cycle follows. Towards and during peak season do not endeavour to replace all the water lost by ET in one operation, better divide the required operating time into 2 or 3 equal periods and re-cycle the controller. Thus the first and/or second application can be absorbed before the next application, reducing run-off and subsequent puddling.

Do consider the advantages of what is called individual head control where each sprinkler in a sensitive area has its own in-built automatic valve and is allocated a dedicated station in the controller, therefore permitting it to be individually timed. This can be a very useful feature particularly where greens and approaches are partially shaded or where mixed part circle and full circle sprinklers are required, for example around a green. Incidentally, this type of sprinkler body has a built-in pressure regulation feature — therefore the problem of incorrect operating pressures is avoided, provided the system has been designed properly.

A word of warning: some contractors design systems with individual head control to reduce the cost of pipework, particularly with spurs and laterals. These must be sized for all greens heads to be operated simultaneously, semi-automatically or manually for the washing in of fertiliser etc.

To accurately programme a controller (which should be done daily), it is essential a water balance record is kept in order that the irrigation programming can be adjusted to compensate accurately for natural precipitation in the preceding 24 hour plus period.

There are controllers on the market now which can be connected to a weather station which in various stages of sophistication can automatically adjust the controller for rainfall, sunshine, wind, temperature and humidity, or alternatively in the simplest form give readings of these various factors.

Add all these factors together and not only will turf grass management be easier but also operating costs will be reduced. And in these days when courses are being encouraged to be more "environmentally friendly" that's important!

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We are founder members of the BTLIA.
After 20 years, a sleeping giant is awakening to challenge the world's leading players.

Carnoustie – generally regarded as the most difficult and certainly the longest links of all the Championship courses – has been restored to championship status in more ways than one. And its sister courses, Burnside and Budean Links, have also been updated over the past ten years, since John Philp took over as links superintendent.

The first formal layout of 10 holes at Carnoustie has been accredited to Alan Robertson of St Andrews, the first professional golfer, in the late 1840s although records of golf being played on the Barry Links go back as far as 1527.

The first 18-hole course was laid out by old Tom Morris who developed Robertson's 10 holes. This new course opened for play in 1872, the holes being cut out of the frozen turf using a mallet and chisel by apprentice Geordie Lowe, later to become instrumental in the formation of Hoylake and Lytham St Annes to name but two of the many well known layouts he subsequently became involved in. Five years earlier young Tom Morris won his first important event against all the best players of the day in three rounds over the 10-hole course following a play-off.

Bob Simpson, one of three famous golfing brothers, came to Carnoustie in 1883 and as curator of the links instigated many alterations and improvements to the course. Further changes took place as well as the development of a second course, the Burnside, until the mid-1920s when James Braid was called in to review the course. Braid introduced several new greens and tees as well as numerous prominent bunkers and with the construction of a new 13th hole in 1930 his changes formed the course that exists today. Such was the impression created later that year during the Scottish Amateur Championship that the R&A promptly announced that Carnoustie would be the venue for The Open the following year.

Alterations have been carried out in recent times and are still under way but all with a view to maintaining the character of the course and, according to Philp, "any revisions deemed necessary are no more than Braid would
It’s time for the programmed approach to turf disease control

‘Greenshield’ and ‘Daconil’ Turf is the best possible partnership to maintain disease-free turf. Two powerful fungicides give broad spectrum disease control including Fusarium Patch, Anthracnose, Dollar Spot and Red Thread, with safety to the grass.

‘Greenshield’ is the ideal product when the turf is growing strongly. The combination of the contact chlorothalonil and the systemic carbendazim controls disease for up to six weeks.

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Empty containers of both products can be collected and disposed of free of charge using the Zeneca service on (01345) 125398.
The potential championship length is over 7,350 yards.

Golfing standards have changed over the years with major improvements to equipment and technique and there are many more top-class professional players around the world who are better prepared both mentally and physically than the best players from past eras. With this in mind, the policy at Carnoustie is to ensure that the reputation of the course is maintained. Indeed it is the ambition of everyone concerned that Carnoustie will set the standard for links golf as we enter the next millennium.

To add to the character of the course and maintain the challenge to the modern experts, improvements are being made to bunkering, especially greenside, in conjunction with a general narrowing of green entrances. Further green reconstruction and recontouring is scheduled to follow the five already completed, placing an emphasis on skilful chipping and putting. “Green and surround contouring is a critical aspect in reconstruction work as this is considered to be an area where developing the challenge to the top players can be most effective,” says Philp.

