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Address_____ Customer's Name_____

City_____ Zone_____ State_____

Man_____ Lady_____ Righthand_____ Lefthand_____

1. Customer's Height_____ Weight_____ Age_____ Handicap_____ Distance from fingertips to floor_____
2. Shaft: Stiff (S)_____ Medium (T)_____ Swing (A)_____ Lady_____
3. Specify desired length: (Standard driver 43", No. 2 iron 38½")_____
4. Swinging Wt.: Woods_____ Irons_____ Loft: Standard_____ More_____ Less_____
5. Wood Faces: Standard_____ Closed_____ Open_____ Slight Bulge_____ Extra Bulge_____
6. Size of Grip: Small_____ Medium_____ Large_____ Extra Large_____
7. Type of Grip: Leather_____ *All Weather_____ Permagrip_____ *Goodwin_____

Remarks_____

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that requires a comparatively small area yet provides grass fairways, regulation greens, sand traps and water hazards and calls for a variety of important golf shots. Lighted for night play it's the answer to the golfer who wants to get in some mid-week practice but who can't get away from his job during the day and it brings out the beginner and the inexperienced who want to learn the game or are out for an evening of pleasure.

Such a course is Little St. Andrews, an 18-hole layout, opened in 1950 by Paul J. Murphy, a former greenkeeper and graduate of the Univ. of Massachusetts Two Year Course in Greenkeeping, in Shrewsbury, Mass. It has made a great hit with golfers and beginners.

Green fees are 50 cents. A player is given a putter and a ball. An 8- or 9-iron is placed at each tee for the player's first shot and he carries his putter with him for the round. Left-handers are provided with a 9-iron which they carry with them.

Holes vary from 20 to 60 yards for a total yardage of 580 yds. The entire course is laid out on 3½ acres. Parties are limited to foursomes or less, and an average time for a mixed foursome of ladies and men to play 18 holes is 45 minutes, although this may be considerably longer when play is heavy.

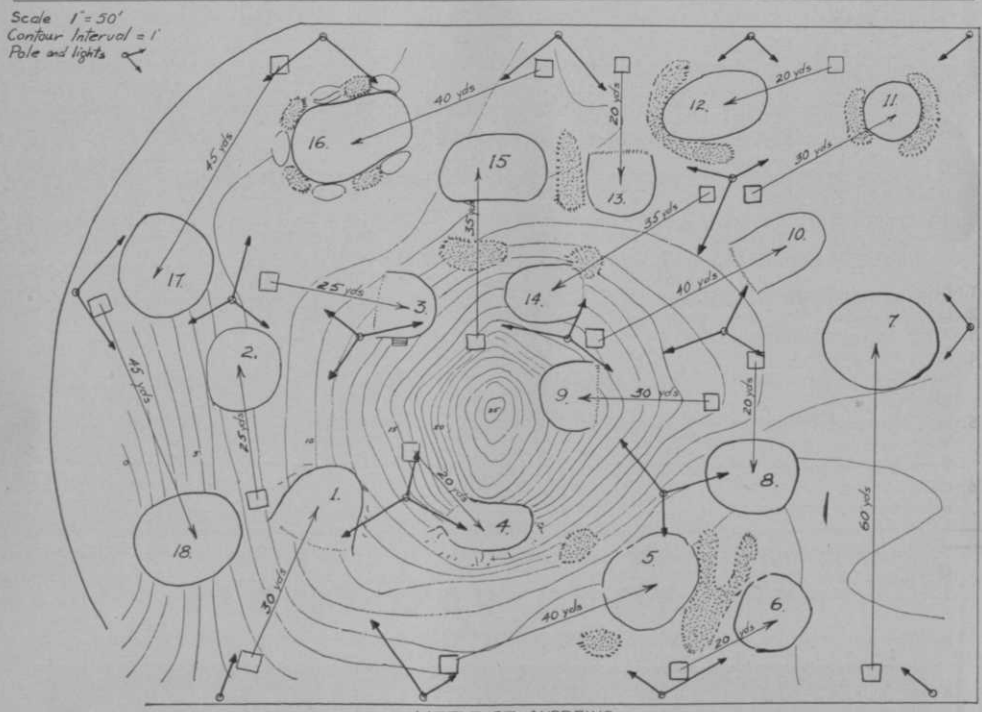
Little St. Andrews was popular in its first year of operation. With green watered fairways, low evergreen shrubs and white sand traps it is also a picturesque landscape feature on the Boston-Worcester Turnpike.

