



Lined up for a great debate: The second day forum

Donald Steel made this plea during the Architect's Conference at Wentworth

“We need to help greenkeepers and committees preserve golf courses in the traditional manner.”

That was the clarion call of respected golf course architect, Donald Steel, at the at the Silver Jubilee Conference, sponsored by Barenbrug, of the British Institute of Golf Course Architects held at The Wentworth Club last month.

“Heavy handed fairway irrigation alters the terrain. Everyone should be aware of the problems of fairway irrigation,” he said.

“The phrase ‘beautifully lush’ is one which grates and colour is no guarantee of quality. You must remember that a watered course is a longer course which is not what the members want,” he told delegates.

He called for law makers to provide help for greenkeepers and committees by giving a stronger lead when it came to controlling the ball and the clubs.

USGA Guidelines

Another issue discussed at the conference was that of USGA guidelines on green construction with Jim Moore, of the USGA, stressing that they where not actually “specs” but guidelines.

“We are often asked why do we change the guidelines. Well we are always looking for weaknesses in the guidelines so we can amend them. We learn and change rather than decide that we are perfect and not change it.”

He revealed that most clubs which claim to have USGA greens do not, in fact, meet the guidelines and he said that they would like to drop hydraulic conductivity from the guidelines.

More New Courses

The boom in golf can be reflected by the fact that over 1,000 golf courses will open worldwide in 1996 – the greatest number in history – revealed Geoffrey Cor-

‘Let’s get back to traditional links’

nish, a highly regarded American architect.

With 503 of these opening in the States and the rest throughout the world it is good news for greenkeepers looking for future career opportunities. It has also, as Jim Moore explained, created a new profession – the Grow In Superintendent, who spends six months on a course before moving on to his next project.

On the same theme Hamilton Stutt, who can recall travelling to golf courses as a youngster in the back of a car with his father and James Braid, said that he always encouraged owners to appoint the future Head Greenkeeper at

the start of the construction work so he could act as the Clerk of Works and feel a part of the team right from the beginning.

Another point which was raised was the need for Post Construction Manuals so everyone can be made aware of the materials which were used during construction and therefore what is required to maintain greens etc. It would be particularly useful in continental Europe.

Fungicide Bans

BIGCA Associate Member Tom Mackenzie, predicted that within 10 years fungicides would be banned and fertilisers and water

rationed and that change is going to be forced on the committee.

“Architects are going to be required to design courses to be played under the conditions which prevail if this does happen,” he explained.

This would involve designing greens to accept the running shots which will be need to succeed in the firm fast conditions.

Presentation

Hamilton Stutt, Peter Harradine on behalf of his father Donald Harradine, who died a week before the Conference, Eddie Hackett, Geoffrey Cornish and Dr Martin Hawtree on behalf of his father Fred Hawtree were all presented with Gold Medals by the Institute in recognition of the work they had done.

New Federation

A Federation of European Golf Course Architects was formed during the Conference with the coming together of the three professional organisations in golf course design in Europe.

AGFA, BIGCA and ESGA formalised their relationship in the formation of the Federation to progress towards a single voice in the European Golf market.

Representing almost 100 architects in practice the Federation will lobby on matters such as ecology, safety planning, education and so on to governments and administrative organisations.



Signing papers to establish the Federation of European Golf Course Architects

A blending of the seasons

November – dark mornings, frozen locks, flat batteries, solid white ground, numb feet, wet gloves, diesel soaked fires, steaming trousers, grey gloom, dirty oil drums with thin ice floating on top, cold, bright moon shining through the bare trees.

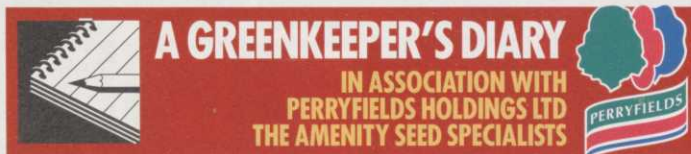
Is my mind playing tricks or were Novembers really like that? I can recall one when it was impossible to move the hole for three weeks but now it seems that I am unlucky if a frost lasts more than three hours. On checking my 1994 and 1995 diaries I find no mention of temporary greens. Instead it reads mowing fairways once a week, 14mm. Fairways! – November! – 14mm! I remember when my gang mowers used to go down to the council yard in October and would not be seen again until April. It seems that the seasons no longer obey their cosmic laws. They have not so much shifted as become fuzzy at the edges. It is difficult to tell where one starts and another begins. Autumn could last well past Christmas and spring can simply not happen at all.

