

# Water still news in New York

*USGA Greens Section devotes whole conference  
on golf course management to irrigation.*

By DESMOND TOLHURST

**T**he first of this year's USGA Greens Section conferences on golf course management was held on January 28, at the Biltmore Hotel in New York City. The topic was the irrigation of golf courses in all its ramifications—from design of sprinkler heads to sources of water.

After the introductory remarks by Henry H. Russell, Chairman of the USGA Green Section Committee, the morning's sessions were kicked off by Don Hogan, Professional Civil Engineer, Seattle, Wash., with a talk on "Designing irrigation systems for golf courses."

Hogan first discussed some general aspects of course irrigation systems, then delved into sprinkler spacings and patterns.

All the sprinklers discussed were of

the rotating nozzle type. They perform best, said Hogan, in what is called "triangular spacing." This spacing should be about 70% of the diameter of the throw of the sprinklers being used. The distance between lines of sprinklers, he added, should be .866 or 6/10 of the sprinkler throw diameter.

You require overlap, Hogan observed, because the further out from the sprinkler you go, the less water is thrown. Close to the head, the individual sprinkler covers completely. Therefore you must have a line of sprinklers fairly close to the rough for effective coverage of the fairway next to the rough.

Hogan then discussed charts showing the distribution curves of two actual sprinkler heads. (These charts are available on request from sprinkler manufacturers.) The charts demonstrate the efficiency of a sprinkler head by plotting the actual amount of water it delivers 5, 10, 15, 20, feet, etc., out from the center.

The demonstration showed that because one sprinkler has a diameter of throw of, say, 130 feet and another, only 80 feet, does not mean that the one with the larger diameter is the one to choose.

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*H. Burton Musser holds USGA Green Section Award plaque, as Henry R. Russell, left, and Dr. Marvin H. Ferguson, right, look on.*

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## **WATER STILL NEWS**

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Only larger droplets of water have the weight to "carry" to the outermost point of a long-throw sprinkler head. In fact, it is desirable that smaller droplets be used for irrigating turf. The smaller the droplet size, Hogan observed, the better the water can permeate the soil, go through thatch, etc.

On paper, therefore, it sometimes can be very tempting to go for the longest-throw sprinkler offered, because theoretically they could be spaced further apart and reduce the number of sprinklers needed, thus reducing costs. But, said Hogan, as he had shown, this can be dangerous without first looking at the distribution curve charts of the sprinkler heads concerned.

As a rough rule of thumb, Hogan recommended that a 1/3 inch an hour is the maximum desirable. Also, plan for 80 foot spacing between sprinklers—then select the sprinkler that can do the job.

Some of the considerations for the design of a satisfactory irrigation system that Hogan detailed were: Determine total amount of water needed; evaluate water supply available; estimate the number of hours of watering needed in inches per week; evaluate the performance of various makes of sprinklers, and take into account such considerations as wind, climate and topography of land to be irrigated—not forgetting to evaluate the needs of shady and sunny areas, also areas with or without air movement.

Hogan closed his talk with this golden rule: The bid should always determine the cost of the system to be installed, and engineering should determine the design. If you allow cost to determine the design of the system—which is, he said, too often the case—you will likely land in a packet of trouble.

A panel discussion on "Water requirements of turfgrasses and irrigation practices" was next on the agenda. James L. Holmes, Agronomist, USGA Green Section, was Moderator, with Lee Record and Holman M. Griffin, Agronomists, USGA Green Section, on the panel.

One of the most important considerations, the panel thought, was the loss of

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water by the plant by evapotranspiration—loss by evaporation and by transpiration of water by the grass plant. Nine-tenths of the water lost by a grass plant is lost upwards into the air through the stomatic openings of the leaves. Most of this loss occurs by day and the rate will vary by climate.

When talk got around to disease and water practices relationships, the panel pointed out that fungi need "free water" in order to penetrate the grass plant. In a dry region, there will be less disease; in a humid region, more disease.

It was at this point that a question was raised from the floor about the possibility of introducing fungi to the grass via the irrigation system—i.e. the fungi were in the water supply. (From the unhappy tone of the questioner, it seemed he had had a bitter experience.)

Mr. Holmes answered this by saying that despite the fact that water can be polluted by fungus spores, it will not materially increase the number of fungi that are already right there in the grass.

Tests show, he said, that practically all fungus spores concerned in outbreaks of disease are already lying on the grass plant. Very few could be introduced by water from the irrigation system. While water polluted with fungus spores could do some damage, it could not be held responsible for outbreaks of disease solely on its own account.

The gentleman from the floor rose again to observe that even if the grass was covered with fungus spores, all he knew was that something triggered the outbreak of disease. If it wasn't his polluted water supply, then what did the damage?

(Due to the demands of time this topic had to be dropped.)

The Panel then discussed fertilization and water requirements. One guide, they said, was that tests show the transpiration rate decreases with proper fertilization. As a result, grass can better withstand drought.