Laid out by the writer and Paul J. Murphy, who operates it, it was opened on Saturday, May 20, 1950. Throughout the season a great deal of interest was shown in it by potential owners of similar courses. In the autumn of 1950 Murphy and Cornish designed and commenced construction of a 9 hole layout for a company at Groton, Massachusetts. This short course, to be known as The Midway, occupies 2 acres of land and will open for play Memorial Day. The season's experience at Little St. Andrews was especially valuable in designing and constructing the new layout.

Cost of Construction

In a tour through the West last autumn, Murphy made a study of similar layouts, but found they were few and far between. Murphy, a low handicap player, says that short courses for chipping and putting are a decided asset to a community and will attract many newscomers to the game of golf.

They are not expensive to construct and are economical to maintain and operate if



LITTLE ST. ANDREWS
18 HOLE FLOODLIT APPROACH COURSE

Diagram showing layout of Little St. Andrews approach course and arrangement of light poles and floodlights. Chain link type fence surrounding course serves as boundary of playing area.

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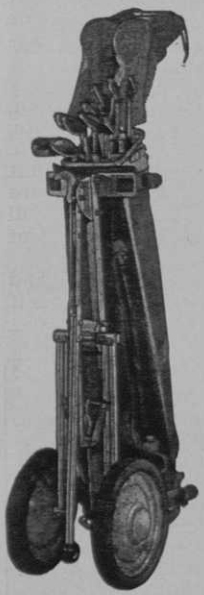

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properly designed. For a 9 hole layout the average construction cost per hole is about $1,000 including soil preparation, seeding, lighting, fencing, water system, parking lot, small cabin maintenance and playing equipment, but excluding real estate. For an 18 hole course the cost per hole is roughly three-quarters of this.

Principles of Design

The ideal terrain is fairly flat land with a few low rolls. It is important that the entire course be visible from at least one vantage point, preferably the cabin, because constant supervision of play is necessary. Steep rolling and hilly land is costly to light.

In designing a course for chipping and putting, the principles to be observed are:

a) Interest for the experienced player and novice
b) Safety
c) Economy of maintenance
d) Economy of lighting

A short course laid out attractively will continue to draw the same players night after night. Varying length of holes, their orientation, and utilization of different levels are all important. But interest can be increased and greater skill called for by addition of such hazards as low shrubs, shallow ponds and sand traps. A word of caution is required in regard to the latter. Deep traps would be impossible to play with the equipment provided, and the danger also exists of a player picking up an iron on a nearby tee and blasting out at considerable risk to other players and spectators. Shallow traps however are quite safe and contribute much to the interest of the game and beauty of the course.

To assure safety, careful orientation of holes is required. A hole on which the line of play is directed towards another is dangerous on these compact courses, as also are holes much over 60 yards in length.

Economy of maintenance is secured by designing the course so that it can all be mowed with a power mower. Furthermore, a green should not be under 1,000 square feet in area because grass cannot be maintained on smaller greens. Even with the relatively large greens at Little St. Andrews this is the greatest single maintenance problem. These greens were originally seeded with Colonial Bent together with a small percentage of Creeping Red Fescue. From time to time they are spiked and Red Top is seeded into them. Greens at The Midway are being sodded with Kernwood Velvet Bent from the Mitchell Brothers Nursery. On several Sundays when play was particularly heavy at Little St. Andrews, not only was the grass around the cups worn away, but the soil was depressed for almost an inch by the excessive tramping.

Economy in lighting requires careful attention. Dead areas on the course must be avoided. Correct design utilizes every square foot. Power at Little St. Andrews runs about $1.50 an hour. The course is lighted with 37 lights on 17 poles. This includes 1,000 and 1,500 watt lamps.

Maintenance and Equipment

Green grass, particularly in hot summer weather, attracts players by night and day. Both greens and fairways should therefore be watered in dry weather.

The major pieces of maintenance equipment required for either a 9 or an 18 hole short course in addition to small tools include a power mower for cutting the fairways, at least one hand putting green mower, a hand tee mower, a fertilizer spreader, a spike disc and aerating machinery to relieve the unbelievable compaction on both greens and fairways. Course furnishings include direction markers, signs, benches, regulation flags, poles, and hole cups.

Playing equipment at Little St. Andrews includes 30 irons, 8 left-handed irons, 100 putters, score cards, wooden tees, and balls. Although 72 players is the course capacity, people waiting should be given their putters and balls; otherwise they may decide to go elsewhere. Play is concentrated just after dark when lights are first turned on, and Sunday afternoons. This year Paul Murphy intends to keep 125 putters on hand, since he lost customers on several occasions last season when he had insufficient putters for rush periods.

