

What Cost Water System?

By WENDELL P. MILLER

(Continuing a series of articles on the important subject of golf course watering systems. See our June and July issues for the two preceding instalments.)

Fixed Sprinklers (Concealed or Pop-up)

This type of system has not been used on golf courses because the makers have never been able to convince the golf clubs that these systems are practicable. Hence it is the specialized makers of golf course sprinkling equipment who are the first to develop concealed-fixed position sprinklers for golf courses. At this writing, "Billy" Bell is installing eleven hundred concealed sprinklers on the grounds of the Agua Caliente golf course. Greenkeepers are quick to accept this equipment for tees. The illustration shows a typical double-tee installation at Midlothian Country club. Other tee installations have been successfully accomplished at Pomonok Country club, Flushing, Long Island; Cascade Hills Country club, Grand Rapids, Mich. and University of Michigan golf course, Ann Arbor, Mich.

The concealed sprinkler is a revolving sprinkler, usually throwing two streams, and when not in use, is concealed underground, only the top (3 inches in diameter) being visible. When the water is turned on the sprinklers rise out of their shells and operate in the same manner as the portable sprinklers. A typical sprinkler secures a uniform coverage over a diameter of 100 ft., at 85 pounds residual pressure. A smaller type (tee size) covers a diameter of 80 ft. at 60 to 70 pounds.

These sprinklers, called pop-ups, are practical, cost not over 10% more than the portable sprinkler systems (for the entire installation).

The outstanding advantage of this type of sprinkler is the saving in labor cost. There are no sprinklers to handle, and only occasional adjustments required. The night engineer or night watchman can operate an entire system, in addition to his regular duties. The next step is the application of time-clock controlled solenoid automatic valves which will eliminate all operating labor. The automatic systems, once set, will start and stop each battery

of sprinklers according to water requirements. The year 1931 should see this system in actual operation on one or more courses.

Fixed Above Ground Sprinklers

Fixed above ground sprinklers are not readily accepted by golfers hence initial installations of this type are limited to tees and greens. Country Club of Detroit has used fixed tee sprinklers for several years. They piped to convenient locations, put a valve in each tee line and attached lawn sprinklers.

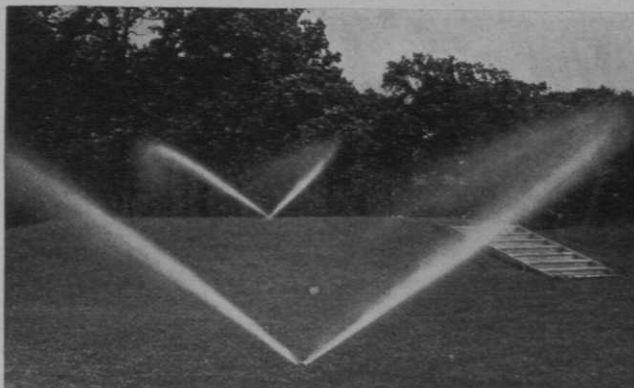
Hoseless greens, using fixed outlets and portable sprinklers have been in use for some time on greens not surrounded by sand traps. Recently we have extended this idea by using "half circle" sprinklers, two to four located in the long grass on the edge of the green and out of the line of play. These sprinklers are permanently attached to their riser pipes and each sprinkler is adjusted to its required arc, more or less than a half circle as required. The radius covered is 50 ft. at 60 to 80 pounds residual pressure. One valve controls each green.

The eighteen greens of the Cascade Hills Country club, have recently been equipped in this manner. No water enters the traps. The over-lapping on the greens is not a serious factor and is minimized by prevailing winds. The writer cannot predict the acceptance of this system by golfers as the ever-present sprinklers occasionally present a mental hazard rather than a stymie and there may be some objection which, however, we believe will be overcome when the advantages of this system are known.

Portable Half-Circle Sprinklers

Recently we adopted a different procedure for several sample greens at Pomonok Country Club (Long Island). Here we used fixed outlets and portable "half-circle" sprinklers. Each sprinkler is permanently adjusted to the arc proper for its position and is numbered to correspond to

Pop-up type sprinklers in operation on one of the tees at the Midlothian C. C., Chicago.



the number of the outlet. At each watering each sprinkler is placed in its correct outlet and position. The objection, if any, to this method is the requirement of about 60 numbered sprinklers for the eighteen greens. Perhaps this is offset by the advantage of fixed certain coverage and no waste of water.

We have described the essential features of the various types of systems. These systems are applicable to the nine-hole courses but before proceeding to the principles and details of the mechanics and hydraulics which will enable the smaller clubs to engineer their own systems, we propose to answer the question, "What does it all cost?"

