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20 → difficult to repair. Surface aeration should be confined to the use of solid or chisel tines in the summer, although a top dressing of sand or sand-based compost will help reduce the level of visible surface disturbance, particularly when verti-draining or spiking to depth on greens approaches or heavy traffic routes on the fairway. Sand top dressings can also be most beneficial in improving the

drainage efficiency of heavy clay soils.

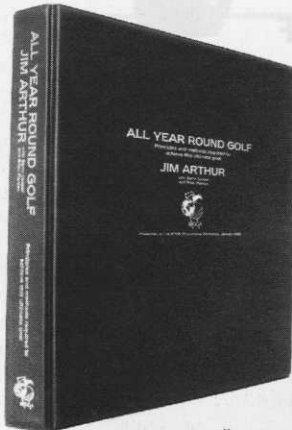
At all times, one has to be aware of possible disruption to play and ensure that the work carried out will have positive results which justify the need to move onto a fairway during the busiest time of the year. Of all the regular summer maintenance work required on fairways, mowing will be the most frequent and important on many courses. Grass should

# A FAIRWAY TO GO

never be allowed to grow too long. Aim for a height of cut of between 14mm and 19mm (0.5in to 0.75in), removing about one third of the existing growth at each cut to achieve the required length. Correct mower settings and maintenance are vital for even, healthy grass growth, with all cylinders adjusted to the same height and the cutting edge keen and true to the bed knife.

There are few better sights than a fairway evenly striped along its length. Apart from the cosmetic appearance, striping can help emphasise contours and the shape of the fairway, helping golfers with their game. "It's a fact that fairways can be neglected due to pressure of work on other parts of the golf course," points out Smith. "However, with just a little attention to the density and length of the grass, its nutrient requirements and aeration needs at appropriate times of the year, there is absolutely no reason why one's fairways should not gain the level of praise normally reserved for greens.

"Golfers also need reminding that a divot cannot replace itself. Someone has to do it, preferably the person responsible for its removal."



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A Belfry lake at 'low tide'

When I came across the term water farming, it immediately conjured-up thoughts of a country tale about a bunch of yokels who, one bright moon-lit night a couple of hundred years ago, were discovered raking the surface of a large pond, near Devizes, Wiltshire, with good old fashioned, man-size, wooden hay rakes.

Challenged for an explanation by a mounted Excise Officer who happened to be passing (as the result of a tip-off from some local 'grass' who evidently was not welcome in parochial circles) the leader of the group, no 'yokel', replied by saying; "We'm only tryin' to rake this yer moon in off the water, Maister."

When told that it was the moon's reflection they were attempting to reach with their rakes, the yokel's spokesman shrugged his bemocked shoulders, smiled disarmingly and so it is said, answered with, "Thank 'ee fer tellin' us zur, we were a-wonderin' why we couldn't budge 'ee!"

Shaking his head in disbelief, the Excise man rode off into the darkness reflecting that he had been the victim of a fools-errand. In a way, he had. After he had gone the yokels set-to with their rakes to haul up barrels of contraband hidden in the depths of the pond. Not only did the locals get their booty, they carved themselves a niche in the history of the Shires. From that day, all Wiltshire folk became known as 'Moonrakers' – but I digress...

Water farming? My Oxford dictionary reveals that the term can be related to 'A tract of water used as a preserve...' For what, I wondered. Fish, stated the dictionary, oysters or perhaps, I thought, watercress. No, that wasn't it, so I asked my friend, Robin Hume, for clarification.

Now as some of you will know, Robin is top man at Turf Irrigation Services and as such, most of his working hours are spent planning water management schemes around irrigation systems, mostly for golf courses.

"Water farming, ah yes, interesting subject", said Robin. "It's all about water conservation or rather the practice of farming (management) water resources by the collection of surface run-off or similar sources into controlled channels – like a drainage system – and preserving or storing it in a suitable reservoir. "Farmers have been

# Understanding WATER FARMING

by CEDRIC JOHNS

doing it for years and we have adapted their ideas to help overcome the problem of water shortages, especially on golf courses."

"What with more and more golf clubs investing in automatic watering, the changing patterns to much drier weather in parts of this country, and the clamp-down by the National Rivers Authority on the use of water supplies, we have been forced to re-assess the whole situation", he told me.

