

## Demonstration of Equipment at the Shackamaxon Country Club

A demonstration of golf course equipment sponsored jointly by the New Jersey State Golf Association and the Service Bureau of the Metropolitan Golf Association at the Shackamaxon Country Club, Westfield, N. J., on October 27, was most interesting and attended by approximately 250 greens committee chairmen and greenkeepers. Miscellaneous golf course equipment and supplies were on exhibition throughout the day. After luncheon there were demonstrations of tractors and fairway units, compost machines, power mowers, hand mowers, greens mowers, greens topdressers, fairway topdressers, sprinklers and worm eradicators.



Thirty-three manufacturers or dealers exhibited equipment, and an interesting innovation in golf course machinery made its appearance in a tractor-drawn triplex putting green mower.

In the evening the club entertained the visitors at dinner. Mr. B. R. Leach then gave a talk on Japanese beetle control, during which the point was made that the Metropolitan District was subject to infestation not only by the Japanese beetle but also by two similar species which have been found in Connecticut.

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## Golf Course Architecture and Construction.

Specifications. By William S. Flynn

In addition to laying the course out and designing holes that hold the interest of the player, the architect must prepare specifications for the construction of the course along with his plans.

Specifications for the building of a golf course cannot be made as definite as for the building of a house or bridge for obvious reasons. While no two courses are similarly designed, yet in most cases acreages to be prepared are more or less the same.

For instance, in 18-hole golf courses the amount of actual fairway to be prepared will hardly vary over 5 percent. The same applies to rough, etc. The amount of material to be moved in building greens, tees and bunkers can be very easily figured from the architect's plans and the quantities of the various materials required, such as seed, fertilizer, stolons, tile, etc., can be very easily estimated from the acreages on which each is used.

On the face of it, it would seem hard to the layman to figure out what the cost of a golf course would be from the architect's specifications, but one with experience in this class of work over a period of years becomes so familiar with the problems involved that figuring it becomes more or less simple. The items that help increase the cost of golf courses are clearing, rock excavation or covering, water supply and drainage.

A close survey, however, permits the architect's engineer to figure these various items and arrive at a cost.

The following is a specification which might be made for a course in the New England or Middle Atlantic States, coupled with explanations:

**Architect.**—The course is to be constructed as per plans and specifications of (architect's name) made and to be made as the work progresses.

The architect is to make periodical visits during the construction to see that the work is being carried out in accordance with his plans and specifications.

When the course is completed, it must pass the final inspection of the architect before being accepted for the club.

The building of a golf course, while primarily a construction job, is really more like painting a picture from the architect's standpoint. As the construction progresses, he may see flaws that, if corrected or modified during the construction, complete the picture. In other words, the architect's job is to fit his course to the ground, and he should have the liberty of modifying the original plans so as to produce the best possible job.

**Greens.**—The sub-contours of the greens shall be fashioned as per plans. The greens at this point must pass the inspection of the architect before further work is done on them. After approval of subgrades the green is plowed and probed for stones, and stones four cubic inches and over are taken out. Following this operation topsoil is placed to a depth of not less than six inches over the surface of the green. Well-rotted manure (\*) cubic yards per thousand square feet shall be spread over the surface of the green and thoroughly disced in. If, in the opinion of the architect, any green should require additional manure, it shall be applied in accordance with his orders.

Following these operations the greens are prepared for planting in the customary manner.

Great care should be taken that no surface pockets exist on the greens, and to avoid this the gradients should be checked with a level.

Before planting, organic fertilizer (tankage) shall be applied at the rate of (\*) pounds per thousand square feet, after which the green shall be planted with a proven strain of creeping bent stolons or any grass seed acceptable to the club.

The architect in designing his greens provides for the material to be taken principally from the bunkers adjacent to the greens, except where the green is cut into a slope, in which case the cut generally takes care of the fill. In

cases where the bunkers are not sufficiently large to accommodate the fill for the green, he designates where this fill is to come from. Generally this is taken from a point in close proximity to the green, but out of the line of play. Wherever material is taken from that area is prepared and seeded similar to the rough.

**Fairways.**—Fairways indicated on the plans shall be cleared where necessary, said clearing to pass the inspection of the architect.

Playing areas indicated shall be plowed to a depth of not less than eight inches, and shall be disced from time to time and kept fallow until ready to be planted.

Playing areas shall receive an application of not less than (\*) cubic yards of manure per acre. If it is necessary, in the opinion of the architect, to apply additional manure per acre on any area, it shall be done in accordance with his orders.

Manure shall either be thoroughly disced in or plowed in and incorporated with the soil.

Playing areas are prepared for planting and a fine seed bed made by sufficient cultivation.

Before planting playing areas shall receive an application of organic fertilizer (tankage) at the rate of (\*) pounds per acre.

Playing areas shall be planted with a mixture of four parts Kentucky bluegrass and one part re-cleaned redtop at the rate of 150 pounds per acre. An additional 10 pounds of South German mixed bent per acre shall be mixed with the above.

Rock ledges shall be covered with at least six inches of soil and an additional four inches of topsoil, as directed by the architect.

Removing of stones and roots in fairways is included under the heading of clearing.

**Tees.**—Tees other than those shown on the plan may be put in by the architect, but the total number to be built shall not exceed 45 in number.

Tees should conform as much as possible with the existing natural surface, but should it be necessary to build artificially the only requisite is to make them practically flat with enough slope to take care of surface drainage.

Banks and slopes outside the tees, where practicable, should be constructed in such a way as to make it possible for them to be cut with a tractor mower.

The preparation of the tees for planting should be practically the same as the putting greens. Well-rotted manure (\*) cubic yards per thousand square feet shall be spread over the surface of the tee and thoroughly disced in.