Turf from Carnoustie’s own 15 acres of turf nursery, which includes a 5,000 sq yd greens nursery, has been used in all construction projects. Philp reckons it is well worth the time, cost and effort to produce his own sandgrown turf of chosen varieties without which a good deal of the restoration and development work accomplished on the links would have been impossible. He says he is looking forward to the establishment of two new areas of turf nursery, one sown with a mixture including the new crested hairgrass variety Barkool from Barenbrug, the other with a special mixture formulated for the purpose of producing an aggressive bunker revetting turf.

Bunkers are constructed in typical links fashion using “half” turves in strips 6in wide by 2ft long. Bunker wall bases are formed using “full” turves set about 15ins below anticipated finished sand levels. Turf is cut thick and layers are set back a little over an inch per row to pro-

most likely be endorsing if he were alive today.”

Philp was appointed links superintendent in 1985 as part of the move to restore the course to Championship condition. He began his career at Pitreavie Golf Club in 1964 and gained promotion to head greenkeeper there in 1970. Following five years as head man at The Links Golf Club, Newmarket, from 1974-79 he was appointed to the new position of deputy links supervisor at St Andrews where he worked under Walter Woods for six years gaining experience in preparing The Old Course for the Open Championship in 1984 in addition to various national and international amateur events. Philp is quick to point out the invaluable experience he gained in many aspects of golf course management during his years at St Andrews and he is indebted to Walter Woods and agronomist Jim Arthur for what he considers the completion of his training. As he puts it: “No matter what variety of golf courses you may have worked on, your education is not complete until you have experienced the links and thereby become involved first hand with the origins and true values of the game of golf.”

Over the last ten years he and his greenkeeping staff of 20 for the three courses have improved the condition of the links. The reward for their efforts is that the Open is to return to Carnoustie in 1999 and, as an added bonus, the links will host the Scottish Open this year and next.

One of the factors affecting play is the wind, as you'd expect this year and next. The condition of the links. The potential championship yardage of 461, 250, 457 and 516 respectively.

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Realising the full potential of the three courses is the aim and since 1986 Philp and his staff have been gradually winning back the fine fescue and bent grasses.

One of our great courses, there has been a buzz about the links reminiscent of past times. But still the work goes on...

From early summer this year fairway landing areas will be narrowed at appropriate distances and roughs will be encouraged to afford a suitable penalty for wayward shots. Some 700 tonnes of fresh bunker sand will be used to top up the 119 bunkers on the course, over 80 of which have been revetted over the winter. The routine maintenance programme will be under way and intensified as the weather dictates.

Philp believes that turf quality is more critical to the game of golf than in any other sport played on grass and following a close examination of sward composition throughout the links, especially greens, by far and away the most important surfaces on any course, along with soil conditions, a corrective programme was devised to encourage the fine perennial species indigenous to the links at the expense of annual meadowgrass which had been a major problem in the production of quality surfaces for many years.

Realising the full potential of the three courses is the aim and since 1986 Philp and his staff have been gradually winning back the fine fescue and bent grasses by way of well established greenkeeping principles, controlled nutrition, minimal watering, frequent topdressing with consistent good quality materials including seaweed products to encourage root development and drought tolerance, combined with "the single most important aspect of modern greenkeeping" - an intense and varied aeration programme. "Aerobic conditions have to be maintained, and a free-draining uncomplicated medium is essential for the development of the finer species," says Philp.

Additional verti-draining on traffic routes and weak areas as well as main playing surfaces together with regular slitting have been Philp's weapons in the battle to beat Poa. A variety of tines are used - from 5-40cm. Shallow in the summer, deeper in the autumn and winter. The larger tines help to alleviate compaction in the main problem area - down below 4ins, where previous aeration work stopped. The shorter tines are used for root pruning, assisting the incorporation of topdressings and generally keeping the immediate rootzone open for entry of air and water. Hollow-tining is not normal practice on greens save for overseeding purposes where deemed necessary and is carried out when annual meadow grass is very much in recession, September being the typical month. Hollow-tining has however proved most useful as part of the fairway improvement work.

Little and often is the philosophy behind the topdressing programme. The fairways are topdressed with a 90:10 sand-fenfen soil mixture. Greens receive an 80:20 mix but using fendress purchased at 60:40 and let down with a similar quantity of beach sand. During the summer, greens are topdressed every three weeks, golfing calendar and weather permitting.

"Maintaining some acidity at the leaf surface has proved useful in stressing annual meadow grass in a mixed sward situation," according to 47-year-old Philp.

Together with the other main effects of the programme, ie promotion of a dry surface, minimal nitrogen nutrition, regular light topdressings and verti-cutting allied to slitting, meadowgrass plants become chlorotic and much smaller physically giving a very much "tightened down" appearance to the sward. This all lends a competitive edge for ground cover to the more desirable species in the resulting thinner sward.

