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the endangered Green and
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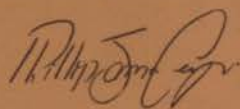
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the seed of something big

On behalf of the turf industry editorial committee, welcome to the very first edition of Australian Turfgrass Management (ATM). I guarantee it will keep you entertained and informed about all that's happening in the world of turf and more. It's been a very busy couple of months for the ATM team, but we are confident that the move to a new title, and new publisher will provide readers with a superior industry publication. In this issue we look at how the endangered Green and Golden Bell Frog has been successfully reintroduced into the wetlands at Long Reef Golf Club. Peter Schumacher dropped in on the staff at the Sydney Cricket Ground just prior to the 5th Test between Australia and England and reports on the difficulties of managing a multi-purpose stadium, and provides an insight into finer points of pitch preparation undertaken by the SCG staff. Writing exclusively for ATM, Turfgrass Technology's John Neylan discusses waste water use and quality guidelines and we travel to the land of "curried fish," for John Modini's recollections of his 18 months spent in Kuala Lumpur preparing the Bowling Greens and soccer pitch for last years Commonwealth Games. WA Turf specialist, Nick Bell reviews the life and times of the WACA and the AGCSA's Euan Laird has filed reports from the Australian Open in Adelaide and the Presidents Cup in Melbourne. Our new regular Review section features reports from two of sports leading statesmen. Firstly, Peter Thomson, Captain of the International Team in the recent Presidents Cup, discusses the effect of technology on golf course design and Tony Crafter, former Test Umpire, and now Umpire Manager for the ACB, discusses the role of technology in modern cricket.

It's a "bumper" issue, so shut the door, put your feet up, and enjoy!



Phil George
Editor



PHIL GEORGE
EDITOR



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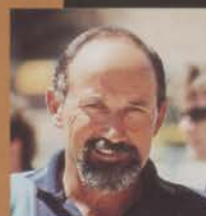
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PRESIDENTS

Cup

Nightmare for Porter and Royal Melbourne Groundstaff

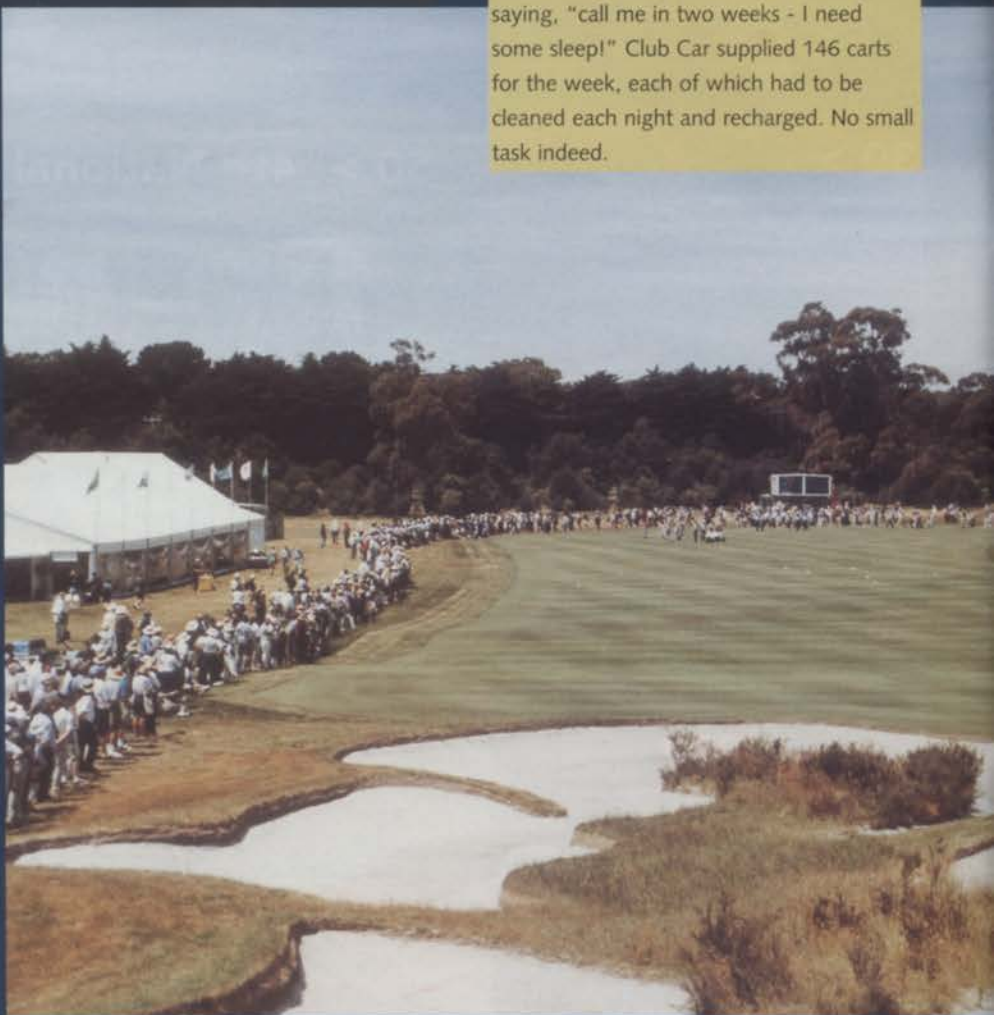


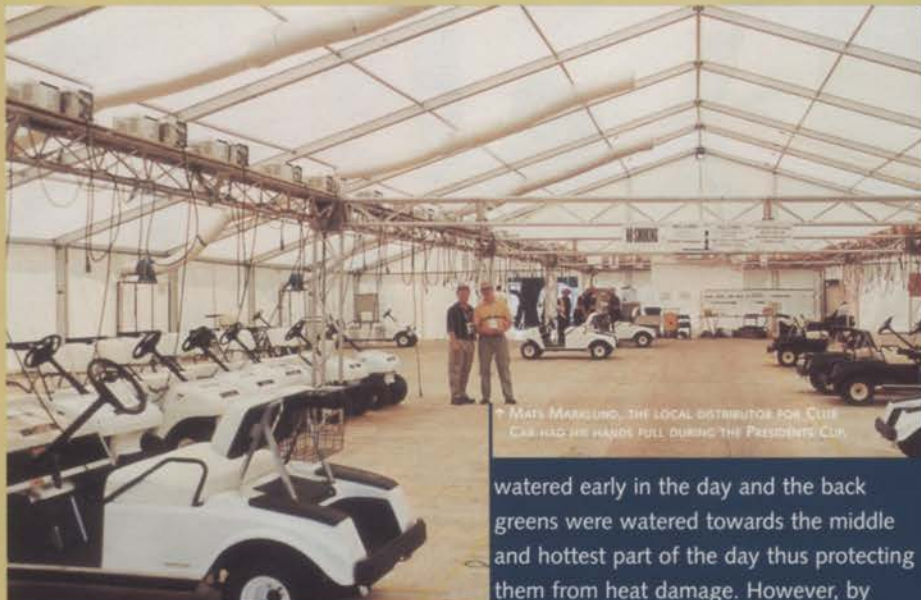
that the Presidents Cup could hurl at them during tournament week. What they could not have anticipated however, was the pure hell thrust on them by Melbourne's tumultuous weather. Following a rather sedate and lush Spring, Porter was faced with one day of mid- thirty degrees, two days of 42 degrees followed by a day of 15 degrees with 30 mm of rain which pooled on some greens. Despite the conditions, the international and local players were quick to praise the condition of the course with Greg Norman commenting that the Royal Melbourne course was at 99.99 % perfection. The Presidents Cup presented unique challenges for all involved in the organisation of the event. As one example just take a look at the picture opposite which shows the temporary Golf Cart storage area for the tournament. Mats Marklund, the local distributor for Club Car was heard mid way through the week saying, "call me in two weeks - I need some sleep!" Club Car supplied 146 carts for the week, each of which had to be cleaned each night and recharged. No small task indeed.

↓
↓
By Euan Laird

The gritty performance by the International Team to take out the recent Presidents Cup was matched only by the performance of Jim Porter, Course Superintendent and the Royal Melbourne groundstaff. The International Team, by defeating the highly fancied and high profiled American Team, staked their claim in history as the first International Team to defeat the Americans. Peter Thomson captained the team to a 20.5pt to 11.5pt victory over the Americans in weather conditions that could best be described as bizarre. Japan's Shigeki Maruyama was a favourite with the crowds and his bear hug of Craig Parry after Parry chipped in to seal a match on day two will be remembered by many as a sporting highlight for Year 1998. The US Team struggled in the heat of battle on the first two days and could not come to terms with that hot northerly wind and parched conditions that Royal Melbourne is so famous for. The Melbourne weather turned it on for our US visitors with many on the course uttering "where did this come from," when a 20-degree drop in temperature and wind direction came late on the Saturday afternoon.

After months of preparation and pure hard work, Porter and the Royal Melbourne groundstaff thought they were ready for almost anything





↑ MATS MARKLUND, THE LOCAL DISTRIBUTOR FOR CLUB CAR, HAD THE HANDS FULL DURING THE PRESIDENTS CUP

Porter's crew triumphed through the tough conditions. Porter stated that his big advantage was the small number of actual golfers on the course at any one time - minimising the wear on the stressed turf. He was quick to mention however, that on the two hottest days, the soles of the golfers shoes were so hot that they burnt the bentgrass turf leaving clearly visible footprinting. On the Friday and Saturday of the tournament, the greens were watered between rounds. Porter stated that the greens were watered behind the players as they progressed through the course meaning that the front greens were

watered early in the day and the back greens were watered towards the middle and hottest part of the day thus protecting them from heat damage. However, by early afternoon the front greens were again feeling the heat and did suffer as the afternoon groups resumed play.

The Sunday presented new challenges, with heavy rain making many of the tracks around the course untrafficable. Porter placed tones of crushed rock in the worst areas behind the catering compounds (his practice fairway) to maintain traffic flow. Now, after the event, all of this crushed rock has to be picked up. As Porter stated, "crushed rock and turf just don't mix!" Also during Sunday as the rain intensified and water started to puddle on greens, the event organisers requested Porter change a pin position mid-round. Fortunately for match play this is not such a large concern.

Setting pin positions became a major workload for Porter and his assistant Michael Love. Seven separate pin placements were used during the event with two pin placements required on each of Friday and Saturday. Jim stated that he felt like he was going around circles, selecting, setting and marking pin positions with the tournament organisers. On the Friday and Saturday in particular, no sooner had he finished setting the pins than they would follow the players through and move them to new positions. Sunday saw the singles competition with all players competing. Squeegies were required on some greens to remove excess water, mid round with some of the players waving hands in all directions, providing expert(?) advice on the best way to use a squeegie.

The plan for the de-commissioning of the course included the removal of marquees from the most sensitive areas as a major priority. One such area was the member's bowling green which had been covered for about a week and Porter reported that the turf was showing signs of significant recovery as early as Christmas.

Porter stated that some two weeks after the event, the staff was getting back to normal following a days break. Porter has also had a day off and planned to spend his Christmas holidays relaxing in his caravan in northeast Victoria.

Overall the club was impressed with the event and the PGA Tour was pleased with the Royal Melbourne Golf Club, although remained guarded about the locations of future President Cup competitions outside the USA. Many of the International players including prominent South Africans Ernie Els and Nick Price stated that the event should move around from country to country. Melbourne will at the very least play host to another huge international golf event in the not too distant future. January 2001 will see Melbourne play host to the Anderson Consulting World Matchplay Championships. The event, heavily lobbied for by the Victorian Government and Melbourne Major Events, "will see Melbourne confirm its status as the golf centre of Australia," according to Victorian Premier, Jeff Kennett.



