

growth materials below, binding them together into a carpet. So a completely weed-free turf is produced with roots intact and containing only the grass varieties sown. The water is drained off and the carpet of grass is rolled up ready for despatch. The measure of the impact of this new culture lies of course in the performance.

Lightness

Tana's first contribution is to take a lot of the uncertainty and hard work out of producing a first class playable sward. Tana units are light—less than a third of the weight of conventional turf. They are also much larger, coming in just over one yard wide by up to six yard long pieces. Being of uniform thickness, no boxing is required. Care of course should be taken with laying, but this only involves correct alignment as the units are unrolled, and the use of an adjacent wooden platform on which to stand. They should be lightly tamped down but preferably not rolled until the roots have anchored. To gain full advantage of fresh growth and active root growth the Tana units should be laid within two days of being lifted and transported from the production site. The speed and ease of laying enables you to measure jobs for completion in a very short time, so there should be few hold-ups for breaks in the weather once work is under way.

"If you suffer from bad compaction contact Gordon West (Auckland, N.Z.) who by elaborating on a Ted Lowen (Waikerie) system, shattered his clay pan and rattled Middlemore Hospital's windows.

Five holes 17' deep and 15' apart tamped with 5½ plugs of gelly each, not only relieved compaction but gave "porina" a bad case of shell shock".

**From the N.Z.G.G.A.
Newsletter No. 3**

LETTERS

Mr. D. DIX
"Greenkeeper Association"
Addington Court Golf Club
Featherbed Lane
Croydon—Surrey/England

Sehr geehrter Herr Dix !
Über Herrn Tom Bovington, Golf—
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In unserem Club ist die Stelle eines
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bereits einen englischen Clubsekretär
und wären gegebenenfalls bereit einen
versierten Greenkeeper einzustellen.

Bitte teilen Sie uns Namen und
Anschrift, sowie Gehaltsansprüche
evtl. Interessenten mit.

Mit vorzüglicher Hochachtung
Wolfgang Taegener
Spielführer

This means that there is a vacancy
for Head Greenkeeper at Berlin-
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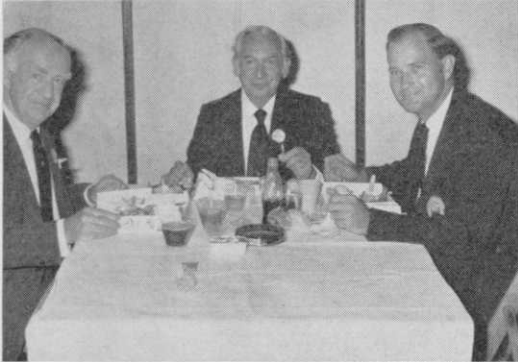
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| TEAM | 1 ST ROUND | | 2 ND ROUND | | TOTAL POINTS SCORED | POSITION |
|------------|-----------------------|---------------|-----------------------|---------------|---------------------|----------|
| | HOLE | POINTS SCORED | HOLE | POINTS SCORED | | |
| CANADA | 12 | 14 | 11 | 11 | 36 | 2 |
| IRE | 12 | 14 | 11 | 11 | 42 | 4 |
| ENGLAND | 10 | 16 | 11 | 11 | 41 | 5 |
| EUROPE | 13 | 13 | 11 | 11 | 37 | 7 |
| N. IRELAND | 16 | 11 | 11 | 11 | 41 | 6 |
| SCOTLAND | 13 | 13 | 11 | 11 | 49 | 1 |
| U.S.A. | 10 | 16 | 11 | 11 | 46 | 3 |
| WALES | 15 | 13 | 11 | 11 | 36 | 8 |



INTRODUCTION TO AUTOMATIC WATERING

R. W. SITWELL

Watermation

It is reputed that an expert on the care and maintenance of sports turf, when asked the question "How do you make grass grow?" replied, "wet it?". Appreciating that there are other factors governing the growing of grass, let us consider the need for water. It is a fact that to survive, any crop requires water in varying degrees in order that it may feed.