Legislation can be interpreted in many ways but as Robin sees it, any water currently running into ditches, streams, lakes or reservoirs – or percolating through the soil to underground aquifers – is deemed to belong to the nation. In other words, it is considered (by the legislators) to be a natural asset and, as such, its use is controlled by the NRA.

"However", said Robin, "Any water that is collected before it reaches a water course or is absorbed by the soil can, as I understand it, be utilised by the landowner, (in this context, a golf club), for subsequent use without need for a licence".

In effect, water farming or the collection of run-off forms a valuable supplementary source of water for topping up existing lakes or reservoirs where normal supplies are marginal relative to the seasonal needs of irrigation.

Conditions have to be favourable. Because this method of collecting surplus water is very much dependent on natural rainfall, it is important to understand that it is also dependent on topography. There must be sufficient

high ground on a golf course to generate worthwhile run-off.

Soils also play an important role. Limited drainage and heavy soils which quickly become saturated create the best conditions for run-off. Light sandy soil or soils containing a high percentage of gravel are not so helpful – unless extensive pot drainage has been installed to collect and channel surplus water. Alternatively, golf courses covered in densely cultivated turf grass or where large areas of compaction are present provide suitable surfaces for the generation of run-off, even on lighter soils.

Mind you, the practice of water farming is not just confined to trapping surface water. Gary Parker, who heads-up the irrigation business, ISS, in the southern counties, has demonstrated the potential value of collecting rain water from roof top guttering. While completing work on a newly excavated reservoir on a course in Surrey, he spotted several out-buildings clustered close to the excavation. Having mentioned the thought that the roof tops could prove to be a source of additional water for the club, he decided to prove the point. So he rigged up a temporary pipeline linked to the gutters. Gary knew that rain had been forecast, he later told me, but even he had not anticipated the bonus of 4-5mm which fell in a matter of hours. Well it did, and it contributed handsomely to the contents of the reservoir. Apparently tens of thousands of litres of water were successfully channelled from the roof tops via the makeshift pipelines.

Having said that, I am reminded that the Cotswold Edge club took advantage of a small spring on their course to provide a good source of water for their reservoir. Instead of continuing to let the spring rise and trickle away, they dammed the area to create a small lake. Once established, the water was (and is) pumped into the club's reservoir proper and used for irrigation.

Another example which comes to mind relates to the Barton-On Sea club, overlooking the Solent, on the Hampshire coast. With the approval of the NRA, a small stream has been channelled into the clubs recently constructed ornamental lake cum reservoir. For years immemorial, the stream ended its journey to the seas by simply soaking into the porous, crumbly cliff-top soil. In doing so, the stream probably contributed something to the long running saga of cliff erosion along that stretch of coast – but not any more!

Back to Robin Hume – "When considering the economics of water farming coupled to storage facilities, a club must begin by establishing whether or not licence will be granted for summer abstraction from a secure source." he says. In his experience, Robin told me that southern and eastern parts of the country will not be granted licences unless substantial winter water storage facilities are available.

It is therefore essential that any club wishing to be self-sufficient should investigate the possibilities of creating a reservoir and filling it with winter rainfall. This in turn can then be supplemented by farming run-off or similar sources of water.

Talking of self sufficiency, Robin Hume's biggest water management project to-date was that of mastering the multi-million pound scheme completed at The Belfry, at the back end of last year. There, winter water is diverted from a stream into the Brabazon's three in-play lakes and cross-fed into a new off-site reservoir holding 40 million litres of water. Even on a project of this size, water farming – purely incidental in this particular case – helps. According to Robin, the collection of rain falling into the lakes and reservoir is about equal to that lost through evaporation.

When thinking in terms of the volumes stored at The Belfry, that is not so much moonshine as a substantial amount of water.



