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Contents

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Construction of the Cascades Golf Course

By R. H. Patterson, C. E., Washington, D. C.

The Cascades Golf Course at Hot Springs, Va., was opened to play October 11, 1924, exactly thirteen months after ground was broken. Since that time it has won wide renown and approval of some of the foremost devotees of the game. Selection of the site, however, was not merely a matter of choice; it was foreordained as the only available one within a reasonable radius of the Virginia Hot Springs.

Few places could have been found to combine more natural and artificial obstacles to construction. A timid administration would have shied at the prospect; for as the seas cover three-quarters of the globe so the rocks covered the site of this course. And beside rocks there were forests and streams, hills and houses at inopportune places, awaiting reduction, diversion or removal. Compared to the advantages of the site, however, these difficulties were of minor importance and the wisdom of those whose vision foresaw the result is sufficiently attested today. A brief exposition of the nature and diversity of the elements of this work may be of interest to readers of THE BULLETIN.

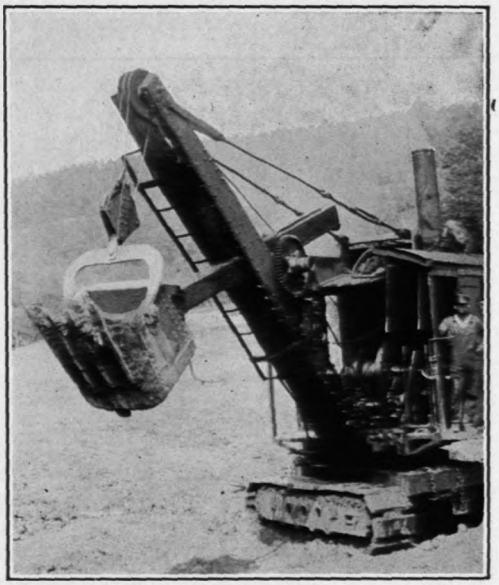
The course is located at the northern end of the Falling Springs Valley near the headwaters of the picturesque Cascades, conceded by many the loveliest small stream in America. On three sides the wooded hills, notched with vistaed gaps, hover in protecting beauty a thousand feet or more above the general level of the links.

Preliminary to a definite consideration of the site a golf architect was retained. A tentative layout, based on reconnaisance, was submitted, followed by a complete topographic survey from which a 100-foot scale base map was prepared, using a 5-foot contour interval in general and a 1-foot interval in detail. The field control from which this map was prepared was used as the basis of all later construction. Contrary to lay opinion, the value of such a survey and map so far exceeds their cost as to be inestimable. This is more readily understood when it is known that the cost was less than half of 1 percent of the cost of construction. Furthermore, survey and map were completed in eleven days and a tentative estimate of the probable construction cost was prepared from the data thus supplied.

When a decision on the final layout was reached the whole scheme was quickly transferred from field to map, checked over carefully for errors of alignment and distance and approved for construction. With this map as a base the water system was now designed. The height and location of the reservoir determined, the site of the pumping station fixed, the sizes of the mains calculated and their disposi-

tion laid down on the map, the whole layout was transferred to the field as required by using the control and reference points of the basic survey. Keycock hose connections were provided at 100-foot intervals over the entire course, and at greens and tees, with a capacity of 300 gallons per minute. The pumping units consisted of two 10 H. P. semi-Diesel oil engines and chain driven triplex heavy duty pumps. The reservoir was of reinforced concrete with a capacity of 150,000 gallons. While this water was not intended for drinking purposes, and special fountains on a separate system were provided, automatic chlorination was installed as a safeguard.

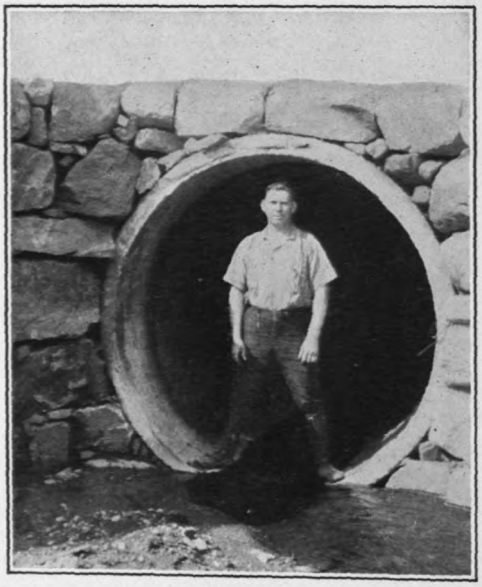
Actual work was begun September 12, 1923, and construction was pushed with such vigor as the man power and weather of that period permitted. The organization of personnel and equipment was made as simple, complete and compact as possible. The men were divided into timber, clearing and dynamite crews, grading and trenching gangs, team and tractor units, and a steam shovel and truck unit. A filling station, garage and blacksmith shop were established in buildings on the site and the teams were cared for in an excellent stable, also a part of the property. Tools and equipment were assembled and repaired as required on the job.



Steam shovel grading hill on the first hole

The work was divided into its component parts and assigned to the nine crews of from twelve to twenty men each. Cutting, clearing and burning gangs were followed by the dynamite crews, while these in turn were pressed closely by the tractor rooters, colters and gang-plows. Other tractors with spike-tooth and disk harrows followed in their wake, and then came the horse-drawn drags. At the same time still other crews were busily engaged in roughing out greens and tees, and a trenching gang was at work on the water lines. Nine of the holes were heavily timbered while five of them evidenced typical characteristics of glacial moraine, being ridged and heaped with rock from hand size to boulders of twenty tons or more. On some holes, notably numbers four and six, this condition existed to such an extent that no attempt was made to remove the rock. The steam shovel was put in a rock-free deposit near by and sufficient earth trucked to the holes to cover the rocks, the tops of the protruding ones being mud-capped and blasted off after settlement. Naturally, clearing was work of the first order. All merchantable timber was sent to the mill, being returned shortly in the form of planking for fences, lumber for bridges, blocking for the removal of houses and blanketing for dynamite shots.

