

**Bruce Reekie is the Environmental Co-ordinator for The Gleneagles Hotel. Here he explains the philosophy behind Gleneagles' approach to irrigation and water conservation and looks at possible future developments.**



# Water, water everywhere



Above: Rainfall, soil temperature, air temperature and wind speed all have to be taken into account before making a decision to irrigate. Here the irrigation system has been activated at the 9th on the Monarch Course. Photograph courtesy of Russell Kirk, Golflinks.

## Introduction

Throughout history irrigation has been used as a method of conveying water for crop cultivation during periods of drought.

This means that water has always commanded a high value both economically and environmentally. This is more pertinent than ever with increasing demand from the public, industry and golf courses for potable water (drinking quality water).

The large majority of the general public argue that the use of potable water for golf course irrigation is not a sustainable practice. Golf courses and the greenkeepers who maintain them can have only two responses to this:

1. Conserve and manage existing water resources.
2. Seek alternatives to potable water.

In many cases the requirement to irrigate has been driven by members' needs to have their local courses brought up to the standards seen on the clubhouse television.

However, a note of caution has to be introduced as the expectations and perceived benefits of an irrigation system can often lead to disastrous consequences. In many cases over watering and compaction of poorly drained soils has led to water logging, a factor in the increased occurrence of patch diseases such as Fusarium and Take-All.

The conservation and management of water, avoiding the above scenario, begins by defining the irrigation priorities relative to the course.

What are the priority areas on the course?

1. Greens and Collars
2. Tees
3. Approach Areas
4. Fairway Landing Zones
5. Other Fairway Areas
6. Out-Of-Play Areas

For example, only small areas of fairways may be susceptible to dryness during the summer months, therefore hand watering may be all that is necessary, rather than installing a full fairway irrigation system. The main

Right: Loch-an-Eerie, between the 13th and 14th holes on the Queen's Course at Gleneagles acts as a natural reservoir for the irrigation system

benefit of lower priority areas receiving little or no water is that it allows them to rejuvenate into original features of the course, therefore retaining the natural feel of the surrounding environment.

### Conservation of irrigation water

The main factors affecting irrigation and water management are:

1. Turfgrass species
2. Weather patterns and data
3. Drainage and cultural practices
4. Irrigation system efficiency

### Turfgrass Species

The tables below show grass species, their water requirements and their salt tolerance.

#### Weather patterns and data

Obviously, the weather has a major influence on the conservation of water supplies on golf courses. Therefore, carefully monitoring and predicting weather patterns can save both water and money.

Rainfall, soil temperature, air temperature and wind speed all have to be taken into account before making the decision to irrigate. This is a continuous day-to-day process through the summer months. Even in July in Northwest Europe 100mm of rain is not uncommon, and therefore natural irrigation is the best option.

To reduce the impact of evaporation losses, irrigation should be carried out

when soil and air temperatures are at their lowest. This can be done early in the morning or late at night with manual irrigation systems or a cycled programme through the night with an automatic control system.

The benefits of running an irrigation system on a cycle is that water can be applied at a rate which the soil can absorb it, rather than irrigating with one large flush and producing water-logged greens and tees. It also makes sense to delay irrigation when wind speeds are up as you are more likely to water your neighbour's crop or your cart path.

In the spring every year at Gleneagles water samples are taken from the main irrigation ponds and sent to a laboratory for testing. The main items that we look for in the analysis are:

1. pH
2. Nutrient Content
3. Sodium Content
4. Suspended Solids

A pH range of 6.0 - 7.5 allows for better availability of nutrients in general, but in particular this range allows favourable conditions for Nitrosomonas and Nitrobacter stimulation that transforms  $NH_4^+$  into  $NO_3^-$ .

The sodium content is an important factor when utilising effluent wastewater and will be discussed in greater detail later in the article.

The test results will also identify the presence of suspended solids and if they are found to be present they should be filtered out to avoid causing damage to pumping equipment, sprinkler heads and nozzles.