↑ LEE JANZEN TEES OFF IN FRONT OF A HUGE CROWD



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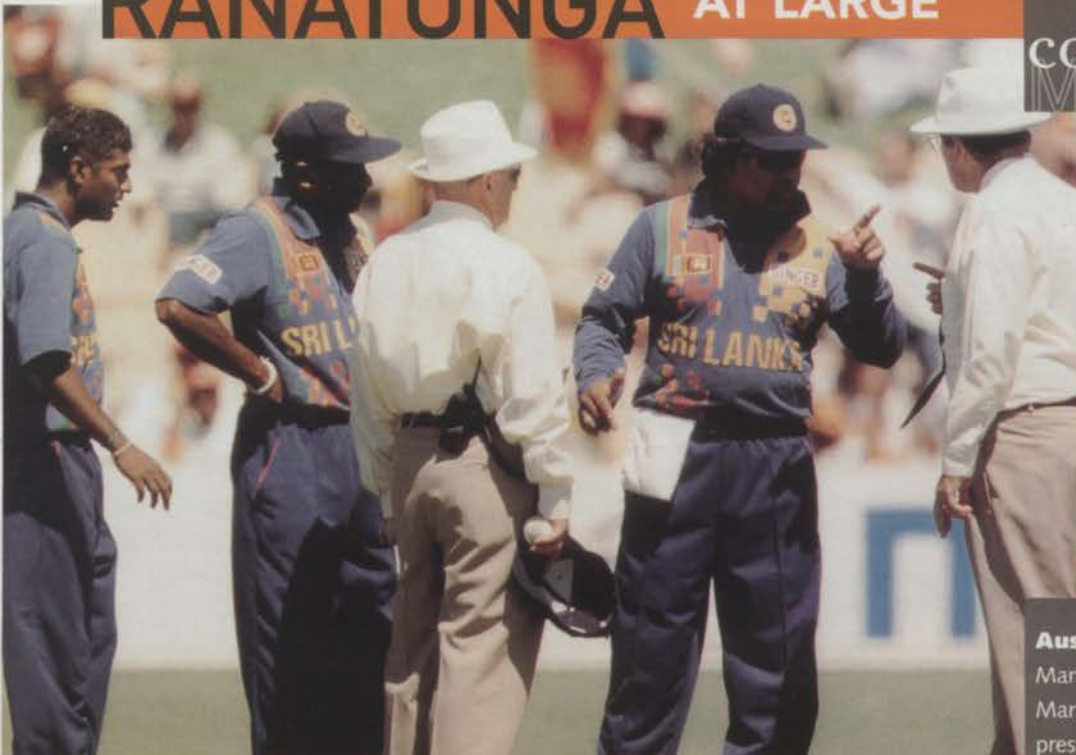
LION

amongst the lambs

Too often during the Ashes Series, England's "braveheart" Darren Gough looked to be the only lion "busting a gut" and was rewarded for his efforts by taking five wickets in Adelaide, bowled his side to victory by destroying the top order in the first innings at Melbourne and followed up with a hat-trick in Sydney.



RANATUNGA AT LARGE



congratulations

MARK PROSSER



Australian Turfgrass Management congratulates Mark Prosser for the way he presented Royal Adelaide for the 1998 Holden Australian Open and for his appointment to the Commonwealth Golf Club as the new Course Superintendent.

Whether or not Sri Lankan spinner Muttiah Muralitharan is a "chucker" and whether or not umpire Ross Emerson should have "no-balled" him in the incident marred tri series one-day match against England in Adelaide are stand alone issues. However, even though Arjuna Ranatunga looks larger than the game, the umpires decision is final and to dispute it for fifteen minutes is unacceptable.

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Risk Factors for Racing Injuries in Australian Thoroughbreds

By Craig Bailey

Injuries sustained by horses during racing represent an important source of wastage to the Australian Thoroughbred industry. Some injuries result in lameness, requiring a long spell from training, whilst others such as broken limbs may necessitate the horse being humanely destroyed. The public's perception of racing is also at stake. While a number of studies investigating racetrack injuries have been conducted in countries such as the United Kingdom (McKee, 1995), the United States (Hill et al., 1986; Haynes and Robinson, 1988; Mohammed et al., 1991; Peloso et al., 1994; Estberg et al., 1996a; Estberg et al., 1996b; Wilson et al., 1996; Cohen et al., 1997) and Japan (Ueda et al., 1993; Oikawa et al., 1994), results from these may not be directly applicable to the unique conditions of Australian racing. Consequently, a study was undertaken to identify risk factors for serious racetrack injuries ("breakdowns") in Thoroughbreds racing at the four Melbourne metropolitan racecourses (Figures 3-1 to 3-4) during the period 1st August 1988 - 31st July 1995. The definition of a breakdown was any

horse that was recorded in the Veterinary Steward's reports as having sustained a musculoskeletal injury (an injury to the bones, joints, tendons, ligaments or muscles) during a race and that then was either euthanised (put down) at the track or failed to race for 6 months from the date of injury. These horses were compared to an equal number of randomly selected horses that had raced at either of the four tracks without signs of injury.

Variables that were thought to be potential risk factors associated with breakdown were then investigated. These included: age, sex, total number of race starts, days since previous start, track (Flemington, Moonee Valley, Caulfield, Sandown), track condition

Fig 3.1 Sandown racecourse



(fast, good, dead, slow or heavy), type of race (flat, hurdle or steeple), class of race (stakes race or non-stakes), distance of race, field size, weight carried, barrier position, distance of previous race and change in distance from previous race, season (summer, autumn, winter or spring) and average days between races.

Risk factors

There were 196 cases of serious musculoskeletal injury in flat races, 52 cases in hurdle races and 53 cases in steeplechases over the seven-year period of study. The variables found to be the most significant risk factors for serious injury were age of the horse, track condition, racetrack and race type.

Age

Increasing age was associated with a progressive increase in risk of breakdown. Horses 4 to 5 years-old were approximately one and a half times more likely to suffer an injury than those aged 2 and 3 years, whilst horses 6 years and older were over two times more likely to sustain an injury. This is not surprising given that older horses are more likely to have been exposed to a greater accumulation of "wear and tear" injuries from a long racing career (Pool and Meagher, 1990). In addition, the age effect may be a reflection of delayed healing in older horses and the greater likelihood of older horses being retired after a serious injury.

Track condition

Tracks rated as "fast" were associated with nearly three and a half times the risk of serious injury compared to "heavy" tracks. In other words, harder, drier turf track surfaces were associated with a greater risk than rain-affected softer tracks. This may be due to harder turf tracks having less cushioning effect (Zebarth and Sheard, 1985). Considerable interest has been focused on the role that track conditions play in racing injuries but results from various studies have been conflicting. For turf tracks in Japan, accident rates are highest on tracks that are in fast condition (JRA, 1991). In contrast, Wilson et al. (1996) reported that the frequency of fractures in two-year-olds racing on dirt tracks was two to three times higher on non-fast tracks than fast tracks. Studies by Hill et al. (1986), Mohammed et al. (1991) and Peloso et al. (1994) found no association between track condition and racing injuries in the United States. It is important to consider that turf track surfaces when affected by rain probably behave differently to dirt tracks (JRA, 1991).



Racetrack

Differences were found between the risk of breakdown at some of the Melbourne racecourses. During the period of study, horses racing at Flemington were at an increased risk of injury compared to horses racing at Moonee Valley. This was a surprising result given that Moonee Valley is a smaller course with tighter turns. However, the increased risk of Flemington appeared to be more associated with the steeplechase track. The difference in risk may be due to different track designs or structural features such as the number and positions of crossings that represent areas of increased soil compaction (Clanton et al., 1991). Whilst this is speculative, it does provide an indication that further comparison of these tracks is warranted, particularly since major renovations have been carried out at some of the racetracks after the end of the study period.

Race type

The most notable risk factor was the type of race. When compared to flat races, horses in hurdle races were approximately four times as likely to be injured, whilst horses in steeple races had the greatest risk, being nearly eight times more likely to suffer an injury compared to horses racing on the flat. The presence of barriers is the most obvious factor placing horses in jumping races at greater risk and

Fig 3.2

Moonee Valley racecourse



Fig 3.3

Flemington racecourse

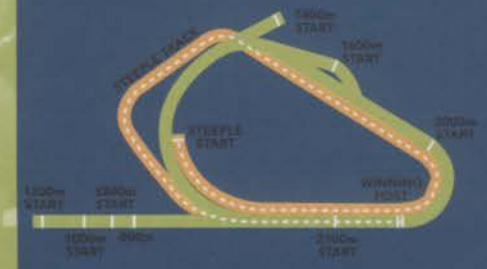
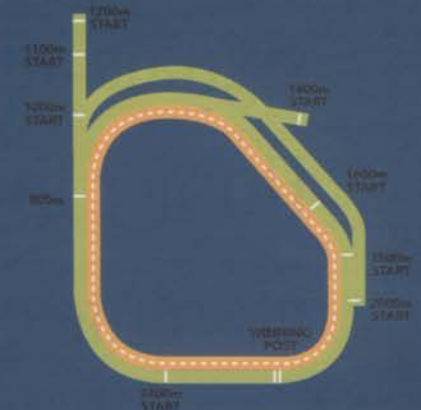


Fig 3.4

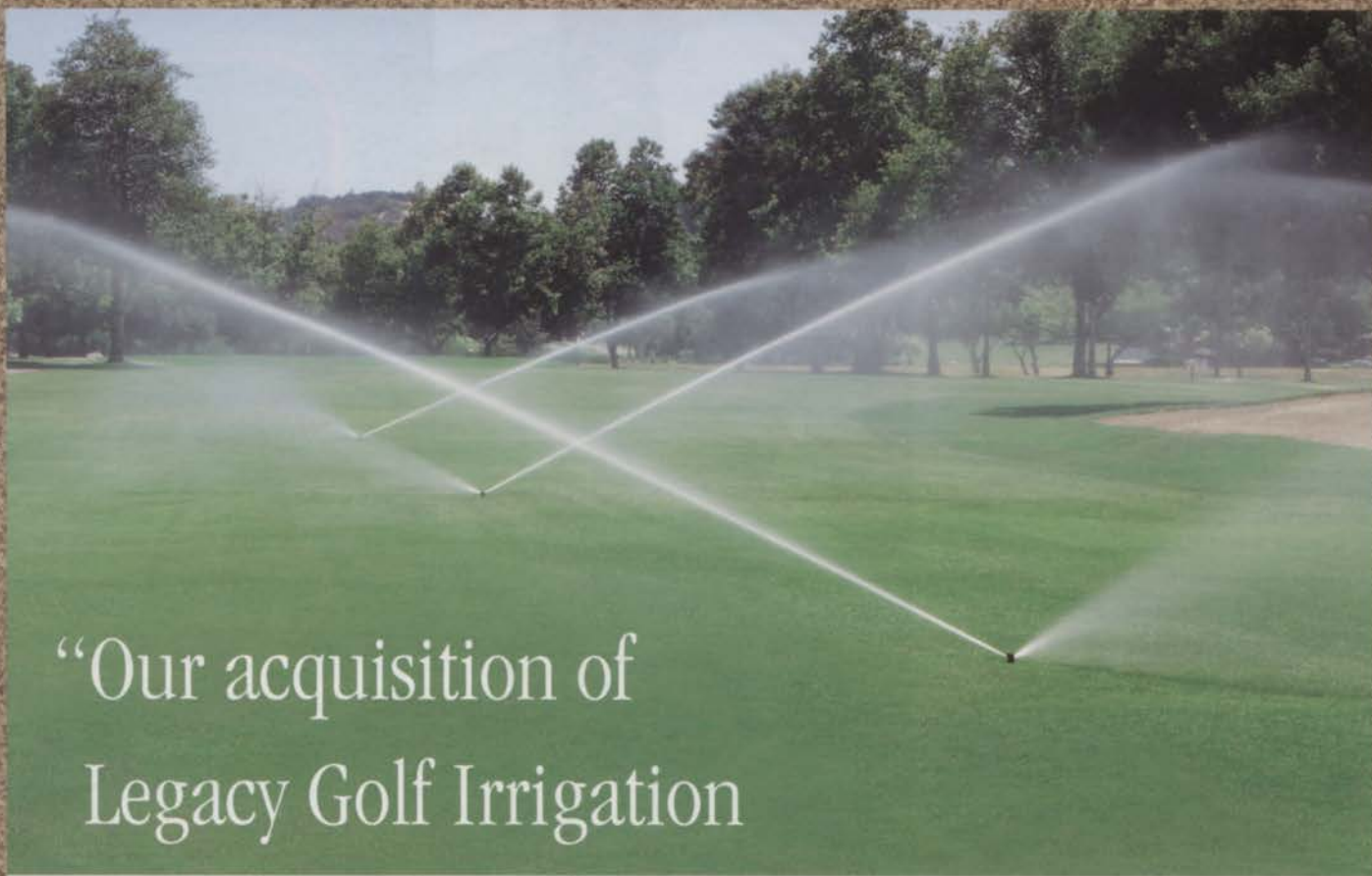
Caulfield racecourse



the finding that the majority of jumping fatalities were associated with a fall (Bourke, 1994) supports this. The jumps in steeplechase races are solid structures and are higher than the brush hurdle jumps, contributing to the increased risk of injury in steeplechase races compared to hurdle races.