So, what about November this year? The only thing for certain is that I will have a plan and I will have a contingency plan, for who can tell?

ROUTINE MAINTENANCE

The single most important operation I do all year is spray for worms. On our ground it is essential. I will spray Carben-dazim to greens, tees surrounds and walk routes. Worst fairways will also be treated. I try to do this as late as possible so that one dose will last all winter and so be more cost effective. Any areas that are heavily infested are sprayed earlier and so may require another hit. When the costs for worm killing were prohibitive I used to spray one run around each green, the walk routes and the winter tees and greens. Since doing one run only up the middle of a worm ridden fairway I now have no trouble getting the necessary funding.

Aeration in November consists entirely of slitting. I do all areas as often as I can which is never as often as I would like nor is it ever enough. I use nine inch knife tines on fairways, walk routes, tees and approaches, six inch knife tines on greens. I prefer these tines as they leave comparatively small surface slit yet open up much more area underground for gaseous exchange, drainage and root development. If ground conditions restrict aeration I concentrate all efforts on walk routes. I would rather do these three times than the fairways once so targeting the slitting on the most compacted ground.



Troublesome diseases are usually dealt with by using a full dose rate of Carben-dazim which means that those greens treated get their worm killing for free. Should Take-All or Anthracnose threaten I dash for the Chlorothalonil which does seem to have some suppressing effect. I once tried to tough it out with Anthracnose and refused to spray. It was like sparing with Mike Tyson – a brave but painful experience not to be recommended.

As you would expect mowing heights on all areas are now a few mms above summer levels with one exception of green surrounds. Varying growth rates of different species in winter can leave them scruffy if left to their own devices so I cut down to 25mm to leave a more open, even and tidy surface during the winter.

One of the most important jobs at this time of year is traffic management. I ban all heavy vehicles from the course when the ground conditions dictate. It is not a good idea to trundle tractors about when you are about to announce the first trolley ban of the year. I have tried various methods to guide golfers over different routes; post and rope, post and chain, hoops and signs of all descriptions but nothing works as well as the humble white plastic strip. It does not rust, rot nor need painting and does not interfere with maintenance operations. It is not obtrusive on the eye and best of all it actually works.

Above ground items are invariably moved by golfers thus leaving a gap for all to trample through. The plastic strip is not movable and seems to throw up an invisible wall which is powerful enough to overcome the physiology of the golfer. I put 30cm strips at three metre spacings right across the front and up both sides of each green to push traffic wider than the normal summer route.

PRESENTATION

Without the pressure of all out mowing, course presentation takes a high priority. Bunkers are kept edged,

paths hoed and trimmed up. All areas are brushed, blown and raked free of leaves. I tour the course to check the condition of course furniture. This immediately improves the look of the course and hurries up the process of replacement. Any unsightly areas which are due for repair that winter I mark GUR straight away. This has the effect of turning a scruffy cause for complaint into an ongoing upgrading of course standards.

I apply soluble iron at 14 to 18 kg/ha to greens, approaches fairways and tees. This helps improve winter colour while aiding the fight against disease and worms. I try to hand mow the greens at least once a week to present well during the winter months. After a dose of iron I might double hand mow the putting green and first tee or choose a short fairway and double cut with the tee triple, hand mow the tee and the green stripe up the rough with a chain har-

row or brush.

The idea behind this short lived Augusta syndrome on one or two holes is not to show that we can stripe with the best of them or to improve turf conditions nor even to try to increase resources so that we could achieve this all year round. I do it to show members that we can be plain one day and stripy the next but turf conditions have not changed.

No matter how much I dislike the superficial nature of striping I have to admit there is something undeniably alluring about it. However it can so easily be flatter to deceive. Having demonstrated this fact to golfers I hope that they will be more understanding of the need to produce quality year round surfaces and less enamoured by here today gone tomorrow stripes.

COURSE DEVELOPMENT

There is always a progressive construction programme to improve the facilities offered by the club. Having just read Bob Maibusch's article for October our improvements seem modest in the extreme but I suspect

they are more in line with the average club over here. I intend to refurbish those greenside bunker faces which have suffered in the past two very dry years. I will dig out and completely rebuild the faces so that any sand build up is removed and the finished bunkers move back from the greens to leave a wider traffic route for mowers between bunker and green.

Two or three tees which have had add-ons over the years will be lifted, cultivated and re-turfed to provide a level stance. I use big roll turf for all but the smallest jobs. The time saved by this considerable and will be put to good use installing paths as necessary and carrying out some small scale tree planting schemes. There will be hopefully be some time to move tee irrigation from the middles to the sides of some tees as part of an upgrading scheme.