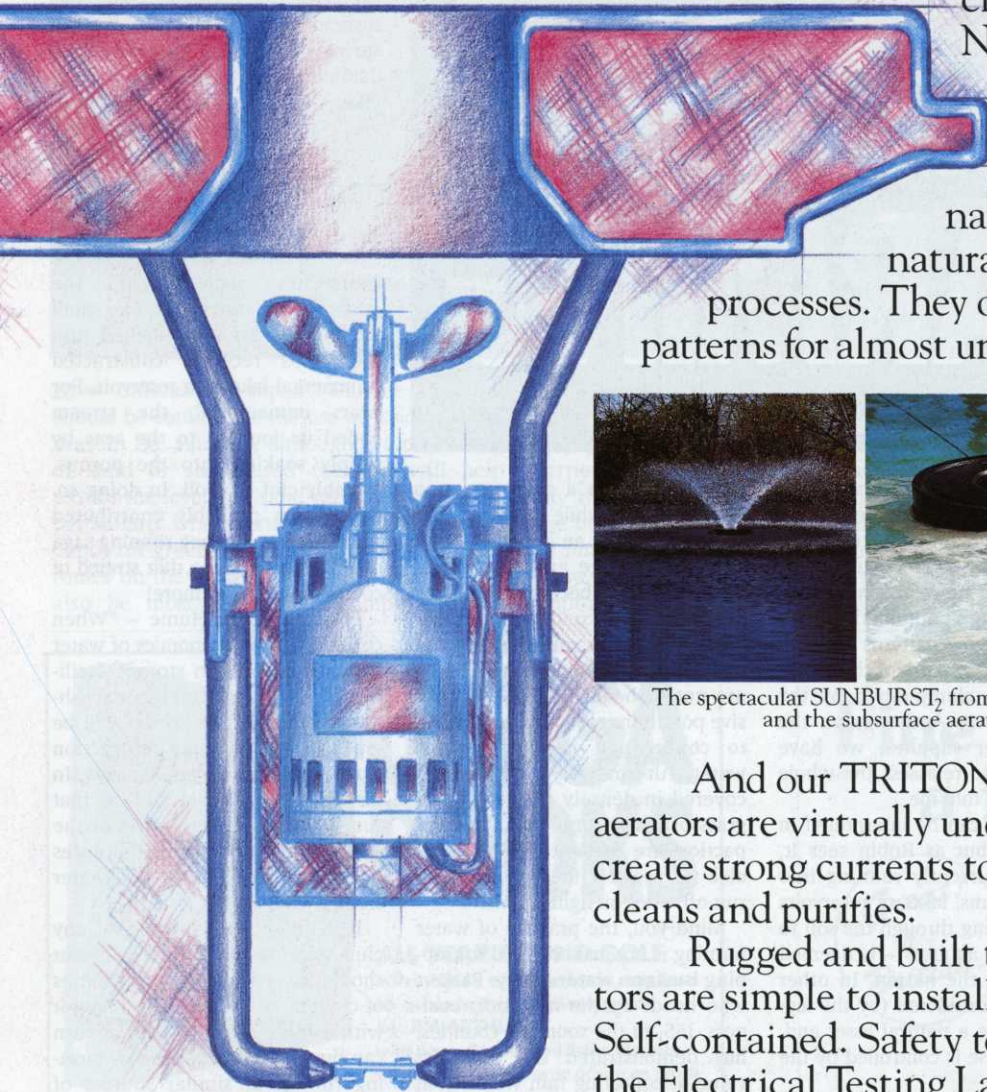
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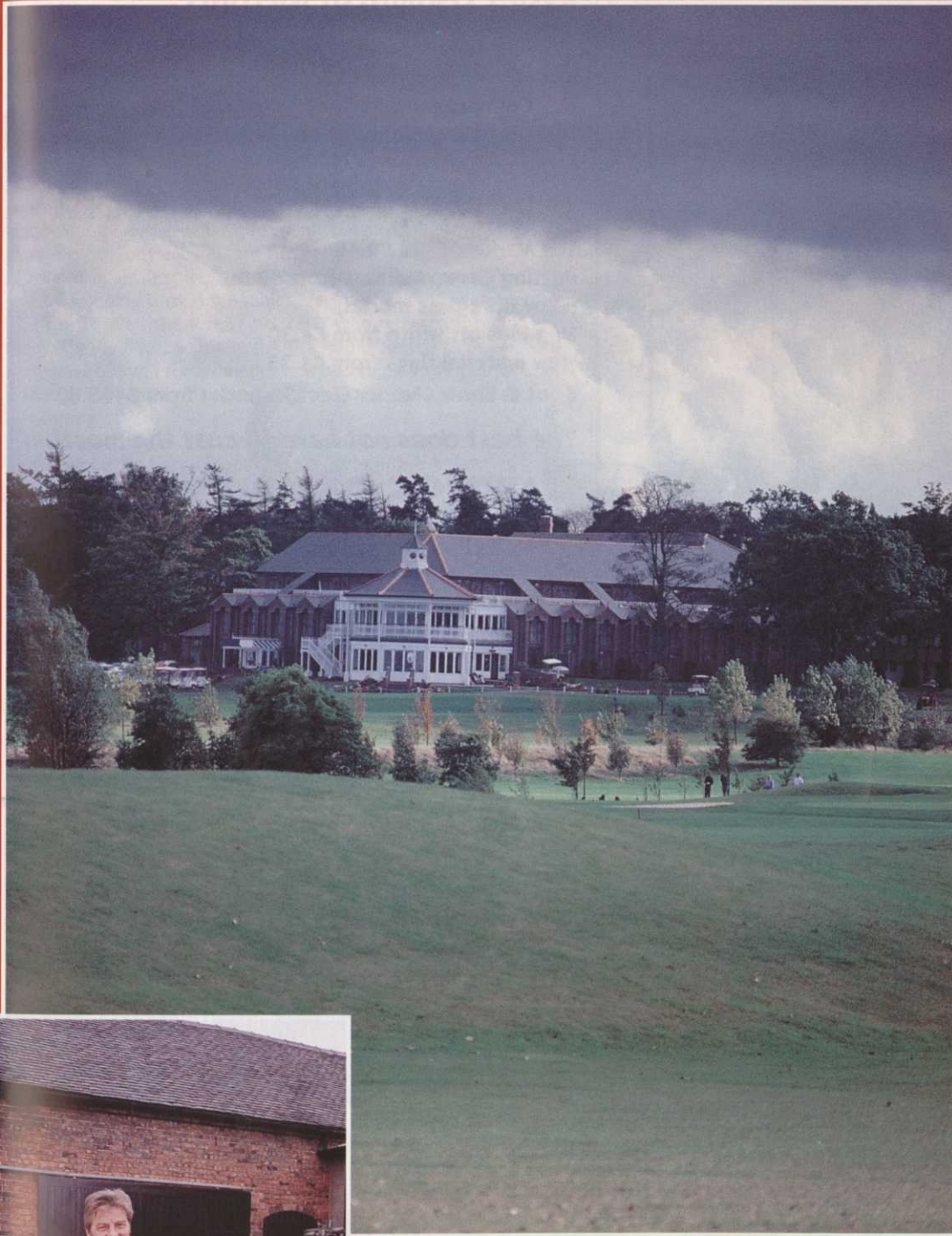
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# BATS *about The*