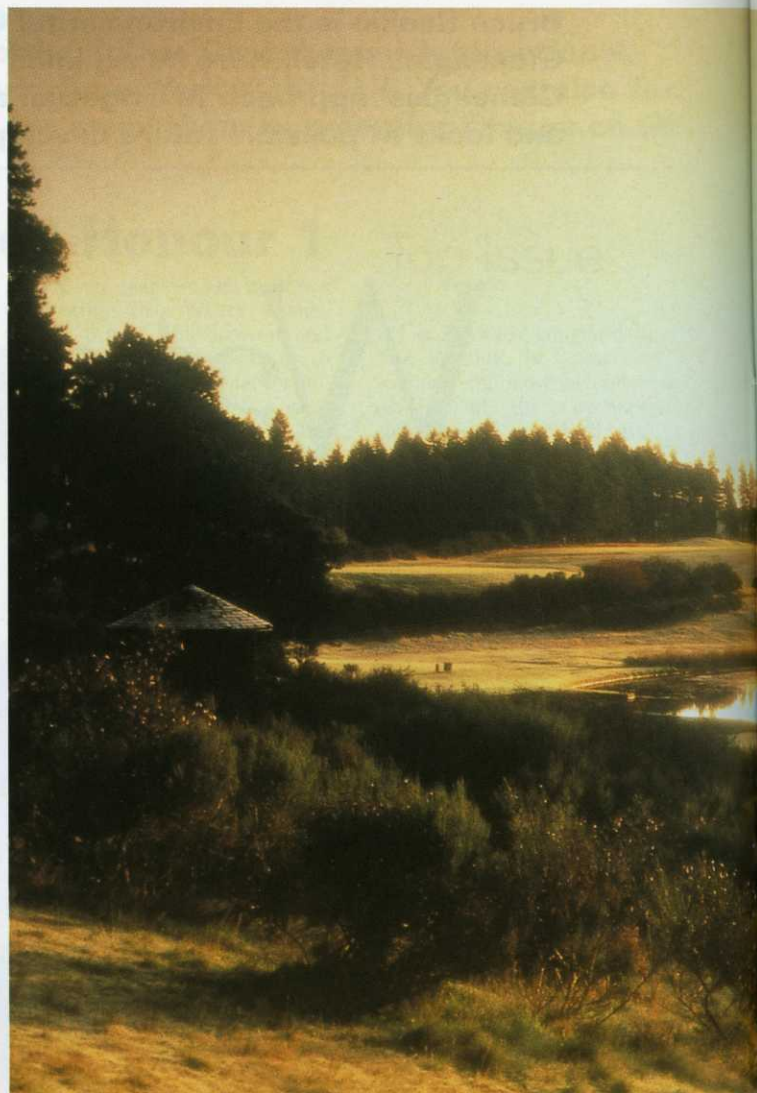
### Irrigation system efficiency

From October to March the majority of irrigation systems are shut down, the pipes are then drained and blown through with a compressor, which virtually eliminates the risk of frost damage.

In April, an external service engineer will carry out the start up of the system. This ensures the pump house systems are operating efficiently, that there are no leaks in the system and all sprinkler heads are operational.

A computer utilising irrigation software is the best way to ensure the efficient use of irrigation water on a golf course. Here at Gleneagles we have a Rain Bird system and my colleague, Scott Fenwick, Golf Maintenance Co-ordinator for Gleneagles' King's and Queen's Courses comments,

"Irrigation technology has made



massive advances in the last decade, especially with the introduction of ever more powerful personal computers and this has enabled sophisticated systems to be managed from a desktop environment. We have invested over £500,000 in our Rain Bird system and it has proved a most worthwhile investment. The flexibility of the software that includes the ability to upgrade through a range of control packages without the need for major retraining is a huge benefit. However, if we are to make this level of investment we must ensure that the greenkeeping teams know how to operate it effectively.

We recently attended a training day, organised by Rain Bird and held here at Gleneagles, that provided an introduction to their range of computerised control systems. The duties associated with golf course management are becoming more diverse and lifetime learning is now part of the culture. That's why this type of training session is so important to get the maximum benefit from our significant investment."

### Drainage and cultural practices

To ensure good water infiltration during the summer months, turf should be aerated during the spring months using hollow coring, verti-draining and tining.

Good cultural practices also help

reduce the risk of soil compaction and allow the plant roots to grow and take up water more efficiently. Wetting agents are utilised through the spring and summer months to provide good infiltration rates into the soil and to ensure that the water is retained there. Wetting agents will also aid in water penetrating thatch.

Careful selection of topdressing material is also required. Fine particles may make the surface impermeable and can cause damage to sprinkler heads. Also the height of cut during prolonged dry periods should be increased to ensure continuing photosynthesis in the green tissue, ensuring that root development will continue underground. Good root development will maximise the uptake of water from the soil. And, by maintaining a thick sward, the loss of water through evaporation and wind is minimised.