Injury and fatality rates

Severe injuries involving the bones, joints, muscles, tendons or ligaments that necessitate the humane destruction of a horse are referred to as musculoskeletal (MS) fatalities. Figure 3-5 shows the incidence of MS fatalities and MS breakdowns for flat, hurdle and



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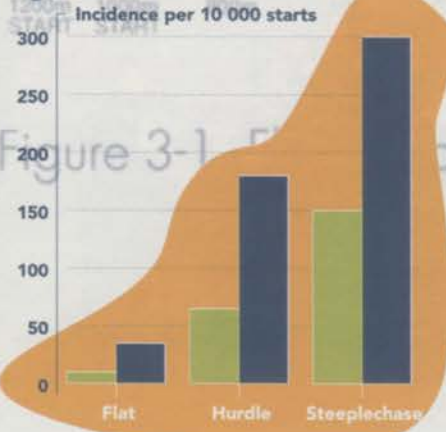
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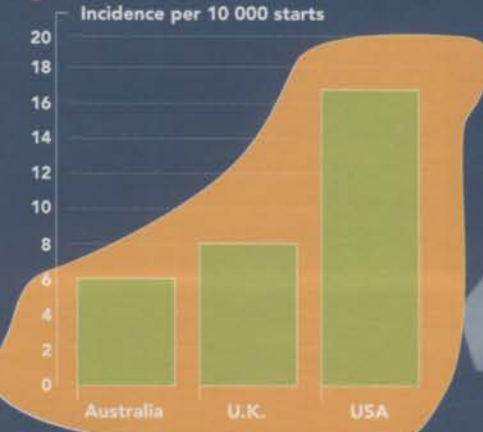
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Fig 3.5



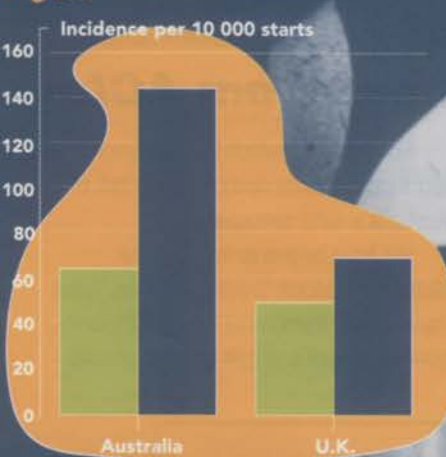
Graph of the rates of musculoskeletal fatalities and breakdowns in flat, hurdle and steeplechase races at four Melbourne racecourses for the period August 1988 - July 1995

Fig 3.6



Graph comparing the rates of flat racing fatalities in Australia, the U.K. and U.S.A.

Fig 3.7



Graph comparing the incidence of fatalities in hurdle and steeplechase races in Australia and the U.K.

steeplechase races. (As outlined previously, the definition of a breakdown included horses that were put-down and horses that did not race within 6 months of being injured.) The incidence of MS fatalities in flat races for the four Melbourne tracks was 6 deaths per 10,000 starts (a start represents a single horse leaving the starting gate). This fatality rate was comparable to figures reported in the United Kingdom (8 deaths/10,000 starts) (McKee, 1995) but considerably lower than the United States, which ranged from 14 (Peloso et al., 1994) to 17 (Estberg et al., 1996b) deaths per 10,000 starts (Figure 3-6). In the United States, racing is predominantly on dirt tracks, in contrast to the turf racecourses of the U.K. and Australia. However, directly inferring that turf tracks are safer may be over-simplistic. Other possible explanations for this difference include variation in the frequency of racing, rules governing the use of medications (e.g. "bute") before racing, climatic conditions, training regimens and the class of horse, which may be associated with racing on each particular type of track.





In contrast, the fatality rates for jumping races were higher for the four Melbourne tracks than that in the U.K. (Figure 3-7). At the Melbourne tracks, there were 63 deaths/10,000 starts in hurdle races and 143 deaths/10,000 starts in steeplechase races, whereas in the U.K., there were 49 deaths/10,000 starts in hurdle races and 70 deaths/10,000 starts in steeplechase races (McKee, 1995). Differences may exist between the type of horse used for jumping races in the two countries. In Australia, geldings that have retired from a career in flat racing form a large proportion of the population of jumping horses, and thus are older and may have predisposing

injuries, whereas in England, horses are more likely to be specifically bred and reared for jumping races.

Conclusion

It may be regarded that horses taking part in athletic competition are inevitably placed at risk of injury. However, there is a responsibility on the veterinary profession and racing industry to address the welfare and public relations issues arising from such injuries. Substantial research is needed if serious injuries are to be prevented or at least have their incidence

reduced. Maintaining accurate and uniform records of track conditions and injuries, during both training and racing, is an important part of this process, which will enable the safety of a track's design and surface to be evaluated. Based on the identified risk factors, strategies of a practical nature that could be implemented to reduce the incidence of injury may include closer monitoring and regulation of track moisture content to avoid excessively hard racing surfaces; more rigorous examination of horses before races for signs of lameness, particularly in older horses; and altering the number and design of jumps in hurdle and steeplechase races. However, although the odds of becoming injured may be quite high for some factors, the incidence of serious injury and death is very low at the tracks studied, and horses racing at them appear to be as safe or safer than horses racing at tracks in the United Kingdom and United States.

'Risk Factors for Racing Injuries in Australian Thoroughbreds' is reproduced from 'Wastage in the Australian Thoroughbred Racing Industry' published by 'The Rural Industries Research & Development Corporation'. The complete book is available through RIRDC for \$10.00. Phone (02) 6272 4819.



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Year 2000 Millennium

Turfgrass Conference Launched



↓
After years of thought and months of planning and discussion the Year 2000 Millennium Turfgrass Conference was officially launched by the Overall Joint Steering Committee in December. The committee is made up of representatives from the major turfgrass associations/ conferences in Australia including:

Australian Golf Course Superintendents Association

Victorian Bowling Greenkeepers Association on behalf of bowling green managers

Seed Industry Association of Australia

Turfgrass Association of Australia

John Neylan as co-organiser of the Racing Industry Annual Conference

Parks and Leisure Australia

The Conference and Trade Exhibition will be held at the Melbourne Exhibition Centre, from June 5th-8th, Year 2000. Six plenary session rooms, over 250 rooms of accommodation and 6,000 square metres of

↑ MELBOURNE EXHIBITION CENTRE

exhibit space have already been booked for the event which is set to be the most comprehensive turf management conference ever staged in Australia.

Each of the various associations involved has agreed on an overall conference template. The template includes a four day golf turf conference and workshops, a three day bowling greenkeepers conference, a two-three day racetrack managers conference, a one day cricket wicket seminar and a one day sportsfield managers seminar. The Opening Session

will see all of the separate groups come together for a keynote session which will see leading turfgrass luminaries pose their prophecies as to what's in store for the turfgrass industry during the next millennium. The AGCSA will act as the Conference Secretariat and Exhibition Manager for the event. The Overall Joint Steering Committee tours the Melbourne Exhibition Centre in early February and hopes to have preliminary programs available by mid year. Further information can be obtained by contacting Euan Laird at the AGCSA on (03)9886-6200.

→ MEMBERS OF THE OVERALL JOINT STEERING COMMITTEE (L TO R) BACK ROW- PETER STOWE, MICHAEL REESE, PETER FREWIN, MARK COUCHMAN, MATT SCOTT, PETER BARRON, ROBERT SAVEDRA, JOHN NEYLAN



TECHNOLOGY and golf



Peter Thomson, Five Times British Open Winner and Captain of the successful International Team in the recent Presidents Cup, reports on the influence of technology in golf course design.

Any event worldwide that aspires to the title 'championship' must provide a worthwhile test of the modern equipped player's skill. It is not enough in this day and age to turn them loose on 'the members course', hoping that the weather will be foul enough that they won't tear it apart. These considerations then come into the preparation of courses for Open Championship play. Holes must be of a dimension commensurate with professional playing length. Which is usually, at sea level, seeing drives of 270 metres and more. Even then courses are vulnerable if conditions are friendly and soft. Greens have to be reasonably firm for the approach shot. Some of these items are within the realm and responsibility of the Course Superintendent, who will achieve such goals if he is allowed free rein for his talents. The rest fall into the category of design/architecture. This new development has come about because of modern technology yielding club and ball designs increasing the distance and accuracy of golfers at all levels. Drives over 300 yards are common if not the norm. Unless a hole measures 500 metres, it is comfortably within reach of two professional shots. It is thus virtually a Par 4. Most courses built before the 1950's, would have two or three holes of such length. Thus in rating these for championship play, they would end up as fours, not fives. The total Par of the course would add up to perhaps 70 or even less. Bunkering is the item that gives 'teeth' to bite with. Apart from disposition, bunkers for Open Championships should provide definite penalties of distance. Players must face the fact that to get caught in a fairway bunker will cost at least a stroke by way of distance

limitation. To get this in sand, bunkers must have enough depth to provide a fairly straight 'face' which makes forward progress a matter of sacrifice.

The R&A Championship Committee achieves this by revetting the walls. The USGA have a different philosophy, using more than reasonable long grass off-side. However, bunkers are raked to a softness that at least offers a possibility of unpleasantness. Why all this? A championship course must have some sort of strategy and hard thinking. Bunkers must 'worry' contestants. The Australian



Golf Union is moving steadily forward towards the R&A standards of course preparation for the Open Championship. Metropolitan Golf Club made some major changes for the 1997 Open and Royal Adelaide undertook even more radical upgrading for the recent Australian Open. It is a step in the right direction as far as the Open's standing is concerned. Are we heading then for championship courses of Par 70? It seems so. If it is good enough for Royal Birkdale, it would seem good enough for anywhere else. Seventy is certainly an all-round good score. This is a score, which a competent touring pro would average over a period, playing the course from its back tees.



Holes under 500 metres would be rated as fours, since, even if he couldn't actually get on the green in two shots (and then two putt), his skill with the pitching club would make up the difference. (Pros pitching from inside 50 metres will be extremely angry if they take more than two to get down.) On the subject of distance and measuring of holes, I offer the principle that measuring of holes should be done from the 'medal' tee markers, to the very far back cup position on the green. The reason for this is that it is most often the actual 'yardage' played. A par three of say 167 metres, (which is the new length of the extended 7th hole at Royal Adelaide measured by laser to the green centre), is actually 177 metres, when the cup on the green is cut somewhere near the far back edge. This pin position is used at least once in any championship week. This measuring applied over the whole course, will add another 180 metres to nearly every layout. Most greens are at least 20 metres in depth, some like those at the Vines are even double that. It really means that

championship courses measured by the conventional manner, are actually much shorter than they play. The touring professionals know this, because they are supplied with accurate charts of all greens and 'pin placements' each day of a championship. In addition they do their own measuring. They know when a hole is 177 metres and not 167 metres, as the card reads. Royal Adelaide is the longest course on the Championship roster now as a result of the recent extensions. It is measured at 6507 metres.

However, on some days of the recent Championship, it was actually longer. Some sacrifices of length had to be made to surrender space to grandstands and the like. But generally speaking it was a long course indeed.

Acknowledgement: SAGCA Journal 2 1998

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The Effect of Technology on Cricket

By Phil George



We are now witnessing the development of a human subspecies, characterised by enlarged thumbs and capable of flicking a joystick up to 310 times per second. There once was a time however, when the summer song of the cicada, was broken only by incessant appealing, and the occasional scuffle between school boys trying to avoid the "follow on" in what was possibly the seventh innings of the Saturday afternoon Test. I distinctly remember pushing off the neighbour's roller door, (which doubled as a sightscreen), and after extending myself to a full 4 ft 7 inches in my best Joel Garner impersonation, had my brother beautifully caught at point, only to have him insist that it came off his forearm. The match erupted and ended in tears. This was a time when you virtually had to hit the cover off the ball to get caught behind, and had to be struck half way up the shin, dead in front, with the bat raised Chris Tavaré style, to be given out LBW. As far as my mates and I were concerned, this was "cricket" and it didn't get any better than that.

Things have changed since then though. I now bowl left arm "nude" balls (nothing on them!) and technological advances are revolutionising professional sport at an unprecedented rate. Opinions are generally divided as to whether or not these changes have improved sport from a player and spectator point of view. I caught up with former Test Umpire and now the ACB's National Umpires Manager Mr. Tony Crafter at cricket headquarters in Melbourne to discuss.


