

"Look Before You Leap" Is Beaumont's Plan

The Beaumont Country Club, at Beaumont, Texas, planned to install a watering system for its greens. But before signing any contracts for the work, they sent questionnaires to all the interested manufacturers. Armed with this information, Beaumont was able to buy intelligently with the assurance that the watering system would be satisfactory.

TO A LIST of manufacturers of watering equipment for golf courses, Beaumont wrote the following letter:

"We are contemplating the establishment of a watering system for grass greens to cover nine holes at present and eighteen holes in the course of two to five years. We will be in the market for supplies of various kinds and wish to have prices, circulars, descriptive matter and advice in regard to what we will require in the establishment of this water system, and its approximate cost.

"Our golf course is within one hundred yards of the river where water is obtainable in unlimited quantities. We have not at present any other source of water supply which is available in quantity or quality to the extent that the river would furnish. The only thing we are doubtful about in this connection is the effect of the river sediment on any system we may install.

"On a direct line from the river bank; the furthest point of distribution would be about three thousand feet. Two hundred and twenty-volt alternating current single phase electric current is available for power.

"We do not contemplate now or at any time in the future to water our fairways from this plant.

"Please give all details, information and advice you can or may be disposed to give in this connection and oblige.

He enclosed, with this water system letter, a questionnaire to be filled in by those interested in supplying the club's requirements. This questionnaire read.

"What type of pump would be most suitable for our requirements?

"What type tank is most suitable for this kind of water distribution?

"Give reasons for preference as to pressure or gravity tank system.

"How much water is necessary to water properly 18 grass greens in the course of one night's watering?

"What size or capacity of tank would be

necessary under (a) a pressure or (b) a gravity system?

"How much higher than the highest point on course would tank have to be elevated in a gravity system?

"What pressure per square inch is necessary (a) at tank, (b) at sprinkler heads for the proper or satisfactory operation of the larger size sprinklers?

"What size pipe leading from tank to greens on main line will give best results? What size laterals and green connections will give best results?

"Is well water superior to river water for green watering purposes? Or, is river water better? Give reasons."

Watering Data Supplied

Getting help on the watering problem via the questionnaire means that only some excellent general information may be expected. There are too many details that are entirely dependent upon a careful study of the local situation for the conscientious helper to submit data that will answer all the questions.

Some of the factors that control the watering system design are the size of the course, distance to the point farthest from the source of the water, irrigation pipes that will be piped off from the main line, the various elevations, and the sprinklers that will be used. Sprinklers vary in their demands in capacity and pressure, and this makes a big difference. Then there is the matter of labor available. Clubs water varying numbers of greens at a time. These varying requirements figure prominently in the design of the watering system. The soil, too, is a controlling factor, for sandy soil requires two to three times as much water as soil containing considerable clay. There also are varying water requirements of different grasses on greens.

One of the manufacturers supplying data for the Beaumont club suggests that

golf clubs write pump makers for the manufacturers' own questionnaire blanks for these blanks carry leading questions, enabling the manufacturer to submit some definite figures and recommendations.

A point of error common to golf club water installations is emphasized by M. B. MacNelle, manager of Fairbanks, Morse and Company, pump division. He says most golf clubs are paying an unusually high price for pumping water because the pipe lines are too small in size, resulting in abnormal friction losses. He states that he has seen a fairly level nine hole course requiring water being pumped against 100 pounds pressure, where, if the lines had been of adequate size, 45 pounds would have been sufficient pressure.

In a number of respects there are wide variations in the recommendations passed on to Beaumont for its water system. All of those answering have had successful experience with golf club installations, so it goes to show that some latitude is allowable in this matter of watering installations. Wendell P. Miller, who has specialized on golf course watering problems, the Kewanee Private Utilities Company, which also has done considerable golf course watering work, A. D. Cook, and Westco-Chippewa Pump Company are the suppliers of the following data:

Miller Answers

Direct connected electrically driven or double stage centrifugal pump should be used.

No tank should be used unless automatic water pressure control is desired, in which case use 1,000 to 2,000 gallon hydro-pneumatic tank.

Modern efficient sprinklers require line pressures of from 60 lbs. to 80 lbs., which would require too high a gravity for economical storage.

Greens should be given at least one-half inch of rainfall at each watering and counting an average of 8,000 square feet to the green you would require approximately 45,000 gallons of water at each application.

Capacity of tank for pressure system should be 1,000 to 2,000 gallons, for gravity system, 20,000 to 45,000 gallons, depending upon the capacity of the water system supplying the tank.

Tank for gravity system should be elevated above the highest point on the course not less than 140 feet for efficient sprinkler operation and provided friction loss in the mains was held down to a minimum.

Pressure per square inch necessary at tank is 60 lbs. to 80 lbs. and not less than 50 lbs. at sprinkler heads for larger size sprinklers.

