Eddie Park has spent many years in a quest for knowledge about fine turf as found on our traditional golf courses. Here, he continues his chosen theme...

Indigenous turf reclamation—a diagnosis and prognosis

THE story is told of an American visitor to Cambridge who wanted to know the secret of the beautiful lawns at the colleges. He was told he would have to take every weed out by hand and roll the lawn, spike it and feed it, rake out the moss and mow the turf three times a week from spring until autumn for 300 years!

Unfortunately, we do not have 300 years to recover sadly damaged golf courses. We must not waste time nor money on experiments or gimmicks and, as in every other field, we must go back to fundamentals.

Let us start with some definitions. I often turn to a book published 35 years ago by the United States' Golf Association, which has run a greens section since 1920. In the book, the basis of a management programme is set out. I quote: 'The development of a sound management programme rests on (1) Knowing how to do the job and (2) Knowing the why of it. The first of these is the art of greenkeeping. It is founded upon experience and requires the knowledge of the mechanics of all the operations concerned with the growing of grass and the ability to perform them efficiently and in a timely manner.

'The second is the science of turf production. It is based on the fundamental principles of plant growth and development and is concerned chiefly with the underlying reasons back of the practices which constitute the art of successful turf building and maintenance.'

In the UK, we have many versed in the art of greenkeeping. We now have to provide those versed in the science of turf production.

The first step on a golf course is to make a full diagnosis, enabling a confident prognosis of what we can reasonably hope to achieve on the site and in how long. In medicine and surgery, everyone has it drummed into him as a student that no treatment of a problem can commence until a complete diagnosis is made. The classic procedure is (1) Case history, (2) Clinical examination and (3) Special tests. I am not suggesting that this can take the place of expert advice, but it helps everyone, including golfers, to understand the problems.

Case histories in greenkeeping can be gathered from committee minutes, reports of general meetings, articles in local newspaper files—perhaps a club history has been written, or perhaps there is mention of the course in an old handbook? Who was the architect? What was the original use of the land and who owned it?

When most clubs are first asked these questions, they invariably say there are no such records but, with a bit of active questioning, it is surprising what comes to light. Older members will have views about changes in playing conditions, an old ledger may reveal what fertilisers were ordered and at what cost, when watering was installed or pop-ups substituted. Of course, we must be careful, all memories are fallible but, with perseverence, a fairly full picture can be built up.

Such exercises should not be seen as a witch hunt to apportion blame. In fact, in most cases, just the reverse is the case as it can be discovered that a deterioration in recent years may have been started by policy changes of 50 or more years ago.

Now, what about examination of the site? First, take a look at reference books in the local library. A geological survey will reveal what the underlying parent rock is. The soil survey, which is published for most counties, tells us not only the type of soil, but its capability and best usage. This detailed description is invaluable and covers most areas of the country almost field by field. If you don't understand soil classification, find a simple book on soils. Don't believe that every boggy area has to be clay. It should be no surprise to find that the vast majority of golf courses were built on excellent sites and designated as such in the land-use section.

You will see that we are skipping all

subjective judgements such as slow greens, green greens, lush greens, soft greens, etc, as unreliable and looking at *scientific analysis.* Remember, also, that subjective judgements can be easily confused by the application of fertiliser and water and the use of the new generation of excellent mowing equipment.

The most important analysis is botanical. Either we have fescue/agrostis playing surfaces or we haven't. This subject is so important that I am going to digress for a while to consider grass identification in the cut sward. This isn't too difficult on the golf course, but there seem to be many mistakes. It is, of course, vitally important that you actually can see and most people will need to put on their reading spectacles and get down near to the ground!

The general habitat should be at the front of our minds. We know that on seaside links the acid and calcareous heaths and on moorland the natural grasses *should* be agrostis/fescue. There will be a few local extras, such as the brome grasses, Yorkshire Fog, etc, but we can be pretty certain 'our grasses' were there originally. That is why the courses were built there in the first place. If they are no longer to be found on the playing surfaces, look in the rough. If they are still there, we know that faulty management of playing surfaces has caused the problem. Things are a bit more difficult on more modern sites, too many of which were badly chosen.

You can probably get by if you know the ten most common grasses on any site. Many people have published systems or keys to enable identification of these grasses by elimination. The best known is probably the Pelican paperback by C.E.Hubbard, but simplified versions have appeared in two STRI publications—a booklet by David Clouston and *Turf Grass 1982.* A booklet published by Messrs Sutton, *Identification Of Grasses By The Foliage,* is another essential reference. There are good pictorial representations in a Pan paperback by Roger Phillips, in the *Observer Book Of Grasses* and in a book by the Czech Jaromir Sikiela.

However, this year has seen the publication of the *Collins Guide To Grasses, Sedges, Rushes and Ferns* by Richard and Alastair Fitter, a companion to the same authors' excellent *Guide To Wild Flowers in Europe.* This features a rather different kind of key—the single access key, which works on the same principle as computer keys. You describe the grass by up to 12 simple botanical characters using letters and simply look down the list to find the matching description. A second key extends this to habitats. It may sound complicated, but it isn't!

My feeling is that botanical analysis is the key to correct management. The only real confusion is between agrostis and poa.

If we stop trying to make the sward uniform with fertilisers and water, the different grasses soon show up—different densities, different texture and different colours.

Now let us do some simple tests. Dig a hole carefully with a sharp spade to examine the different soil horizons. You will find something like this: (a) Topsoil, usually dark with humus and living organisms, (b) Subsoil, pale and dead (c) Parent material formed from (d) Rock. Fill the hole with water and see if it drains away. If it does not, look at the drainage in some detail. Cut both ends off a can and embed one end on a green and fill the can with water. We are looking to see if we have good permeability or compaction.