The "3rd umpire" was first used in the 1992-93 South Africa / India Test Series. It was to be used to assist with hit wicket, run out and stumping decisions but has now evolved to the point where in New Zealand video technology is called in to help with all decisions except leg before wicket (LBW), in the Super 8's competition. Following a controversial series between England and South Africa last year, a South African University Professor designed a system capable of quickly and accurately judging LBW decisions. The system is likely to be in use in South Africa next year. Hi-tech video cameras provide such clarity that caught behind decisions can also now be made with a superior degree of accuracy. Tony Crafter believes that improved video technology has proved to be a valuable educational tool for introducing new cricket fans to the game. He said it has added excitement and extra dimensions to the experience of watching a game live, by being able to refer to the "big screen" for replays. Tony had concerns however, that the introduction of the 3rd umpire has removed much of the "human element" and "character" that the umpires brought to the game. "I would hate to see things get to the stage where umpires were only on the ground to hold hats and jumpers," he said. He also indicated that all first class umpires were under more pressure than ever because of the increased scrutiny that

technology provides. He added that umpires are therefore less likely to rely on their own judgement alone in calling close decisions, but recognised that cricket is very much a professional sport where the ramifications of incorrect decisions can be considerable. Former test Captain Greg Chappell put a positive spin on this issue by saying that the introduction of video technology has been great because it shows just how often the umpires get it right!

The speed of technology change especially where video and computer technology is concerned does in fact represent a serious challenge to cricket administrators and threat to a game based so heavily on tradition. However, Tony anticipated that the establishment of some clear guidelines and limits will take a high priority at an International Cricket Council (ICC) meeting to be held later this year.

I doubt whether cricket will ever get to the stage where all matches are played indoors on specially designed "international pitches" that are transported all over the world but if you had of told me 10 years ago that LBW decisions would be decided by computer in the year 2000, I would have had my doubts.





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Treated wastewater is an important water resource, particularly from an irrigation point of view and in many situations it maybe the only source of supplemental water for turf culture.

With the greater demands on our water supplies for domestic consumption, there is less water available for irrigation purposes. On the other hand, with the increase in urban development there is not only a greater demand for potable waters but also more wastewater generated. The treatment of this wastewater and its disposal has become a significant environmental issue. In particular, the disposal or reuse of wastewater must be done in an ecologically sustainable manner. Wastewater can contain a range of contaminants including salts, nutrients, heavy metals, viruses and bacteria that can limit the reuse options.

The use of wastewater that has a heavy contaminant load can have implications for human health, cause soil degradation and result in uncontrolled discharge of nutrients to surface and groundwaters. The other important component of the sustainability equation is maintaining the playing quality of the turf area.

In Victoria and other states, the reuse of wastewater will be in the future an integral

part of the ecological sustainable development and integrated catchment management philosophies concerning water quality (EPA 1996). There is now strong encouragement to reuse treated wastewater for irrigation purposes in order to protect the quality of surface waters. In most states, there are environment protection policies that demand that wastewater no longer be discharged to surface waters and that it be reused. The general philosophy and in some cases legislation, demands there be no discharge of wastewater to waterways by early in the new millennium. As a consequence there are numerous reuse schemes being established around Australia, using wastewater to irrigate turf.

The reuse of wastewater has a strong community appeal and it seems to be the right thing to do. However, if a reuse scheme is to be sustainable for a long period and most authorities define this as at least 50 years, then there is a lot of investigation required before the scheme is implemented. Once the scheme is implemented it must then be monitored to ensure that it is sustainable and does not present an environmental risk.

GUIDELINES FOR WASTEWATER REUSE

Most of the state authorities responsible for the reuse of wastewater, such as the Environment Protection Authority (EPA) and the various State Health Authorities, have in conjunction with Departments of Agriculture and Water Authorities produced guidelines for wastewater reuse. These guidelines do vary from state to state, however, the underlying philosophies are similar and most use the ANZECC (1992) water quality guidelines and the National Health and Medical Research Council and Australian Water Research Council Guidelines (1987) as their base documents.

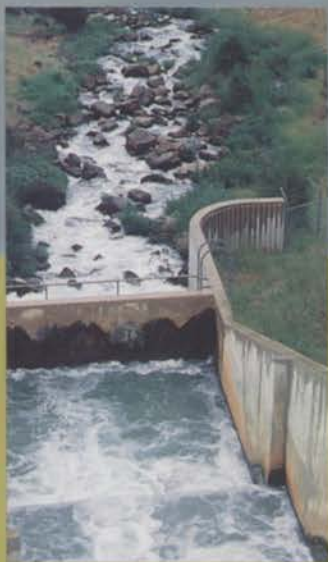
The guidelines can be described as performance based and encourage best management practices. This approach is designed to assist the user of wastewater to achieve certain environmental objectives and outcomes and is not necessarily regulatory. The topics that the guidelines include are ;

Potential Reuse Options

The guidelines encourage water authorities to investigate all possible reuse options whether they are for urban, agricultural or industrial applications.

The critical aspect of reuse is that the wastewater be managed to achieve the following environmental performance objectives;

- > Management of wastewater so as not to cause any health risks.
- > Control of reuse operation so as not to pollute ground or surface waters.
- > Use of organic matter, nutrients, salts & wastewater for sustainable operation (EPA 1996)



Roles and Responsibilities

- > It is generally accepted that it is the responsibility of the supplier to ensure that no harm results from the use of wastewater. There is a requirement for the supplier and user to develop a sustainable system that includes the following;
- > An understanding of the relevant legislation and that the appropriate licences and permits are obtained.
A good communication strategy is developed. This means communication between users, supplier, community groups and statutory authorities by way of appropriate reporting procedures.
- > A management plan is developed that accounts for soil and water conditions, vegetation, proximity to houses etc.
- > Environmental monitoring is critical in the operation of a reuse system. It is important to assess turf management techniques, fate of nutrients, impact on water bodies and changes in turf quality so that appropriate actions can be taken to avert any environmental problems.

Good record keeping is essential.

Wastewater Treatment and Quality

The quality of the wastewater depends on the catchment and industries serviced and may include water from industrial sources, stormwater runoff and sewage. The level of treatment will determine the proposed use and must be such that it protects the beneficial uses of soil, ground and surface waters from polluted runoff and protects public health from toxicants and micro-organisms.

The performance objectives for wastewater reuse are based primarily on the human health requirements. In general, the better the treatment and the greater the disinfection, the fewer microorganisms there will be and therefore there are fewer (or no) restrictions to site access.

For example, tertiary or advanced treatment will produce an effluent that is very low in Biological Oxygen Demand (BOD), suspended solids (SS), coliform bacteria and viruses and the wastewater can be used for food crops, aquaculture or where there is close human contact with the irrigated area.

Nutrients, salts and heavy metals are recognised as important constituents of wastewater and must be accounted for in determining the sustainability of a reuse site (see wastewater quality for irrigating turf).

WASTEWATER QUALITY FOR IRRIGATING TURF

The development and maintenance of a quality turf surface depends on the availability of a good quality water supply. All irrigation waters, including wastewater, contain varying concentrations of soluble salts and other elements. These may include sodium, calcium, magnesium, potassium, chloride, bicarbonate, sulphate, boron, and

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nitrate. Of significant importance for wastewater use on turf areas is the nutrient content and in particular the nitrogen and phosphorus concentrations.

The quality of irrigation waters has been discussed in detail by Neylan (1994) and ANZECC (1992), however, some of the key implications of the various constituents are as follows;

Total soluble salts (salinity): Probably the single most important measure and indicator of water quality. High salinity levels are very detrimental to turf growth due to the osmotic inhibition of water absorption (physiological drought), nutritional imbalances and salt ions toxicity.

Chloride: Chloride can cause direct injury to turfgrasses.

Sodium: If sodium is in excess it can cause the deterioration of soil structure, particularly on high clay content soils.

Bicarbonate: High levels of Bicarbonate can increase the sodium hazard by forming insoluble calcium and magnesium carbonates in the soil which increases the proportion of sodium and therefore has a greater effect on soil permeability.

Nitrogen: Nitrogen levels can be very high in wastewater and the main impact will be on grass growth. Everytime the turf is irrigated it is fertilised with a soluble source of nitrogen that is readily taken up by the plant. Uncontrolled and lush growth can occur, resulting in a soft, thatchy and disease prone turf.

Phosphorus: Phosphorus is another important element and applications in excess of what the soil can absorb and the plant will take up can be leached into ground and surface waters.

Heavy metals: In domestic wastewater sources, the concentration of heavy metals is generally low. However, wastewater from industrial sources may contain high concentrations of zinc, lead, copper etc, depending on the industrial processes.

Other contaminants: Wastewater used for turf irrigation can come from non-sewage sources and knowledge of what takes place at the source will provide an indication of possible toxic elements e.g. Citrus processing - various oils and acids. Petroleum processing - hydrocarbon residues.

Wool scouring - sodium and bicarbonate.

In assessing the suitability of wastewater for irrigating turf, long term analytical data is required as the quality of wastewater can change during the year e.g. in summer the salts often increase. Monthly water quality data over several years will give a good indication of the possible changes. Unfortunately many wastewater treatment plants and in particular those in rural areas often only have minimal information available.

The critical data required is:

- pH
- Electrical conductivity
- Calcium
- Magnesium
- NH₃-N
- Total phosphorus
- Bicarbonate
- Heavy metals
- Sodium
- Chloride
- NO₃-N
- NO₂-N
- Potassium
- Boron

Site evaluation & monitoring

In evaluating the feasibility of using wastewater it is important to determine whether or not the system can cope with the potential nutrient and salt loads and that a long term, sustainable turf system can be maintained. There is no point in establishing a recycling system because it seems like a good thing to do, if in the long term it is going to result in site degradation.

Any site assessment must look in detail at all greens tees and fairways and determine the following conditions;

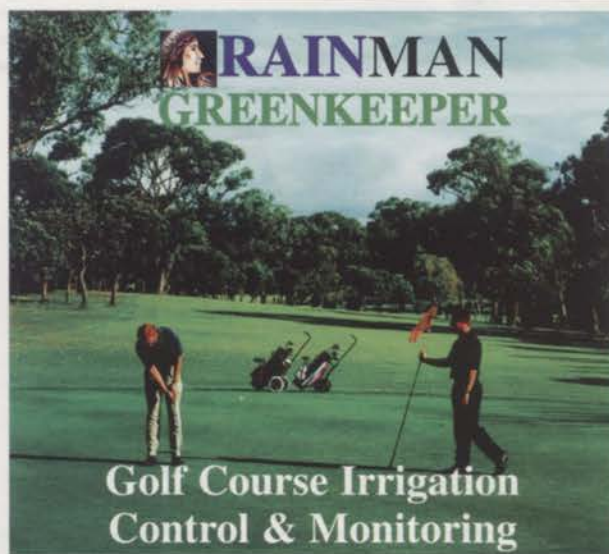
- Soil types
- Drainage
- Grass Species
- Phosphorus retention
- Proximity and quality of ground and surface waters
- Topography
- Geology of the site
- Irrigation requirements
- Nutrient loads
- Ability of the site to cope with extra demands because of the waste water e.g. extra growth, runoff contaminant

Once the site assessment is completed and a reuse program implemented, it is then necessary to initiate a monitoring program. The site assessment will identify key areas that can be used as indicators and include monitoring surface and groundwater, each of the major soil types and representative greens and tees. The monitoring will consist mainly of water and soil analysis and keeping records of any significant changes in turf conditions.

CONCLUSION

Wastewater is an excellent source of water if it is of satisfactory quality for the intended purpose. The salts, nutrients etc., in wastewater can be beneficial, however, in excess, they pose a significant environmental risk. To reuse wastewater, because it is an environmentally friendly thing to do, is admirable, however, the system must be sustainable in the long term. Excessive concentrations of nutrients, salts, heavy metals and other contaminants can cause rapid and severe deterioration of soils, turf quality and water bodies.

With careful planning, good understanding of the wastewater/site interactions, good site and water management and an appropriate monitoring program, wastewater can be a useful resource and not become a contaminant.