MANAGEMENT

As the manager I will be busily communicating with the Club and members at all opportunities. I will be publishing Course News updates and there is a message on the answer phone and notices by the 1st tee every day to give news about the course, temporary greens, trolley bans and tee bookings. There is also a monthly report to the committee which is circulated to all the staff so they too are kept informed of the business of the club.

Like all Course Managers I know that my staff are my biggest asset. November is the month I hold our annual appraisal interviews where we discuss individually their aspirations and review their agreed development programme. Of all the meetings I attend during the year these are the most important. A great deal of time and resources goes into preparation for and the delivery of outcomes of these interviews but the results are well worth it and I recommend them to all.

November of course means bonfires. I like nothing more than to stack up accumulated rubbish both physical and metaphorical and erase it from memory. A good clear out will make room for a more ordered and tidy approach and allow the mind to concentrate on a positive attitude to the future. Just around the corner is another year and everything is possible.



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AD REF 73

The chase after colour must cease

I have no wish to compound Alistair Connall's problems and indeed I make it a rule not to criticise unless I have seen matters for myself and although I am fully conversant with both background and events my intervention is on the basis that there is so much to learn from his comments, in general rather than particular terms, that my observations may draw attention to the revealed causes of the crisis.

Collingtree, established 1987, is hardly a new course. The long line of problems it has experienced follow, as night follows day, the decision of an inexperienced US "designer" to use "pure sand greens and Penncross". Both have been comprehensively condemned, often and specifically, by most of not all advisers – certainly by STRI and myself for years. "Unfortunately the predominant grass species is now annual meadow grass which seeds almost continually". Precisely! Any plant seeding "almost continually" is clearly under stress – nature's reaction to the threat of imminent death is to reproduce.

Sand only greens demand constant feeding with NPK and lime. This ensures total dominance of *Poa annua* in temperate climes. Failure to do so results in massive attacks of Take All Patch disease. This grass is the source of 90% of the problems in greenkeeping. Slow (seeding) putting surfaces follow – and encourage close mowing to try to collect the seed and speed up putting surfaces. Stressed grass responds for a limited period to this feeding but constant close mowing pushes even *Poa* beyond its limits of endurance.

"Symptoms seemed to indicate leaf spot"! This is never a significant disease – but the symptoms did indicate severe stress not disease. Fungicides would be counter-productive and ineffective. Allowing the cuttings to fly would ensure *Poa* dominance but it died instead – end of story. The stressful regime "caused *Poa* to complete its life cycle". Precisely! I am reminded of one club who told me they were concerned that their greens (*Poa*) were dying. "No, Sir you are killing them" was my reply – but gave them hope and they now have 50/50 *Poa/Agrostis* greens.

Finally we are told the grass is recovering (or regenerated) "proving that A.M.G can survive". It most certainly *can* recover – that is why it is so prevalent and such a persistent problem, especially in that it is

such a very poor winter grass.

What is the moral of this sorry tale? Where does the blame lie? Not with the greenkeeper dealing with a difficult situation of which he has no previous experience. There are virtually no good sand-only greens – and the one or two that are, are a tribute to the skill exercised in management.

Does it lie with advisers? Yes, but not in relation to the course, but to the principle. The expression "we gave them (in this case the European Tour) what they want", says it all.

The blame lies fairly and squarely on the shoulders of the professional Tour touting for "customers through turnstiles" and prostituting sound greenkeeping principles (of both construction and maintenance) to appeal alike to the great God television and ill-educated entry golfers.

All those spectator golfers who enthuse about "beautifully green" courses for summer tournaments will be the first to moan if as a result they are on temporaries for most of

the winter – when the Tour will be enjoying golf in warmer climes. If our traditional game is to survive and all year round golf remain feasible then this chase after colour – the "Augusta syndrome" – must stop.

Before dismissing me as some crotchety old Victor Meldrew of golf, think on! We have seen it all before (well, I have) in the '60s and '70s, when the feed and water brigade destroyed so many of our courses – and here we go again. If basic principles are ignored and sound management stopped eg by hotel managers, "because it might upset the guests" then nemesis will assuredly strike and strike again. Too many venues for televised golf fall far short of expectation for this to be mere coincidence. Failures are not acts of God, unfortunate accidents or due to previously unheard of diseases. They are the direct result of bad construction methods and bad subsequent management.

Jim Arthur

Taking an ecological view

I found the article entitled "The Buzz Never Stops at Wentworth" about Chris Kennedy – October *Greenkeeper International* – very interesting but felt that relating to heathland management the comment "some people say there shouldn't be any trees on a heathland golf course but I disagree" if taken literally could lead to the loss of heathland courses and their reversion to woodland.