Accepting therefore that water is required, and on highly cultivated areas in quantities greater than those obtained from natural rainfall, there exists a need to water artificially.

Why therefore automatic watering?

To consider the advantages it is necessary to appreciate the water requirements of the area to be watered. These requirements will not only be dependent upon the nature of the soil but also on the climatic conditions which vary day to day as well as the natural contours of the ground.

How much ?

Taking these factors into account the amount of water to be applied weekly to maintain an average root depth of 9" on a golf green can vary from as much as 1" on a light sandy soil in a moderate climate to as little as $\frac{1}{2}$ " or less on a heavy soil. In hot climates these figures are increased whilst in a cold climate they decrease. Whilst charts are available in differing forms which will act as a guide, these do not take into account the construc-

tion of the area to be irrigated, i.e. drainage arrangements, and thus to a greater or lesser extent the precipitation required is a matter of trial and error. Taking all these factors into account and bearing in mind that each green may have a different drainage factor it is only with experience that the Greenkeeper will know how much water has to be applied to any particular green.

Having established that the application of water is a fairly precise exercise let us consider the alternatives to automatic watering.

Manual problems

Assuming water mains have been laid to each green, watering is accomplished by either portable sprinklers or by a man with a hose spraying the area almost ad lib. Taking the former, these are usually of the single or twin nozzle impact type and due to their relatively poor performance require moving two or more times in order to cover the whole area. Due to the increase in the popularity of golf, courses are now heavily played which of course means that when a golfer approaches a green that is being watered and the sprinkler is unattended, he will either move the sprinkler so that it does not interfere with his game, or turn it off altogether. More often than not on leaving the green the golfer forgets to replace or turn the sprinkler on again

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so that watering becomes entirely hit and miss. The alternative is to water at night when there are no golfers about but this involves the Greenkeeper being out on the course at all hours moving sprinklers, which from his point of view must become extremely inconvenient and from the Club's point of view extremely expensive. There are courses which adopt the policy of turning the sprinklers on last thing at night and turning them off again first thing in the morning but of course this means only part of the green is watered and in a lot of cases the green is virtually unplayable for a greater part of the following day, as far too much water has been laid resulting in flooding.

Wastage

Considering therefore the use of portable sprinklers it is quite apparent that the unauthorised movement and turning off and on of sprinklers results in uneven, as well as under and over watering, the former and latter possibly causing disease, whilst the third leads to shallow root depth and weak grass. Apart from the natural aggravation for the Greenkeeper, this will tend to result in loss of revenue to the Club as no golfer wants to play on bad greens and furthermore unnecessarily high water bills due to the obvious wastage. In addition the cost of labour charges has to be added but this is incalculable as the time involved will depend upon the layout of the course and therefore the distance between greens, the number of times the sprinkler needs to be moved which again will vary depending upon the strength and direction of the wind and the frequency of outside interference with the sprinklers. A further factor is the number of sprinklers which can be operated at any one time.

Pressures

On many such installations the sprinkler system is operated direct from the water company main which of course means that the golf course supply is being shared by the nearby town or village. As will therefore be appreciated the pressure will vary according to demand by other users and thus the watering time should be varied accordingly. In terms of figures a sprinkler with a 5/32" nozzle will put out 4 $\frac{3}{4}$ gpm at 60 p.s.i. but only 3 $\frac{3}{4}$ gpm at 40 p.s.i.; thus instead of applying 500 gallons per green in a given period of time only 400 will have been actually used; thus inadvertently under-watering.

The alternative to sprinkler usage is to employ a man to water the green with an open ended hose. This invariably means that unless the man is careful some areas are over watered whilst others are under watered. Also the heavy rate of application, which always exceeds the rate at which the ground is capable of absorbing the water, results in considerable run off as well as pools forming in all the low spots. This of course means that where the water gathers the area is over watered and susceptible to disease. The only advantage that hand watering has over sprinkler watering is that it ensures that the watering period is not interfered with by outside parties. However, when this is compared with the labour costs involved it is quickly appreciated that it is a luxury that cannot be justified financially and even if the finance is available, the shortage of suitable man power which can be spared from other work quickly over-rides the financial availability.