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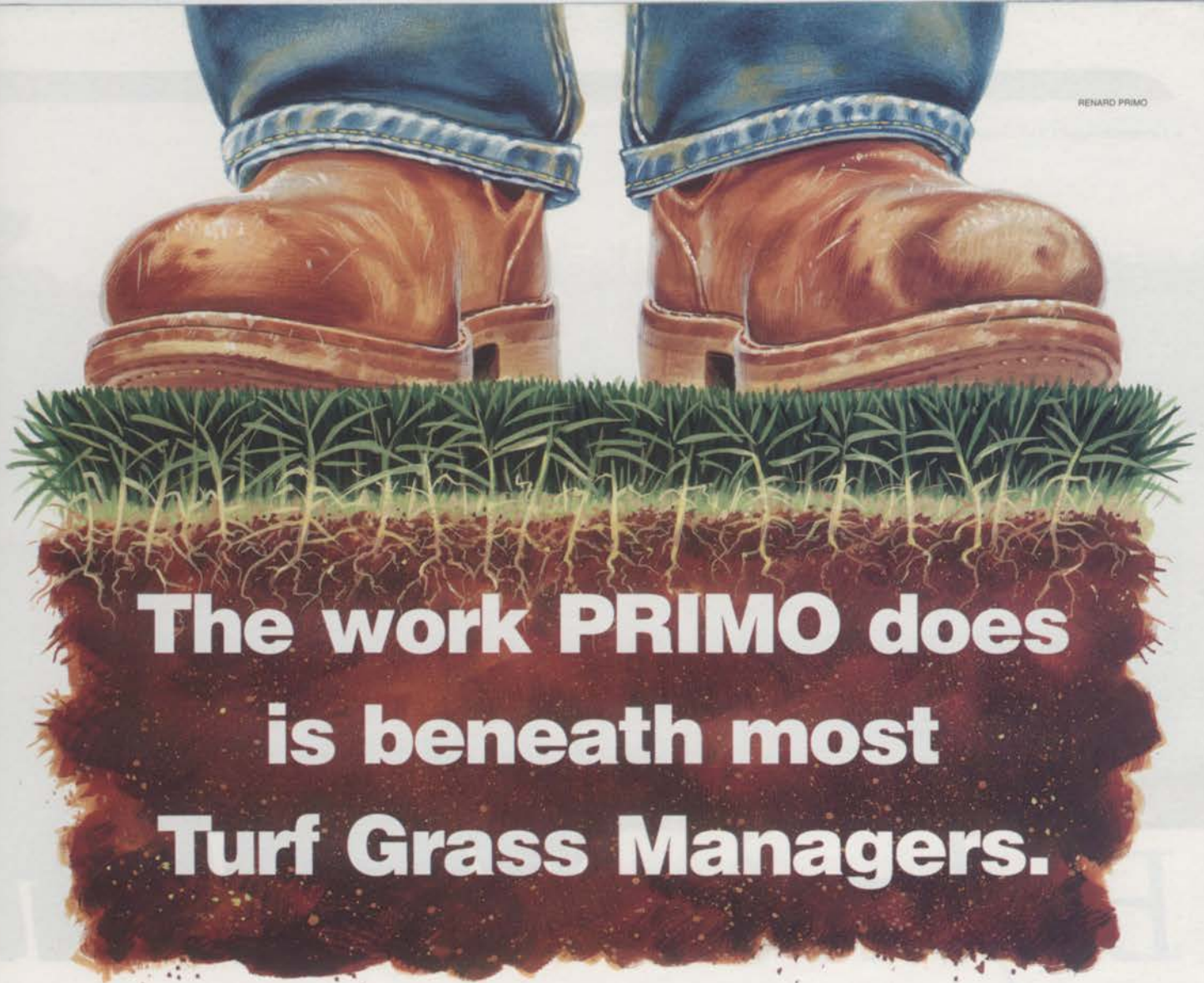


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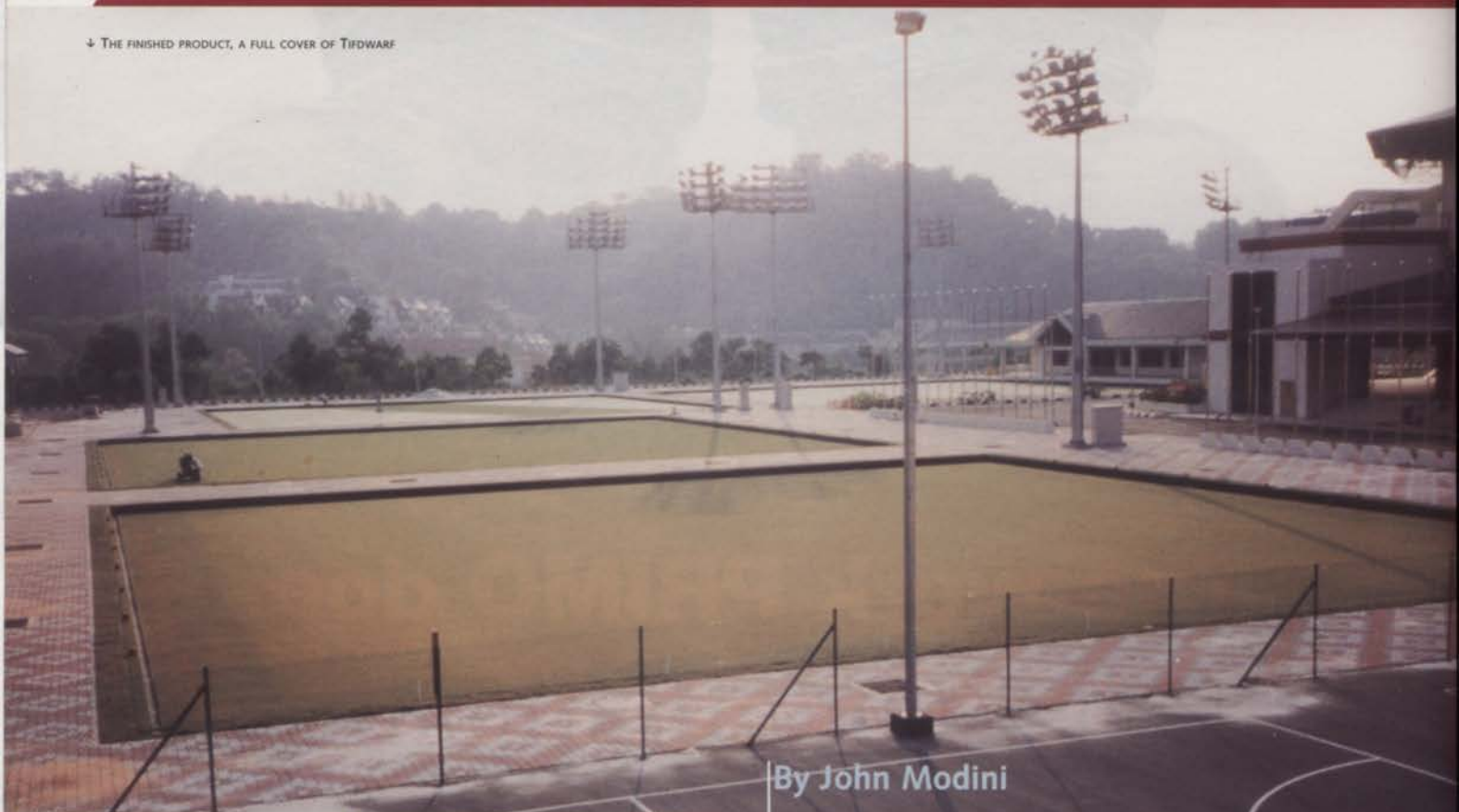
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By John Modini

Eighteen Months in

The Land of

CURRIED FISH

John Modini, a Queensland bowling greenkeeper had the experience of a lifetime, when he accepted a position in charge of the construction and maintenance of the bowling greens and the main soccer pitch for the Commonwealth Games held in Kuala Lumpur last year. Below he reports on the unique challenges he encountered.

When an opportunity arose to assist in the construction and maintenance of the bowling greens in Malaysia for the 1998 Kuala Lumpur Commonwealth Games, I leapt at the chance. After fourteen years as a Bowling Greenkeeper at the Coolangatta Bowling Club, I knew it was time for a change. I first travelled to Malaysia in August 1996 to familiarise myself with the site and on March 18th,

1997 I found myself flying to Kuala Lumpur to start work. I was employed by a Malaysian company, Grasse Master. This company had the overall task of the construction and maintenance of five bowling greens and the soccer pitch in the main stadium for the Commonwealth Games. I was to be responsible predominantly for the bowling greens but upon arrival found that a large part of my duties also included the soccer pitch being constructed. Fortunately, I had an expert team working alongside me, with representatives from StrathAyr, Grass Master, the New Zealand Turf Culture Institute and a diligent team of Indonesians.

Although, the language barrier proved difficult at times, their dedication and work ethic had a very positive influence on me. Our first major task was to secure a reliable and consistent supply of high quality sand. At one of the sandpits, the Lands Department turned up and told us to stop working, threatening us with arrest. As I didn't like the idea of spending a night in jail, work stopped until the matter was sorted out. I lost track of the number of sand tests I carried out to ensure the sand met the specifications. Finding a reliable supply was made more difficult by the local conditions - I arrived one morning at one sandpit to find that a

connecting bridge had washed away during the night. We managed to find a narrow makeshift track through a rubber plantation, but we were quite nervous crossing the many small bridges on the track with our Proton Saga (type of car). It brought back memories of the Leyland brothers - the only difference was I didn't have a 4 wheel drive! Due to constant problems at this sandpit I was forced to find another source. After inspecting a further 20 pits, I finally found two pits which were OK. The bowling greens were eventually constructed using the StrathAyr system with "Reflex" mesh elements. The greens had a very high drainage rate. The lower layer of sand was amended with zeolite to increase the nutrient holding

White Spot", a fungal disease, which effected many new greens. The disease had also effected golf courses and other turf areas in the region. Iron was used to reduce the visual appearance of the disease with success. Turf growth was generally so rapid that it did not show up for long. The Tifdwarf couchgrass required very little fungicide considering the high rainfall and very humid conditions. The greens were fertilised initially with Lesco Turf Starter supplied by Chemturf, and then Coron



capacity of the greens and Dynamic Lifter was added to increase the organic matter content. We had some unique challenges during the establishment period with monkeys and wild dogs digging holes in the sand layer - but we soon solved that problem! At one stage a television light tower fell onto the green but luckily we didn't have any grass planted and no one was injured.

The first two greens were planted in December 1997 and the remaining three by mid March 1998. The first two greens were ready for play in April and all were open for the six-nations tournament held in June/July, only three months after the last three greens were stolonized to Tifdwarf. Early on, some of the greens showed signs of what was termed, "Asian



High K was used as a maintenance type fertiliser based on soil tests. I found that the greens were leaching so rapidly that even with slow release fertiliser, applications of N-K type fertilisers were required every three weeks. Primo was also used on the bowling greens with good results. Broken irrigation pipes were a constant problem at Bukit Kiara (Lawn Bowls Site) due to there being so many contractors digging every where.





When I first arrived in Malaysia, irrigation was not a concern as like clockwork, the rain would start at around 4.00pm and last for at least one hour (I am sure that raindrops are bigger than here in Australia), - well that was until El nino hit. You may recall seeing the terrible fires and associated pollution on the Australian news channels. This was the worst drought Malaysia and neighbouring countries had experienced for decades. A drought in the tropics, but at least the Tidwarf on the greens and the Greenlees Park on the Soccer pitch were tough enough to withstand such conditions. Twelve full time construction staff were involved in the bowling greens. Four of these I trained on to assist with maintenance, and a further four were trained closer to the Commonwealth Games to assist with greens maintenance. The Indonesian labourers were a great bunch of guys and despite the language barrier we developed many friendships. The success of the overall project lay with the team effort. The most rewarding aspect was being able to prove the critics wrong - especially the people who were trying to push synthetics as a bowling green surface for the Commonwealth Games. The most disappointing thing was when the powers in Malaysia decided to build a stage in the middle of the newly built soccer pitch. This was left in place for twelve days despite our advice that it would cause significant turf damage. The damage was repaired but to no avail.

