, Agri-Systems Laboratory of Texas is a private contractor. The USGA Green Section has made arrangements with Dr. Marvin H. Ferguson, President of Agri-Systems, to conduct the physical soil analysis requirements for USGA Green Section Specification Greens. Dr. Ferguson was instrumental in developing the Specifications in the early 1960s and has had over 20 years of laboratory and field experience with them.

FILLING HOLES WITH TOP DRESSING

Question: Filling holes with top dressing after aeration is time consuming and costly. Is it really necessary or beneficial? (Florida)

Answer: Definitely yes. Filling aeration holes reduces insect infestation and can double or triple the recovery time from bumpy surfaces to smooth surfaces. Also, heat can build up in the empty aerifyer holes, which can restrict vigorous root rejuvenation. Of course, ½-inch holes are easier to fill than ¼-inch holes.

HERE TO STAY

Question: We have had a great deal of difficulty growing trees on our golf course. The irrigation system reaches to the trees and the edges of the fairways, yet one irrigation specialist has told us that this is not sufficient irrigation for the trees. Is that correct? (Montana)

Answer: Yes. In most of the arid West where water is in short supply, tree establishment can be enhanced greatly by use of a drip irrigation system. Such a system will help you conserve moisture and keep tree roots out of the fairways. Drip irrigation will be more widely used on golf courses in the future. It's here to stay!