A common spray applied to fairways contains liquid seaweed extract, liquid iron and wetting agent. Occasionally some liquid organic manure is included for certain fairways. Greens generally receive a dressing of ammonium and iron in the "false spring" period with sandy topdressings taking over from April through to September. Tees are dressed with SSD (8-0-0) in the spring following by occasional topdressings and liquid sprays.

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manure. Bunker faces are sprayed usually with a liquid organic fertiliser and wetting agent. All new constructions and repair work receive appropriate nutrition during the critical establishment period along with extra topdressings.

Very little fungicide is used on the links and any local outbreaks of fusarium patch are controlled using dry iron sulphate bulked up with sandy compost.

The irrigation system is used to keep the fine grasses alive and any additional requirements are applied by hand to local dry areas or by setting sprinklers to aid establishment of new turfing work when required.

Ryegrass patches on greens, a legacy from many years ago, are conspicuous among fine species and are removed by taking circular plugs. Philp finds these blend in better on smaller areas.

The maintenance programme then is fine-tuned with “blanket” treatments seldom used. Surfaces are treated according to individual need and the situation is monitored on a day-by-day basis. This means some greens are top-dressed more frequently, some are oversown, some are not. Some get additional iron dressings, seaweed treatment or wetting agent but mowing regimes are never severe.

“The experience of seeing the recovery of native fine grasses at Carnoustie and the long-term benefit for the heritage of the game and the future generations of golfers has been very satisfying,” adds Philp. He is well aware, however, of the challenges that lie ahead and in particular the staging of the last Open of this century.

Only five Opens have been played over the massive links since 1931 but the names of the past winners speak volumes for the challenge the course has set: 1931 – Tommy Armour, the Silver Scot; 1937 – Henry Cotton, The Maestro; 1953 – the legendary Ben Hogan in his one and only appearance in the event; 1968 – Gary Player, The Man in Black; and, most recently, 1975 – Tom Watson winning his first ‘major’.

The man who adds his name to that list by holding aloft the old Claret Jug in 1999 will truly deserve his place in one of golf’s most elite clubs.
There were so many new products launched at the BTME that we couldn’t fit them all in last issue...

Barenbrug used the BTME to launch two low maintenance mixtures featuring Barkoel, crested hair-grass. Named Bar Slow Motion, the two mixtures are quick to establish but then produce unusually slow annual regrowth, according to Barenbrug. The company says Barkoel’s performance in dry and infertile conditions has been “remarkable.”

The company’s new creeping bent Providence has good resistance to fungal diseases, it keeps an excellent weight distribution has been achieved to minimise compaction and great care has been taken to obtain a tight turning circle with the minimum of tyrecutting frequency. At the rate it is used in Bar Slow Motion, a reduction in mowing of up to 50% can be expected.” The mixture aimed at greenkeepers for use on fairways and roughs is the one without Barcredo/Barlow perennial ryegrasses. It features 35% Barkoel combined with four other varieties, each recording the lowest regrowth rating listed on the STRI Turf Seed Guide.

The new Beaver FM 514 five-gang, self-propelled mower from Hayter has been designed specifically for cutting fairways. It features newly designed 26in fully floating cutterheads to follow precisely the ground contours. The mower is available with 7 or 11 blade cutting reels offering a clip rate of 131 or 206 per metre. It also has a wide wheel track of 1.46m to ensure safety and stability in difficult areas. Four-wheel drive is fitted as standard and when the going gets really tough the differential lock can be engaged. Hayter also claims excellent weight distribution.

Rope and rope stakes are an easy, economical way of protecting high traffic areas and ground under repair. Standard Golf now offers green rope stakes and green and white polypropylene rope. The green rope stakes are available in two sizes – 32in for traffic control and 14in for use along cart paths and around new plantings. Costing £4.70 and £4.45 respectively, each stake is 5/16in in diameter and is said to position easily with foot pressure, even in compacted soil. The loop at the top is designed to make it easy to attach or remove rope. The green and white polypropylene rope – costing £22.75 for 500ft – provides high visibility without disturbing the beauty of the course. Classic yellow rope and rope stakes are also available.

Standard Golf has also added a new “bigger, better” bunker rake to its range. The Tour Smooth Maintenance Rake is a maintenance class version of its Tour Smooth Bunker Rake. With its 22in wide, extruded aluminium head, heavy-duty teeth and extra-long, powder-coated aluminium handle (66 or 82in), the new rake is said to be “perfect for finishing bunker edges quickly and professionally.” Prices are £60.33 and £51.43.

An extension to D&E Turf Maintenance’s premises in Bishop Auckland houses a new purpose-built training facility where greenkeepers can receive practical and theoretical training in turf machinery maintenance. A constantly updated fleet of machinery will ensure that the training delivered is technically up to date, relevant, more specific and indepth than other training establishments.