Heathlands by definition are "open landscapes largely devoid of tree species, characterised by nutrient, poor acid soils and a domination of low growing shrubs, principally of the heath (*Ericaceae*) family, (*Culluna vulgaris*) being the most prominent species".

Management is the key to maintaining the heathlands, either naturally through grazing or via physical methods employed by man. These processes have continued over 4,000 years since the first forest clearances by our early farming ancestors depleted the nutrient status of these predominantly sand areas. Many species of wildlife have, over this period, become totally dependent upon the heathland conditions, several are of international importance ie

Red data species on the brink of extinction. Golf is contributing to the conservation of heathlands, helping to extend what is now a very fragmented resource.

The final straw leading to a further loss of our heathlands would be to stop management and let succession take its course. From an ecological viewpoint loss of heathland through tree regeneration and the reinstatement of woodland would not be the most appropriate conservation strategy. From a golf point of view, tree invasion will reduce the prestige and status of the heathland course, its strategic/playing quality whilst at the same time reducing the overall aesthetic contribution that the open heathland condition can offer.

Indeed, on so many courses where heather was once a dominant feature large areas of this attractive and penalising hazard have now already been lost.

Thus, whilst some trees are tolerable, and indeed necessary, on our heathland courses their potential for natural spread must be recognised and rigorously controlled.

R.S Taylor
STRI Ecologist

Value for money

I write to you to convey my thanks through your magazine firstly to Rod Clark of Vector Training and Ken Richardson BIGGA for running an excellent two day course in Computer Skills at Falkirk recently.

The training was first class and I and other members of the class gained excellent practical use of computers which I hope will become of great use in the future.

Secondly I would like to thank all contributors to the BIGGA Education and Development Fund for making these courses possible.

I would recommend any of these courses to anyone. Great value for money!

Thanks again.
Gordon I. McKie
St. Andrews

Times change

How times have changed. I was a Head Greenkeeper at two golf clubs for a number of years in the '70s. The frustration of lack of investment in machinery and the fact that the job was not being done to my satisfaction finally drove me out of the job, which I still think is the best job for any outdoor worker.

Recently, I started back at my local golf club as an assistant and was amazed and envious of the amount of equipment now available to the Greens Staff. With so much equipment on hand and double the staff when I was Head, the opportunity is there to do the job quicker and to do it better.

Unfortunately I was also amazed and dismayed at the frenetic and often obscure efforts to get certain jobs down in record times.

Golf courses are becoming very busy places, more and more people want to play this great game and any ideas of how to get the job done quicker is obviously very welcome. What I can't accept is the surrender of quality to quantity. There should be no compromise on presentation.

Name Supplied

Footnote

Re: Mr Jeffrey's problem "How do I tackle pearlwort?" in August's magazine. I have found on my lawn that by applying "Verdone" in dry conditions, then twisting your foot on the Pearlwort gets results.

C.C Moore
Budleigh Salterton, Devon

REAL WORLD TEST

Irrigation Equipment

GREENKEEPER INTERNATIONAL

Hugh Tilly looks at a range of irrigation equipment on the market.

Past seasons have put "automatic" irrigation to the forefront of most greenkeeper's minds and although there are still some, particularly on links courses, who believe that drying out is a natural phenomena which should be part of the game, most recognise that water is essential to maintaining a playable and attractive surface – not to mention sustaining the grass.

How far you go in irrigating depends upon a number of factors including any requirements for "a pretty course". The norm is for greens, tees and approaches to be watered, however some clubs have watering on specific banks and some surrounds while others have found a need for water on some or all fairways. One of the controlling factors in selecting an automatic irrigation system is the availability and cost of water, and while many clubs are still linked into mains water and thus pay through a meter there are a growing number which have installed a reservoir or borehole – and still pay. A valid point made by one Course Manager was that it was logic, even essential, to consider irrigation as an integral part of overall design – and to consider where the water would be sourced. Obviously the most satisfactory answer for the environment is to save winter rainfall, however, this needs a large reservoir which can be a major capital expense if the terrain is not water retentive. Boreholes are another option however often these cannot always be relied on to provide the volume required when it is most needed – much depends on the sub-strata. Which ever way you acquire water you will have to pay – the important point is that water should be sourced economically and reliably, this latter being as vital as the source itself.

