

average of .55 inches of water per day. For this time of the year in his area, the water use rate was only .2 inch per day. Since there are some unavoidable losses during any irrigation, he would, of course, have to apply more than the .2 inch per day. Assuming an irrigation efficiency of 75 per cent, and this is conservative, he should be applying about .25 inch per day. Actually in using 900,000 gallons per day he is applying more than twice as much as required. Yet he had some dry areas because he could not get uniform distribution of the water applied. To keep these dry spots green he was forced to apply much too much water over most of the course. Better irrigation equipment would have helped him save money and water.

Even in water-short desert areas you find golf courses using a great excess of water. (A color slide was shown of such a course where water was standing in numerous puddles and the grass just ahead of the irrigator was soggy from the previous irrigation). Excessive use of water in arid areas may in time produce a very serious problem - salinity. There are many examples of irrigation causing high ground water tables and in time a salty soil. When the ground water level is near the soil surface, water carrying salts rises to the surface. The water evaporates - leaving behind salt. (A color slide was shown of a field which looked good one year and was lost to salt the next year). I have seen on western golf courses some examples of rising water tables, accumulating salts and dying grass. This was occurring in one case alongside an unlined lagoon developed to enhance the beauty of the course. Unless steps are taken soon to prevent a further rise in water table, all will be lost to salt! In other courses consistent overirrigation is raising the water tables and with the water comes salt. These golf courses have tremendous investments which can easily be lost by nonsensical water management practices.

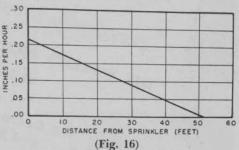
Up to this point we have been considering the "when" and "how much" questions: Of at least equal importance is the problem of "how to apply" the water. Time will not permit us to go into great detail, but I must call a few points to your attention.

Sprinkler manufacturers are doing their best to provide you with sprinkler patterns which will meet your needs. A typical sprinkler operated in one spot may give a distribution pattern as follows.



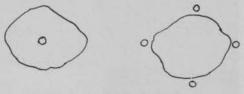
(Fig. 15)

With this sprinkler, most of the water falls near the sprinkler with less and less the greater the distance from the nozzles. Sprinklers can be obtained which apply a more nearly equal depth of water over the wetted area. These may be useful for certain situations, However, many sprinklers have a so-called "conical" pattern as shown in the following figure.



By properly overlapping the patterns of adjacent sprinklers, a nearly uniform precipitation over the wettest area can be obtained.

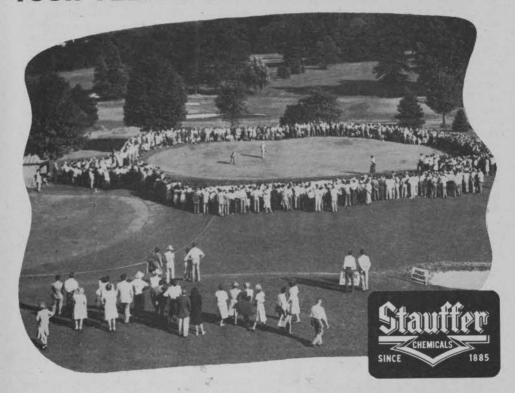
Time permits only a few short illustrations of serious water management problems built-in when sprinkler systems were installed. One of these is the green with just one sprinkler in the center. (Fig. 17). The sprinklers commonly plugged into this center spot will give the most water near the center and less and less toward the outside edge. The superintendent with this setup has a difficult problem. If he applies enough water to take care of the



(Figs. 17 and 18)

outside edge of the green, he is putting too much water on the center of the green. One way to solve this problem is to place three or four sprinklers around the edge of the green as sketched (Fig. 18) so that by proper overlap a more uniform applica-

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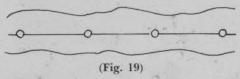
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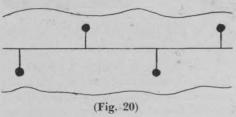
tion can be obtained over the entire green. This arrangement also has advantages in

windy situations.

Fairways present similar problems. There are many fairways which have a single line of sprinklers down the center. As with the greens, if enough water is applied to keep the edges of the fairway from drying up, the center strip is badly overwatered and often soggy. With this sort of a system, you have built-in trouble and there isn't much you can do to avoid wet centers and dry edges. This problem is generally not so serious in the humid parts of the country because the rain helps to overcome the lack of uniform water application during irrigations. But even in the humid area, this single line system always gives too much water along the middle of the fairway. In arid areas where one must depend almost entirely on irrigation for moisture, this system should not be used.

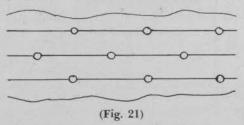


There are several types of layouts which will improve the uniformity of application on fairways. One is to run the center line down the fairway and then tee off short laterals to form a pattern like this.