British Seed Houses introduced its new creeping bent, Providence (Agrostis stolonifera). Bred by Seed Research of Oregon and marketed by British Seed Houses, Providence has high STRI ratings for all characteristics and is recommended for greens, tees and fairways. BSH claims: “No other cultivar of Agrostis stolonifera has the outstanding high shoo rex density of Providence to quickly give a strong dense turf of even texture and, therefore, hard wearing.” BSH also says it is highly rated for its fineness of leaf, it has much shorter growth than other cultivars, it has good resistance to fungal diseases, it keeps an attractive colour throughout the season without heavy application of fertiliser and it produces less thatch than Penncross.” Tel: 01925 654411.
Autoguide Equipment has introduced a new flail mower. With a 1.5m (59in) working width, the mower is designed specifically to fit on ride-on power units such as Ford CM224/274, Kubota F2000/2400 and Iseki SF300. The flail rotor, which carries 90 heavy-duty reversible back-to-back grass flails, is dynamically balanced and runs in large sealed self-aligning ball bearings. Cutting height is variable and quickly adjustable without tools from a minimum height of 8mm (3/8in) to a maximum of 122mm (4 3/4in), with the mono-coque-constructed machine running on two castor wheels at the front and an anti-scalp roller at the rear. The side frames have anti-scalp skids and 'plygene' safety deflectors are fitted to both front and back. Price is £2,575 plus VAT.

Farmura Environmental has launched a new fusarium management product, Inhibiter. Working on the principle that prevention is better than cure, Inhibiter is applied before the onset of this major turf disease. But it is not a fungicide. A British development, Inhibiter is applied by spreader at 50 grams per square metre and stays active for 6-8 weeks. It costs £36 per 25kgs. Farmura managing director Jonathan Harmer says it should be used as part of an integrated disease management approach, that is, combining cultural, chemical, mechanical and now biological methods. "We are not in the magic business - no product can be set to cut at heights from 2-20mm (0.078-0.78in). At the recommended 6km/h (3.6mph) mowing speed, cutting frequency is every 3mm (0.19in) using the 11-bladed reels. Maximum transport speed is 12km/h (7.5mph). Maneuverability is enhanced by rear wheel power steering which requires just two and a half turns of the steering wheel to move from lock to lock. The result is an inside turning radius of 150mm (6in) and an uncut turning circle of 685mm (27in). Features are a thoughtfully laid out operator's platform, high-back seat and adjustable height steering arm. A kick pedal is fitted to lift, lower and engage the cutting units, with a timed delay ensuring that all three units start and finish mowing in line every time. Back-lapping can be carried out in-situ on the fully interchangeable units.

New from Ransomes is the Greenplex 160 hydraulic greens mower. Available in 19hp diesel and 18hp petrol-engined versions, prices excluding VAT are £16,235 and £13,435 respectively. Designed and built with continuous input from greenkeepers, the new triplex has three steerable cutting units producing a maximum mowing width of 1.6m (62in). The cutting reels, available with either nine or 11 blades, can be set to cut at heights from 2-20mm (0.078-0.78in). At the recommended 6km/h (3.6mph) mowing speed, cutting frequency is every 3mm (0.19in) using the 11-bladed reels. Maximum transport speed is 12km/h (7.5mph). Maneuverability is enhanced by rear wheel power steering which as well as open areas. The standard machine costs £16,545 plus VAT. Tel: 01962 733222.

Turf Machinery Ltd has introduced a range of replacement cutting units suitable for Jacobsen and Toro greens mowers. Made from premium grade steel, the cutting units and accompanying verti-cut units are cheaper than manufacturer-branded originals. Turf Machinery's price for a Toro GM300 unit fitted with an eight-bladed cylinder, standard bedknife, grooved front and solid rear roller is £740 – a saving of more than £400. A nine-bladed unit for a Jacobsen Mk4 Greens King with tournament bedknife and grooved front and solid rear roller costs £720. Tel: 01483 764467.

Inventorlink Products Ltd is marketing a practice mat that enables golfers to practise on downhill, uphill, sloping lie. The Quadra-Slope Golf Practice Mat is designed specifically to incorporate drainage, artificial or natural surface material, drainage pipe or hose facility. Prices start at £325.00 plus VAT. Tel: 0171 3234323.

Gannon's Aera-Vator AE60 150cm width (for the compact tractor) now has a big sister - the Aera-Vator AE80 270cm width. The Aera-Vator, which can be used for turf cultivation, seedbed preparation and bare soil conditioning, is available in standard form or with optional seeders, rollers and brush attachments. Prices start at £5,692, or it can be hired with all its attachments.

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FENDRESS™ TURF TOP DRESSING BRITAIN'S NO. 1

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