Evaporation

In addition to the foregoing it must be borne in mind that there is in this country an urgent need to ensure that

Continued on page 19

Quick-change artist

The Ransomes-Hahn Tournament Triplex is a remarkable machine — so remarkable that we call it the world's first Greens Management System. The Tournament Triplex is a 12hp vehicle with hydrostatic drive, which powers four separate turf maintaining operations.

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Utility Units Heavy-duty cutting cylinders and bottom blades for approach and tee mowing. Grass catchers provided with all units.

Verti-cut Units Patented twin offset blades remove 'thatch', keep greens in play even in difficult conditions.

Vibra-Spiker Now spiking takes even less time than greensmowing. High-frequency vibration penetrates to a depth of 1½" with a minimum of compaction. The combination of this unique quick-change unit feature, full 67" swath for every operation, variable-speed units and individual unit lifts make the Tournament Triplex an investment which no club can ignore. Your local Distributor is keen to impress you with a demonstration. Give him a call.

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RANSOMES

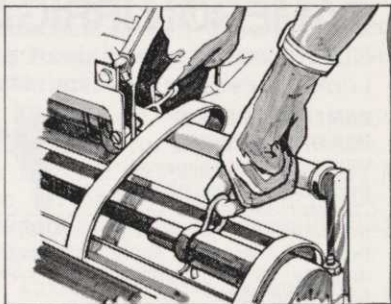


Ransomes-Hahn Tournament Triplex



Ransomes-Hahn Tournament Triplex

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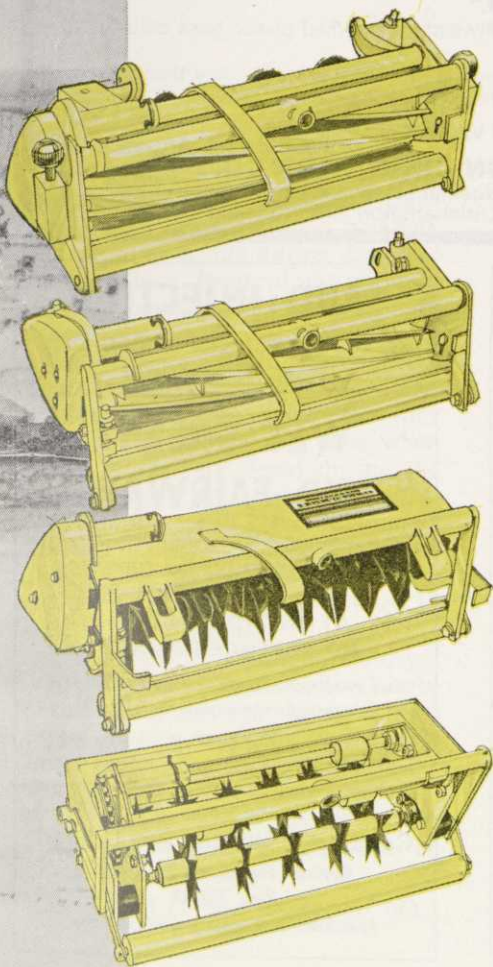
Tournament Triplex Verti-Cut Units

Verti-Cut units use durable, yet thin offset blades to remove thatch and grain as they begin to form. With 67" of cut (the Verti-Cut units are the same width, work at the same speed, and use the same grass catchers as the greens and utility units) and a riding vehicle, these attachments are ideal for preventing the development of thatch etc., lessening the need to take greens out of play for renovation. Variable-speed cylinder drives provide high tip-velocity even at low forward speeds.