Trees situated close to tees and greens compete strongly with the turf for moisture. The Willow and Pine families are good examples of moisture loving trees. To overcome competition between trees and turf, stands of trees can either be thinned or have their lower branches removed.

### Alternative sources of irrigation water

The use of other sources of water rather than potable supplies is obviously a major step towards conserving

#### WATER USE

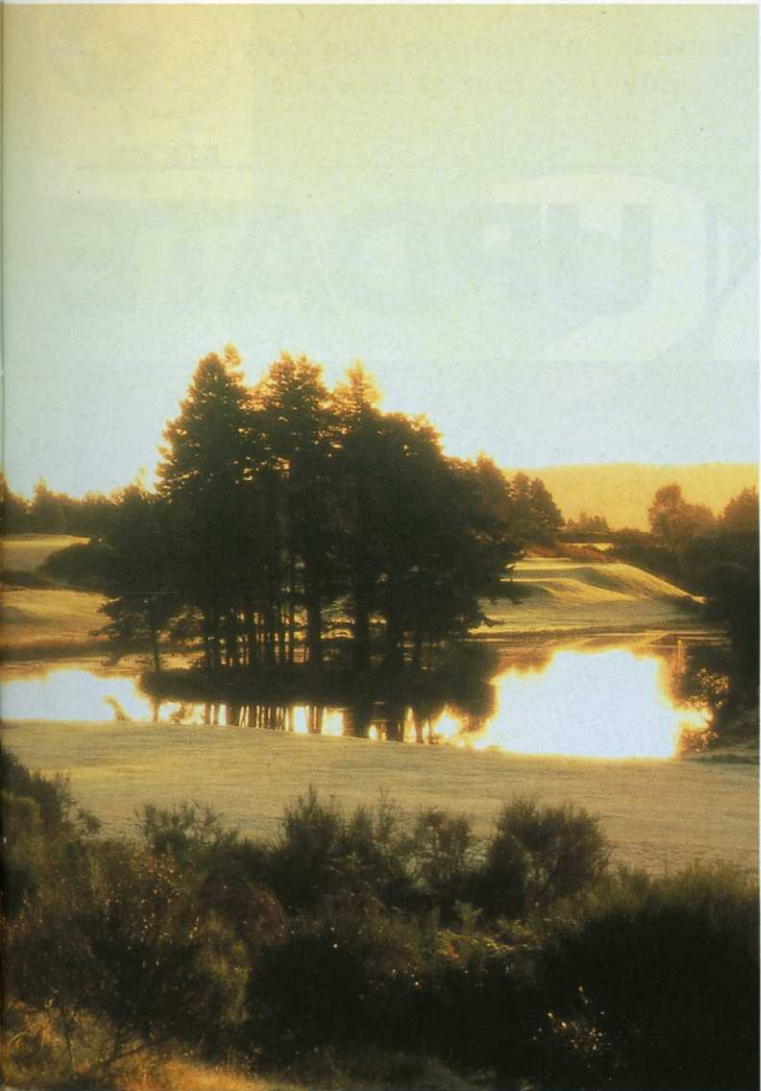
Low  
Medium  
High

Buffalograss  
Kentucky bluegrass  
Perennial ryegrass  
Bermudagrass  
Velvet bentgrass  
Creeping bentgrass  
Zoysiagrass  
Red top  
Tall fescue

#### SALT TOLERANCE

Low  
Medium  
High

Colonial bentgrass  
Tall fescue  
Hybrid bermudagrasses  
Most zoysia spp.  
Perennial ryegrass  
St. Augustinegrass  
Annual bluegrass  
Common bermudagrass  
Seashore paspalum



such a precious resource.

In the United States the use and management of effluent water (sewage wastewater) is increasing in popularity as an alternative to diminishing potable supplies. A recent survey by the National Golf Foundation (NGF) reported that approximately 13% of golf courses in the United States use effluent irrigation sources, and this increases to 34% in the Southwest States where water availability is lower than average.

The biggest concern revolving around the use of effluent water on golf courses is the Sodium Adsorption Ratio (SAR). This test measures the sodium hazard present in the water. The higher the SAR, the greater the potential for damage to plants and soil. High SAR test results are usually down to a deficiency of calcium and magnesium in the effluent water. This situation, in most cases, is brought about by bicarbonate ions, which react with calcium and magnesium and remove them from the water.