Instead of having all the sprinklers in a line down the center, this gives an offset arrangement which helps to reach the edges and reduces water in the middle.

Another possibility is to run three lines and space the sprinklers in a staggered pattern along each line as sketched below.



Such a system, of course, costs more money. This three-line system with proper overlap gives good distribution across most of the fairway. It is an excellent system to use in an area where shifting winds are a problem. If the wind is blowing from the top in this sketch, you can operate only the top two lines; if the wind is from the bottom, operate only the two bottom lines. This gives you the flexibility you should have in any good sprinkler installation.

A brief comment about traveler sprinklers may be helpful. This is a very useful type of sprinkler, but the performance characteristics of travelers should be recognized in planning irrigation operations with them. With average nozzling and under typical operation speeds, they apply between .18 and .25 inch of water in a single pass. If the soil is dry, this shallow depth of water will wet a sandy soil only three inches deep, a loam about one and a half inches deep and a clay soil less than one inch. Unless more than one pass is used, the grass is given very little water to grow on, and it is no wonder that is is dry the next day or two thus requiring very frequent irrigations.

By sensible water management, I wish to suggest that we study our own situation and intelligently plan and carry out irrigation practices which will produce good turf at a minimum cost for water and labor. One can easily waste money, waste water and cause many turf problems either by applying too much water or by applying

too little water too often.

Let's be sensible in our water management. Avoid drying up the grass if we have water and equipment to prevent it. On the other hand, don't drown it out. Irrigation is carried out for the purpose of supply water to the grass.

Canadian Amateur

The 52nd Canadian Amateur Championship will be played at Edmundton (N. B.) GC Aug. 15-18 with qualifying rounds scheduled for the 13th and 14th. The field will be reduced to 64 qualifiers for the championship which will be at match play.

Amputee Tournament

The eighth annual Amputee Amateur tournament will be played Aug. 24-25 at Lake Shore Yacht and CC, Syracuse, N. Y. Entrants will play 36 holes in six divisions which are based on skill and age. Inquiries about the tournament should be addressed to Dale S. Bourisseau, secy., National Amputee Golf Assn., Solon Center Bldg., Solon, O.



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Turfgrass Questions Answered by Grau

If you've got a question you want Dr. Fred V. Grau to help you answer in this department, please address it to Gray Q&A, Golfdom, 407 S. Dearborn, Chicago 5, Ill.

INTEREST in grass and sod nurseries is on the increase. The need for nurseries is greater than ever before. It is encourag-

ing to find chmn. who encourage the supt. to provide good nursery areas for the club. A good nursery represents inexpensive insurance. It keeps club personnel ahead of the crowd on

The Nursery: Inexpensive Insurance

new grasses, new equipment and the effect

a new chemical has on grasses.

Area: Plant at least one full size putting green in two or more of the most promising grasses for your area. Plant at least one full size tee in tough grasses adapted to your area. Don't be afraid to try a new grass even though someone says it may not work. If you have not had first hand experience with it you can't honestly say whether or not it will succeed. But do not put water-loving grass right next to grass that will die if it gets too much-water. Keep complete control over the amount of water applied.

Soil preparation: Well drained soil is essential along with lime as needed to bring pH to about 6.5 to 7.0. Complete fertilizer to supply about 2 pounds each, N, P, K to 1,000 sq. ft. (equivalent to 20 pounds 10-10-10). Seedbed should be firm but capable of being loosened without becoming cloddy. Preplanting treatment is a must. You have a choice of Cyanamid or Dowfume, or perhaps one of the newer ones like Vapam or liquid Cyanamid. Freedom from weeds and contaminating grasses can reduce expenses and increase confidence in results.

Solid sod or rows of stolons (or sprigs): We suggest both so as to gain the fullest measure of information from trials. One sq. ft. of full bodied sod or nursery row stolons, pulled apart carefully by hand, can plant about 100 running (linear) ft. of nursery row, laying the sprigs or stolons about end-to-end. One bu. of sprigs or stolons should plant from 500 to 1,000 linear ft. of row, depending upon several

factors such as "plumpness" of the bu., care in planting, condition of material. One bu. should plant from 100 to 500 sq. ft. when material is pulled apart and scattered uniformly over the seed bed for solid sod such as in planting a stolon bent green. Fast growing, vigorous grasses need smaller quantities of planting material.

Management: No two grasses thrive under exactly the same management. Make an honest attempt to learn and study the MR (management requirement) of each grass and to provide what is most likely

to bring out the best in the grass.