Meanwhile the steam shovel and trucks were filling in the old cress lakes to form the fairway for Number Seventeen. 38,000 cubic yards were required at this point and then the shovel moved into the bed of the Swift Run, diverting it westward to the foot of Little Mountain practically the entire length of the course. This stream has a catchment area of nearly twenty square miles of steep mountain land. The run-off is extremely rapid and in a freshet Swift Run is a swirl of mad water. Cattle and horses have been drowned attempting to cross it. In dry weather it is a rocky Sahara, an impossible golf hazard. Hence its diversion. Where it crosses the fifth and tenth holes it was put in a seventy-six-inch reinforced concrete pipe and covered over. There was no compromise with Swift Run.



The 76-inch pipe under the fifth and tenth fairways.

The pipe was cast in two-foot sections in a barn on the site during the winter of 1923-24. Each section weighed one ton and was set in place in the stream bed with the aid of the steam shovel which covered it over as set. This method was used because the uncertain and torrential nature of the stream made the placing of forms and pouring of concrete in its course highly impractical.

One of the most unusual jobs encountered was the moving of a ten-room brick house from the center of Number One fairway to a point on the side of the hill below it. A steel cradle was placed under the house, the foundation removed and the house jacked along on timber cribbing until well off the fairway, where another foundation was built under it and the house lowered to its new resting place. Not a crack appeared in any of its walls.

During the fall and early winter most of the light grading, coltering, rooting and plowing was done with tractors, but as the ground froze deeply, dynamite was used more freely. Later, when the thaw came, horses supplanted tractors as the latter mired and became useless. The tractors were then moved to higher grounds and used for skidding boulders and sledding rock. Meanwhile, air drills were hard at work in the ledge rock outcrops. Water mains were laid in trenches dynamited in frozen earth. Compressed air was used for testing in place of water because of the low temperatures of this period. On the site of Number Three green the frost was forty-two inches deep and the ground had to be blasted ahead of the steam shovel. But, in spite of the cold, excellent progress was made all through the winter. It was particularly essential to have the water system complete and in operation by the time the first seed was sown. At intervals during the winter, when other activities were slowed up

by snow or heavy freezes, hundreds of yards of black dirt were loaded out of the hollows and draws in the adjacent hills and hauled to green and tee sites. A great deal of this material was obtained in the black walnut groves and was singularly free from weeds and other filth common to such soil. Before being applied it was screened through rotary power driven sieves.

Much has been said against spring seeding, but it is doubtful if better results could have been obtained had sowing been delayed until fall. Besides it would have meant the loss of a season's play. This section is the natural habitat of bluegrass, and though the fescues did not show much progress the condition of the bluegrass fairways was little short of phenomenal when the course was opened in October.

Late spring rains delayed planting of the creeping bent stolons until the middle of June and even then much difficulty was experienced in the preparation of the bed due to intermittent rainfall. Most of the greens and tees were in excellent condition, however, when opened to play, and showed continued improvement throughout a season of fairly heavy tramping. The utmost care was taken in cutting and watering and any evidence of crowning or puddling was corrected at once. Light dressings of humus, sand and ammonium sulphate were applied every two weeks. It was found that as much as seven and one-half pounds of the latter to the thousand square feet could be applied with safety if immediately watered in. This amount should seldom be used, however, except in cool, cloudy or rainy weather, or unless applied late in the afternoon. The usual dosage was but three to five pounds. What may seem in excess of the best practice was necessary at Cascades because of the comparatively high lime content of the soil and consequent need for rapidly increasing acidity. To prevent damage to the turf and avoid undue compression of the still light and springy top soil, horse-drawn mowing equipment was used for cutting the fairways and semi-rough, while the rough was cut with a tractor mowing machine. Since 1926, however, tractors have been used over the whole course with excellent results.

Practically no brown-patch was noted until late in the summer of 1925 when it appeared on Number Thirteen and Sixteen greens. Repeated treatments of Semesan eliminated it shortly and the turf made rapid recovery. Perhaps as much credit is due the early morning washing of these greens with a heavy spray of clear water which tended to break up the formation of the mycelium and prevent its spread to the unaffected turf. It should be noted in passing that both of these greens were in low lying areas surrounded by trees on three sides, so that the passage of air over their surfaces was retarded to the point of stagnation, a condition most favorable to the production of the fungus.

A brief compilation of the materials used in the construction of this course, expressed in their units of weight or measurement, together with their carload equivalents, is appended for the benefit of those interested in figures.

Materials	Tons	Carloads—50 Tons or Equivalent
Dynamite, Powder and Exploders	20.24	2
Manure	1,204.27	24
Fertilizer	16.00	1
Sand	1,287.13	26
Seed	5.61	0
Feed	208.63	12
Cement	83.46	2
Crushed Stone	330.00	7
Building Supplies	76.00	2
	Line. Ft.	
Gal. Iron Water Pipe (1" to 6")	31,765	4
3-Ply Rubber Hose (1")	11,400	0
4" T. C. Drain Tile	10,000	1
Wire Cable and Conduit	19,626	0
Fencing Wire	6,435	0
	Sq. Ft.	
Creeping Bent Stolons	181,111	3
Steel Reinforcing	23,200	1
Lumber	37,620	2
Roofing (all types)	7,911	0
	Gallons	
Gasoline and Oils	12,082	1
Paint	373	0
Tools, Equipment and Supplies	.....	1
Boilers, Radiators, Engines	.....	..
Pumps and Fittings	.....	1

This would make a train nearly three-fourths of a mile long. Compared with the actual material handled, earth, rock, timber, topsoil, etc., however, it is a small item.

The whole job was done with local labor who displayed great interest in the progress of the work from start to finish. Its timely and successful completion, in view of the many hardships of the winter of 1923-24, was a tribute to their efforts.

Seepage Water, A Menace to Good Turf Maintenance

By O. B. Fitts

One of the important drainage problems which is most frequently neglected in the construction of golf courses is that of properly taking care of seepage water from side hills. The writer has visited seven golf courses during the past season where his attention was called to poor drainage conditions on at least one green of each course, and in one instance a highly unsatisfactory fairway, resulting from seepage. Yet, in spite of the fact that all greens had been maintained in accordance with the same plan, on these courses, those which were not damaged by seepage water being in good condition, it was difficult to convince most of the greenkeepers that their trouble was due to seepage. This indicates that not only the constructor of each of these courses but also those in charge of maintenance had failed to appreciate the importance of intercepting seepage water and preventing its reaching the putting green or fairway.