While it was once common to find portable hose and sprinkler systems which connect to hydrants around the course, such systems are labour intensive and have become increasingly rare. Nevertheless most courses still find a need for some manual



The Oxfordshire's Martin Jones at their weather station

watering. Some fairways can be watered using travellers irrigators but these are only semi automatic and need good hydrant around the course. The most favoured system for today is fully automatic with an electronic controller to operate remote valves and pop-up sprinklers. Modern systems, and all in this survey, are of the pressure type which keep pressure in the line using a pressure vessel with a switch to activate a pump when pressure goes below a pre-determined minimum. Modifications can be used to improve response and control.

Perhaps the most important

factor for successful installation and operation is the ability of the designer and installer. There have been some horrendous tales of poor installation, of underground lines which are always failing, and of valves and pop-ups which jamb regularly, however, there are now several specialists who have the experience to "get it right" and to rectify the inevitable glitches fast and with minimum fuss. While most modern systems are very versatile, getting them set up to put water where you want it, when you want it and in the right amount is not always quick nor simple – especially as

most irrigation is carried on overnight. A growing body of opinion says that setting and operation of irrigation is a specialist task and perhaps a full time one – particularly in the early years of use. A mixture of imperial and metric units are used in this feature, usually those in most common use in irrigation. There are about 225 gallons in a cubic metre of water or 1000 litres.

The Oxfordshire Golf Club

Designed to championship standard by Rees Jones, the 18 hole Oxfordshire at Thame, this year hosted the Benson and Hedges International Open on the European Tour. It has irrigation installed by Turf Irrigation Services on all greens, tees and surrounds plus watering of part fairways as well as "feature roughs" and other important clubhouse turf. The installation was put in when the course was built – it opened in July '93, which enabled TIS to trench all pipework and control cabling. There are some 1400 individual sprinklers, all Toro gear driven pop-ups in five models, full or part circle, and spaced to water head to head – varying nozzle and model sizes ensures that output met the specification. Control is by a Toro Network 8000 with 46 satellite stations which operate the sprinklers and most have individual control. There are three pumps, of differing sizes from 25 to 60 hp to give it the ability to output up to about 1050 gals/min – and these are automatically selected to suit demand. What is radically different to many other systems is that the Oxfordshire has a weather station which provides input into the system. Course Manager, Martin Jones, says that it is most revealing how conditions can vary day by day. He, or the computer, uses an index of 'evaporation/transpiration' – (E/T) to assess water need and this can vary dramatically when objectively measured. He is totally convinced about the efficiency and effectiveness of this method and has altered his thinking to E/T rather than minutes of application.

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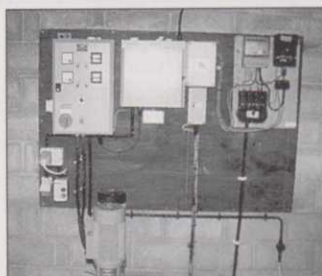


wind and slope as well as location and use are all fed into the computer – and these can be reprogrammed if they are altered. This programming was initially mainly done by the supplier, and it controls output from each head. Martin says that he does not think in terms of length of watering allowed as the program is based on E/T and automatically allows for these variables. The critical measurement used is millimetres/week which is processed to a specific formula to interact with the settings and demands of the Toro controller. The Network 8000 can be programmed to operate on daily, alternate, three day or weekly cycles and Martin programmes it to apply water as a percentage of the 'E/T' rate. He programmes sprinklers into four types according to location, i.e. greens, surrounds, tees, and other and normally applies from 35% to 48% of the E/T figure provided by the weather station. He commented that as a rough guide 40% is maintenance level while over 45% gives lush grass, when taken over a period. The controller has the ability to apply from 1% to 900% of set rate. Double normal rate – i.e. 80+% is used for watering in feeds etc.

Asked about the overall performance of the system Martin said he was very pleased with it, there is little maintenance required, it can be drained down with the existing drain points without needing compressed air to clear the lines and frost has not caused any damage to lines or sprinklers – the pump house and control electronics have automatic frost heating. And there have been very few stuck sprinklers.

The Oxfordshire takes all its irrigation water from two lakes which collect rainfall from the course – the entire course is drained, either with ditches or underdrains. These lakes have pvc linings – at the instance of the NRA – with clay on top and hold 200,000m³. Use in 1996 equalled about half of this. Location for the weather station is all important and the supplier provides some critical requirements which have to be met for it to give accurate and representative readings. On the Oxfordshire it is placed well away from trees or other disturb-

ing features, about 100m from the course manager's office which houses the controller. The lakes and pumps are some distance from the controller. Control cables carry 240 volts to the satellite stations which decode and relay 110 volts to individual valves. All pipework is uPVC with solvent welded joints and has been leek free – the few problems have been caused by subsequent ground settlement or heavy traffic over uncompacted ground.