During five consecutive dress rehearsals for the Commonwealth Games Opening Ceremony, the entire pitch was covered with black plastic. In the end, the turf was cooked under the hot plastic, and the decision was eventually made to spray the entire field with green dye in time for the Commonwealth Games. I have learnt a lot in the last eighteen months and haven't looked back. At present I am assisting with the construction of the turf surface at Stadium Australia, but I am hoping to go back to Malaysia for a new contract or maybe to Brunei if they decide to go for grass rather than synthetic on their bowling greens. It would be remiss of me not to mention those that supported me

during the project. The turf stolons were supplied by Bob Cass, from West Horizon Malaysia, Lesco products were supplied by Matt Gallagher and staff from Nufarm Malaysia. Maintenance machinery including greens mowers and rollers were supplied by Stan Wells, from Turfwell Sales in Australia. Thanks to Ted Baker and Staff from Chemturf, Globe Australia, Keith McAuliffe and staff from the Turf Culture Institute in New Zealand and Joe McCullagh Construction Manager, StrathAyr. The golfies, Shane (Arnott's) Bisseker, Scott Paterson, Dave Thompson, were always willing to give advice and support. The staff and management of Grasse Master were also a great help. All up, everything turned out well, the greens were level and consistent with 99% of the bowlers happy. It was a fantastic experience just to be involved in the 1998 Commonwealth Games.



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SCG

BY PETER SCHUMACHER

On January 2nd this year the Australian test team did battle with England in the fifth and final game of the 1998/99 Ashes series at the Sydney Cricket ground. The ground however went through its own battle long before January 2nd. The SCG is very much a multi use facility and the transition from AFL football to first class cricket can be both difficult and dangerous. With the recent success of the Sydney Swans, over the last couple of seasons, the spring renovations have become more and more demanding and the time allowed for recovery before the commencement of cricket has been steadily decreasing. A problem not dissimilar to many of our major sporting complexes around Australia.

What is different at the SCG compared to the other major grounds around Australia is that after the resignation of Curator Peter Leroy the SCG Trust decided not to replace that level of management, preferring to increase the responsibility of the four department heads. The turf facilities were split and each department head given sole responsibility for its renovation, preparation and maintenance. The turf facilities and managers responsible for them are Wicket Table- Tom Parker, Outfield- Mark Familow, Sydney Football Stadium- Michael Finch and Horticulture- Doug Robson. Each department head reports to the SCG Trust Property Manager and through him to the Chief Executive Officer of the trust.



ASHES

Tom Parker, wicket table curator, said that even during the middle of the AFL season his thoughts are on the up and coming cricket season. The wicket table is covered through out the entire year when the weather necessitates it. Tom says that the wicket table is covered during the football season for two main reasons. The first, being for the protection of the table and to provide more grass for the up coming spring. The second is for presentation purposes. Tom says that with AFL football on our televisions every weekend the administrators and viewers do not like seeing a mud heap in the middle of their screen. Therefore the covers are placed on the wicket table whenever rain is forecast in the lead up to a Swans game or even a Swans training session.

At the end of the football season a thorough inspection of the wicket table is carried out to determine what renovation practices are required and most importantly to select what pitch will be used for the test match. There are 9 pitches on the SCG wicket table and all efforts are made to play the test match on the middle pitch. If this pitch has been damaged by football, then one of the pitches, either side of the middle one will be used. Each year approximately 2 pitches are entirely returned due to the football damage. To bring the rest of the

wicket table up to a playable standard traditional renovation practices are used. These include scarifying, vacuuming, cutting, sprigging or stolonizing, topdressing, laser grading and fertilising. Tom Parker said that, even with all of the above encouragement for good growth, if the soil temperature is not sufficient during the middle of spring, then the wicket table can be quite thin come the start of the cricket season. Tom says that this year was one of those years with the coldest November in 50 years and the wettest August in recorded history. He said that the couch grass just sat there and looked at him until early December. Remembering that the first game of cricket was set down for October 27 it is not hard to see the difficulties Tom faced.





In the lead up to the test, the pitch came under what one might call normal maintenance. All other games in the weeks preceding the test match were planned around reducing the amount of wear and reducing the possibility of wear on the test match pitch. Therefore cricketers found themselves playing on pitches nearing the outside of the wicket table. Tom Parker said that the amount of water applied to the pitch in the lead up to the game is critical to the final surface. He started with heavy deep watering and light infrequent rolling and gradually reverted to light infrequent watering and heavy rolling as the match got closer. He also covered the wicket table every night in the week preceding the test match and would do so no longer if the weather was unpredictable. Irrigation of the wicket table and the outfield is by a automatic overhead watering system. The control system is a Hardie 3200 Micromaster and the sprinkler heads are Hunter I-41. Most of the irrigating on the wicket table is done via this system except in the immediate lead up to the test match, when Tom likes to control the exact placement of water by hand watering only. Tom stated that he is

charged with producing a pitch for the beginning of play on day one. He can make all his own decisions on watering, cutting, rolling but come the beginning of play he hands over the pitch to the umpires and he is bound by the rules of the game and the umpires instruction.

During the test match the pitch and wicket table would be cut every day. What is interesting is that the umpires must watch the ground staff cut the pitch and wicket table to ensure that a fair job is done and that the result serves the interest of both teams. The ground staff also mark out and sweep the creases. If at any stage the bowler's footmarks are bad enough they may be repaired, but only at the umpires instruction. On match morning, except for the first day's play, the batting captain is asked what size roller he would like. Rolling can be for a maximum of 7 minutes and must take place between 10.30am and the commencement of play at 11.00am. No water is allowed on the pitch during the entire match unless approved by the umpires. During the days play no rolling can take place except at the end of one teams innings, then the in coming team captain decides on the size of the roller to be used.

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↑ MARK FARMILOW (L) & TOM PARKER (R)

The outfield under the guidance of Mark Farmilow, also requires special attention after the football season if it is going to live up to the standards expected by first class cricketers. Mark says he oversows the outfield with SR4000 and Caravelle Ryegrass for the football season and believes that if he didn't the surface would not hold together due to the rigours of football and the dormancy period of the Greenless Park couch.

Between the last game of football and the beginning of the cricket season Mark scarifies the outfield, cuts it down short to allow sunlight onto the struggling couch grass, vacuums, hollow tynes, deep slices, topdresses and fertilisers. Then, like Tom Parker he hopes for warm spring time temperatures to stimulate couch grass

growth. Mark says that the outfield does not fall uniformly from the wicket table to the boundary fence and therefore will one day require complete reconstruction. In fact I was staggered to learn that the fall of the outfield ranges from 20mm in some parts to 971mm in others.

Mark uses slow release fertilisers for constant steady growth during the test match and iron for colour. He tries to avoid flushes of growth because the outfield may be cut in the morning but by the last hour of play some 8 hours latter considerable growth could effect the speed of the outfield and disadvantage the batting team.

During the test match they cut the outfield every day at 12mm and collect the

clippings. Each cut is on the same strip to enhance the cutting pattern even further as the match goes on. Mark like Tom cannot water the outfield during the match and must endeavour to produce the same quality outfield on all five days of the match as he produces on the first days play.

In the lead up to the test match and during the match Mark, Tom and the groundstaff work from 7.00am to 7.00pm to produce the magnificent

surfaces we all saw on the television.

It is also worth noting that test cricket is not the only first class fixture at the SCG. The ground also caters for one-day internationals, Sheffield Shield, Mercantile Mutual Cup, Corporate Cup, and Cricket Association games.

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concerts and back to cricket are surely great. With the dedication of true turf professionals, like Tom Parker and Mark Farmilow however, our first class cricketers will always have first class turf surfaces on which to play.

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Greg Wilson oversees the delivery of a load of amended USGA sand.

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John Groom rakes a seeded green

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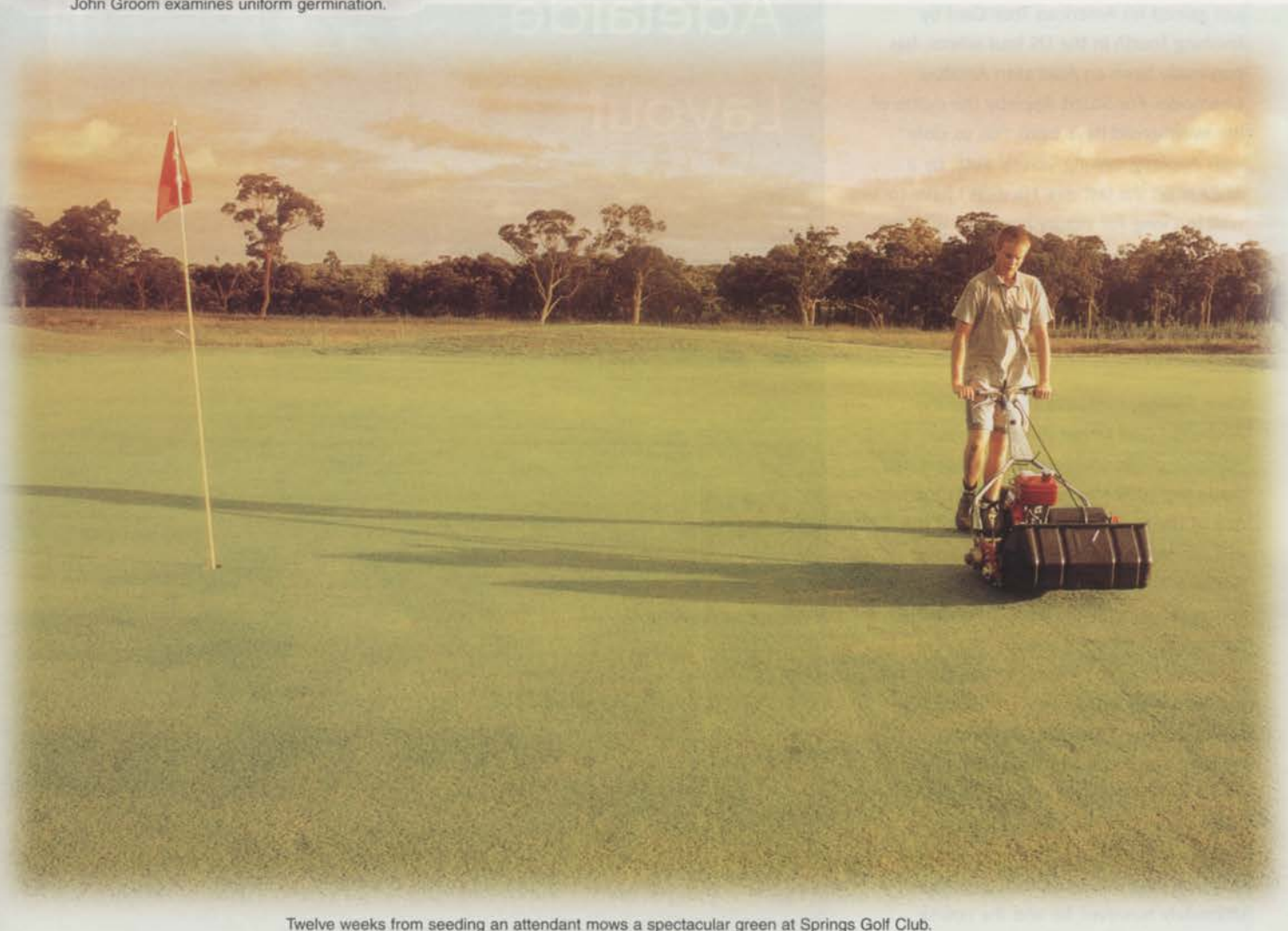
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John Groom examines uniform germination.