Seepage problems are most frequently encountered on putting greens located on side hills, where, in order to get the desired grade, it has been necessary to cut into the slope, leaving a bank rising above the surface of the green, or on greens located on low, flat land near the base of slopes or hills. The trouble in both cases is caused by water

which has accumulated in the higher ground finding its way to the green, where it comes to the surface and keeps the soil in a more or less waterlogged condition, eventually resulting in a soil condition more or less toxic to grass. In other cases the soil becomes puddled by the trampling of players and workmen following a rainy period, when the soil finally dries out it is impervious to water applied on the surface. Either of these conditions is very undesirable, since the turf is unhealthy and the green too soft or too hard to provide a good putting surface.

In the case of hillside greens, seepage water may be easily diverted by cutting a ditch between the green and the higher ground. This depression should be cut between the green and all higher ground to a depth below the lowest level of the surface of the green. Care should be taken in the construction of this ditch to give enough fall to carry the surface water away freely.

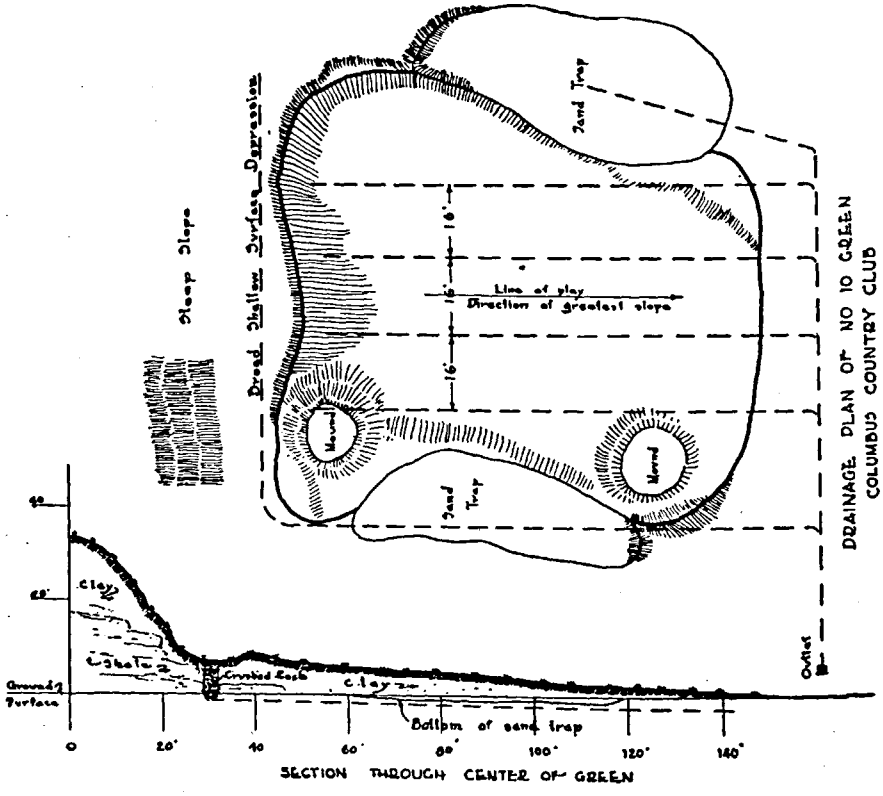
In some cases, where it is not necessary to cut quite deep in order to intercept the seepage water, it is advisable to leave the drain open and utilize it as a shallow sand trap or grassy hollow. In such cases the drain should be constructed to conform with the requirements of a trap, or grassy hollow, best suited to the architecture of the hole, as well as to properly intercept and carry off the seepage water. But if it is necessary to go deeper than is advisable for traps or grassy hollows, a narrow ditch or trench is sufficient. Tile should be laid in the bottom of the ditch and coarse material such as cinders or gravel used to fill it within 4 to 6 inches of the top. The remaining 4 to 6 inches should be filled in with good loam top soil that is sufficiently permeable to permit any water that accumulates on the surface to pass through to the drain. If the area is to be used as a sand trap, the coarse material should be covered with 3 or 4 inches of permeable soil and the sand placed on top of it. The soil in this case serves only to prevent the sand from filtering through the coarse material.

In the case of a green located at the foot of a hill, it may be found necessary to construct a ditch or hollow as described above and in addition install a system of tile under the green, for often the water which passes under the depression cut below the level of the green will rise to the surface, or near enough to the surface, to cause trouble. Where this condition exists it is advisable to install several lines of tile across the green parallel with the greatest slope of the surrounding ground. The tile should be placed 18 inches to 2 feet below the surface and the lines should be 10 to 15 feet apart. Each line should connect with a main leading to the outlet. The depth of the tile and the distance between the lines should be governed by the type of soil. In a clay soil the tile should be nearer the surface and the lines closer together than is necessary where the soil is sandy. In any event after laying the tile it is advisable to fill the trench to within 4 to 6 inches of the surface with coarse material as suggested above and then cover with permeable soil.

The accompanying illustration of the tenth green at the Columbus (Ohio) Country Club, shows a good system for such a green. One view gives an idea of the arrangement of tile in the traps and the green itself, while the other shows how the seepage is intercepted between the slope and the green. Before seepage from the slope was intercepted the green was soggy and the turf poor.

In many instances attempts have been made to intercept surface water by building an embankment between the green and the higher ground. Such attempts not only fail to better conditions so far as seepage is concerned, but make them worse unless care is taken to insure quick run off of surface water, for if drainage from behind the bank is slow the water confined there will seep through onto the green. It is often worth while to check the flow of surface water in this manner, thus preventing the carrying of weed seeds onto the putting surface, but quick run off must be assured, and it must not be forgotten that this is never a solution of the seepage water problem.