# BELFRY

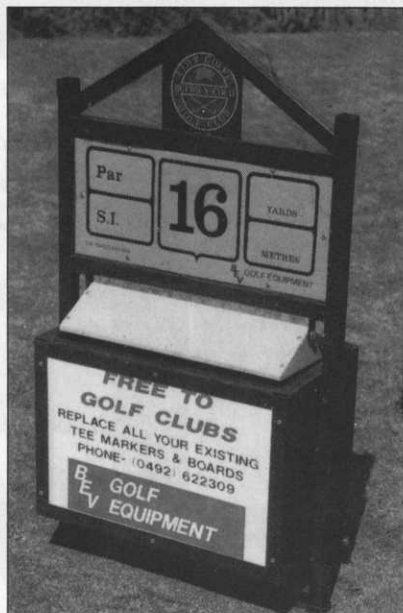


**Derek Ganning BEM (left) isn't just preparing his course for the Ryder Cup, reckons DAVID WHITE. With golfing passions running high, he may just as well be getting ready for World War III**

**F**rom 1927 until the mid-eighties it smouldered and spluttered, on occasion appearing in danger of dismissal by the Americans as of little consequence. For the better part of fifty years it might as well have been played in Outer Mongolia for all the interest shown outside the minuscule bunch of rah-rah's who waffled on about it being character building, an exercise in stiff-upper-lipmanship, of being 'good for golf! There's no doubt about it, a huge amount of piffle has been written in the past about the Ryder Cup matches generating international goodwill between the Yanks and the Brits, when in truth the British until 1985 had



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25 • been well and truly stuffed far too often, winning just three times in 25 attempts over 58 years.