The session ended with a discussion of irrigation systems in New England. There, it was pointed out, they have bentgrass-fescue, an irrigation system is

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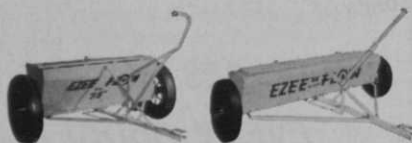
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put in, and soon the members of the greens committee are demanding that the superintendent water constantly. When he says no, this is not right for the grass, they reply, we'll fire you! The superintendent often has no alternative but to overwater—or lose his job! Ideally, bentgrass should only be watered every three days or so. However, members are demanding overwatering to get plush fairways at any cost, even at the risk of encouraging annual bluegrass.

The third item on the morning's agenda was a talk by Mr. Harry Day, Woodway CC, Darien, Conn., on “Sources of Supply.”

With the drought in the Northeast, Day said, many clubs in that area have had to make a re-evaluation of their source of water supply. Many natural sources of water supply like lakes or streams have become contaminated by inadequately treated sewage, and clubs have had to cast about for other sources of supply.

The minimum requirement in the Northeast is around one inch of water weekly. Roughly speaking, Day said, you need around 18 million gallons per season—based on around 40 acres of greens, tees and fairways to be watered.

The main sources of supply available for golf course use were, he said: Rainfall; municipal sources; wells; small streams running through the course; sewage effluents, and lakes.

The problem with municipal water, Day observed, was this can be cut off just when you need it. Small streams are attractive, but they tend to dry up in summer. Sometimes you can dam them up and store the water. However, you must investigate the question of water rights first. Sewage effluents are a possible source, but you should thoroughly investigate the methods of treatment being used to ensure that no pollutants would be introduced.

At Mr. Day's club they solved the problem of water supply by building a lake. He described how this was done—from the drawing of the topographical map necessary to get a permit to the finished product. Along the way he

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punctuated his talk with many useful tips. For instance, care must be taken that no seepage occurs. If the bed of the proposed lake is not naturally impervious, then steps such as lining the bottom with polyethylene material must be taken. Or if the proposed site for the lake cuts into a hill, take the excavated dirt and build up the downhill side of the lake, thus increasing capacity.

At Day's club, they were able to do the whole job using just their own grounds crew. Although this saves the cost of using an outside contractor, he cautioned that at some clubs this could lead to neglect of regular course maintenance.

To illustrate his talk, Mr. Day showed slides that for practicality and sheer beauty would be hard to beat.

The last morning session was a Panel discussion entitled "Types of system—Economics." Alexander M. Radko, Eastern Director, USGA Green Section was Moderator, with Charles McCrea, Green Acres CC, Lawrenceville, N.J., and Ed

Hunter, Sprinkler Irrigation Association, Riverside, Calif., on the Panel.

To kick off the discussion, the panel first analysed an actual quotation for installation of a center line manual system or an automatic irrigation system dated January 1966. (To be analyzed in April GOLFDOM.) Interestingly enough the price differential is only \$26,000.

The panel pointed out that price alone should never be the sole consideration. For instance, in some parts of the country galvanized iron has only a life expectancy of three-four years, so plastic pipe in this case would actually be a better choice.

If you are undecided what system to install, said the panel, then it's best to pick a manual system. Later, you can always do what is necessary to convert it to a semi-automatic or automatic system, if this seems desirable.

Before deciding on a system, there are several important areas the club must probe: The amount of water to be supplied in inches per week; the total area to be covered; the hours available for watering; investigation of the different

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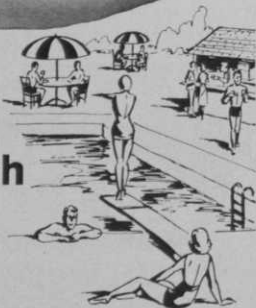
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## WATER STILL NEWS

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types of system available; the water distribution efficiency of the system, and the expected life of components, under local conditions.

Hunter pointed out that if members will allow sprinklers to operate during play, the period for watering will be longer than if they demand that watering be only done in non-play hours. This demand can sometimes reduce watering time to as little as seven hours per day.

Labor costs should not be the sole criterion for installing a fully automatic system, said McCrea. Night-time watering jobs are difficult to fill. The cost of maintaining a crew is often more than the pure labor cost alone. Much supervision is needed and this cost should not be overlooked.

Many clubs may be wondering whether to install an irrigation system with their own grounds crew or use an outside contractor. You have to remember, said Hunter, that the cost of the components of a system is much more than the cost of labor to install it.

A good contractor can buy components at a better price than can a golf club. He can install the system at a profit, and do it at a lower cost than can a club on its own. Don't be misled, Hunter cautioned, by contractors who say they can do the job at a very low price. It's best to limit bids to those few contractors who can do the job properly.