Pipe size—all depends upon layout of system; relation of pumping plant to center of distribution and number of greens to be watered at one time. Never less than four inch, usually six inch, seldom over eight inch.

Minimum of 1½-inch pipe should lead to greens where run from main does not exceed 200 feet; over 200 feet from main use 7-inch pipe. Minimum size lead to a tee should be 1¼-inch with 1½-inch used on leads in excess of 150 feet.

There is absolutely no difference in the value of well water or river water for greens watering unless the well water should be so heavy mineralized as to corrode the pipes rapidly, in which case I would prefer the river water. Temperature of the water has nothing to do with its value.

The Beaumont system should be designed so as to keep friction losses in the pipes down to less than 5 per cent. Beaumont should count on a discharge of not less than 25 gallons per minute at each green and ten gallons per minute at each tee. I usually design a system to water either six or nine greens and tees simultaneously, depending upon whether daylight or night-time watering is desired and upon power rates and line sizes.

Kewanee's Advice

The Kewanee Private Utilities Company answers the questions as follows:

No. 1: Under most conditions a displacement type of pump in either a single, double acting or in a triplex plunger type will be most suited for golf club requirements. The efficiency of this type of pump is very high and far surpasses the centrifugal unit. The life of these pumps is also very much greater. Consequently over any period of time a displacement pump is found to be the most economical.

No. 2: A pneumatic tank is best suited for golf club water distribution. This sprinkling requires high pressure. High pressure will give the best spread to the water out of the sprinkler and at the same time will reduce the size of pipes necessary. This means a cheaper installation. When it is considered that a tank 40 feet high will give less than 20 pounds pressure and that the friction loss in each 100 feet of 2-inch pipe at 20 gallons per minute is approximately ½ pound, you can see that this small amount of pressure in this tank is not going to be very much at the farthest end of the course. It is not always found that the farthest end of the course is the lowest and it is not always good practice or is it economical to try to have the tank located at the highest point and perhaps the source of the water will be clear across the course.

No. 3: Pneumatic tanks will give higher pressure and reduce costs, as explained above, and they can be installed under-

ground or in a pump house as preferred. They can be easily reached for attention and do not require a great deal of painting. One coat of paint every second or third year is usually sufficient. A gravity tank system, on the other hand, is costly. The tower must be gone over to see that the tower has not weakened and that everything is painted. Failure to do this has resulted in collapse of the towers or breaks in the tanks. This not only means destruction of the tank and tower, but sometimes of property or life below.

No. 4: Watering of greens is greatly dependent on the kind of soil and the season. As we explained, sandy soil may require as much as 20 gallons of water per minute and other soils of denser nature are down to approximately 8 or 10 gallons per minute. At our local club we have the past several years succeeded in watering eighteen greens at a rate of about 4 gallons per minute and have never had a burnt out green all this time. Then again some clubs prefer to water the entire course every night, some water one-third of the course one night, another third the second night and the last third the last night and then repeat. Some divide the course into two so that every green gets watered every other night. This depends, of course, upon what the club wants to do, and of course, as we have stated, on the kind of soil.

Nos. 5 and 6: The capacity of the tanks varies considerable on the amount of water necessary. With a pneumatic system the capacity of the tank is quite a bit less than an elevated tank. The pneumatic tank is generally figured about one hour's capacity of the pump, and the pump is generally figured to furnish sufficient water or a little more than what is taken out for the greens at one time. In this way the pump puts back as much or a little more than the sprinklers are taking out and at the same time this keeps up the pressure in the tank so that there is no break or variation in the pressure or the volume of water being supplied to the greens.

Nos. 7, 8 and 9: For the majority of courses 75 pounds pressure at the tank is usually the maximum. In some cases on very hilly courses pressure has been raised to 85 and 110 pounds. Seldom is it necessary to go farther than this at the tank. To obtain an elevated tank pressure equal to 75 pounds the tank would have to be approximately 170 feet high. This would be an expensive tower to construct and keep up. The pressure at the sprinkler heads is at an average about 40 pounds. We have data here from a great many sprinkler manufacturers and as we go through these we find that they state that the sprinklers operate best at a pressure of about 40 pounds. Some of them will operate as low as 20 and 25 pounds but

will not give the coverage.

No. 10: This question has been answered in our letter, and we will again state that it is impossible to state offhand what size pipe should be used until we have some idea as to what the course is and can figure properly just what the friction losses and the elevations are. We will state that not less than one-inch pipe should be used from the sublaterals to the greens. This means, of course, that all pipes back through the sub-laterals and then the main to the tank must each be correspondingly larger.

No. 11: This question has been practically answered in No. 10.

