

# Cost Factors In Fairway Watering Installations

By WENDELL MILLER

**N**EARLY 100 clubs east of the Rockies now enjoy the advantages of fairway watering. Droughts which have seriously affected large sections of the Eastern states during the past three years have served to force fairway watering on clubs. Competition between neighboring clubs has also been a factor in bringing fairway irrigation to the status of a necessity.

The introduction of fairway irrigation causes adjustments in many maintenance items, increasing some, decreasing others. The net result will depend, at each course, upon the importance and weight of numerous factors. The most important of the factors are:

(a) How much has been spent annually prior to installation of irrigation for fairway seed, topdressing, weed eradication and fertilizer.

(b) How much will the water cost per 1,000 gallons.

(c) How much will the power for pumping to proper pressure cost, and

(d) How much will the labor of irrigation application cost.

## Water Rates from Public Sources

Many golf courses in metropolitan centers are, or can obtain the necessary water for irrigation from the public water supply mains. Whether this source of supply will prove the most economical depends upon three factors:

(a) The initial cost per 1,000 gallons.

(b) The cost of the electric power required for boosting the pressure to the point required for satisfactory sprinkler operation.

(c) The cost of developing the same amount of water supply at the same pressure from surface or sub-surface sources.

Representative rates for some of the larger golfing centers are:

New York City (5 boros)	\$ .123 per 1,000 gal.
Chicago	.068 per 1,000 gal.
New York suburban	.16 to .35 per 1,000 gal.
Chicago suburban	.18 to .25 per 1,000 gal.
Cleveland Metropol.	.18 to per 1,000 gal.

Very few of the smaller cities have rates below 15c per 1,000 gals. and most public

sources charge more than 20c per 1,000 gals.

Pressure obtained from the public mains will vary from 20 lbs. to 70 lbs., with a few rare cases in which pressures either lower or higher than these limits will be encountered. The relatively low pressure supplied by the public water mains usually makes it necessary to install booster pumping plants capable of pumping 400 to 500 gals. per minute and increasing the pressure in the irrigation mains to a residual pressure at the irrigation outlets of from 75 to 100 lbs.

Table I shows the quantity of water consumed by seven clubs during the past three or four years, together with the power cost for pumping from well, river or reservoir or booster pumping from the public water mains.

## Water Required for Turf

Most authorities have agreed that one inch of water per week from May 1st to October 1st is required for proper turf maintenance in the bluegrass and bent grass territory. This average requirement will be increased or decreased locally by abnormal weather conditions, but in developing plans for golf course irrigation this rate of application should be provided for by the source of supply. One inch of water covering one acre equals 27,000 gals. The average 18-hole golf course will have 45 acres of fairways, 7 acres of tees and greens and 3 acres of lawns, nurseries and flower gardens, or a total of 50 acres to irrigate.

From a study of the operating records for four years at 20 Eastern clubs it appears that the irrigation system will be operated on an average of 14 weeks per year, a minimum of 8 weeks and a maximum of 18 weeks. Based on the application of 14 inches of irrigation water, the club with exactly 50 acres to irrigate, would require 18,900,000 gals. of water per season. From a study of Table I it will be seen that most of the clubs, for which total consumption is given, are closely ap-

TABLE I

CLUB	Year	Total Water in Gallons Consumption	Cost of Water Purchased	Cost of Elec. Power for Pumping	Cost Labor
A.....	1930	16,400,000	Well and Pond	\$1,128.83	\$1,651.36
	1931	15,225,000	Well and Pond	1,065.73	808.96
	1932	15,440,000	Well and Pond	1,080.92	642.80
	1933	13,600,000	Well and Pond	956.63	690.80
B.....	1931	19,000,000	River	517.00	215.00
	1932	21,500,000	River	575.00	220.00
	1933	20,000,000	River	540.00	185.00
C.....	1931	6,000,000	Lake	1,400.00	480.00
	1932	6,000,000	Lake	1,511.53	360.00
	1933	6,000,000	Lake	972.15	316.00
D.....	1932	20,000,000	River	1,500.00	420.00
	1933	18,000,000	River	1,400.00	360.00
	1932	31,000,000	2,100.00	1,300.00	940.00
E.....	1933	32,350,000	2,200.00	1,200.00	765.00
	1930	18,494,000	2,467.90	847.40	800.00
	1931	9,014,520	1,228.10	709.40	470.00
F.....	1932	21,352,750	2,793.00	890.00	935.00
	1933	13,613,000	1,035.30	616.00	396.00
	1931	9,550,000	1,270.15	382.00	315.00
G.....	1932	17,250,000	2,294.50	690.00	425.00
	1933	6,000,000	794.00	310.00	170.00

A—Chicago C. C.; B—Columbus C. C.; C—South Bend C. C., 8 holes only; D—Oak Park C. C.; E—Ridgemoor C. C.; F—Pomonok C. C.; G—Bayside Links.

proximating the above theoretical requirement.

### Irrigation Systems

There are four types of irrigation piping systems, two of which are common to the states west of the Rockies and two to the Eastern states.

The California hoseless quick-coupling portable sprinkler type of piping system consists of mains between pairs of fairways with branching laterals extending to two or more lines of outlet valves in the fairways. In the Eastern states this type of system will be found only at the North Shore CC and Long Beach CC in Chicago; the South Bend (Ind.) CC and The Country Club of Detroit. The large amount of pipe required for this type of system has restricted its general adoption by Eastern clubs.