A good tip from McCrea was that the greens chairman should be allocated expenses expressly for the purpose of travelling to see irrigation systems installed at other clubs. He can then thoroughly brief himself on the problems he's likely to encounter, and avoid some of the mistakes they made at all phases in the operation.

The panel wound up its discussion with this advice: Don't try to be a system designer. Concern yourself with investigating and ascertaining what you expect out of the system—not what to put in. Leave that to designer.

After lunch came the presentation of the USGA Green Section Award. This year, H. Burton Musser was honored, being presented with the award by

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Clarence W. Benedict, of Greenwich, Conn., the USGA President, and Henry H. Russell, of Miami, Fla.

Prof. Musser, who retired in 1959 as Professor of Agronomy in the School of Agriculture of the Pennsylvania State University in 1959, was responsible for developing Pencross bentgrass, Pennlawn fescue and Penngift crown vetch.

Following the presentation, an interesting film on water movement in soils was shown. Layers of soil of various types were shown sandwiched between plates of glass. By means of time-lapse photography you could see how water moves through some types of soil faster than others. The film was prepared by Dr. Walter Gardner, Washington State University.

Next on the afternoon agenda came a panel discussion on "Comparison of types of system—Operation." William H. Benguefield, Western Director, USGA Green Section, was Moderator on this one, with the panel being; Herb Clark, Sprinkler Irrigation Association, Director, Fresno, Calif.; Carlyle Regele, Sprinkler Irrigation Association, Irrigation Engineer, Peoria, Ill., and Joe Lee, Golf Course Architect, Delray Beach, Fla.

Clark pointed out that a manual system is fine—as long as you have a good man on your greens staff who understands its operation. But it's difficult to do the job well otherwise. The reason why automatic systems are becoming so popular is the problem of getting competent labor. Another advantage of an automatic system is that it turns on the water the instant you want—manual systems take more than an hour to get going.

Joe Lee raised the question of water-logged traps. How could this problem be alleviated? By a new sprinkler head?

It's possible, replied Clark, that the irrigation industry would design a special sprinkler head, if the demand was high enough. However, he added that usually good drainage in the trap would take care of the problem. Regele concurred in this opinion.

In answer to a question from the floor, Herb Clark discussed a few things about

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sprinkler head design. A sprinkler, he said, is self-sufficient up to about 50% of its diameter of throw. Beyond that, it relies on overlapping coverage from adjoining sprinklers. He pointed out that the best type of sprinkler gave constant, even coverage up to 50% of the radius of its watering circle. Such a sprinkler could be spaced further apart than sprinklers whose efficient water coverage fell off rapidly as you went out from the sprinkler head.

The last session of the day was another panel discussion entitled "Engineering and Installation." Dr. Marvin H. Ferguson, Mid-Continent Director, USGA Green Section, was Moderator, with panel-members Austin Miller, Sprinkler Irrigation Association, Director, Royal Oak, Mich., Graham Daniel, Sprinkler Irrigation Association, Director, Athens, Ga., and James B. Moncrief, Agronomist, USGA Green Section.

It was the opinion of the panel that most of the trouble that comes from irrigation systems stems from overwater-

ing. They also suggested that a high capacity system is desirable, with from 800 to 1,000 gallons per minute being available.

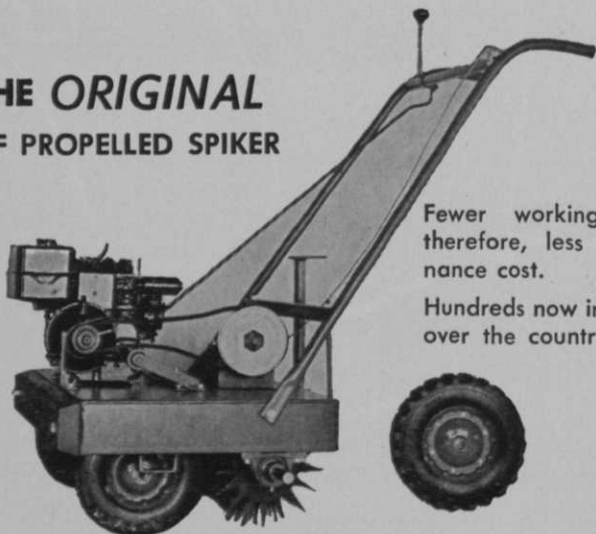
It takes three "must" groups to get a good design for a particular course: The greens chairman, the man who knows the economy of the club; the greens superintendent, the man who knows the course intimately, and what its watering needs are, and the engineer, the man who knows the performance of the system. Together, they can build a winner. Neglect any one of them—and rue the consequences.

Dr. Ferguson raised the question: If the designer, installer, and buyer of the components is one and the same man, how do you protect the club's interests?

After some discussion, the panel concurred in the opinion that in this area there could well develop a great role for the independent designer. He would then be in an analogous position to that of a golf course architect, who is charged with the responsibility of overseeing the work and seeing that it is done properly.

On this note the conference ended.

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