Great care should be taken that no surface pockets exist.

Organic fertilizer (tankage) shall be applied at the rate of (\*) pounds per thousand square feet before seeding, after which the tees are seeded with four parts Kentucky bluegrass and one part re-cleaned redtop at the rate of 200 pounds per acre.

It is not necessary in building tees to have any particular slope, the player has the advantage of teeing his ball, which should be sufficient help. A tee may very readily pitch forward, backward to the right or left, and be a suitable tee so long as it does not hold surface water.

**Rough.**—All rough areas between tees and fairways and approximately 12 yards on either side of the fairways shall be plowed, after which they are prepared for seeding and seeded with a 50 percent mixture of sheep's fescue and re-cleaned redtop at the rate of 75 pounds per acre. The preparation of the rough shall be similar to

that of the fairways except that the application of organic fertilizer (tankage) and manure shall be eliminated.

All back slopes of the greens shall also be seeded in the above manner.

Rock ledges coming in the rough shall be covered with at least six inches of soil, as directed by the architect.

The object of keeping the fertilizer out of the rough is to make the growth as sparse as possible. The grass seed used, sheep's fescue, produces a tufty growing grass, which generally presents a bad lie, keeps the cost of upkeep down, and reduces ball hunting to a minimum.

**Bunkers.**—All mounds or bunkers adjacent to greens must be built in conjunction with green construction and be properly drained either by surface or tile.

Fairway bunkers other than those shown on the plan may be built or designated by the architect and drainage shall be taken care of either by surface or tile.

All slopes of bunkers, mounds, etc., shall be seeded with the same mixture as used for seeding the rough and at the same rate.

A ribbon of sod shall be used to outline the limit of sand in all bunkers.

Bunkers should be designed and built so as to keep surrounding surface water from running into them and to let what water falls in them drain off naturally. Nothing interferes more seriously with the game than water in a bunker, and tile drain, while correcting the condition to a certain extent, does not permit the water to drain off rapidly enough to overcome this situation. Outlining the bunkers emphasizes the architect's ideas and gives the course the character which he has planned for.

**Drainage.**—Tile drains shall be put in to take care of drainage of greens and fairways wherever found necessary.

If springs show up after ground has been broken in construction, same shall be taken care of with either tile or French drains.

Before a bid is made on the construction of the course the architect, with his engineer, determines where drainage is necessary and the amount required.

**Water System.**—A dam shall be installed along the creek on the property at the point determined by the architect. This dam shall be so constructed as to provide and insure the storage of enough water to produce not less than 300 gallons per minute at any time. A power plant shall be installed in connection with this for pumping the water to fairways, greens and tees of a capacity not less than 300 gallons per minute.

This water shall be piped so as to water all fairways, greens and tees. The pipe to be of sufficient size to take care of friction and distribute the 300 gallons per minute over the course in the customary manner.

The pipe line shall have outlets along the fairways either 75 or 100 feet apart, as designated by the architect, and shall have outlets at greens and tees.

A complete sprinkling system shall be installed with this plant to take care of the watering of greens, tees, and fairways, and must include all necessary hose. The complete water and sprinkling systems must be installed and be in operation prior to the planting of greens and tees.

In conjunction with the water system the architect's engineer prepares a plan showing pipe sizes and amounts to cover the above.

**Clearing.**—All trees, stumps, roots, bushes, vines, stones, stone walls, interior fence lines, and other obstructions coming in the line of play, exclusive of buildings, shall be removed to the satisfaction of the architect. Removal of buildings must be disposed of under separate contract.

**Practice Field.**—The practice driving field shall be plowed and prepared similar to the fairways, except the amounts of material may be reduced at the option of the architect, and shall be seeded with a mixture of four parts Kentucky bluegrass and one part re-cleaned redtop at the rate of 150 pounds per acre.

The application of manures is generally omitted in preparing the practice field.

**Practice Green.**—The practice green shown on the plans shall be built identically the same as the other 18 greens and planted similarly.

**Grass Seed.**—All grass seed used on the course shall be analyzed for purity and germination by the United States Golf Association Green Section or some reliable seed laboratory.

**Temporary Ditches.**—Temporary ditches shall be installed as indicated by the architect wherever necessary to prevent excessive surface wash on fairways. These ditches shall be left open until the rainy season is over in the spring of . . . . ., at which time they shall be filled up and sodded by the club's organization at the club's expense.

Regardless of what specifications are made for the building of a golf course, the club must depend upon the integrity of its architect for the kind of course they will get.

The club first of all places confidence in the architect, and he would be a poor example of manhood who would take advantage of such a situation.

The same thing applies in the making of a contract for the construction of the course. The club puts itself in the hands of the contractor, after having decided on who is to build the course. No matter how rigid the specification there is always an opportunity to beat it, and no contract has ever been written but what can be driven through with a horse and cart by some smart lawyer.

The most important thing in a contract is for each party to understand the other. The contractor indicates in the contract what he is going to do and the club understands exactly what he means. Boiled down it is nothing more than "faith." If a club finds that an architect or contractor has been unscrupulous in his dealings, they should not hesitate to tell the world. On the other hand, when relations have been amicable and a good job has resulted, the club should not hesitate to pass the word along.

\* In view of the fact that amounts of materials vary with the course these have been omitted in this specification in order to avoid confusion.

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**Lime carbonate in sand.**—A number of clubs are submitting samples of sand to chemists for analysis and are having more complete analyses made than are necessary. Determinations of the content of silica, iron, alumina, etc., are unnecessary. It is only the amount of lime carbonate, the so-called calcium carbonate equivalent, which affects the reaction of the soil, because it is lime in this form