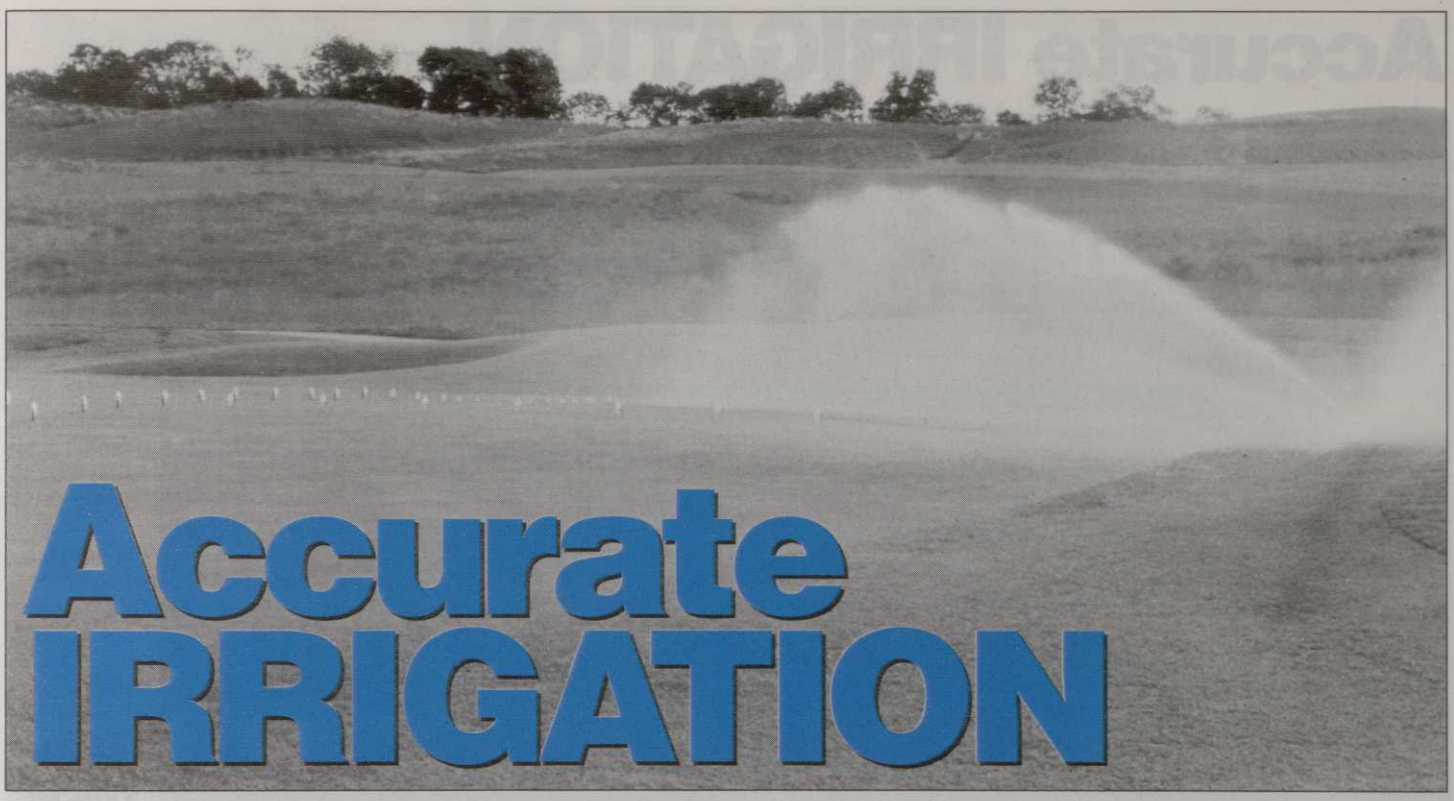


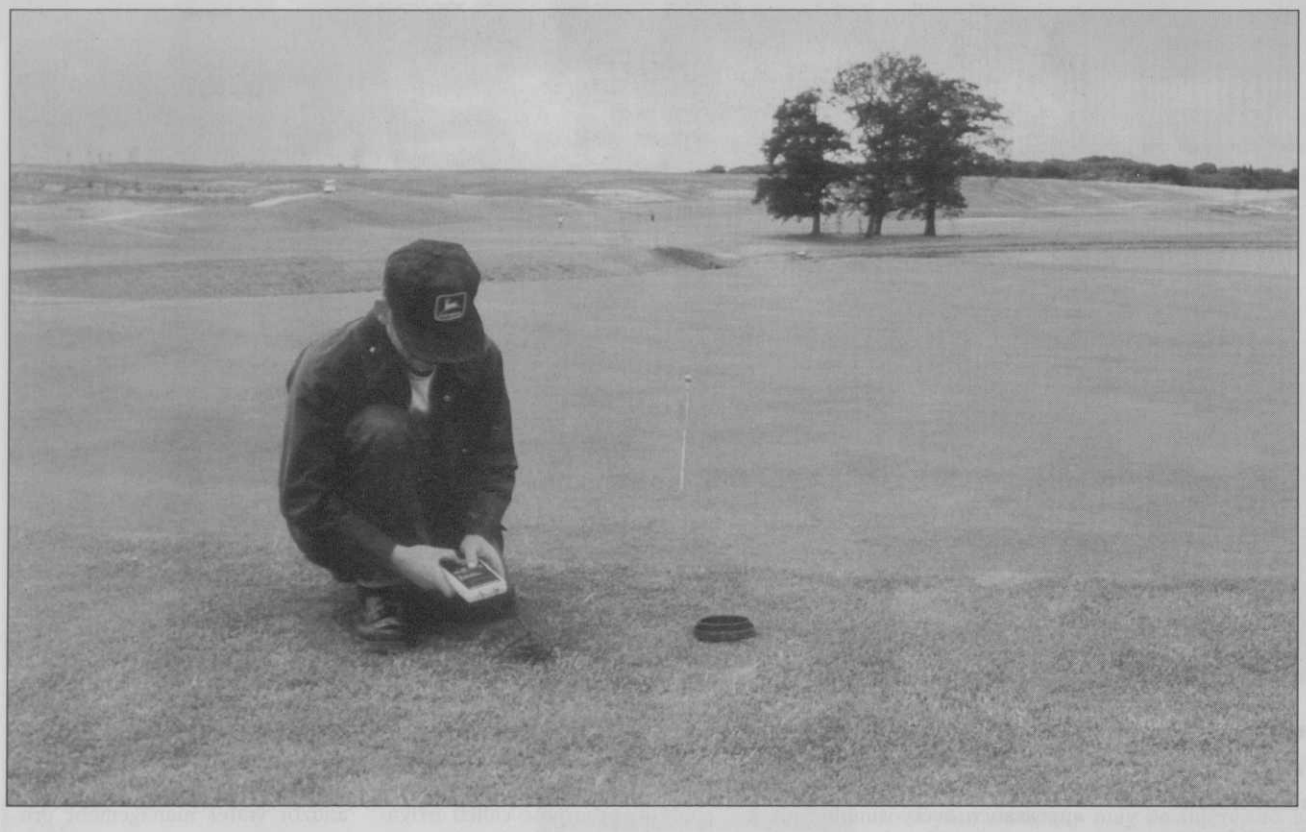
Accurate IRRIGATION

Turf scientist COLIN SAINSBURY advocates an irrigation system which will put the thorny issue of water use well and truly in its place

Irrigation is one of the more notorious subjects in greenkeeping literature, with the appearance every summer of a number of articles about irrigation equipment and maintenance, water quality and conservation and so on – all of which fail to address the main concern of greenkeepers, namely how much water to apply and how often to apply it, otherwise called irrigation scheduling. Further, it seems to me that many commentators highlight overwatering as the source of numerous greenkeeping problems, whilst failing to substantiate their views with provision of any concrete figures and/or water management programmes.

At the London Golf Club we have undertaken a programme of research that encompasses ➡ 38

Accurate IRRIGATION



Taking readings, two or three times a week, with a meter, plus thermometer placed at 6" depth in the green

37 ➡ sprinkler performance, water use and monitoring, storage and catchment management, all of which are designed to use the system as efficiently as possible whilst obtaining the best agronomic results.

Despite strong efforts at self regulation of standards through the BTLIA, it would appear to me that the irrigation industry still has problems in ensuring that system designs will translate into properly working systems in the field, by this I mean the evenness of coverage across the surface, regardless of the brand of product.