Danger of seepage should always be considered by the architect, or drainage engineer, during construction of the course. If this is not done the club may be put to needless expense later, and what is more serious in many cases, may be forced to use miserable greens until the cause of the trouble is recognized and corrected.



Really interesting three-shotters can be made on a straightaway level strip of land in just one way, and that is by placing a very wide bunker or a nest of smaller ones across the fairway in such a position that the second of two good shots will carry clear and the green will be out of reach for the man who plays short of the cross bunker on his second.

Planning Holes to Necessitate Special Kinds of Shots

By Maynard M. Metcalf

Is it not good golf architecture to provide in an eighteen-hole golf course not only such a variety of holes as to call for the use of all the major clubs, but also holes so planned as to compel a variety of shots with at least such of these clubs as are used in approaching, while allowing on other holes a choice of several sorts of shots? Most "natural" holes allow too much latitude in choice of club and kind of shot in coming to the putting green. On many otherwise good courses one finds a strange sameness in the greens and their trapping. On other courses, however well the holes may be planned, poor care of the fairways just short of the greens makes nearly all the greens in effect "island greens," compelling a dead-stop approach, since predictable result can not be gotten with a ball which strikes short of the green and runs up.

This is one of the commonest defects in otherwise good courses (witness one really fine course in Massachusetts, to most of whose greens a dead-stop approach is necessary if one does not wish to trust to Providence for a normal bound).

I believe a good course should provide some holes best reached by a run-up midiron shot, others playable only with a dead-stop ball, and others calling for a pitch and run. This last can be compelled by making a green so heavily contoured with slopes in different directions as to preclude a high back-spin approach.

For all holes, except a proper number designed to compel a back-spin approach, the fairway just short of the green should be true-surfaced and so well turfed and well cared for as to allow reliable calculation of the behavior of a ball lighting upon it. This does not mean at all that the approach fairway must be leveled. It may to advantage have broad even slopes, but on these slopes there should be no minor irregularities and the turf should be true. Cuppy turf on the fairways just short of the greens is one of the most serious of defects and by no means an uncommon one.

Should not every good course have not less than two one-shot holes and a couple of two-shot holes which compel a high back-spin approach? Should not one of the four call for this shot at not less than 145 yards? Should not every good course have at least a couple of holes necessitating approaching by pitch and run, there being no open access for a run-up shot and too irregular contouring at the green to permit a high approach to the green itself? Such holes are very rare on North American courses. Ituzamgo at Buenos Aires, Argentina, has one fine hole of this sort; 140 yards, a beautiful smooth saucer for the front half of the green, the far half of the green elevated about three feet and so contoured with slopes in all directions that the bound of a high ball can not be calculated from the tee. Of the rest of the holes on a course, should not a number allow choice between a run-up, a pitch-and-run and a back-spin approach, weather and other conditions and even the player's whim influencing the choice? It seems that a good course should train its golfers to versatility as well as to good distance and to accuracy both in direction and distance.

Birds of the Golf Course

The Chipping Sparrow

By W. L. McAtee

The Chipping Sparrow

This familiar little red-capped sparrow is known as the chippy from its simple song, and as hair-bird from its preference for material with which to line its nest. Long hairs shed from the mane or tail of a horse are what it has sought in the past to coil up as the inner layer of its nest, and it will be interesting to observe what substitute the bird turns to in the many localities where horses are now becoming rarities. The chippy occurs in all parts of the United States and breeds in all but extreme southern districts. In northern states, the bird is an early arrival in spring and at once announces its presence by its oft-repeated chipping song. It nests at no great height from the ground in shrubs and vines often near buildings. In early fall south-bound migrants collect and the loose flocks they form are often seen on fairways shifting from place to place like leaves fluttering before the wind.

Chipping sparrows frequent northern golf courses at all seasons except winter, and southern ones except midsummer. They feed upon both weed and insect pests. The seeds of foxtail, knotweed, chickweed, goose grass, and crabgrass are favorites among the vegetable items that make up three-fifths of the bird's food. Fully 200 seeds of crab-grass are known to have been taken at a single meal. Here is one of the birds then that helps to save the greenkeeping force some of the crawling about over greens and pulling seedlings of crabgrass.

This little bird also helps to reduce the insect enemies of golf courses, including in its bill of fare such grass devourers as the army worm and other caterpillars, grasshoppers, flea and leaf beetles, and clover leaf weevils; such grass suckers as plant lice, leaf hoppers,

and plant bugs; and such sappers of the turf as the clover root borer, white grubs, wire-worms and cut worms. It also preys upon burrowing bees and ants and the various small dung beetles that mine in putting greens and throw up those little hillocks of dirt that constantly interfere with good greenkeeping. The chippy does no harm, is beneficial in many ways, and withal is a very pleasant and sprightly neighbo"

Daffodils for Golf Courses

By David Griffiths, Horticulturist, Bureau of Plant Industry, U. S. Department of Agriculture

When winter has gone, when spring has arrived, and when the urge of the open is upon us, the pleasure of one's leisure in the open is intensified by nothing more than by pleasing vistas of quickening verdure. Much has been done to beautify our pleasure grounds with "shrubs," "annuals," and "perennials," but upon our golf courses especially there is a notable lack of use of all early spring bulbous flowering plants so effective, so attractive, and so conducive to one's enjoyment in early springtime when the conventional ornamental plantings of our landscapes are only just awakening from their winter lethargy.

This is not because of the cost of such an improvement, for the beautification of landscapes by the use of bulbous stocks, especially daffodils, is not prohibitive. Indeed, it may be doubted whether a comparable effect can be produced as cheaply for an equal length of time for the same money with any other group of plants. Besides, the effect is easily attained and requires little skill in the distribution and the arrangement of the plantings. About all that is needed is to mass-plant on informal lines in open waste or unoccupied spaces in the edge of woodland, around the base of shrubbery, in the border of glades, or similar situations.

The handling of such a naturalized planting is simplicity itself and when once established requires a minimum of care and expense. In open glades, where there is naturally more or less forest débris, there may be needed no attention whatever. Often mowing once a year is advisable and, so far as daffodils themselves are concerned, there will be a decided advantage in leaving the mowings lie where they fall to help smother out some of the native competitive growth.