Operation and Playing Season

Little St. Andrews was open from 12 noon to 12 midnight last season. The last players were allowed to start around 11 P.M. It was found that two men were needed to operate and maintain the course and it is believed that the same number will be required for a 9 hole layout if it is open 12 hours a day.

Many players were new to the game. Usually Murphy was on hand to give limited instructions and also directions to new players to prevent congestion. It is of interest to note that beginners took quickly to the game and a number were playing and taking lessons from professional golfers at clubs and public courses before the season was over. Homer Darling, Jr., professional golfer at nearby Juniper Hill Golf Course gave lessons at night by appointment on the short course and attached driving range.

Experienced players also patronized Little St. Andrews. The floodlights gave them an opportunity of enjoying golf at night. Last season Murphy permitted players to use their own irons if they wished. This season he anticipates restricting them to use of Little St. Andrews' irons because of the divot problem on the small

fairways. Spectators were always allowed to accompany players and it is intended to continue this practice this year.

The biggest crowds were obtained on the hottest summer nights. Approximately 85% of the season's play was from June 10 when the weather turned warm until September 9 when it turned cool. A cool night and even a single shower of rain in the evening appeared to keep the largest part of the crowd away. Little St. Andrews will open early in May this year and will probably close late in September. Undoubtedly the season for a course located further south would be considerably longer than this.

Sound Business Venture

A short course correctly designed should pay for itself and return a profit despite the relatively short season if located near any medium sized or large city, provided of course real estate charges are not excessive. Little St. Andrews is located next door to The Moors, a famous eating house, five miles from downtown Worcester. The Midway is centrally located between Nashua, New Hampshire, Lowell and Fitchburg, Massachusetts, and next door to the Boots and Saddle, another well-known eating place. Both locations are considered ideal.

For a few weeks after opening, the first season costs are relatively high because

young turf takes greater upkeep. A certain amount of costly experimentation may also be necessary to ascertain the correct number of men required, the hours for turning off the lights, the kind of evening (wet or very cold) when it is advisable not to turn on the lights at all, and the most effective means of publicity. As the first season advances it will undoubtedly be found that the course can be operated more and more efficiently.

Besides paying for itself, a short course is a useful adjunct to better eating places located on the outskirts of cities, and to driving ranges and resort hotels. Golf clubs and public courses might also consider installations of this type to attract night play and to secure additional revenue.

AVOID TROUBLE WITH GREENS

(Continued from page 33)

feet, per month. Clover is not a problem in these greens even though the reaction is nearly pH 7.5.

Both phosphate and potash become fixed in the soil. Potash is taken up by the clay and the organic colloidal material. The phosphate is fixed as calcium phosphate if the soil is not too acid, otherwise probably in part as iron or aluminum phosphate. They are far less subject to leaching than the nitrogen. We talk a lot about leaching of potash. Personally, I do not think it a big factor, provided there is at least 15 per cent of colloidal material in the soil derived from silt, clay or organic matter. Because the soil colloids pick up and later release plant food elements, it would be unwise to grow grass in pure sand. However, there should be enough sand present to insure a well ventilated soil.

Some phosphoric acid and potash can be supplied each month or it can be applied in two applications once in the spring and once in the fall. All but two of the greens at Brynwood in Milwaukee receive 5 pounds of 20 per cent grade superphosphate and about the same amount of 60 per cent grade muriate of potash per 1,000 square feet at the start of the season and a like amount during September. So far, the grass is behaving normally and seems to be getting enough of both elements. Then nitrogen is supplied as needed during the season.

Soil Testing

A few remarks about soil and plant tissue testing: Soil testing has been in vogue for quite a few years. Many states have laboratories which are equipped to do testing for farmers. They test thousands of samples every year, advise the farmers and, I am sure, the farmer is benefited as a result. Soil testing never will reach the point where you can be told to put on 152 pounds of 20 per cent grade superphosphate and that the yield of wheat will be 28.5 bushels per acre. Soil tests provide an inventory of the plant food content of the soil. If properly done, they furnish valuable information so far as phosphorous

and potash are concerned, and about soil reaction. In other words, the best way to find out if lime is needed is to make a soil test. However, there are times when the soil may be above that figure and yet the grass responds to lime. The response will not be marked. It is quite safe to say that lime is needed whenever the soil is below pH 6.0 in reaction. Benefits will be obtained eventually even though the effects are not immediately noticeable. It is important to determine available calcium and magnesium. If calcium is extremely low, more lime is needed on an acid soil than when it is high. If the magnesium is very low, it is important to apply a dolomitic type limestone — one that contains 20 per cent or more of magnesium reported as the oxide. This information is usually printed on the bag and if not, can be obtained from the producer of the lime. By using a dolomite, any possibility of magnesium deficiencies as a plant food element are eliminated.