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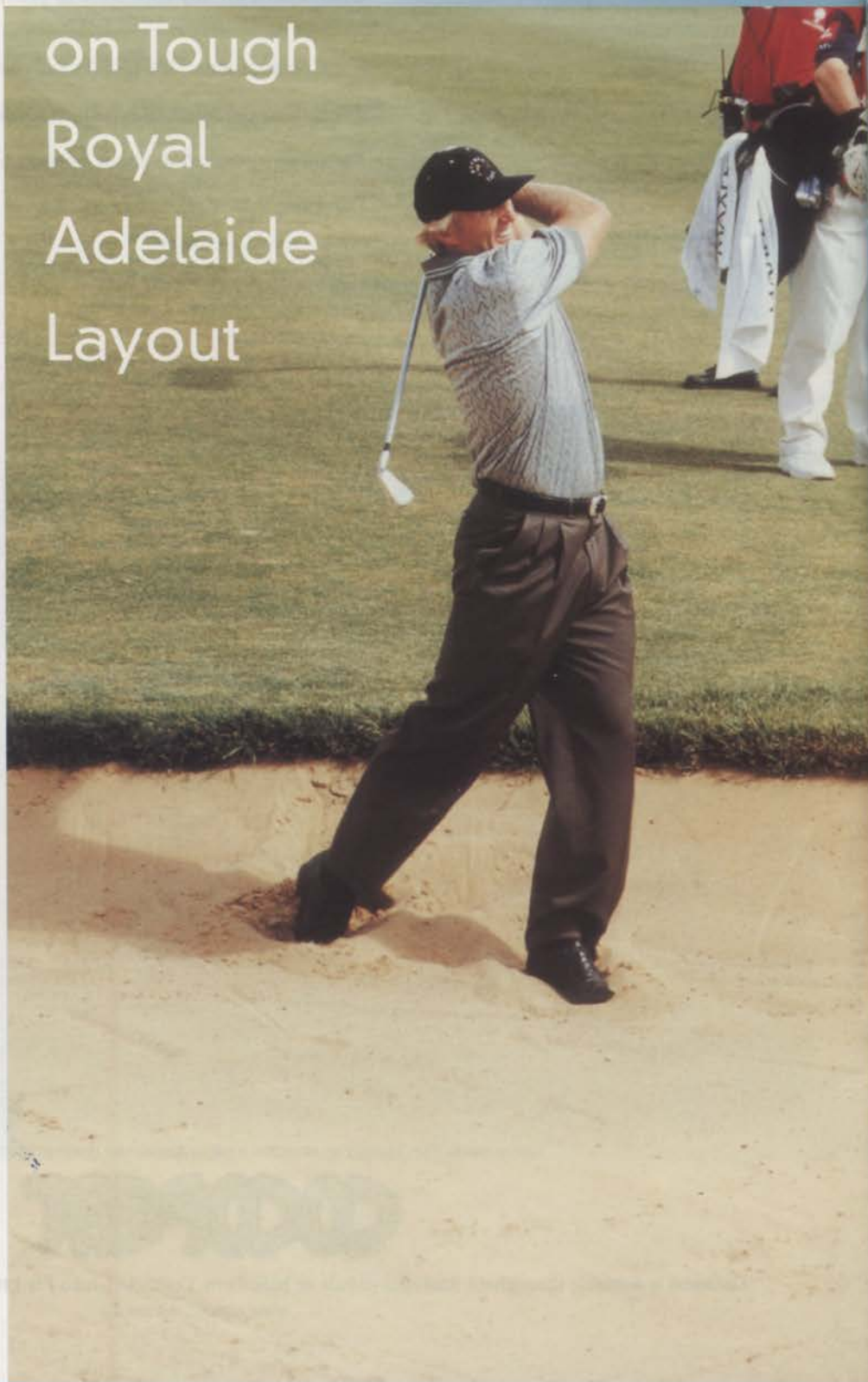
CHALMERS CLAIMS

By Euan Laird

Greg Chalmers, the likable 25-year old Western Australian leftie, overcame a tough field to win the Holden Australian Open played in December. Chalmers, who had just gained his American Tour Card by finishing fourth in the US tour school, has previously been an Australian Amateur Champion. For Stuart Appleby the motto of the event could have been "oh so close", with Appleby missing several putts by a whisker on the last day. He didn't have to wait too long for victory however, with the International Teams' victory in the Presidents Cup following a week later. He followed that successful week with a win in the Coolum Classic in late December

Colin Phillips, Executive Director of the Australian Golf Union stated that the Adelaide public and corporate support had made the 1998 Holden Australian Open one of the best in recent history. But the real winner for the week was the Royal Adelaide course itself. The links style course, situated to the west of Adelaide consists of sand dune country with the course recently toughened to meet AGU regulations by well known golf course architect Peter Thomson. Thomson, received much criticism from players and media early in the week, for both his design changes, and his direction to Course Superintendent Mark Prosser to keep the rough as long and as difficult as possible. Ultimately however, he and the course came out on top as steadily the course's integrity gained the respect of all golfers. A great final day saw the crowd favourite, Stuart Appleby, close to forcing a playoff with Chalmers, with Nick Faldo and Peter Senior lurking a further stroke in arrears.

on Tough
Royal
Adelaide
Layout



GREG CHALMERS, MARK PROSSER AND
THE ROYAL ADELAIDE GROUNDSTAFF
SAVOUR THE MOMENT AT THE END OF
THE FINAL DAY →

OPEN



MARK PROSSER, COOL AS A CUCUMBER DURING THE RECENT AUSTRALIAN OPEN →

For Mark Prosser, the staging of the event was the culmination of eighteen months of planning and preparation. In the weeks leading up to the tournament the greens were regularly brushed and cut with walk behind mowers, the brushes being made up by his course mechanic to attach to the walk behind mowers. "The use of the brushes on the front of the walk behind

mowers, assisted in thinning the turf surface and providing a consistent playing surface for all golfers," he said. Talking to Prosser during the event, you could not believe his cool, calm disposition. He stated that he was surprised how well his plans had worked, "Everything seems to be going like clockwork," he said mid way during the third round. "We've been

planning this for a long time and have practiced preparing the course before and after each days play. Each staff member knows exactly what their tasks are for the tournament and are keen to ensure they do a good job." The professionalism of Prosser and the staff did not go unnoticed with AGU Executive Director, Colin Phillips, stating that Prosser was, "one of the best Golf Course Superintendents I have worked with for the preparation of Australian Opens courses." The good news continued for Prosser with him reporting some two weeks

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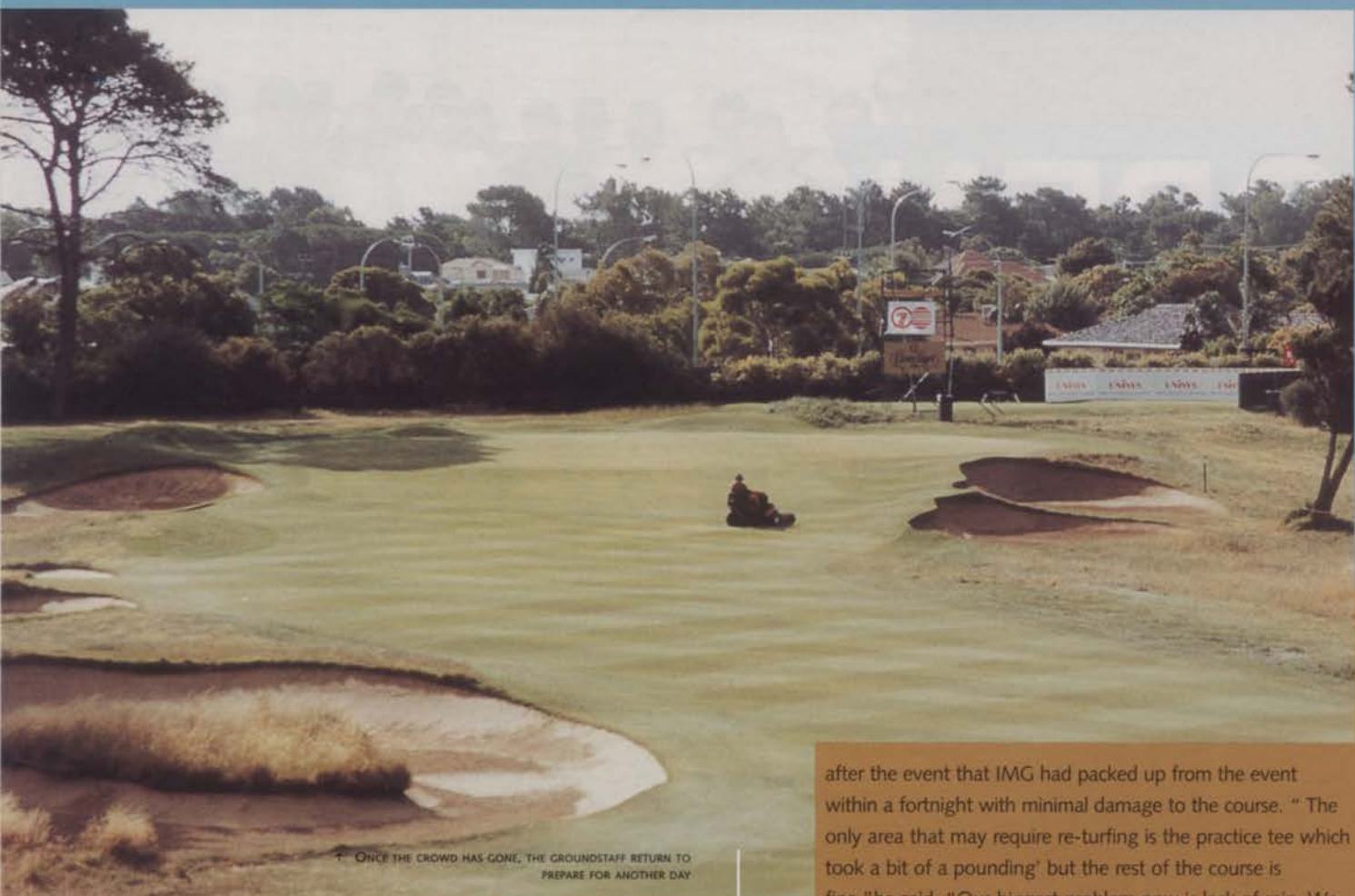
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↑ ONCE THE CROWD HAS GONE, THE GROUNDSTAFF RETURN TO PREPARE FOR ANOTHER DAY

after the event that IMG had packed up from the event within a fortnight with minimal damage to the course. "The only area that may require re-turfing is the practice tee which took a bit of a pounding' but the rest of the course is fine," he said. "Our biggest problem now is lack of rain. We had 9mm of rain in mid December but that was the first significant rain for three months and we may not get any more until May or June."

Prosser handed over the reigns at Royal Adelaide in early January to Jeff Kaines his third in charge. He stated that he and Jeff got through an awful lot in the weeks before the changeover took place. Prosser was pleased to see Jeff get the job ahead of some well-known Superintendents from interstate. Prosser started at Victoria's Commonwealth Golf Club in January and has the unenviable task of restoring the Commonwealth to its former glory under the direction of a strong Greens Committee.

The AGCSA provided Course Quality Officials for the Open with seventy-five volunteers assisting with the event. The Course Quality Official Program is sponsored by the Toro company, who provide \$15,000 to help the AGCSA run the program and also provide free shirts and caps for all of the volunteers. Many of the AGCSA's regular CQO's were back in force in Adelaide with one even claiming Fred Couples Golf Vest, after Freddy lost his nerve in three consecutive bunkers on the second day of the championship. Sean Storer was quick to accept the gift as Fred Couples apologised for getting in so many bunkers. The 1999 Australian Open will be played at the Royal Sydney Golf Club with host Golf Course Superintendent, John Odell

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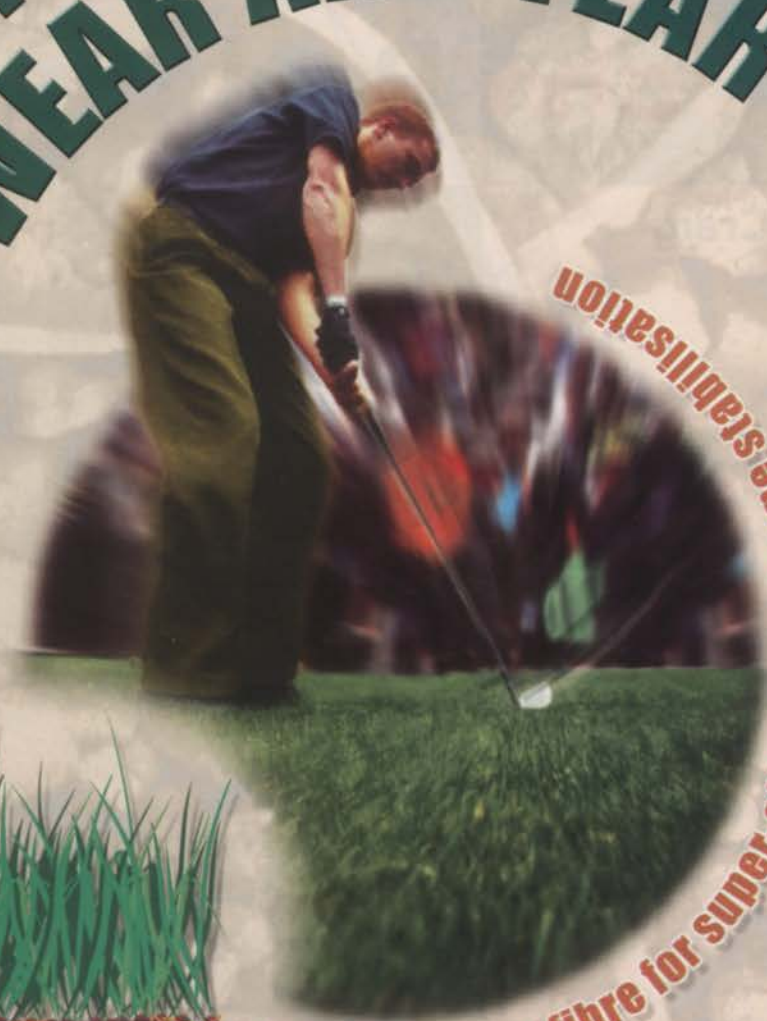