In many situations, however, on golf courses where naturalized plantings of daffodils are desirable, mowing and removal of the mowings is necessary. This applies to exposed situations and edges of shrubbery plantings.

To make a success of a naturalized planting of daffodils over a long period, and none other is worth while, the bulbs should not be set on any portion of the course where constant close cropping of the grass cover is required. Such close cropping of the grass from the last half of June on, however, is permissible, but the foliage of the daffodil must have about two months' time after the flowering period to properly mature the bulb for flowering again the next year. It will be necessary, therefore, to confine naturalized plantings of daffodils on our courses to such situations as can be left without mowing from spring to late June. During the remainder of the year close mowing can be practiced with removal of the mowings or not, as is most desirable or necessary.

The establishment of such naturalized plantings may be made in various ways. The area devoted to the bulbs may be placed in a thorough state of tilth, planted to bulbs, and then seeded any time from August to October, or, the bulbs can be planted directly among the native vegetation or in the grass sod, of whatever nature it may be, without putting the land under plow.

The method of setting the bulbs may also vary a great deal. Either a spade or a mattock make serviceable tools to plant with. The blade of either tool can be thrust into the soil its full length, the sod raised up sufficiently, the bulb inserted, and the sod pressed back into place with the foot. It does not matter if the bulbs are not set exactly vertical. If placed at an angle of 45° they will function just as well and the setting at such an angle is often more easily done, especially with a spade.

Narcissus Empress. Experimental planting at Bellingham, Wash.

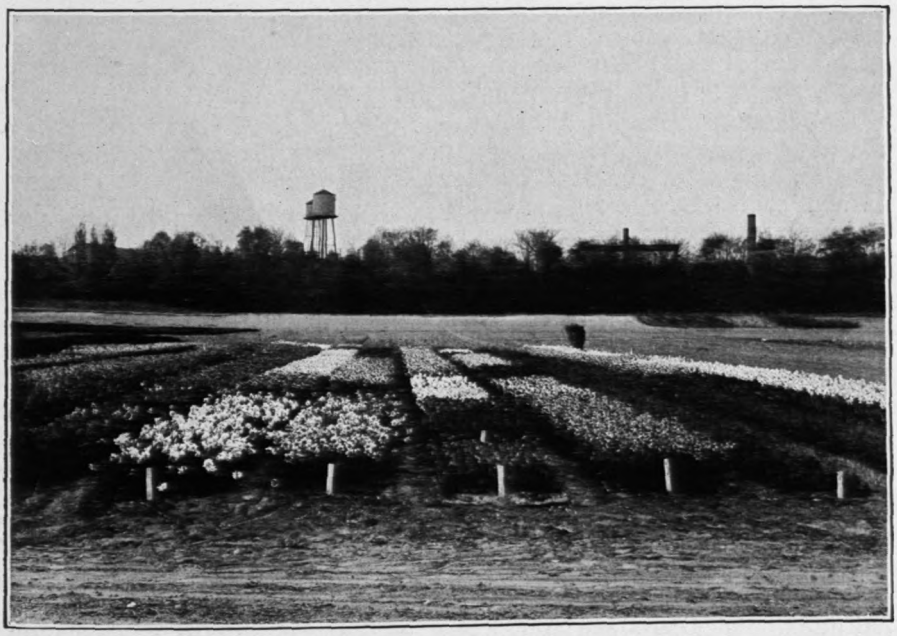
It must be seen to, however, that the bulbs are set deep enough. The danger will usually be that in hard ground workmen will slight the job and put the bulbs too shallow. There should be in a planting of this kind, which is intended to last more or less indefinitely, fully 4 inches of soil over the top of the bulb. If the soil is light, another inch or two would be an advantage.

The distribution of the material on the ground should be decided upon before the planting begins. If the workman plants without any guide, simply attempting to approximate this thickness of setting, the result will be informal enough, especially if a few scattering clumps are placed carelessly beyond the confines, so to speak. An effort should be made to vary the density of the planting a little, thus enhancing the informality.

Of course, the character of setting must be influenced greatly by the availability of stock, the area to be covered, and other considerations. If the amount of stock is small in comparison with the area to be covered, good results will be obtained by a very thin planting which will really be only scattered individual bulbs. These will in a few years, if the conditions are at all favorable, become clumps which will give a half dozen or more flowers each season.

If economy must be practiced, a thousand or even a few hundred bulbs set thus scatteringly may be dug at the end of three to five years for resetting over the same, contiguous, or different areas. It is surprising how rapidly stocks will multiply in this way. Five for one in five years would be moderate.

Should this sort of handling be planned, a scattered setting where the bulbs are set on an average of 5 to 10 feet apart would increase so



Various varieties of narcissus at Arlington Farm, Va.

that a thick enough setting would be possible in four or five years from the natural increase of the stock. The four or five-year old clumps could then be dug when the tops have turned yellow, separated, and reset again immediately on the same area, simply making a thicker planting.

We have considered thus far the aesthetic aspect of the naturalizing of daffodils on the course, but aside from this very important feature the utilitarian aspect should not be lost sight of, for in some cases at least this may have decided appeal. In our present condition, with references to daffodil stocks in this country, the accumulation of naturalized bulbs on courses and other little occupied areas may be made a very important adjunct of the bulb nursery business.

It is well recognized that old naturalized stocks undisturbed for years make the best kind of planting materials for the production of

merchantable floristic bulbs for the ordinary market. This opens up a vista of economic possibility in connection with these naturalizing operations without detracting in the least from their aesthetic value.

In order to make the bulbs available for use, however, it is imperative that all plantings should be pure, i. e., each variety by itself, because mixed daffodil bulbs are not usually wanted by the grower. This again does not detract one whit from the ornamental value of the naturalization. Indeed, to my mind a naturalized setting wherein a definite space, not necessarily with definite boundaries, is given over to one variety, is much more pleasing than a larger area devoted to a mixture. Here again conditions will govern the plan of distribution. The quantity of bulbs and the number of varieties must have the areas covered adjusted to them.