Moisture

An agricultural soil moisture meter can be used to test the relative moisture of the soil at different levels and also to demonstrate the existence of a pan. A dry-looking green may have plenty of water six inches down. Or a soggy green may be quite dry six inches down—the water being held in a spongy thatch layer near the surface.

Next, take a careful look at a hole plug and see if there are deep, white, healthy roots or poor root depth or thatch. All soils consist of particles of differing size (sand, gravel, silt, clay, etc) and their varying proportions determine their texture. We might describe the resulting soil mix as sandy, loam or clay. A quick test is to shake up some soil in water in a test tube and see the different fractions settle out. A more satisfactory scheme is to ask a lab to do the fractions on a sample.

Just as important as soil texture is soil structure, which covers the way particles are held together and whether there is a good crumb structure with suitable air spaces between. Damage by compaction may lead us to think we have a clay soil when the real condition is poor structure and lack of air space.

In a normal topsoil, approximately half the volume consists of spaces—half of which will be filled with water and the other half with air. The pH of a soil helps explain the availability of some elements. There is an ever present danger of over-reacting to seasonal variations and forgetting that, in this country, the seasons seem to balance out every year.

All these observations and tests are easy to do and we are slowly building up a complete and objective picture of our course. Let me repeat, have a good look at the rough, particularly the bottom grasses in the rough. This is the area least likely to have been damaged by chemicals, water or compaction. If, let us say, we can see that the course was originally built on moorland, the original moorland grasses, fescue and bent, will still be growing in the rough. And, if that is so, we can begin to see the first glimmerings of hope. With a change in management, we can gradually eliminate that which has invaded our playing surfaces and encourage our grasses to reinvade them.

It is really only when we have gone through this ritual of (1) Case history, (2) Examination and (3) Tests, that we can begin to form confident judgements on these important points.

- What have we got now and from what was it derived?
- What is its potential for higher standards?
- How long would it take to achieve them?

We are then in a position, probably with expert advice, to draw up a policy document, which embodies a statement of the potential of the course, a game plan for its implementation and a costing of any suggested course of action.

Just to get the full flavour of the real complications of the situation, let us throw in two more essential items. Clearly, so far I have been discussing mainly turf, but there is other vegetation on a golf course in the shape of the off-course environment or, as the Americans call it, the no-use areas.

Natural succession will have dictated that if these areas have been neglected (and they usually have), they will have continued to develop remorselessly towards the climax forest. So grass will have become coarse grass, herbs, gorse, broom, depending on the habitat. And, even worse, that will have developed an overstorey of hawthorn, birch, etc.

Within relatively few years, scrubland develops that is unsightly and encroaches on to golfing areas. People feel that if conservation of these areas requires cutting or pruning of trees, then it must be wrong. So, nothing is done and this neglect becomes expensive. A sober estimate of putting right the neglect on one

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Eddie Park Continued...

course (which had occurred over 40 years) was over £2m.

The other factor in a golf course besides vegetation is terrain and architecture. The lucky architect was given land with contours that made course construction a joy and a sinecure. On some courses there was the need to alter the terrain quite markedly. On others the architect was only able (or competent) to do a poor job. It is on these courses that committees have tried to remedy the deficiencies with 'instant architecture'—usually hundreds of tiny trees. All too often they are unsuitable species on unsuitable land and probably die or fail to grow to any height.

Trees surrounding greens and fairways in this country are usually bad news for turf culture. And as they are often tied to a philosophy of target golf, even if they succeeded they would pose problems for future generations. How much better to use a competent architect and constructor in the first place. There seems little point in trying to return to indigenous turf if, meanwhile, we are trying to destroy the terrain with unwanted trees. The return of many greens to fast and firm conditions will often make the original architecture perfectly viable. Again, it is no good setting a different form of architecture simply because we are using the wrong golf balls or clubs for British conditions.

It is my hope that people will stop looking for instant, easy, magical solutions to problems. Where we have damaged turf, we must simply not reach for the obvious remedy. We must dig deep and look for the real reasons for the trouble. They may not be purely agronomic. There may be golfing reasons, architectural reasons, incorrect or inadequate greenkeeping procedures or perhaps a failure in the implementation of advice.

Emotive

The word 'advice' seems an emotive one to some people. I have experienced steering a golf course through the daily problems of returning to indigenous grasses. I will take advice from anyone and everyone! Just as I taught young university students, I now teach young greenkeepers that advice means help and only the very lucky or very arrogant can do without help.

Money is now becoming available for research into the problems of British course maintenance. I have a shopping list of matters to which I feel answers are urgently required. We know little about the maintenance of fescue/agrostis swards. What is the optimum water requirement of the different grasses? What are the optimum conditions for these grasses? How much aeration is required once the soil structure is improved? I suspect there is a markedly different response between fescue and bent. We know little about the side effects of most chemicals. We need to know much more about the decomposers of unwanted organic matter—the fungi and bacteria. We might get nearer solving the thatch problems if we had such knowledge. We know little about the interactions between different chemicals and it seems likely that some chemicals act in opposition to each other, while some potentiate others. We must know.

I am as suspicious about greenkeeping with high inputs of energy, chemicals and water as I am about farming with high inputs. In farming, too, we are seeing a return to more natural, less costly methods. These are all matters that require urgent investigation in the conditions of the British climate.

Next time, I will look closely at the actual implementation of a change in management regimes aimed at reclaiming indigenous golf turf. The seventh veil?