Pump controls at Cumberwell Park

Cumberwell Park at Bradford on Avon

This new private parkland 18 hole course has an Ocmis designed irrigation system which Course Manager, Marc Haring, says performs extremely well with minimum problems. First opened in 1994 the irrigation was installed while the course was being built. Installing contractor was M J Abbott Ltd whom Marc praised highly. Reasons for deciding on an Ocmis installation was the use of MDPE – blue plastic – piping with screwed connections, price, a three year warranty overall and installation by Abbotts – who was a contractor already known from previous work carried out for the James family who own the land.

Water for the system is stored in a winterbourne brook-fed 12 million gallon lake situated on clay. Under half of this was used during each of the last two summers, furthermore such volume was replaced last autumn in a single week of rain. Irrigation is laid on to all greens, tees and approaches, it is supplied to four zones by two Grundfos CR8 pumps each with an 8.8m³/hr output (at 10.3 bar). All sprinklers are of the pop-up type, full or part circle, either Buckner impact heads on greens and

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approaches or Hunter gear driven on tees. In-head controls are used on greens and approaches, some of these having twin nozzles, while each tee has a single control. The actual sector can be set on all heads. Marc stated that greens at Cumberwell are relatively large and have, on average, four heads each, while approaches have two, and tees five or six. Hydrants for hose and a lake feed have been included in the specification and the controller has several spare outlets to make it easy to add to the system if necessary – Marc said that one green is to be extended this winter and so will utilise this expansion ability. The wall mounted CIC computer control operates the system in four zones. It can be linked into a P.C. at a later date and incorporates a small printer which Marc finds useful to give a hard copy of settings.

Programming the controller has proved to be quick and easy, Marc reckons that on average he now takes under five minutes per day. Experience has taught him how to tweak the system to maximum effect and while he did not criticise the manual provided, he did say that it took a little time to learn the jargon used. The volume delivered by each head can vary according to height and distance from the pump but this is easily compensated in programming by adjusting individual run times. Similarly other physical differences on each green, such as shade and exposure to wind can be corrected by actual run time. Some manual watering, with a hand held hose, is still carried out, perhaps ten hours a week, to correct areas of specific deficiency. Some of this need results from wind effect on sprinkler pattern, some from the inevitable difficulty of using circular pattern sprinklers – even if overlapped.

The system is decommissioned in autumn and recommissioned each spring initially by Ocmis, however the club will be drying out the system themselves this winter. Ocmis's engineers will still be used in the spring.

Very few problems have been experienced overall, there have been no leaks in the line and a minimum of head problems – the greatest number of problems

being wear on the impact drives, and sticking pop-ups close to bunkers when sand has got in. There have also been a few blown fuses. Frost damage has been limited to the outer castings on a few heads, but Marc thinks this was due to ground water seeping in. The course is on clay which forms the impermeable strata for the lake. Where heads have stuck they have been easy to spot, either due to the dew still being on the grass or by turf colour and growth.

Overall Marc said the system has been trouble free, and while past experience has led him to expect some problems he said the Ocmis system at Cumberwell has almost always gone through its cycle without trouble. Installation had been "very good" and Ocmis were "very helpful" were his summary words.

Canford Magna in Dorset

This course began as a 9 hole and has been extended to 36 in the past few years. It is variously laid over gravel or on silt over gravel in the Stour river flood plain and all greens are to USGA spec, thus drainage is exceptionally good. Course Manager, Trevor Smith, said he feels that it is essential to keep the root zone moist. The system was installed by Salisbury-based ISS and it now comprises of a computer (IBM) control running about 400 sprinklers through six zones. Water comes from a spring fed lake via three



Canford Magna's Trevor Smith

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Irrigation in action:
Watermation system at
Hankley Common

main Godwin pumps with a small pilot pump which is used to maintain pressure. The controller has recently been changed from the original ISS BBC "Aquaflow" to a new IBM 486 computer and "Aquaflow +" software. Change-over has not been entirely straightforward due to some misunderstandings and polarity mix ups which 'blew' several chips – ISS are sorting this out. The new controller will give the system almost infinite flexibility and being 'Windows 3.1' based will enable the operator to use a mouse to set all parameters more quickly and easily. Important features of the Aquaflow+ program include "global adjust" which allows the operator to alter the times on all heads by percentages from -50 to +100%. Producing new programs – or files or adjusting old ones is quick and easy by copying, modifying then re-naming – several files can be 'chained' together to operate consecutively. ISS says the new controller system was released in March 1996 and some 32 new systems or upgrades have been sold to date.