What changed it? Well perhaps the Nicklaus gift to Jacklin of a two or three footer for a tie at Royal Birkdale in 1969 set folk thinking that perhaps there was something in this pukka sportsmanship caper, though I like to think that there were two, maybe three, other factors that swung the world into Ryder Cup ferment. The rule change to include European players, first in 1979, turned the hitherto exclusively Brit bashing into a much more evenly balanced contest. The captaincy of Tony Jacklin, our first modern super-hero, who time and again inspired 'our' players to unknown heights and by so doing turned the tables, gave us back our dignity. The third? Well there may be some who will scoff, but I fancy The Belfry, essentially the Brabazon, turned from her early days of bitch teeny-bopper into becoming a voluptuous princess, evolving in the process into a national monument to winning.

Derek Ganning, B.E.M., has been course manager at The Belfry since its very inception, masterminding a host of 'majors' and two hugely successful Ryder Cup matches. When I visited him recently he was in the throes of preparation for what promises to be the biggest sporting spectacle this side of Mansell's Formula One World Championship bid. There is no doubt, the world's hottest ticket for 1993 has again seen Ryder Cup mania reach fever pitch before a ball is struck, and Derek is leaving nothing to chance in his personal bid to outdo anything that has ever been done before.

Criticisms voiced in the past, not of Derek's management regime but of the course itself, were of a constructive nature, a sort of 'wouldn't it be nice if we had such and such', for without exception folk could see the potential, admired David Thomas's design concepts and wanted the place to be successful. Granted there were early construction specifications that justified adverse comment, the rootzone structure in particular, but nothing that couldn't be put right. It is to the great credit of De Vere Hotels, owners of The Belfry, that they have taken such critique on board to the extent of investing something like £2.5 million in a major redevelopment programme, the whole Belfry arena now a cauldron of activity as workmen and technicians put every effort into dressing the princess in her niftiest party clothes.

Before talking me through the new developments, Derek spoke of the pride he and his team have in being able to boast a near 100% complement of British made machinery, mostly sparkling new Ransomes kit supplied by ET Breakwell and finished in traditional British Racing Green. The patriot in him went further by suggesting, "it wouldn't do for us to be seen waving any flag but the Union Jack and I believe that by opting for this fantastic Ransomes machinery we'll be seen as having a two-up match advantage before the first blow is struck, certainly in the eyes of the Americans."

Things have changed since the Ryder Cup first was staged at The Belfry in 1985, for, as Derek recalled, in those days the Belfry greenkeeping team worked in unison with the PGA's Tony Gray and John Paramor, a time when the PGA European Tour was in its early stages. They learned one from each other, bouncing ideas and suggestions back and forth, taking on board the best of both sides. It all seemed good fun, nothing was impossible, there was no measurable intensity. Came the time for TV cameras to roll and the world was suddenly taken aback – could this really be the course that everyone thought of as 'ordinary'? There were flowers and shrubs in profusion, there was pattern and definition in cutting regimes that had never before been seen in



**Bridge building at The Belfry.**

**Above:**  
**from this...**

**Left:**  
**...to this**

**Below:**  
**...to this**



Britain, certainly not on TV, something like 80,000 trees had been planted, this was course presentation like never before, a show-place on view to the world.

The 1989 event saw still more changes, the event even bigger, American interest hugely increased – they wanted the damned cup back! In Derek's view the event had intensified somewhat, an agronomy team headed by Bruce Jamieson and George Shiel was appointed and tournament condition regimes were more rigidly enforced. This regime has grown apace and for 1993 the PGA European Tour's new agronomy department, linked with IMG, have an even closer involvement, with Derek, Bruce Jamieson, Richard Stillwell, Mike Tate, De Vere's Mike Maloney, and the new head greenkeeper and Derek's right-hand man, David Norton, holding regular meetings to discuss such things as throughput of golf, capital projects to be instigated, deadlines that must be met. For the first time ever the course will shut ten days prior to the Ryder Cup, a move that pleases Derek in that it will allow last minute tuning without the problem of club golfers encroaching and holding up activities.