The soil test for phosphate, potash, calcium, and magnesium are no better than the samples submitted for testing. If they are improperly collected, the results are meaningless.

Nitrogen determinations on soil samples are meaningless for grass. When grass is in good growth it takes up the soil nitrates as fast as they are produced. A test would indicate an acute deficiency when none exists. Soil samples collected in spring or fall when grass is dormant will often show plenty of nitrogen after they are brought into a warm place. The combination of moisture and warm temperatures enable the soil organisms to produce nitrates. They accumulate because there is no grass or other living plants to utilize them. The test may show very high nitrates and be misleading.

Samples of Uniform Depth

In our soil testing we never got consistent results until we took samples to a uniform depth. Most state laboratories suggest taking the sample to the plow layer depth. The suggestion is perfectly right for farm crops. The agriculturist works the soil frequently. Therefore, the area from the top to the bottom of the plow layer is apt to be reasonably uniform with respect to plant food content. That is not true of grassland areas. The plant food content is seldom uniform with depth. So it is important to take samples to a uniform depth and never change. For example, we would suggest the use of phosphate because of a low soil test. Yet a new sample taken the next year would show less phosphorous than the year before. The first sample was a shallow one, and the second was taken to a depth of 6 to 8 inches. The

applied phosphate was fixed in the top inch. The extremely low phosphorous content in the lower layers obscured the larger amount in the top inch and made it impossible to spot the difference. That is why we insist that samples be taken to a uniform depth of 2 inches.

Then we collected samples from an area where superphosphate had been used at 1,000 pounds to the acre and from the adjoining unfertilized area. Separate samples were taken for each inch to a depth of 4 inches. The top inch on the unfertilized area contained 20 pounds of available phosphorous per acre. The range was 10 to 15 pounds in the other three. The average was about 15 pounds. Where superphosphate was applied, the top inch had 120 pounds of phosphorous per acre, the second inch contained 20 pounds, and the third and fourth were 10 to 15 pounds, making the average 40 pounds per acre, which is about half of what it should be. The average for the top 2 inches is 70 pounds, so by sampling to a 2-inch depth it is possible to tell something about past fertilizer practices.

In collecting soil samples we prefer a small sampler made from a discarded steel golft shaft. A mark is made 2 inches from the bottom. A little candy bag is used as a container for the sample and a pencil with a soft lead is used to write the name of the golf course and the number of the green, fairway, etc. on the outside. Each sample is a composite of 8 to 10 plugs. It provides enough soil to make all the tests and insures that the sample is representative. Too much soil only makes extra work for the man in the laboratory who prepares the sample for testing. Fairways samples should be taken to an exact depth of 2 inches also, and each sample should be a composite of 8 to 10 plugs at least.

Tissue testing is gaining favor. At the start we were unable to obtain consistent results. The newer tests for nitrogen and potash seem to be more reliable. The kit I have here was used on my last trip to Forida. At Ponte Vedra I tested the grass on the first tee where the grass was obviously in need of nitrogen. On another tee the grass was high in nitrogen, but it looked starved. I asked about the fertilization and was told the last tee had been fertilized two days before. Nitrogen had been taken up by the grass, but it was another several days before the effect on growth was visible.

Those of you who grow grass watch the amount of clippings and when they are

about ½ a basket per green, you know it is time to fertilize. If you are getting 3 or 4 baskets per green, you know the grass is doing pretty well. This is as good a test as any we have, but the tissue test may show a prospective drop in growth several days before it occurs.

In making the test we gather clippings with a knife. They are placed on a piece of filter paper and rolled up like a cigarette. Juice is squeezed into the paper with a pair of pliers. A white powder is used for the nitrogen test. It turns pink if nitrogen is present in the juice. When the grass gets enough nitrogen there is some present in the plant juice as nitrates. The same is true of phosphorous and potash. The tests show their presence or absence. The phosphorous and potash tests should be the most useful because it is impossible to judge need for them by growth behavior of the plant unless the deficiency is acute.

The phosphorous test is made by wetting the paper with ammonium molybdate solution and adding stannous chloride. Phosphorous produces a blue color. The intensity of color is roughly proportional to the amount of phosphorous. In making the potash test a drop of test solution is placed on the paper. Juice from grass clipings is squeezed into the spot. After 30 seconds the spot is drenched with dilute hydrochloric acid. If there is no potash in the tissue, the spot bleaches to a lemon yellow. If potash is present, a brick-red color develops. The red color means that the grass is obtaining ample potash.