Attention must also be paid to the level of nutrients contained within the effluent water. Nutrient levels vary, and are dependent on the type of effluent plant and type of effluent being processed. In many cases the ratio of salt and nutrients can be diluted or even eradicated through 'polishing' treatments before being used for irrigation. The effluent can be stored in holding ponds for dilution with sur-

face water, rainwater and/or a limited potable supply.

In many cases the water can be passed through a wetland/reed bed system. These can be designed to consist of plant types, which are salt loving and will absorb much of the salt content of the water. They can also be interspersed with other types of reeds to aid nutrient absorption.

Although the use of effluent water carries a greater potential risk than using a potable supply, the implementation of an irrigation management plan can resolve many of these issues. By looking at the interaction between the incoming quality of effluent, the turf and soil types on the course, management techniques and weather data it is possible to run an irrigation system utilising effluent water, maintain good quality turf, reduce water costs and help conserve potable supplies.

In a changing world where water has the potential to become as valuable as oil, golf courses must adopt best practice in order to use water in a sustainable manner. In short this means constant analysis, monitoring and control.

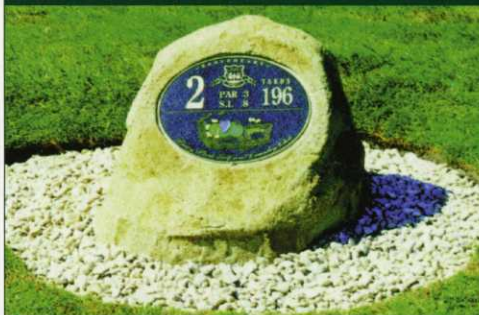
Sources used in the compilation of this article include Audubon International, 1996; Carrow & Duncan, 2000; Christians, 1998 and NGF, 1999.

# PHOTOCAST TEE SIGNS

By  
**EAGLE PROMOTIONS**

Scorecards • Course Measurement • Yardage Books • Tee Signs  
Event Boards • Leaderboards • Notice Boards • Bag Tags • Green Fee Tickets  
Call Philip McInley on : 01883 344244  
email us: eaglepromotions@compuserve.com

visit our website @ [www.eaglepromotions.co.uk](http://www.eaglepromotions.co.uk)



Ad Ref 549





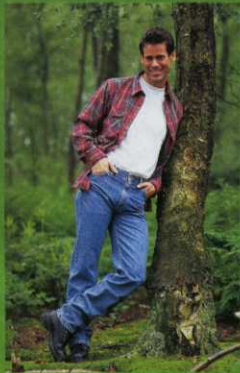


# BIGGA MEMBERS SAVE

# 20%\*

## WITH ARCO

ARCO and BIGGA have got together to offer you 20%\* discount on the UK's widest range of Workwear, Safety Clothing & Equipment and Industrial & Maintenance Products



- ◆ All the big brands
- ◆ Free delivery
- ◆ No minimum order charge
- ◆ Extra discounts for bulk and quantity orders - telephone for details
- ◆ Free catalogues and technical advice
- ◆ Embroidery and heat seal badging available if required
- ◆ Choice of ways to pay:
  - ARCO Account - if your club or business does not have an account, please telephone us for an application form.
  - All major Credit and Debit Cards
  - Corporate Purchasing Cards
  - Cash
  - Cheque

To order or request FREE catalogues, just call ARCO'S special BIGGA Hotline on

# 01482 611773

and quote your BIGGA membership number

\*Discount not available on selected technical products and special offers. Please telephone for details.

## ARCO

### Personal Protection

- Head Protection
- Eye Protection
- Ear Protection
- Respiratory Protection
- Safety Equipment
- Corporate Clothing & Workwear
- Weather Protection
- Hazard Protection
- Hand Protection
- Skin Protection
- Washroom Hygiene
- Foot Protection

### Workplace Safety

- Site Safety
- Traffic Management
- Vehicle Cleaning
- Hygiene & Cleaning
- Floor Level Safety
- Fluid Handling
- Showers
- Insulation
- Fire Protection
- Safety Signs

### Maintenance

- Lubrication
- Adhesives
- Packaging
- Jointing and Sealing
- Hose, Ducting and Fittings
- Tools
- Site Maintenance

Ad Ref 1

**BIGGA's Membership Services Officer, Tracey Maddison, would like to welcome almost 80 new members to the Association and offer the opportunity for members to win some fantastic prizes**

## Be a BIGGA winner!

Impress your other half by winning a weekend break to Dublin, York or go on a spending spree with Marks & Spencer Gift Vouchers. HOW? It's easy! All you have to do is to introduce at least two new members to the Association, make sure your name goes on their application form as the person who referred them, and leave the rest to us! The draw will be made at BTME 2001.