Pipework and the low voltage control cables were all trenched in, the pipes all being 6 m lengths of uPVC with solvent cement joints. All were protected by hand by the greenkeepers with a layer of sand over the top and Trevor said that the care with which this laying was carried out has ensured that there have been absolutely no problems – no bursts or leaks over three years.

Greens and approaches are watered by Toro 650s and 760s, adjustable part or full circle, gear driven pop-up sprinklers while all tees are irrigated by Hunter I31 ADS pop-ups, the latter having

proved to be easy to service and clean out. Trevor said that it was his belief that all greens and approach irrigators must be of the in-head control so that they can be individually set to allow for shade or wind variations etc. He said that it was also important that each green had a hydrant for hand watering.

Canford Magna is going to change its water source in the next winter from the spring fed lake currently used to a borehole fed lagoon. The main reason Trevor gave for needing this change was the high pH found in the spring water. The club has always worked in close consultation with the Environment Agency – previously NRA – and a significant factor in this has been that the River Stour bounds the lower course for a considerable part of its perimeter. There are also some 14 feature lakes on the land.

The club will also extend the system to include some fairway watering as it has found it necessary to use a bowser to apply water to the fairways in the two past summers. This will mean changing the present system from six zones to eight, however, the ISS system has sufficient flexibility built in that changing is not considered to pose any problems.

Use, last year, amounted to 8, million gallons, with a full summer irrigation cycle taking about 75 thousand gallons per night. Trevor said his aim is to apply the water as early as possible in the evening so that it has the maximum length of time to soak into the rootzone. He said the club is open throughout the year and has an expectation of putting some 60,000 rounds through each year

– thus keeping surfaces playable as a must.

Consideration was also given last year to installing a weather station, however this was deferred in preference to upgrading the controller. Trevor feels that a weather station is but another aid to the management of the course, but he still has to be convinced of its need. ISS believe that once installed he will give it increasing credence.

Hankley Common in Surrey

This 18 hole sandy heathland course on lower greensand had its first irrigation in the 1960s – installed by locally-based Watermation. Upgrading in 1971 put automatic irrigation on all greens while an 1991 upgrade resulted in tees and surrounds being included in the system. In 1995/6 the whole system was virtually reinstalled or refurbished with water on all fairways as well, a borehole feed and new controls and pumps. Prior to last year the club took all its water from the mains and last year only had a licence to extract 3 million gallons, which, said Course Manager, Ian McMillan, was insufficient. An abstraction application for 9 million gallons including summer use has now been sought and should mean independence from mains water supply. The specification with which the club went to tender included an ability to apply 21mm per week from 7 hr/day working. Some 16 hectares in total are now covered by irrigation from pop-up sprinklers.

Watermation won the contract for the last improvements and Ian admitted that the company's satisfactory past record and local

base, as well as the quote price, were important considerations. No details of the other bidders were given but it was intimated that there were about three and all were nationally known names.

The installation has mainly GR series pop-up impact heads, variously full or part circle, some 530 of them, which are mostly controlled in stations of 3 or 4 by two TW2/4 controllers operating two pumping stations with a total of five pumps. The overall system is divided into two (old and new) with three zones for fairways and two for greens and tees. Ian said Hankley Common opted, as an extra, for a radio remote control, this is interlinked to both controllers and enables him to operate any station from almost anywhere on the course. This facility, he has found to be invaluable as it allows him to check the functioning of any sprinkler or group of sprinklers as well as allowing him to water in feeds or fungicides etc. without his needing to stop or leave his vehicle – this not having to stand around was a major time saver. In particular it means that he can switch on or off as he drives around or as greens are fertilised.

All heads have the same nozzles, with variations in water delivery being made either by spacing or by run time. Full circle sprinklers are placed in parallel lines on either side of fairways to give full application to the fairway and this meant that they apply only 50% to semi-rough. The use of travelling irrigators for the fairways was considered but rejected as being too labour intensive.