I think there are two reasons for this. The first is that far too much reliance is put on manufacturers' statements regarding sprinkler performance, tests which are conducted in enclosed rooms using single non-moving heads. In reality the application rates can be badly distorted, even on a night when the conditions approach dead calm (<3 MPH).

The second reason is that because of several underlying factors the cost of good irrigation systems are very expensive when compared with the USA and Australia. The result is that many clubs are forced to accept inferior systems which still require extensive hand watering to make good the inadequacy of say a £50,000 green and tee system. As a clear case of this, on the installation at this course the club saved over £30,000 by purchasing the equivalent quantity of a higher class of pipe from the U.S., rather than using that which was available from suppliers in Britain.

Irrigation precipitation rates for May, June and early July

	GREENS	TEES	FAIRWAY	APPROACH	NIGHTLY TOTAL
Original design estimate (mm)	4.0	3.0	2.5	3.0	1181m³ (260,000 gallons)
Peak demand 23.06–08.07 (mm)	2.8	2.3	2.0	2.5	940m³ (207,000 gallons)
Average May–June (mm)	1.7	1.2	1.0	1.2	479m³ (106,000 gallons)

At the London Golf Club we have established a programme that will determine the performance of the Rainbird heads presently installed, as well as testing other major brands under various windspeeds, pressures and patterns of placement, this in order that we may be as well informed as possible about future purchases.