Here are three great reasons why you should recommend a colleague to join the largest greenkeeping association in Europe...

### Reason 1

You could win two return flights to Dublin plus two nights accommodation for two people in a centrally based hotel, all courtesy of BIGGA. The city of Dublin is a thriving, modern centre, home to a million people and rich with a variety of attractions ranging from culture, history, heritage and the Arts, to

sports, shopping, concerts and nightlife. Enjoy exploring this colourful city of fine Georgian buildings and extremely welcoming pubs! One of the oldest areas of Dublin is the maze of streets around Temple Bar, now home to numerous restaurants, pubs and trendy shops.

### Reason 2

You could get away for a weekend break, for two, to the historic city of York. You could be in the first class company of the Monkbar Hotel, which holds an unrivalled position in this historic city, close to the city walls, which date back to Roman times, and by Monkgate Bar, one of the main entrances to the city. The impressive York Minster is only 300 metres away, with the many attractions being only a few minutes walk away. The bustling market with its many stalls is a timely reminder of York's role as

## BIGGA welcomes...

<b>Scottish Region</b>	Thomas E Kaye, N West John Kelly, N West Stephen N McKie, N West Jon McMullen, N West Keith Riley, Sheffield	John P Craddock, Midland Ian Curston, Midland Barry J Gardner, BB&O Daniel Green, Mid Anglia Brian Jefferies, Midland Gary L Jenkinson, Northern Peter T Johnson, Midland Stuart J Langhorn, Mid Anglia Robert J Leach, Midland Jordan Roman, East Midland Wayne Tysoe, Mid Anglia Scott Whale, Midland Andre Woodings, East Midland	Paul Esterhuizen, Surrey Shane W Hulme, Surrey Matthew Keech, London Paul A Merriman, London Simon R Need, Kent Mark Paxton, Essex Colin D Peddieham, Surrey Gary Wiggins, London	<b>Associate Members</b>
Joseph Baxter, West Patrick Bonneyrd, Central Thomas Comerford, Central Christopher Docherty, West Mark Geddes, Central Kevin Kirkpatrick, Ayrshire Boyce G B McLaren, North Gary McLay, West Donald J Meldrum, North Dale W Norquay, Ayrshire Alan T Purdie, Central Craig A Purdie, Central Gary Thomson, Central	Nicholas Robinson, Northern Guy W Stokes, N East Stephen Swindall, Sheffield Darrell Tinsley, N Wales John M Ward, N East James J Waters, N West Nick J Wild, N West Lae C Williams, N West Richard Wood, Sheffield			Alex J Miller, E Ian L Wall, Surrey Martin J Beer, South Coast John Lindsay, Northern Inland
<b>Northern Region</b>	Michael Brennan, N West Paul Charnock, N West Stephen Edwards, Northern Richard Joyce, N East	<b>Midland Region</b>	<b>South East Region</b>	<b>Student Members</b>
	Daniel Brown, East Midland Chris Clarkson, Midland Luke Collins, BB&O Richard W Cosby, Midland Herbert T Cox, Midland	Ross Anthony, E Anglia Scott Bailey, Surrey Alfred R Collier, E Anglia Simon Collingridge, London Justin L Dunstan, Sussex	<b>S West &amp; S Wales Region</b>	Ian Morrison, N West Glynn Parkinson, N West Jason Rainbow, E of England
			<b>Northern Ireland</b>	<b>Check out July's edition for May's new members!</b>
			Samuel Hall Alistair Logan Alan W McKee William Smith William S Walker Gavin J White	

a shopping centre. Your stay will situate you in one of ninety-nine rooms – all with en-suite facilities, colour TV, hairdryer, trouser press, welcome beverage tray and direct dial telephones.

### Reason 3

You could win vouchers from Marks and Spencer, to be redeemed in any one of their many stores. Choose

from their fabulous range of clothing, home furnishings or food and wine.

So come on, to be in with a chance of winning start introducing those new members, and they could soon be benefiting from the many benefits and services BIGGA membership offers.