Installation was undertaken by Watermation supervised by McMillan Shields in a strictly controlled schedule which allowed each hole to be closed for only two days. Pipework was all uPVC – in 6m lengths, solvent welded and then mole ploughed in – larger sections also having a mechanical ring to ensure water integrity. It was, Ian said, a very smooth operation. There have been no problems with installation and the only small problem, with the header tank, was painlessly sorted out by Watermation. The impact heads, the GR3 in particular, have been very



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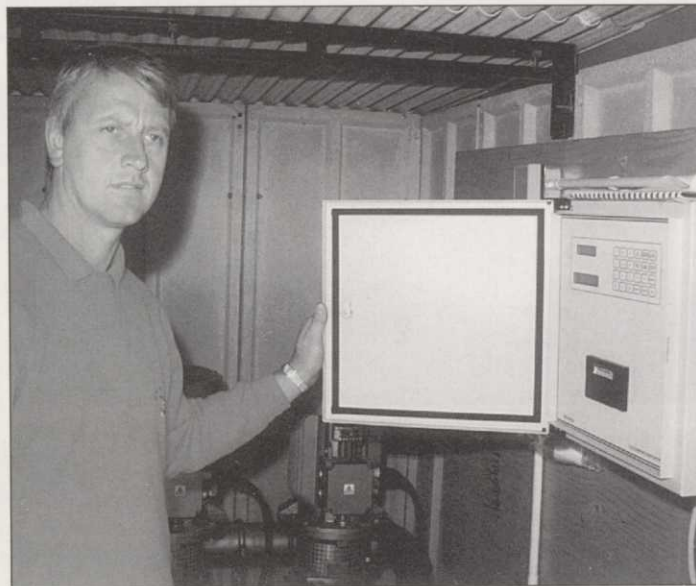
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Andrew Hall of St George's Hill

successful and easy to get out for maintenance, as has all maintenance and draining down.

The TW2/4 controllers have been found to be particularly user friendly and have a good level of diagnostic ability built-in. Programming is very easy and Ian insisted that all important documentation, i.e. user manual and maps, were encapsulated in plastic making them durable even if used with wet or dirty hands. As far as Ian was concerned user manuals are extremely easy to understand. He relies on traditional greenkeeping principles to judge when and how much water to apply and this includes a regular use of probes.

St George's Hill in Weybridge, Surrey

Superseding the original 1970s installation the club's latest system by British Overhead Irrigation Limited has three variable speed pumps, a Photron CIC4 controller, three zones covering the 27 holes and allows for the use of (three) self-travelling sprinklers – with a 200m cable. The heathland courses are extremely free draining however Head Greenkeeper, Andy Hall, uses wetting agent and Toro Hydroject aeration to ensure optimum use of water. This is particularly pertinent as all water is bought from the local water company and stored in a 21,000 gallon butyl lined above ground tank. A key-

stone policy is to keep the system simple, and Andy said this applies to programming the system. Nevertheless the CIC4 which superseded a CIC1 model is extremely flexible. Mr Gerry Wilkins of BOIL suggested perhaps more flexible than any greenkeeper is likely to need. CIC controllers are produced by a 'sister' company. The previous irrigation system only had a single zone and single phase pumps of limited output which meant that it was taking over 14 hours of watering "just to keep the course alive". While the original system was only designed to irrigate 18 greens the addition of 9 holes plus watering of tees (and some banks) called for a radical re-think. The new system has just completed its first season. The system is a constant pressure system, however a time clock maintains a lower pressure during the day and this is increased at night for irrigation. The design pressure is 9.23 kg/cm² – at the lowest point – at St George's Hill there is a variation of about 30m between top and bottom points in the system.

Typically each green has four heads, controlled in pairs, while approaches have three or four, and the tees have from four to six each. All are pop-up gear driven Hunter G600 or G650 heads, full or adjustable part circle. Fairways are covered by three BOIL travelling sprinklers each with an output of 1600 gallons per hour,

these take water from hydrants through 1in. flexible pipes. However, consideration is being given to about putting in a permanent pop-up system for some or all of the fairways. Virtually no hand watering is carried out.

The sophisticated pump control system allows any of the three Grundfos pumps to be set as the duty pump which maintains line pressure – and this can be operated at very low revolutions little more than tick-over so minimising electricity consumption. It is only when demand exceeds this pump's capacity that the other pumps are called in. The variable speed motor controller means that each motor soft starts, avoiding starting under full load and considerably reducing the sudden pressure stresses placed on the whole system but in particular on pipework.

A notable feature of the CIC4 controller is the "duration percentage" function which allows an overall percentage increase or decrease to be made to all watering times, without the need to alter individual settings. Pipework is uPVC solvent welded in sizes suitable to location, some 8 miles of it, and most was mole ploughed in. Ample flush out and drainage points were installed and any section is easy to isolate says Andy.

There were a few small teething problems, but no more than Andy was expecting and these were readily rectified by the supplier. Once the system was set up, fine tuning and operating proved to be quick and simple. Andy said that knowledge with the previous system made using the new one simple.

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