Something must be said about the varieties that should be employed. Availability under present conditions will be the most important consideration. The varieties used will also depend largely upon whether one has in mind ornamentation alone or ornamentation coupled with sales to growers later on.

If ornamentation alone is the goal, the cheapest varieties answer the purpose admirably. Conspicuus, Princeps, Recurvus, Ornatus, Mrs. Langtry, M. M. de Graaff, etc., will do. Spurius is already naturalized in tremendous quantities in grasslands in both Virginia and Maryland. In the South the tender Polyanthus varieties and the Jonquils, which are not expensive, are adapted.

Wherever a planting is made with the idea of supplying planting stock for commercial use, the varieties should be a little more carefully considered and they should be of a little higher quality. They will also be even more ornamental. Emperor, Sir Watkin, Golden Spur, King Alfred, Empress, Glory of Sassenheim, Spring Glory, Elvira, Laurens Koster, etc., might be suggested.

A naturalized area of any of these varieties when dug over for planting stock after a period of years will always have enough bulbs missed in the digging, and they are very likely to be suitably distributed to serve for the ornamentation of the area in the future.

To recapitulate: There are few lines of ornamental plantings for golf courses which are more promising than the naturalization of daffodils, and there are few today which are less in evidence or needed at a season when there is a dearth of floristic beauty. While the ornamental feature has in all probability the greatest appeal, it is perfectly practicable to make such naturalized plantings rather attractive investments which will serve a useful purpose in the establishment of a daffodil growing industry.

Mr. H. H. Ramsay, Secretary of the United States Golf Association, announces that the Women's Committee for 1927 will be as follows:

Chairman, Mrs. Adams C. Sumner	Women's Metropolitan Golf Association.
Mrs. Edward H. Baker, Jr	Women's Golf Association of Boston.
Miss Florence McNeely	Philadelphia Women's Golf Association.
Mrs. Howard F. Whitney	Women's Eastern Golf Association.
Miss Eleanor Allen	Women's Eastern Golf Association.
Mrs. Alfred B. Swinerton	Women's California Golf Association.
Mrs. Robert Cutting	Women's Western Golf Association.
Mrs. Stewart Hanley	Women's Western Golf Association.
Mrs. Dave Gaut	Women's Southern Golf Association.

Troublesome Weeds of the Rough

By L. W. Kephart and M. W. Talbot

Last month THE BULLETIN contained the first of a series of articles on plants that are objectionable in the rough. On a modern, well-planned course the rough does not consist merely of the heterogeneous, nondescript weeds and grass that come in after the land is plowed, but is comprised of carefully chosen plants arranged in such a way as to provide an increasingly difficult hazard away from the fairway. On such a course the handicap is for bad play rather than bad luck, and the player does not find himself in the underbush until he is actually out of bounds. Obviously, there are many plants which are quite out of place in the rough of a well-kept course, no matter how useful these plants may be elsewhere. A typical example of such a weed is the plant described below.

II. JAPANESE HONEYSUCKLE

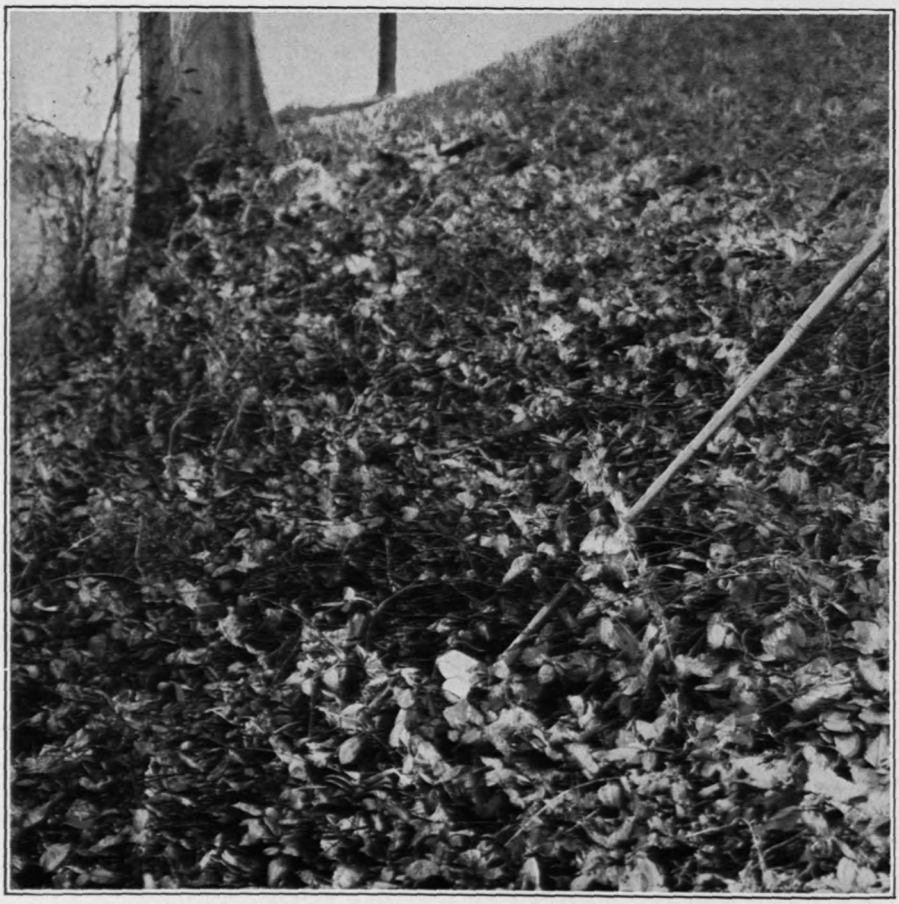
On one of the popular courses not far from Washington there is a favorite hunting ground where the caddies foregather early in the morning following any pleasant day and engage in a spirited and all-too-successful search for lost golf balls. The spot is a hillside adjoining a long, narrow fairway, not more than 10 yards off the straight line from tee to green and in a position where any well-hit ball, if only very moderately sliced, is almost certain to come to rest. The place is a superlative ball trap for the hillside is covered for a distance of 30 or 40 yards by a dense, impenetrable mass of the trailing or Japanese honeysuckle. A ball hit into the honeysuckle is almost as good as lost, and even if diligent search discloses it, it usually is so imbedded in a tangle of tough wiry vines as to be utterly unplayable. Tradition has it that the hilltop was intentionally planted with honeysuckle to prevent the soil from washing. If so, the designer has attained his object, but he has also earned the unending execration of the luckless players who undeservedly suffer from driving into this pile of living fish-nets.