*Please note: The weekend breaks are subject to availability and exclude Bank Holidays*

# Mountain King

You may recall a short article in the magazine last year describing the preparations and fund raising activities of Stephen Jack, of The Buckinghamshire Golf Club, for a trip to the Himalaya's in aid of Whizz-Kidz. Well, he's been and now reports back on his trip and what it was like to survive 12,000 feet up a mountain.

I could probably write a book about my whole expedition – if I had the ability that is! However I will try and describe my experiences briefly and keep them general. The expedition as a whole

is definitely the most overwhelming, extraordinary and vivid experiences in my life. Although it is now five months since arriving back, so much of what I saw and did remains clear in my mind. The place, people and atmosphere is very special indeed and I believe it cannot be fully understood unless you see and feel it for yourself. Pictures are good but truthfully do no justice and simply don't capture the atmosphere, spirit and characters of the people. There is an amazing culture and equality and happiness in the people that I've never seen before – especially happiness, you

can see it in their eyes and their smile

The two main experiences are when I arrived and my first experience of altitude. You don't realise how big an area the Himalaya's are. It is a vast with mountain after mountain. The scale of things is completely different eg. Kathmandu is at 3,000ft (1,000ft short of Ben Nevis!) and you by no means feel you are high up. I remember standing outside the airport looking around me in amazement and probably a daze to what was surrounding me – beyond belief.

The day we started our trek, started with an eight hour bus journey to our

starting point, which was at 1,000ft – So no we didn't get a head start!

Altitude sickness can be fatal and affects everybody differently. There are many symptoms. The only thing you can do is take things slower the higher you go up and be aware of the symptoms. Altitude can become a problem at generally 10,000ft, which is the highest we camped, but climbed to 12,500ft. This part was optional and some people didn't make it. Luckily I felt okay and made the 12,500ft point which was a platform to view the real sharp pointy mountains with snow. This is where the picture is taken - Manaslu south face in the background. Manaslu is in the top ten highest in the world – about 24,000ft, (Everest is 29,000ft!)

At one point, shortly after leaving camp at 10,000ft I didn't think I could make it any further. The few seconds it took for me to drink some water left me gasping for air!

I'll leave you with a thought! Each day we were given a bit of philosophy from the great Bhuda, one was – "Do nothing in haste, look well to each step and from beginning think what may be the end."

If there is anyone interested in doing the same challenge, they can contact me. Alternatively they can contact Tamsin Cowie at Whizz-Kidz on 020 7233 6600. [www.whizz-kidz.org.uk](http://www.whizz-kidz.org.uk)



Mycorrhizal structures associated with turf roots

# Intelligent disease control

Harmless to beneficial turf fungi

Still effective against disease

Amazingly, some species of fungus are hugely beneficial to your turf.

Mycorrhizal fungi develop a mutually beneficial relationship with turf roots for effective nutrient exchange, and increased resistance to drought, insect pests and disease.

As a result, turf associated with Mycorrhiza tends to be healthier.

You'll be pleased to hear then, that Rovral Green leaves these 'friendly' fungi completely unharmed.

You'll also be glad to know that Rovral Green is still as effective as ever at controlling the harmful species like Fusarium, Red Thread and Dollar Spot. No wonder it's still the UK's No 1.

Rovral Green - it thinks for itself.