TESTS SHOW CHEMICALS

(Continued from page 48)

chemicals on various grasses used on putting greens.

On fallow areas where adjacent plant materials and grass are not factors which have to be considered, the above chemicals which gave from excellent to good control have outstanding possibilities as long term weed control treatments from only one application. In this respect the practical use of some of these materials may be limited by cost.

The control of weeds in sand traps will

not only be limited by cost, but also by the effect of the chemicals on grass when treated sand is driven onto adjacent putting green turf by an "explosion-shot". As this was not determined in this study, further tests are planned in this respect, along with additional work on various rates of application. Leaching away of the chemicals in the sand traps, as well as continuous raking are other factors that have a bearing on the effectiveness of the chemicals.

It should be understood that the above report is based on preliminary testing of the chemicals. Some of the chemicals and rates used appear practical. The results are given as a suggestion of what chemicals might be effective and as a guide for further testing under actual conditions.

Certainly, the effective use of chemicals for purposes mentioned above will save many hours of hand labor and expense.

NOTE: The author would appreciate the benefit of any suggestions or experiences of others in the chemical method, or any other method, for controlling weeds in sand traps.

Southern California Holds Third Turf Conference

Southern California third annual conference on turf culture, April 30 and May 1, held its first session on the turf plot at the University of California at Los Angeles, giving visitors an opportunity to see comparative trials of the many new and standard turf grasses under various cultural treatments. More than 200 persons from various parts of Southern California attended the two-day meeting.

The meeting was opened by Dean Robert W. Hodgson, head of the Los Angeles division of the University of California College of Agriculture. Prof. H. B. Musser, Pennsylvania State College, explained the operation of his program, one of the oldest and largest turf research programs in the United States. Prof. Musser also discussed control of weeds.

Dr. F. V. Grau, Director, USGA Green Section, described new improved turf grasses, including Zoysia Z-52, U-3 bermuda grass and Merion bluegrass, and discussed their use in combinations of warm and cool season grasses. He also reviewed turf aeration.

O. J. Noer showed many color slides illustrating maintenance methods and solutions of turf problems. Dr. Robert Hagan of the Division of Irrigation on the University of California's Davis campus, discussed the fundamentals of watering turf grasses.

John E. Gallagher of the University of California Division of Floriculture and Ornamental Horticulture on the Los Angeles campus presented results of experimental trials of herbicides and fertilizers on the turf plots at UCLA.

These five speakers earlier conducted a broadcast panel discussion on turf culture for Armed Forces Radio, with emphasis on the military aspects of turf.

Additional speakers on turf subjects from UCLA were Prof. Pierre A. Miller of the Division of Plant Pathology, who discussed turf diseases and their control by fungicides, and Prof. V. T. Stoutemyer, chairman of the Division of Floriculture and Ornamental Horticulture, who explained the purpose of some of the experimental grass plots.

Another panel discussion on trees and turf at the morning session of the second day evoked many questions. This panel was conducted by Fred W. Roewekamp, city Forester of Los Angeles, Prof. Pierre A. Miller, and Dr. Mildred E. Mathias of the U.C.L.A. Botany Department. William H. Johnson, president of the National Golf Course Superintendents Assn. presided at this meeting.

At the final afternoon session, John J. McElroy of the Agricultural Extension Service on the Berkeley campus of the University of California described their methods of operation and the possibility of assistance to those groups concerned with recreational and ornamental turf.

WHAT PROS SHOULD KNOW

(Continued from page 44)

length, each ⅜ inch deflection, upright or flatter, is equal to a 1 degree change in lie.

Hook Variations

The next item on the order is "not too much hook." The factory has means of checking and measuring hook, but the amount of hook on a wood club varies with practically every pro, that is, as far as personal opinion goes. A straight face to Cary Middlecoff is 2 degrees open to the factory. A straight face to Skip Alexander is 1 degree hook to the factory. The standard hook on a driver and brassie is ½ degree, ¼ degree on the No. 3 spoon, and on the No. 4 spoon 0 degree. This is a perfect example as to the importance of the home professional to the factory. It is understandable that the touring pro uses a wood club faced much more open than the club you would recommend for Mr. Average Golfer. The exact amount of hook necessary to make a club more playable, or the lack of hook, comes to us directly from your recommendations.

That last item on the order was "grip a little oversize." The factory uses a ladies' gauge, a men's standard gauge, slightly oversize, and full oversize. Reducing these descriptions to simple figures, the difference between each gauge is 1/32 of an inch in diameter. "A little