Records: Don't let detailed notes rob the nursery project of the fun that's in it. At the same time, record enough information so that you will have an authentic background. Performance counts! During a season, you probably won't need many notes to know that one grass is easier to handle than another. When the conference chmn. asks you to present a paper, you'll be very glad to have notes ready.

Publicity: Let the rest of the club know about the nursery. It belongs to them. Encourage them to walk over the plots and to learn the grasses from the signs you put

Some nurseries are five acres in extent. Some of the most interesting nurseries are only a few hundred sq. ft. in size. A high level of maintenance is essential. Poorly kept plots are worse than none at all.

This may sound strange but I offer it at the risk of offending a few. Warm-season grasses (Bermudas, Zoysias) should be planted at the beginning of or during hot weather. Cool-season grasses are best planted in spring or fall. Fertilizers for maintenance should be applied during the active growing period of the grass and not dur-ing a dormant period. This is elementary but significant for planting of new grass for the first time.

Q. Will you please explain thoroughly what you mean by vertical mowing? (Mich.)

A. Reel-type and rotary mowers are designed to cut on a horizontal plane (parallel to the

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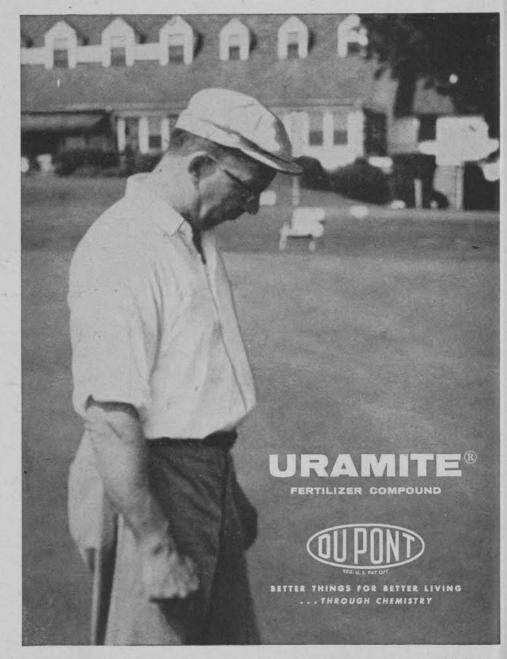
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soil surface). Grass that stands erect is cut off. Creeping grass and many other turfgrasses grow in such a way that many of their stems and leaves do not stand upright but are parallel to the ground. At first they develop what we know as "grain." Reel and rotary mowers can not cut these prostrate stems. They accumulate, causing the mower to continually ride higher on the developing thatch and mat.

Vertical mowers are built so that cutting blades revolve in a perpendicular (vertical or upright) plane - like a rolling wheel. Adjusting the height of the spinning blades in relation to the turf, they can be made to cut the flat blades and stems of grass at the surface, thus removing, at the source, much of the trouble (grain, thatch, mat, and accompanying trouble from diseases which flourish in the "moist incubator" of matted grass) that we find with creeping bent greens. Vertical mowing of greens need not be done more often than once a week or once every two weeks as compared to daily mowing with the greensmower. Use of the vertical mower actually improves the putting surface by removing unseen irregularities which destroy accuracy in putting. Development of vertical mowing ranks high on the list of accomplishments in turfgrass maintenance.

Q. Please explain the apparent difference in recommendations between 50 lbs. to 1,000 sq. ft, of Aero Cyanamide and 13 lbs. of calcium-cyanamide per cu. yd. of top dressing. Are these two different names for the same product?

A. Sometimes we become careless in use of familiar terms. The correct name of the product to which you refer is Aero Cyanamid Granular. The chemical symbol is CaCN₂ — calcium cyanamid. The rate of 50 lbs. (sometimes 75 lbs.) to 1,000 sq. ft. is recommended for treating the surface of seed beds prior to planting. The rate of 13 lbs. to a cu. yd. is recommended for killing weed seeds in compost or topdressing prior to use. Pamphlets on the best ways to use this material may be obtained from American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y.

Q. A large percentage of the grass on the greens at our course is composed of Poa Annua and Seaside bentgrass. Will the application of 10 lbs. of lead arsenate to 1,000 sq. ft. prevent germination of Seaside bent seed, both proposed to be used this fall on the greens? (N.J.)

A. Yes, the germination of bent seed will be affected and retarded if 10 lbs. of arsenate of lead are used at the time of seeding the bent. I assume that your intention probably is to retard germination of the Poa.

Seaside bent is not one of the best putting grasses in your area. I'm sure that if you stay with bent, Cohansey (C-7) will prove much more satisfactory. If you want a grass that will give maximum satisfaction throughout the summer with minimum care and will allow Poa to come in to give you winter color, you might devote some of your test nursery area