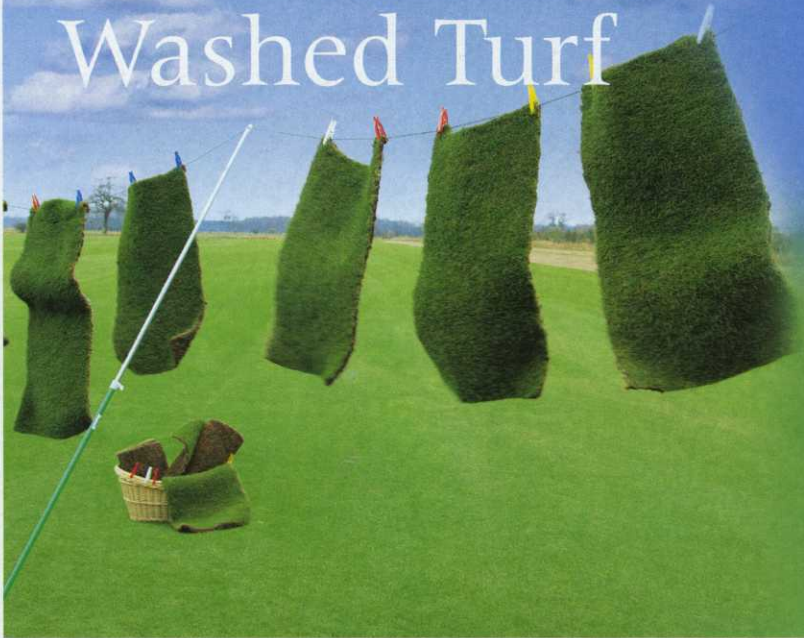
*Fusarium*



*Dollar Spot*



# Wash away rootzone worries with Rolawn Washed Turf



**Washing turf is a job for experts.** Rolawn's expertise in turf washing has been built up over twenty five years. This coupled with a substantial investment in a state of the art turf washing plant has made the company European leader in turf washing technology.

Rolawn's turf washing plant is operated by expert staff to produce top quality turf that is 100% clean and soil free. Our unique process leaves the turf roll intact with a healthy aggressive root system on one side and a first class dense healthy sward on the other. Any roll format produced by the company is available washed. i.e. Standard roll, Budget roll, 1066 roll.

Rolawn Washed Turf is faster and easier to lay, saving time and money. And with no rootzone problems to overcome it establishes rapidly. Therefore your greens and tees will come into play much sooner.

**So don't hang about – choose Rolawn Washed Turf.**



## Rolawn®

BRITAIN'S FINEST TURF

Available on a no minimum order basis from Rolawn's network of UK depots.

*For further details call: 01904 608661  
or visit our Website: [www.rolawn.co.uk](http://www.rolawn.co.uk)*

Ad Ref 34

ALWAYS OUT FRONT

# SMITHCO

**4 Sprayer  
models  
available**



**2 models  
available**



**A range  
of utility  
vehicles &  
trailers  
available**



**12 models  
of bunker  
rake  
available**



for details or a demonstration contact...

Ad Ref 501

**Marlwood Limited**

Court Lodge Farm, Forge Lane, East Farleigh, Maidstone, Kent ME15 0HQ

Tel: 01622 728718

Fax: 01622 728720

email: [marlwood@kentnet.com.uk](mailto:marlwood@kentnet.com.uk)



Last year Tony James played out of his skin to becoming the first winner of the Charterhouse/Scotts National Championship. This year it could be you...



# A Championship of Distinction



Above: Last year's winners flanked by Richard Minton of Scotts and David Jenkins of Charterhouse. L-R Tony McLure, Tony James and David Cuthbertson and Bert Cross representing the Northern region.

The two venues for this year's Charterhouse/Scotts National Championship for the BIGGA Challenge Trophy may well be familiar to some of those people lucky enough to be playing in this year's event.

St Annes Old Links hosted the 1995 National Tournament while its near neighbour, Fairhaven, welcomed the Hayter Challenge Finalists in 1996 as well as both Rest of the

World and Americas teams in the country for the Hayter International Cup.

If there are any qualifiers or entrants who played on either, or both, of those occasions they will know the treat that is in store for them on September 25 and 26 this year.

The abiding memory of those who tackled St Annes in the summer of '95 will be the scorching heat which

drew the last bit of energy out of everyone who played well before they reached the sanctuary of the 19th but the difficult conditions will not have masked the excellence of the course they had the privilege of playing.

Masterfully maintained by Geoff Whittle and his team St Annes is very much a traditional links which adds degrees of difficulty depending upon how hard the wind blows.