Work in progress includes a new raised teeing area ➔ 28



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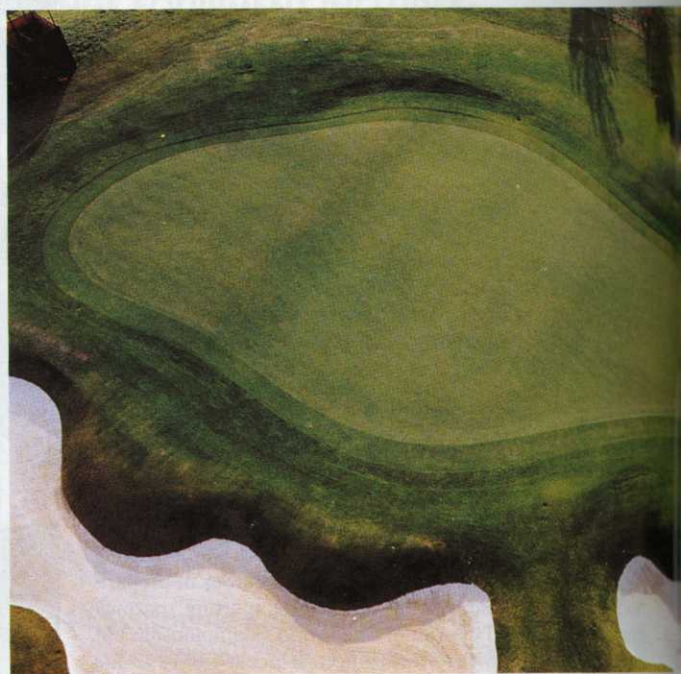
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A Rolawn green at The Belfry



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All this may seem more than enough, but all greens (now pure bent Cobra after being sown originally with Penncross) additionally have been intensively Vertidrainning with tines to a depth of ten inches, slit at four inches, followed by heavy top dressing using 80 tons of an 80:20:20 (sand/peat/loam) mix. Further, the construction of an 11 million gallon capacity reservoir is complete, essential in safeguarding irrigation on the course at all times and dramatically increasing lake levels to

allow extraction at a higher and therefore cleaner level, avoiding silt and eliminating any possible recurrence of anaerobic conditions on the greens.

One would expect someone honoured by the Queen to be pro-British, and Derek Ganning, holder of the British Empire Medal, had some pretty firm comments to make on that subject: "I'm certain that my award was due almost entirely to my having a wonderful team around me. My crew's as good if not better than any in Europe and I am immensely proud of them, every one. With the addition of several bright young HND students on short-term placement I'm truly blessed." Will everything be alright on the day?, I asked. "No doubt about it," came the emphatic reply.

I cannot subscribe to the view that the Ryder Cup is just another game, nor do I see it as 'just a friendly', played for the honour of the old country and all that eyewash. The Ryder Cup in 1993 will be staged like a Third World War, for it's we Europeans who now want the damned cup back, nursing the feeling that 'we was robbed' at Kiawah Island.

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# The BIG question

Is there a greenkeeper who does not at some time encounter one problem or another with his greens? Whether it is a disease outbreak at specific times of the year or one of maintaining good drainage properties, the weed grass *Poa annua* is more often than not a dominating factor.

Fertiliser companies advertise their products as being the most suitable for use on fine turf, from slow-release to organic formulations, and naturally enough they are promoting their own materials in a very competitive market. However, it is the golf course manager who has to make the decision when it comes to purchasing. Full order books may bring joy to the supplier, but I find myself wondering, what about the fine grasses?

There are I feel still too many course managers who do not look closely enough at the composition of the fertilisers they use. Questions which should be asked are • What is the source of the main element nitrogen? • What percentage is of inorganic origin compared to organic? • Is there a slow release element and if so, how is it activated? These are just a few that spring to mind, though precluding the obvious but often overlooked critical point • What do the indigenous fine species actually need? In my view they certainly don't need phosphates unless one is dealing with pure sand constructions or if the rootzone shows an analysis figure substantially below 30ppm.

Fertiliser treatment for fine turf requires nitrogen only. This truism, established at the beginning of the century, still holds firm today. It always will, for the requirements of the fine grasses naturally remain the same and are in any case much more to do with physical rather than chemical aspects! The nitrogen form is so critical nowadays, especially with the wide array of products available.

Little and often, has been quoted on numerous occasions in books on greenkeeping since the earliest times, suggesting the use of sulphate of ammonia (21%N) [inorganic] and dried blood (13%N) and hoof and horn (13%N) [organic] as the standard ingredients. Iron sulphate can be added as required.