This is perhaps an extreme example of honeysuckle as a golf course weed, but in any of the territory south of the latitude of Philadelphia one is likely to find honeysuckle growing wild and rampant over the fences, trees, banks, and waste places on or adjacent to the rough. Japanese honeysuckle was originally introduced into the United States from Asia as an ornamental vine and it is still one of the most popular items in the horticultural trade under the name of Hall's Japanese Honeysuckle or some other varietal designation. It long since escaped from cultivation, however, and now may be considered as nothing but a weed and too objectionable even for hazards on any well-cared-for golf course.

Eradication: As might be expected from such a vigorous grower, honeysuckle resists eradication. A well-established mass of honeysuckle consists of numerous strong, well-rooted "mother plants" and dozens of shallow-rooted young plants where the spreading vines have taken root at the joints. The young plants are easily ripped out by hand and destroyed, but the old plants are firmly imbedded in the soil and can not be torn out without breaking the roots except when the ground is extremely soft. Broken pieces of the plant left in the soil immediately give rise to new plants. Hence, a single hand

grubbing serves to remove the mass of vines for the time being and, unless followed by follow-up work to destroy the new shoots as they come up, may result simply in stimulating the plant.

A method that was found some years ago by the Department of Agriculture to be quite satisfactory is to spray the honeysuckle with oil and burn the area after the leaves are dead. The oil-soaked vegetation burns fiercely and all the tops and many of the roots are destroyed. The burned area must be watched and in about a month or six weeks must be sprayed again to destroy the succulent young



Japanese Honeysuckle (Lonicera japonica)

shoots that arise from the old roots. For the second spraying a concentrated solution of salt (3 pounds per gallon of water) is just as effective as oil and much cheaper. Sometimes a third spraying is necessary, but if the work is done thoroughly the first year there will be little to do thereafter.

The most satisfactory results have been obtained with the heavier grades of oil. A rather heavy fuel oil, a light lubricating oil, or the waste oil from automobile crankcases is of almost the right consistency. The light oils, such as kerosene, light gas oil, light fuel

oil, and light distillate are not reliable. The oil should be light enough to spray readily with an ordinary hand sprayer, but heavy and viscous enough not to evaporate freely. Recently the Virginia Agricultural Experiment Station, in experimenting with the use of oil for destroying honeysuckle in apple orchards, discovered that emulsions of the oil with water were quite as effective as the undiluted oil, and of course saved much oil. A 25-percent emulsion gave excellent results. The preparation of an oil emulsion requires some care, but directions for doing this may be found in Bulletin 244 of the Virginia Agricultural Experiment Station. Before using waste automobile oil in a sprayer it should be allowed to settle and be strained through a double layer of cheesecloth. In the Virginia experiments, three sprayings are recommended; the first about the middle of May and not later than the first of June; the second when the new shoots are four or five inches long; and the third in May of the following year. The second spraying is not considered necessary if the honeysuckle is in the open where it can be burned, as described above, without injury to near-by trees. Spraying should be done in clear weather, since rain dilutes the freshly applied solution and washes it away.

Royal and Ancient Decisions on the Rules of Golf

A provisional ball is played because the player considers that his first ball may be out of bounds. On coming up to it he finds that it is on the course but he deems it unplayable. Is he entitled to continue his play with the provisional ball which was played because of the possibility of the first ball being out of bounds?

Decision.—A provisional ball is played in order to save delay. A player is entitled to continue play with the provisional ball whatever the cause may be which induces him to abandon his play of the original ball.

(1) If a ball is driven into a heap of hay or cut grass, can it be treated as a ball on "ground under repair" or must it be played where it lies?

(2) A drives a ball, but on going forward can not find it. She then goes back to the tee and drives another. On walking to this she sees the first ball.

(a) May she continue play with the first ball, counting the second ball as a provisional ball, or (b) may she go back to the tee and play a provisional ball, allowing her caddie meanwhile to look for the first ball with the understanding that it will be played if found?

Decision.—(1) When a ball is driven into a heap of hay or cut grass Rule 11 applies. The ball may be lifted and dropped without penalty.

(2) The note to Rule 22 makes it quite clear that a provisional ball can only be played before the player goes forward to search for the ball which has been played with the previous stroke.

At a certain hole A has played four strokes and B three. A says "Like as we lie." B plays two more strokes and picks up, saying "your hole." A afterwards discovered that he had played one more stroke than B when he made the statement "Like as we lie." Does he lose the hole?

Decision.—Although B had not asked A how many strokes the latter had played, A conveyed to B wrong information by a method of expression common to golfers and accordingly he loses the hole under Rule 4 (2).

QUESTIONS AND ANSWERS

All questions sent to the Green Section will be answered in a letter to the writer as promptly as possible. The more interesting of these questions, with concise answers, will appear in this column each month. If your experience leads you to disagree with any answer given in this column, it is your privilege and duty to write to the Green Section.

While most of the answers are of general application, please bear in mind that each recommendation is intended specifically for the locality designated at the end of the question.

1. Dynamiting as compared with tile drainage in improving subsoil conditions.—The turf at one place on our course is very poor. Investigation of the subsoil conditions indicates that at a depth of two to three feet beneath the surface is a hard-pan of impervious clay and gravel. The standing level of the ground water at the present time (January) is 9 to 12 inches beneath the surface. A proposal has been made to us to correct this condition of the subsoil by dynamiting. Would you advise us to accept this proposal? (New York.)

ANSWER.—It is evident that the trouble with your piece of land is lack of drainage. Dynamiting would not give you permanent relief. We would advise you to install a system of tile drains not over 20 feet apart. The services of an experienced drainage engineer would be of value to you in this connection.