If that were not enough since our

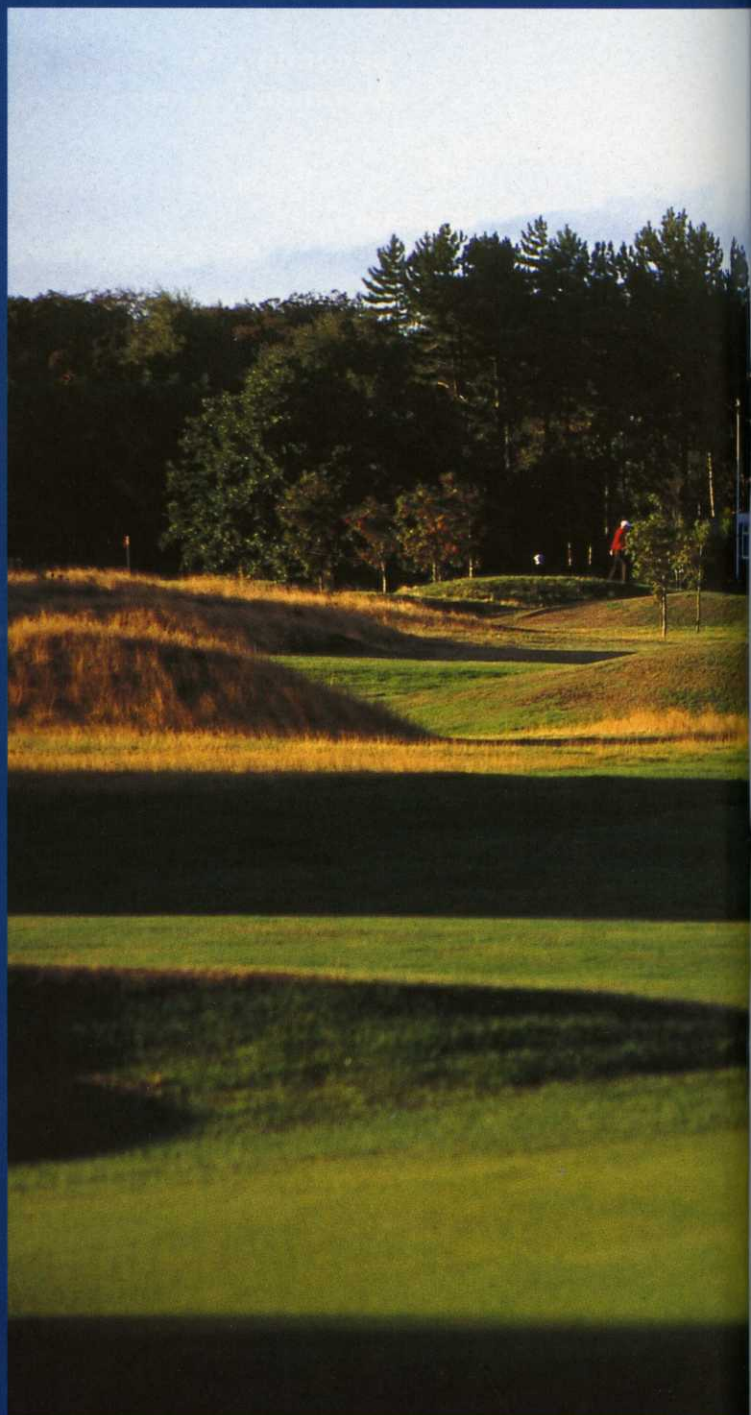
# A Championship of Distinction



Peter Simpson of Fairhaven.



Geoff Whittle of St Annes Old Links.



previous visit the course has also been tightened up!

"Yes, we've put in some extra bunkering in the driving landing areas on the 2nd and 6th holes. It was getting too easy," laughed Geoff, who has been at the club for 11 years.

"The committee felt that it needed toughening up a little in places as it does depend on the weather for its defences."

The decision was influenced by the fact that the club hosted an Open Qualifiers when the Championship was last at nearby Royal Lytham & St Annes in 1996...an honour it will also have next year as well.

"Last time it was dead calm and

the scoring was low. We had a 65 by Richard Boxall for example," explained Geoff, who has recently taken delivery of a several new pieces of kit courtesy of a leasing agreement with Burrows, the local Textron dealer.

As well as the bunkering, which brings the total number on the course to 138, some new Championship tees have been built and the addition of a couple of ponds, one behind the 7th green and another behind the 14th green.

"We needed a huge amount of spoil to build some new Championship tees so we created our own by digging the ponds which, although not affecting play too

much, create a bit of interest," said Geoff.

The pond at the rear of the 7th, which is perhaps more in play from the 15th, boasts a nice touch.

"There is an island in the middle of the pond and one of the friends of the Greens Chairman asked us to put an suggestion box on the island. We did this and it's gone down very well."

Geoff is looking forward to the army of his peers who will descend on the course in September.

"I know they all enjoyed coming here last time apart from the incredible heat. It was a big tournament for us and I hope it is the same this year."

Oh yes. One other change since 1995 which will raise a cheer from those who played then. The clubhouse now has air conditioning!

St Annes will host the first round of the 36 hole Championship with Fairhaven picking up the baton for the second and final day.

Although only a couple of miles from St Annes, Fairhaven is a different type of golf course altogether – tree lined and secluded. In fact, Peter Simpson, the Head Greenkeeper describes it as a semi links.

"We've got the bunkers of a links course but we've not got the rolling fairways while, of course, we've also got trees," said Peter, who like Geoff