Tournament Triplex Vibra-Spiker

Vibra-Spiker reels use gentle high-frequency vibration to achieve deep penetration, without excessive weight, even when ground is hard and dry. Spiking (summer aeration) provides root pruning and moisture absorption, relieves surface compaction, and conserves fertilizers and fungicides by getting them immediately to the root zone. Full 67" swathe and Triplex speed make spiking a task that now takes even less time than greensmowing. Spiker penetrates to depth of 14".

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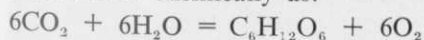
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we conserve our water resources. Manual watering, be it by sprinkler or hand, in the main means watering by day, during which time losses in evaporation and transpiration are taking place. Depending upon the area temperature, the humidity and wind, the rate of evaporation can be extremely high. It is not possible to calculate the rate of evaporation but at times it is believed to be as high as 25 or 30%. This means that for every 1000 gallons which passes through the meter, 250 or 300 gallons are lost to the atmosphere. Evaporation also takes place at night but the rate is negligible.

Other Losses

Transpiration is another loss which has to be taken into account. The word is derived from the latin trans (over, across) + spirare (to breathe). Transpiration occurs during day time hours. It is a form of evaporation from the plant itself. As warm, dry air passes across the leaf surface water in the leaf evaporates off through the pores. Although these pores open and close, observation has shown that they are open during the day time when the air is dry but closed during the night when the air is moist. Transpiration can be extremely high—example. A mature apple tree of the Grimes Golden variety are known to lose water at the rate of 15 litres per tree per hour.

A final loss is through photosynthesis which simplified is the absorption of water through the roots plus carbon dioxide from the air to form carbohydrates (or simply sugar) in the leaves with oxygen being given off. As the name implies photosynthesis is a function of light and can be summarized chemically as:—



Summary

Day time watering results in high evaporation losses, high transpiration losses, wasted water due to outside interference, over, under and uneven watering, leading to disease and weak grass and high labour costs.

Night time watering by manual means involves high labour costs, or in the case of sprinklers that are left on all night, wasted water due to puddling, uneven and partially sodden greens.

Taking all these factors into account there is obviously a strong case for automatic watering providing that it can meet the following basic principles:

- (1) It gives even coverage.
- (2) It operates during night time hours.
- (3) It is reliable.
- (4) It is correctly applied.

Design and Manufacture of Equipment

Before considering the different designs of turf watering sprinklers let us consider the aims to be achieved.

- (1) The sprinkler shall be reliable.
- (2) It shall give even coverage.
- (3) It shall be robust.
- (4) It shall be manufactured from non corrodible materials.
- (5) Where segment or part circle sprinklers are used it shall have an arc which is easily adjustable to suit the particular configuration of the turf to be watered.

Continued on page 23

NEWS

The Telford Course at Sutton Hill will vary from 5,550 yards for ladies to just over 7,000 yards for top tournament play. Estimated maximum capacity is put at 70,000 rounds a year with an average of about 28,000 in the early stages.

Seafeld Nurseries (Cullen) Ltd., of Cullen, Banffshire are the contractors.

The Head Greenkeeper for Telford's first new golf course in East Shropshire will be Derek Keen (27) of Baystone Hill, Shrewsbury.

Derek is at present head greenkeeper at Shrewsbury Golf Club, an appointment he gained when their new course at Conover was under construction.

He will have a similar role at Telford where the daily fee course is

under construction. It is the first of its type in any British new town and one of several courses planned to cater for Telford as it grows to a population of 225,000 people by 1991.

Derek takes over in March. The course is expected to be ready for play in the spring of 1975. He has been in golf course maintenance for the last 12 years—as an apprentice at Maidenhead, then as assistant greenkeeper at Chesham & Leyhill and Ellesborough in Buckinghamshire.

He is a member of the British Golf Greenkeepers' Association. His handicap is 12 and he is a member of Church Stretton Golf Club. A married man, he plans to move soon to live in Telford.

Flymo Limited at Watford has announced agreement for new production facilities in a 15,000 sq. ft. factory and research complex near Darlington, Co. Durham.



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