Mixing your own fertiliser can be very cost effective and gives the satisfaction of knowing exactly what and how much is being applied. The mixed ingredients are bulked up with compost to facilitate spreading, which is done by hand and switched in behind.

Iron sulphate has been used for years in small doses, particularly in autumn and winter to harden the grasses, for disease control and

for lowering or maintaining suitable acidic pH levels. It was also used in the days before selective weedkillers, mixed with ammonium sulphate, for weed control during the growing season. In my opinion, all the modern technology and new fertilisers coming onto the market cannot create fine turf.

There are a wide variety of fertilisers available to the course manager of the 1990s. We have slow release forms and even controlled release. These forms, however, take any control of turf condition away from the manager, are irreversible, and can have variable effects as they are activated by soil temperature, moisture levels and (to a much lesser extent) by bacterial life.

Preparing fine golfing turf for major calendar events and tournaments is impossible with such products, as the requirement is for any previous nutritional effects to have waned prior to the event. It goes without saying that anyone working on a corrective maintenance programme seeking to produce a dominance of fine fescue and/or bent grasses in favour of *Poa annua* will not do so by using slow release or controlled release fertilisers!

I say stick with the old-fashioned style using the materials I have mentioned:

Sulphate of ammonia	- 21%N	- acidifying
Dried blood (10-4%N)	- 13%N	- neutral
Hoof and horn	- 13%N	- neutral

For example, if we want to apply a 1:1:1 mix

50 Kg sulphate of ammonia:	x 21%N =	10.5 Kg N/ha	1.05 g N/m <sup>2</sup>
50 Kg dried blood:	x 13%N =	6.5 Kg N/ha	0.65 g N/m <sup>2</sup>
50 Kg hoof and horn:	x 13%N =	6.5 Kg N/ha	0.65 g N/m <sup>2</sup>
		23.5 Kg N/ha	2.35 g N/m <sup>2</sup>

$$\text{Total N Mix in \%} = \frac{21\% + 13\% + 13\%}{3} = 15.6\%N$$

With proprietary mixtures, which contain 50% carrier to assist conditioning and spreading, the analysis becomes 8: 0: 0.

Of course not everyone prefers fine turf because it is not as easy to maintain as annual meadow grass turf. To understand the maintenance and development of fine turf it is worthwhile going back into the history of greenkeeping and the game of golf in order to gain invaluable insight into previous mistakes and misconceptions. Naturally, people will say that you can't apply exactly the same treatments as the answer to every golf course – and they are right. However, the basic principles remain the same: the difference lies only in how they are implemented, if fescue/bent turf is the aim!

But I believe that many golf course man-

agers don't really want to fight against annual meadow grasses, mainly because they have no experience of how to successfully achieve the change over, what the effects on the turf will be; how to promote the fine species; the different stages the turf will go through or an effective overseeding programme, to name but a few. Consequently they are not in a position to prepare a policy document describing the processes, anticipated timings and associated effects on surfaces of the treatments involved, or indeed the advantages in the long term, to put in front of their club management, let alone the full membership.

To save face, avoid the hassle and possibly preserve their job they take the easy option and continue to promote and maintain annual meadow grass turf, often on courses which in earlier times were of vastly superior composition and which even today may show a high percentage of fine perennial grasses on fairways and even green approaches, yet not on the greens themselves!

I have even heard of courses where the members prefer to putt on the winter greens, which are in use regularly through the winter period, cut out of the fairway, rather than on the main greens! The reason is obvious and it brings us back to grass species. There is something fundamentally wrong in this scenario and it is not too uncommon. The final self-incrimination comes when turf managers of

the annual meadow grass school purchase grass seed composed of the same fine perennial grass seeds which they vehemently claim are 'impossible to succeed on my course!'. Why don't they spread the multiplicity of seed collected in the grass boxes each day if they don't have enough of the weed grass already in certain areas, instead of wasting their employer's money on what must be destined to be fertility under their turf management system? Good quality seed does not come cheap!

I sincerely hope we will be maintaining more fine turf on golf courses in 20 or 30 years time, but the present reality indicates a totally different line, (with a few notable exceptions), despite what might be written or said to the contrary.

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He trained at a GTC approved college in Great Britain and was nominated for the Toro/PGA European Tour Young Greenkeeper of the Year in 1990. He is currently employed at Carnoustie Golf Links whilst studying for an HNC in Golf Course Management.