PART III.

NO TWO clubs can ever solve their irrigation problems in exactly the same way. Soils vary widely in their water-holding capacity, even between different areas on the same property, and still more widely between different properties—hence wide variations in actual water requirements. Surface and underground water supplies are never the same in two places. Topographic features, acreage and course layout are different in every case.

The clubs themselves differ widely in their manner of dealing with their problems. Men who are wizards in their own businesses sometimes lose their sense of proportion when sitting as club officials; again, the action of boards of directors of clubs is frequently a compromise between extreme ideas and contending factions.

Some clubs install cheap steel pipe of very short life, lay it on top of the ground perhaps, install pumps without automatic pressure control, and without adequate housing. Such installations soon become a total loss. Occasionally some club will

go to the other extreme and overdo the installation. One well known club recently spent over \$90,000 on its water system, and still has hose tees and snap-valve outlet greens and ordinary hoseless fairways. In a very few years this club will discover that the present rapid development of concealed sprinkling systems will necessitate further expenditures if they are to keep up-to-date (as they pride themselves on doing), and reduce their operating costs.

Another club went to the other extreme and, combining an inadequate appropriation with unsound advice, installed an irrigation system which operates at an unusually excessive cost for labor and power and their course is only superficially watered.

It is clear, therefore, that there can be no fair comparison of installation costs between clubs—existing figures can serve only as guides to the costs of other projects.

Costs for Nine Hole Clubs.

Little information is available on the cost of installation of irrigation systems for nine-hole courses. Most nine-hole clubs can install their piping systems for less than half of the cost for 18 holes, for two reasons; first, the proportion of large sized pipe is less in a nine-hole system, and, second, most of the nine-hole clubs are located in the smaller towns where lower priced skilled labor prevails. The water supply will, however, usually cost a nine-hole club much more than half the cost of an 18-hole supply, unless the nine-hole club will forego the automatic class of 18-hole installations. Clubs located on lakes, rivers, ditches, having large ponds or cheap village water have a decided advantage as we will later demonstrate.

To Help Us All in This Big Business!

Golf clubs represent investments so large as to be comparable to many of the Industries.

In industry today Management is the keynote of success. Country club operation is just as much of a business as any other industry and requires a technical knowledge gained only by training and long experience.

Successful club operation from the standpoint of finance, members' satisfaction and property appreciation as opposed to red figures and assessments, disgruntled membership and costly depreciation is dependent upon skilled management.

The Club Managers' Association of America composed of managers of leading golf and town clubs throughout the United States offers its services without charge to clubs in the United States and Canada in the solution of club operation problems; construction, planning, equipping, installation of system and the procurement of skilled executives whose records are such as to guarantee satisfactory results.

The Club Managers' Association of America is a clearing house for the problems of club management bringing to club officers and managers alike the benefits of the combined knowledge and the exchange of ideas of the leaders in the profession.

If you are a manager interested in the work of the association and would care to learn of the eligibility rules for membership, or if you are a club officer with problems which might require expert advice, address your inquiries to

CLUB MANAGERS ASSOCIATION OF AMERICA

Henry R. Dutton, *National Secretary*
54 Pinckney St. BOSTON, MASS.

5th ANNUAL CONVENTION
Pittsburgh, Penn.,
February 24th-25th, 1931

Some Typical Costs.

Riverside Golf Club, Riverside, Illinois (Chicago District). This club is located on the Des Plaines river from which the water supply is taken. An expensive submarine cable is required to connect the clubhouse and pumphouse. Also an expensive pipeline was laid across the river. The pumphouse is of brick with fancy tile shingles. Equipment consists of one new 400 gallon pressure pump, one (old) 200 gallon triplex pump, one air compressor, one 5 ft. x 20 ft. pressure tank (3,000 gallons) and one switchboard giving automatic control.