In the past three years a large number of West Coast clubs have gone directly from hose systems to the complete underground pop-up sprinkler system. The almost complete abandonment of hose fairway irrigation by West Coast golf clubs has been due to the necessity for utmost economy in water and labor expenditures.

In the Eastern states more than half of the new fairway irrigation systems installed during the past three years have been of the type known as the one-man hoseless system. This type of system differs from the California hoseless system in two respects, only one line of outlets

is located along the center of the fairway and the operating pressure at the sprinkler nozzle is higher.

The hose type of fairway system is still preferred by some clubs in the Eastern states on the theory that the operator of the system is better able to allow for variation in wind direction or because it is still possible to install the hose type system for approximately \$1,000 less than the cost of the hoseless system.

The difference in labor cost of irrigation application between the hose and hoseless types of system is illustrated in Table I. Clubs A, E and F have high pressure hose irrigation systems. Club C has a California hoseless type system and Clubs B, D and G have the "one-man" hoseless system. Club A changed their sprinkler equipment in 1931 from fire hose and large capacity low pressure small area sprinklers to one-inch hose and high pressure large area sprinklers thereby reducing the sprinkler crew from 6 men during the daytime hours to two men working at night.

### Effect on Other Budget Items

It is difficult to get before and after figures on all of the items of the golf course maintenance budget which are affected by the introduction of fairway irrigation. Some clubs knowing that it was useless to throw grass seed on the ground unless the proper water supply could be assured did not spend money for fairway seed

while other clubs spent thousands year after year for fairway seed without results until they installed an irrigation system.

The following figures are, however, indicative of some of the changes that may be expected:

Club A has never spent a cent for fairway seed since irrigation system was installed in 1922; no money has been spent on fairway top dressing; the same amount (500 lbs. per acre) of fertilizer has been applied every year. Fairways are mowed regularly three times per week throughout the season. Club B reports an average decrease since installation of fairway irrigation of \$200 per year in expenditure for fairway seed and seeding labor; an average decrease of \$250 per year in expenditure for fairway topdressing and a decrease of \$450 per year in fertilizer expenditure. The writer personally knows that this club spent heavily for fairway fertilizer for eight years previous to the installation of fairway irrigation. Club C gives the following figures covering cost of fairway seed, fertilizer and top dressing with separate figures for the labor cost of application:

Before Installation of Irrigation		
Year	Materials	Labor
1929.....	\$3,237.67	\$738.00
1930.....	3,369.66	460.00
After Installation of Irrigation		
1931.....	\$1,429.73	\$206.00
1932.....	433.45	58.00
1933.....	340.45	46.00

The turf on this course has improved until it is the finest in Northern Indiana. There has been an 80 per cent decrease in the dandelion and weed population on the course.

Club D reports a net decrease in total golf course budget of \$3,500 per year since the installation of fairway irrigation.

Club E reports a net decrease in total golf course budget of \$2,000 per year since the installation of fairway irrigation.

### Cost Irrigation Systems

Forecasting cost of installing irrigation systems is dangerous ground because no two golf courses ever have exactly the same problem to solve in installing irrigation. There are no less than 60 variables which effect the total cost of a given job as compared to the composite average cost of a dozen jobs.

Only when an experienced irrigation engineer has developed all the facts concerning the problems of a particular prop-

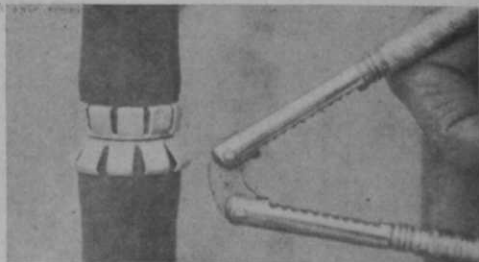
erty can a safe estimate of cost be made for the project.

If extension of city mains are necessary, the cost may be anything from \$100 to \$5,000. Wells may cost from \$500 to \$20,000. Storage reservoirs range in cost from \$500 to \$10,000. Pumping plants may cost only \$2,000 or the cost may of necessity be \$5,000 or \$6,000.

The cost of the fairway piping system will not vary so widely, because the average 18-hole golf course will require about 13,000 feet of pipe for a hose irrigation system and between 15,000 and 16,000 feet for a hoseless piping system. The new investment required for the installation of complete fairway irrigation will depend in large measure upon the value of those parts of the original tee and green irrigation system which will be useful in the fairway system. The ten new systems which have come under the writer's observation in 1933 have cost between \$10,000 and \$30,000 per 18-holes with the average cost, including all power wiring, pumping plants and other items connected with placing the systems in operation, being about \$18,000.

### Nut Cracker Is Handy Tool for Applying Hose Menders

**H**OSE MENDERS are unhandy and inconvenient to get snugly in place when they must be worked with, often in the center of a long piece of hose. Tapping them down uniformly is not always read-



ily done. It is hard to hit one set of prongs lightly without hitting others and still keep the hose end up snugly.

Jam them both in place, hold the hose in any convenient position and simply use an old nut cracker. You do not work against yourself; the cracker is easy to move around the hose and work with while you close the prongs slowly and uniformly. No danger of bulging or squeezing an old hose in spots which allows it to start leaking again.