To monitor our water demand we use a simple weather station, the main elements of which are a home-made evaporation pan and soil thermometers. The use of the first is obvious, but the thermometer is also fairly useful because a moist soil will be roughly the same temperature as the air, whilst dry soils or excessively wet soils will be several degrees cooler.

To provide feedback on the accuracy of our watering applications we have installed a gypsum resistance block (cost £8) into every green at a depth of 6"-7". Any resistance meter can then be used, with a little self calibration, to determine the range of readings, e.g. from dry to field capacity.

With this background work completed we have begun to use estimates of the percentage of evaporation from the pan to determine the sprinkler run times. After some initial over-watering, we had the best possible test of water demand during the hot, windy and dry period from 23 June–8 July, a period which was finally broken with 10mm of rain on 9 July.

To illustrate our water use, it is worth comparing the figures provided by the engineer (Rainbird Europe) in the design of our system, figures which I see as fairly typical of those provided by irrigation installers for use in southern and eastern England.

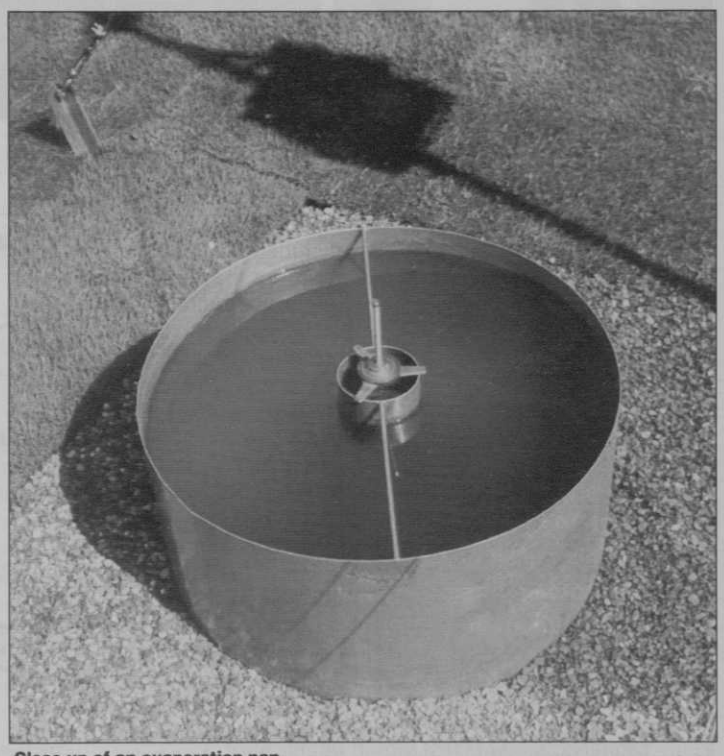
During the highest demand period we applied 44.8mm of water on the greens against a total measured evaporation of 106.3mm, a ratio of 0.42. We can confirm that this amount of water seemed sufficient because the greens continued to maintain

their colour and vigour, and the moisture cores gave consistent readings, showing that water was not accumulating. These particular greens are of a bent/fescue mix on a USGA rootzone mix. They have been established for nine months, with good root density observed at six to eight inches.

During the peak demand period mentioned the greens were cut three times per week at 6mm with the weight of cuttings averaging 22lbs/cut over 650m^2 of green surface.

Looking at the table again, two other important issues are thrown into the spotlight. The estimated run time for our irrigation system to apply the engineer's demand figures is ten hours and this is similar to many green/tee and approach system run times in Britain. However, our highest demand figures would shave several hours off the irrigation cycle, resulting in more time being available for surface water to percolate to depth and thus reduce the risk of compaction from machinery as well as lowering the effect on play.

The other issue is obviously the amount of water used. The average water use figures are less than half the estimated water use on which both our own and many other water storages are planned. This affects cost (and also the feasibility that projects can go ahead) because of this perceived limitation of water supply.



Close up of an evaporation pan

By next summer our greens should occupy the full depth of rootzone, i.e. 0.3m, though it remains to be seen how the lower demand of deep roots and lower cutting heights will be offset by the increase in water demand brought about by play.

Moreover we will see how well the turf stands up against a watering programme based on an application every third day, which is the practical compromise between the need to water long enough to re-charge the whole rootzone, whilst not leaving the surface too saturated.

The hot, dry periods of the past four years have confirmed my belief that no course is sustainable without an irrigation system, and it is timely then to suggest that the greenkeeping industry should really examine the issue of water use and finally put the sabre rattlers with their empty comments to rest.

I also believe that the skills requirement of greenkeepers should be further extended to include the installation, repair and operation of the sort of greens, tees and approach irrigation systems most common to British courses.

● The author, Australian turf scientist Colin Sainsbury, B.Sc., is responsible for the test laboratory facilities at the new Jack Nicklaus designed London Golf Club in Kent.

Installed: a moisture core in the green