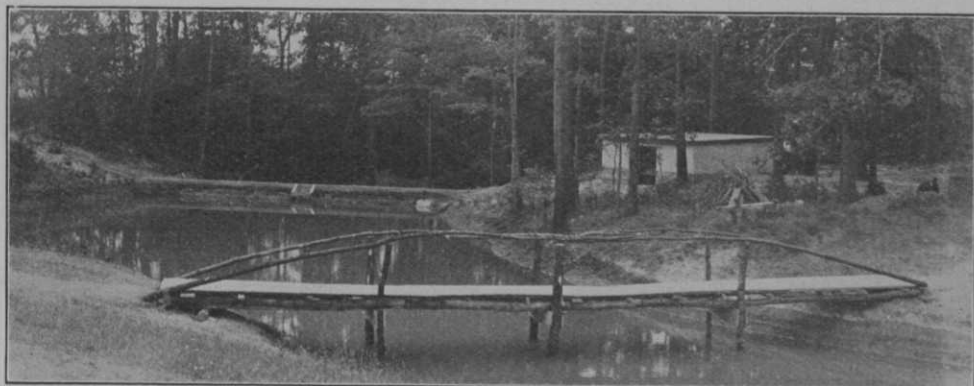
The fairway distribution system comprises 13,558 feet of pipe and 108 snap valve outlets. This new system is connected into the old tee and green system. Complete winter drainage is provided. Total cost, including 2,000 feet of best grade hose, 20 non-kinking hose swivels, 20 quick couplers, and 20 standard sprinklers and all engineering fees, was \$21,363.00 (18-hole poa annua greens course) divided as follows: piping system \$13,729.00; pumphouse structure, \$1,899.00; pumping plant \$3,587.00; submarine cable and re-wiring clubhouse terminals to get all service on one meter \$1,248.00; hose, sprinklers, etc., \$900.00. Only cast iron and standard wrought iron pipe was used. Working pressure at pumphouse, 70 and 90 pounds.

Onwentsia Club (Lake Forest, Illinois).

This club is fortunate in being able to utilize an existing well and well pump. A new concrete reservoir was placed under ground—capacity 250,000 gallons. A substantial pump-house structure and expensive power substation were provided.

The Onwentsia system is a hose system with 134 snap outlets for the tees and greens and along the fairways, also along the polo field and in the gardens and clubhouse area where liberal provision was made for watering the lawns, flowers and shrubs. With ample funds available liberal provision was made for the larger sizes of pipe, which of course tend to keep down the power cost.

The complete system includes 22,386 feet of 2 in., 4 in. and 6 in. cast iron pipe with a total cost for the piping system of \$28,281.00. Hose, sprinklers and couplers cost \$1,134.00. The pump-house structure cost \$4,210.00 and the pressure pumping plant, with automatic control, \$6,125.00. The cost of the reservoir was \$13,687.00 and the power substation, \$3,003.00. Owing to



A handy ravine supplies the site for an inexpensive reservoir. Well pump discharges into reservoir. Surface run-off saves pumping.

the necessity for locating the reservoir some distance from the pumping plant, a connecting pipe line was required at a cost of \$1,660.00. The total cost of the completed system, including all charges of every description, was \$58,102.00. This represents, in our opinion, the maximum cost for an 18-hole hose system where the water supply already exists; this system is representative of the best that money can buy.

Pomonok Country Club (Flushing, Long Island).

This club has a sandy subsoil and hence requires considerably more water than the average club. The Pomonok club intended to sink wells, but an engineering investigation disclosed the availability of New York City water supply adjacent to the property at a pressure of 40 pounds and at a cost of ten cents per 1,000 gallons, which is as cheap as water pumped from

CAN YOUR CHEF SHOOT PAR?



Par golfers possess clubs for every shot—and know how to use them. Your chef to make par should have all the implements demanded by the knowledge of his profession. Ability plus equipment equals par.

Outstanding clubs, hotels and restaurants of the United States use Gloekler food service equipment. Their chefs know that every item from a butcher knife to a complete kitchen installation possesses quality that performs perfectly in actual use.

In refurbishing or in building kitchens ask for Gloekler co-operation and suggestions, without obligation.

THE BERNARD GLOEKLER COMPANY

Manufacturers of Complete Kitchen Equipment.

1627-33 Penn Ave., Pittsburgh, Pa.

Representatives in all Principal Cities.

GLOEKLER PITTSBURGH
—PA—
MANUFACTURERS SINCE 1856



You save time and money by answering GOLFDOM ads.



A well-watered green at Cascade Hills Country Club. Three automatic sprinklers do the job.

wells in that vicinity. The Pomonok system is complete, including automatic concealed tee sprinklers under individual control, with fairway hose system and snap valve outlets for the greens. This system required 15,170 feet of 2, 4, 6 and 8 inch cast iron pipe, 118 snap valve outlets, and 26 concealed tee sprinklers, all at a cost of \$23,692.00. The hose, sprinklers, and couplers cost \$1,020.00, the pump-house structure \$2,750.00, while the booster pumping plant with automatic control cost \$4,102.00, or a grand total for the entire construction of \$31,564.00 including all

charges and expenses of the enterprise.

This construction cost is typical of a high grade system operated at high pressure and utilizing municipal water supply.

Cascade Hills Country Club (Grand Rapids, Michigan).