2. Germination of Chewings fescue seed.—We purchased some Chewings New Zealand fescue seed which was said to have shown a germination of 90 percent in a test made by the New Zealand Government Seed Control Station. Our own test of this seed showed a germination of only 12 percent. Can you account for this difference? (Wisconsin.)

ANSWER.—It has been our experience that New Zealand fescue seed is very uncertain as to germination. The long sea voyage is thought to be injurious to the seed, and furthermore its germination always deteriorates when it is carried in stock over a winter.

3. Comparative values of fertilizers.—Can you give us any data on the relative merit of cow manure, horse manure, and other fertilizers on grasses? (New York.)

ANSWER.—The subject of commercial fertilizers was fully discussed in the November, 1926, number of THE BULLETIN. A great deal has been written in regard to the relative merit of manures, but the main part of the discussion arrives at the conclusion that any stable manure is good. We would not hesitate to use any barnyard or stable manure that could be purchased. If there is considerable straw or coarse litter in it, we would put it in a compost pile with about an

equal bulk of soil and let it rot for six months or a year before using. If it is already rotted so that it breaks up readily, we would use it at once. We would just as soon have cow manure as horse manure. These materials serve a purpose in furnishing organic matter to a soil, which improves its physical condition and helps to hold moisture, a benefit which is not obtained from commercial fertilizers. Commercial fertilizers are best used along with well-rotted stable manure.

4. Value and use of Canada bluegrass.—Would you advise our using Canada bluegrass for fairways in our part of the country? (Wyoming.)

ANSWER.—Canada bluegrass does not make good fairway turf. On poor, loose soil, either sandy or gravelly, it is an excellent grass to sow in the rough, but this is about the only use there is for Canada bluegrass on a golf course.

5. How early in spring to start topdressing.—What is the best time to start topdressing? Is it better to wait until the grass has made some growth, or may topdressing be started at any time after the frost is out of the ground? (Pennsylvania.)

ANSWER.—The best time to start topdressing is just as soon as the grass begins to show signs of growth in the spring. A light topdressing is advisable at that time, and this should be followed by light topdressings at least once a month during the growing season.

6. Grasses for wet fairways.—A portion of one of our new fairways is a muck deposit depression. It is not, however, a swamp, as the soil is firm enough to raise crops. Do you think a bluegrass-redtop mixture will be satisfactory at this place in our fairways? (Maryland.)

ANSWER.—The commonly used mixture of bluegrass and redtop is about the most satisfactory one we know of for wet fairways. The proportions generally used are 3 or 4 pounds of Kentucky bluegrass and 1 pound of recleaned redtop. There are two other grasses which it might be well for you to try out on your wet fairways, namely, *Poa trivialis* and German mixed bent. Both of these do well in moist ground. One pound of the Kentucky bluegrass seed in your mixture might be replaced by 1 pound of *Poa trivialis*, and a portion of the redtop might be replaced with bent seed.

7. Cleansing beach soil of salt.—There is a large area on one of our fairways when even the rankest weeds will not grow. It seems to be covered with salt, and is spreading in size. It is situated on a filled-in meadow. The rest of the fairway seems to be doing very well. Have you any suggestions as to correcting this condition? (Long Island, New York.)

ANSWER.—We would suggest that you install a system of tile drainage underneath this spot in your fairway, as it is probable that the salt which has accumulated will thus be drawn away as it goes into solution from rains. The drainage of the salt would be hastened, however, by thoroughly flooding the area several times after the drainage system has been installed.

The Green Section held a meeting at Washington on February 5, at which the work of the current year was considered and the organization of committees determined. Hereafter the Green Section will function through three committees: The Executive Committee, the Research Committee, and the Advisory Committee.

The Executive Committee will control the policy of the Green Section's work; will prepare and submit to the Executive Committee of the U. S. Golf Association a budget of income and expense, and will take general charge of the business administration of the Green Section. Its Chairman, Mr. Wynant D. Vanderpool, being a member of the U. S. Golf Association Executive Committee, will keep this body informed concerning the problems and the work of the Green Section.

The technical work of the Section will be in charge of the Research Committee with headquarters at Washington. This Committee will control the experimental work being carried on throughout the country; will direct the work of the field men; will edit the Bulletin, and handle the correspondence with the Association's members. Needless to say, this is the most important work of the Green Section and it will be the aim of the Association to give the men carrying it on every possible assistance.

The Advisory Committee is composed of men in various parts of the country who have been actively interested in the work of the Section and who make contributions to the Bulletin from time to time. The men on this Committee render valuable assistance in keeping the Green Section posted concerning the needs of the different parts of the country.

The following is a very brief resume of the work planned for the year:

It is proposed to continue turf experiments in cooperation with the State Experiment Stations at Gainesville, Florida; Manhattan, Kansas; Lincoln, Nebraska; New Brunswick and Riverton, New Jersey; St. Paul, Minnesota; and Arlington Farm, Virginia. Many of the tests being conducted at these stations must be continued several years before any definite conclusions can be drawn. In addition to conducting the tests a present under way, it is proposed to enlarge the experimental work at most of the stations.

The brown-patch disease is one of the most serious problems we have to contend with throughout the country in growing turf grasses. Special emphasis will be given to means of controlling this disease through the use of mercuric compounds and other chemicals.

Beetles, grubs, and other insects constitute a serious factor in many sections and the experiments in controlling these pests by poisons will be enlarged.

The Green Section will conduct tests with strains and species of grasses in an effort to find which are best suited for various golf course purposes in each part of the United States. Special attention will be given to testing strains of creeping bent and velvet bent in an effort to find something more resistant to brown-patch than anything at present available.

The fertilizer tests will continue much as in the past to determine the effect on the soil, the turf and weeds, of long-continued use of the different chemical fertilizers. In so far as practicable anything that has bearing on the maintenance of satisfactory putting greens will be studied.

It is felt that the new line-up of the Green Section gives everyone a chance to put his shoulder to the wheel and make this a year of big results, accomplishments which will serve to keep fresh the memory of Doctor Piper, the founder of the Green Section.

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