No. 12: In some instances well water is not desired for irrigation. This is where a certain mineral may be held in solution that would have a bad effect upon the plants. There should be no objection to any river water that is flowing so that there would not be any stagnant water pumped. It is claimed that river water is to be preferred because of certain life in river water that when distributed upon the ground really provides a sort of plant food. It is also claimed that river water is of a softer nature, while deep wells will provide water that is hard and less desirable for growing grasses. Many clubs are using well water for the reason that they have one system of water supply. They take the water from the well and use it at the club house for all purposes such as showers, drinking, cooking and kitchen and also use the same system for supplying water to the course.

Cook's Answers

A. D. Cook advises Beaumont with the following answers to the questionnaire:

A triplex pump is most suitable for this service with belt or silent-chain drive. Is more positive and more efficient than a centrifugal pump.

We recommend 5,000 to 10,000-gallon hydro-pneumatic pressure tank and a small air compressor unit for surplus air for tank.

A tank with triplex pump gives higher pressure. Pressure tank is less in cost and maintenance. It also can be protected from weather.

Amount of water depends upon soil, kind of grass in greens, etc. To be safe figure 15 gallons per green for about two hours, but only water six greens at one time, then change to six other greens during the evening or night, etc. Eighteen greens can be watered thoroughly.

Use 10,000-gallon pressure tank and triplex pump for 75 G. P. M. and maintain 60 lbs. to 80 lbs. pressure, or 5,000-gallon tank and a 90 G. P. M. pump. Would not consider gravity system.

If you must use a gravity tank get it as high as you can afford—2.3 ft. elevation means 1 lb. pressure.

Sixty lbs. to 80 lbs. pressure should be maintained in pressure tank and not less than 40 lbs. at hose connection at green. Keep pipe sizes large to prevent friction losses as much as possible.

Size of pipe depends upon pipe layout. If a "loop" system is used much smaller pipe can be used, but if not, start off with 4 in. or 5 in. and use nothing less than 1 1/4 in. pipe up to greens.

We have installed both river and well jobs, but cannot notice much difference in water's effect on greens. George Sargent, Scioto C. C., Columbus, likes well water. A drilled well would be best if plenty of water can be obtained from the ground as it does not cause trouble that happens when pumping from a river. If river water is used a good filtering system should be used and you will always have trouble with suction pipe getting full of mud, leaves, etc., which must be cleaned every season.

New England Plans Short Greenkeeping Course

A SPECIALIZED course for men engaged in the profession of greenskeeping, or members of greens committees has been arranged at the Massachusetts Agricultural College in co-operation with the New England Greenskeepers' Club. The subjects as outlined can be effectively studied during the winter months. Tuition charge is \$10.00. Registration fee is \$5.00. There will be no laboratory charges.

Applicants for this school must be members of the greens committee, greenskeepers, or must have had at least one year's experience on a golf course, and their application blanks must be countersigned by the greenskeeper and the chairman of the greens committee.

The number of students is limited to ten, and registration will be confined to citizens of Massachusetts until December 1, 1927. After that date, if there be vacancies, out-of-state students will be admitted in order of the filing of their applications.

All prospective golf students who indicate their desire to take this course, will be sent a regular blank for enrollment. This may be secured by writing the Director of Short Courses at Massachusetts Agricultural College, Amherst, Mass.

Courses offered include: Grasses and Grass Seed, Cost Keeping and Analysis, Fundamentals of Landscape Arrangement, Drainage, Motors, Water Systems, Soil Fertility, Equipment.

Ask Me Another

By NOAH LOTT

Our expert answers two questions of general interest submitted to him. Send in your green-keeping problems; he'll be glad to solve them for you.

Question: Large patches of our fairways have died out in the past month, and on investigation we find there are thousands of grubworms just under the sod. They have eaten the roots of the grass. Of course, it is too late this season to remedy this condition, but if there is a cure for the trouble, we would like to learn of it.—(Iowa.)

Answer: Grubs raise havoc with the turf somewhere in the country every year, and accordingly the series of articles now running in GOLFDOM might well be condensed into a stock treatise for future reference. Fortunately, ordinary grubs differ from the grub of the Japanese beetle (on which the articles are particularly written) in that they are present in damaging quantities for one season only; for the next few summers, any particular piece of turf will generally be left alone.

Question: We are looking for a grass to sow in our fairways that will grow in our arid climate without watering. The usual sparse prairie grass grows on them in lumps, but the bare ground is exposed between the hummocks, so that a ball generally stops in a cuppy lie. Is there some kind of grass that will grow here? We hesitate to disturb the soil unless we can get something better.—(Montana.)

Answer: There has never been a turf grass found which would make a better growth under the semi-arid conditions of the country lying immediately east of the Rocky Mountains than the native sorts. The trouble is lack of water; with sufficient watering, any of the tame varieties can be grown. It would be interesting and valuable to experiment with small plots of several varieties of grasses, watering varying amounts and being sure to leave check-plots untreated for comparison. Your problem will have to be solved under the conditions prevailing in your climate; results attained in a humid region are of little, if any, value in your case.