This system comprises hoseless tees and greens and hose fairways with 24,434 feet of pipe, all cast and wrought iron pipe, with 118 snap valve outlets, and 21 concealed tee sprinklers, at a cost of \$17,220.00 not including either the cost of a tee system or the hoseless greens. The

Approximate Costs of Construction—Eighteen Hole Irrigation Systems—Average Course.

(A) Fairways only, hose system	\$14,000 to \$20,000
(B) Fairways only, hoseless system, California type	25,000 to 35,000
(C) Fairways only, hoseless system, concealed sprinkler type.....	32,500 to 41,000
(D) Fairways only, hoseless system, Miller high pressure one-man method	23,000 to 29,000
<i>NOTE: The above figures do not include tees, greens, or clubhouse areas.</i>	
(E) Additional for new hose tees and green outlets.....	2,000 to 2,500
(F) Additional for hoseless tees (concealed automatic tee sprinklers), and new hose green outlets.....	4,000 to 5,000
(G) Additional for hoseless tees and hoseless greens.....	6,000 to 7,500
(H) Clubhouse areas and dust settling in parking areas.....	Depends
<i>The above estimates do not include water supply or water storage. For these two items, the following figures are taken from actual installations:</i>	
(I) Pumping plant (water supply), contiguous lakes or rivers, etc., including pressure pump, compressor, pressure tank, automatic control, intake and pumphouse structure.....	4,500 to 7,000
(J) Same, City water	4,500 to 7,000
(K) Same, shallow wells, including well, casing, screen, and turbine pump	6,000 to 10,000
(L) Same as (K), deep wells.....	10,000 to 15,000
(M) Water storage, tanks, reservoir, or pond.....	4,000 to 12,000
(N) Hose and sprinklers, for hose fairway systems, eighteen holes..	950

The above figures are based on the use of wrought iron and cast iron pipe, and the highest standards of engineering practice. If a new course (under construction) deduct ten (10%) per cent from distribution system figures. In the South, below the frost belt, deduct five (5%) per cent.



Four automatic green sprinklers in operation at Cascade Hills Country Club, Grand Rapids, Mich.

hoseless tee system, with a single hose outlet at each green, was contracted for at \$2,638.00 but the committee decided they wanted hoseless green sprinklers, which required an extra expenditure of \$2,984.00 including 60 fixed position above-ground sprinklers. The hose, portable sprinklers, couplers, etc., cost about \$800.00.

This installation involved the sinking of a test well followed by a permanent well, which was cased to bed rock (about 120 feet) and equipped with 24 feet of expensive sand screen, at a total cost of \$2,940.00. There was an additional outlay of \$1,650.00 for a turbine well pump. The pressure pumping plant cost \$3,850.00, the pump-house structure \$983.00 and a reservoir, established by damming a ravine, cost \$1,190.00 or a grand total cost of \$34,256.00.

This construction cost is representative of a high grade installation using permanent pipe and providing a complete water supply and storage facilities, which in this case because of natural advantages were developed at very low capital outlay.

There will be further variations due to amount of freight on pipe (distance from mill), compactness of layout of property, location of pumping plant with reference to distribution lines, climate as respects freezing, whether machine trenching can be used in digging the pipe trenches, whether tight or loose soil, local prices of skilled and unskilled labor, whether installed on the present "buyers market" or during a "flush" period; these, together with numerous other factors influence the final cost to a marked degree.

Again the cost of installation would vary widely for each individual club, ac-

ording to the skill, knowledge, experience, and care represented in the design and specifications of the system and whether the club is in position to know about and take advantage of the many mistakes in other installations over the country.

There will be further variations in cost due to the care and skill expressed in planning the greenkeeper's operation and the operating cost. The design of the system is necessarily affected by the predetermined cost of operating the system and the manner in which the greenkeeper is to operate it. This important factor is generally overlooked in planning the water system—and after the system is in operation the club wonders why the system operates with a high labor cost.

Controlling the Construction Cost.

Within reasonable limits, the construction cost of a high grade irrigation system and water supply can be controlled. It is not to be inferred that the examples cited indicate that 18-hole irrigation systems and water supplies for other clubs would necessarily cost as much as stated. Some clubs, having ample funds or resources, want the last word in high grade construction and will spend more money than above indicated.

There will be many more clubs which desire fairway irrigation but which will have to limit the appropriation to \$15,000.00, to \$20,000.00 or \$25,000.00. Where the water supply already exists or can be developed at very low cost the engineer can plan a fairway system and water supply, which of necessity must be a compromise between the best grade of construction and the funds available.