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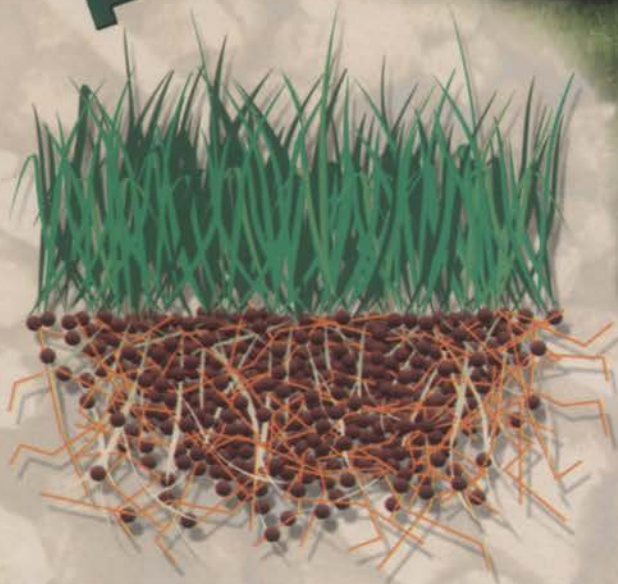
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SCHOOL SPORTSFIELD

John Paul College

By Matt Craig

One generally unrecognised, but large part of the Australian Turfgrass Industry is that of the private and public school sector. Many private and public schools contain sporting facilities and hence turf areas equivalent to that of small municipal councils and many consider the quality of their playing fields as a reflection of the stature of the college itself.

Take the case of John Paul College, located 30 kilometres south of Brisbane in the suburb of Daisy Hill, for example. Built in 1982, rapid growth now sees the college catering for the needs of 2300 students from ChildCare to Year 12. The college had grown at such a remarkable rate, that the sporting facilities became totally inadequate placing a great deal of pressure on groundstaff to keep the existing grounds in adequate condition. The college took the opportunity in 1997 to purchase

33 acres of land adjacent to the main campus to provide for the development of an 'aesthetically pleasing and useful sporting complex, able to cater for the demands placed upon it by the various sporting groups within the school community.' Submissions were received from all stakeholders. Wade Consulting Group, Brisbane based Consulting Engineers, were then given the task of designing the complex to meet the colleges overall needs. Bob Crane, the Project manager from Wade Consulting Group, subcontracted the services of well known turf specialist David Burrup to provide turf specific advice on the project.

The site provided some unique challenges for the design and construction teams. The site forms part of a major catchment area and the water table lies only one metre below the soil surface. The area is also riddled with natural Springs, which appear soon after heavy rainfall events. The local soil is a volcanic red clay, which turns to mud during the rainy season and as hard as concrete during the dry winter months presenting the existing grounds team with a very difficult maintenance task. David Burrup expressed concern regarding the potential drainage problems of the site from the outset, and soil tests undertaken by Rootzone Laboratories in the ACT, confirmed his initial assessment. All samples were shown to contain very high

amounts of fine particles, especially fine silt and clay proving conclusively that the existing soil type would be unsuitable to use as a growing medium. The drainage rate for the sportsfields was the most important design criteria. Attempts were made to develop a blend of the existing soil and imported sand but proved impossible considering the overall need for a high drainage rate. Finally the decision was made to import a sand meeting USGA Specifications as the growing medium. This was to be laid to a compacted depth of 175mm laid on a clay base, having a drainage fall of between 1-70 and 1-100. Earthworks finally commenced in October 1998, and it

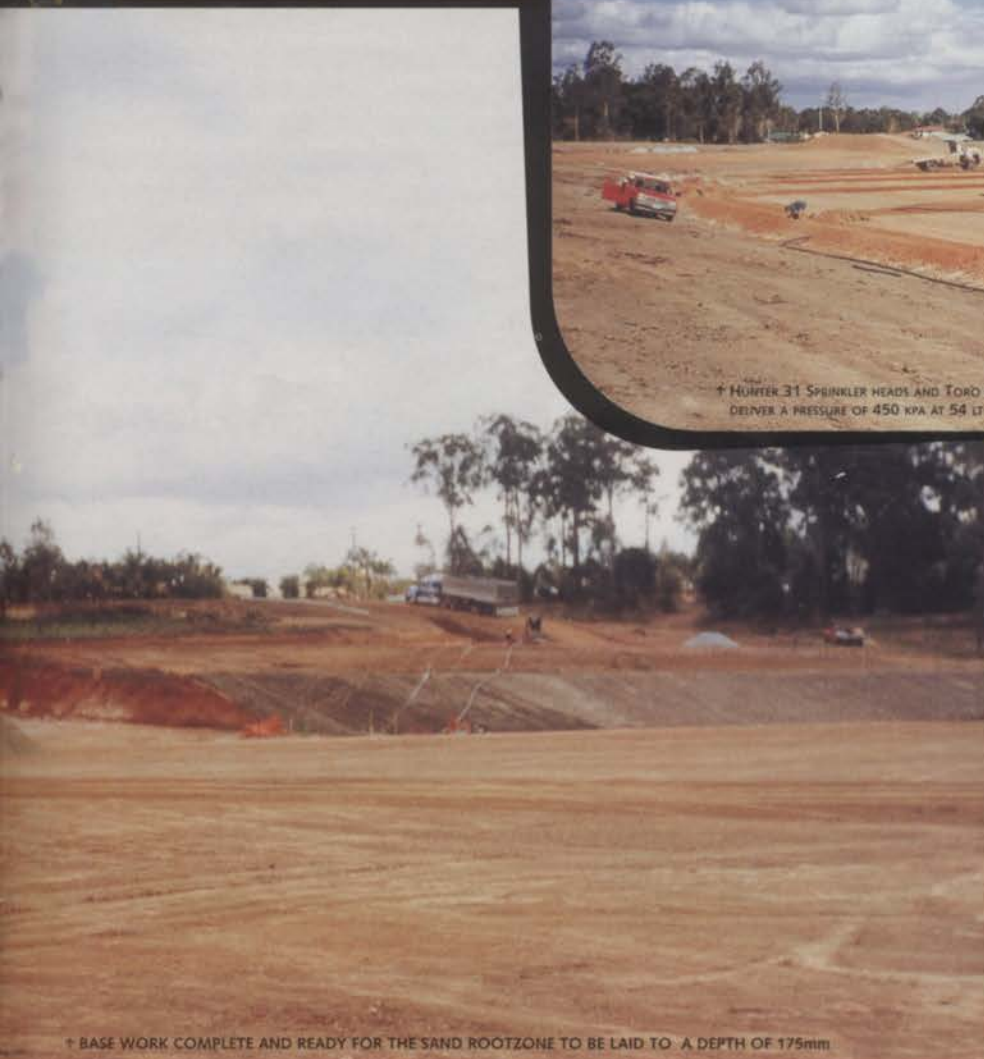


← HUNTER 31 SPRINKLER HEADS AND TORO OASIS PTC 42 CONTROLLERS BEING INSTALLED

CONSTRUCTION



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wasn't long before the underground Springs began causing problems. Following several large downpours, the Springs burst through the surface in several places causing a bubbling effect. These areas were deep ripped several times to allow air to penetrate and the soil was pushed into large windows to dry. The soil was then returned in layers, with each layer being heavily compacted using a Sheep's Foot roller. The entire area was then returned to level with scrapers and graders. In areas where the water was having difficulty draining away a network of drainage pipes were laid to channel water away to the sides of the fields to the storm water drains. This was shown to make a vast improvement to those wet spots.

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Gary Deane Constructions was responsible for the earthworks and by late 1998, with all drainage problems rectified, the fields were ready for the final sand layer to be installed. River Sands, at Carbrook south of Brisbane, were contracted by John Paul College to supply 12600 cubic metres (17640) tonnes of a growing medium meeting USGA standards, for the new fields. River Sands guaranteed that its sand consistently meet USGA standards. The sand was dredged from land neighbouring the Logan River at Carbrook, QLD, and was washed twice, screened to ensure compliance with the specification required, before being delivered to the site. In all, 630 truck and trailer loads made the journey from Carbrook to Daisy Hill (15km) over a six-week period. Barry Edwards of Coolibah Construct Pty Ltd, also based in South East Queensland, was

contracted to undertake the necessary works associated with preparing the sand surface, blending in chicken manure (100 cubic metres /ha) and superphosphate (one tonne per hectare). Under the direction of the groundstaff a team of volunteers, made up of students, parents and teachers began turfing the embankments on November

7th. On each of two working bee weekends, in excess of 250 willing workers turned up to lay close to 9000 square metres. This was achieved in less than two hours on both occasions-saving considerable time and money - money that would otherwise need to be spent on contract labour. This developed a sense of pride and achievement by the school community. After the field had been consolidated and levelled, stolonizing commenced as this was the most effective option with the given budget. Greenlees Park couchgrass was used and planted at a

↓ CHICKEN MANURE WAS BLENDED WITH THE GROWING MEDIUM AT 100M³/HA



↓ THE SITE FORMS PART OF A MAJOR CATCHMENT AREA AND THE WATER TABLE LIES ONLY 1M BELOW THE SOIL SURFACE



↑ OVER 250 WILLING WORKERS TURNED UP TO LAY CLOSE TO 9000M² OF TURF

rate of 10% of the surface area. As each section of the field was planted, banks of sprinklers were turned on to water the newly planted turf.

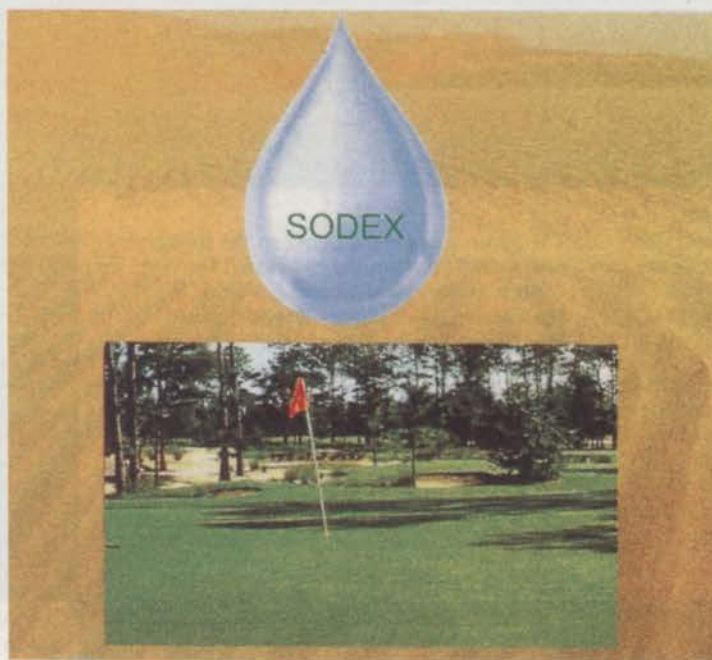
The irrigation was designed and installed by McCrackens and featured Hunter 31 sprinkler heads spaced at 18mx18m. The system delivers a pressure of 450kPa at 54 litres per minute throwing a 17.9 metre radius. Toro Oasis PTC 42 controllers were used as the site has in excess of 60 separate stations to operate. The system allows a maximum of 3 fields (stations) to be run at any one time. A 5 night a week program with 25 minutes per station per night is presently being used but this will vary as the turf establishes and the fields settle.

The development of the sportsfields was a huge and successful project. Faced with unique site challenges, the design and construction teams, together with the groundstaff and school community came together to deliver the 2,300 students with an excellent new facility.



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WACA

A WEST AUSTRALIAN ICON

By Nick Bell

The West Australian Cricket Association ground (the WACA) is a West Australian icon and has been ever since the picturesque site, which originally included Gloucester Park Trotting Complex, was granted to the WACA by Governor Broome in 1889.

In 1826, three years before the first settlers arrived in Western Australia on board the *Parmelia*, the Military Club for English Officers, and the Australian Club for native-born Australians was formed in Sydney. The first record of a cricket match between the two was reported in the *Sydney Gazette* in 1830:

The game was played between the military and native-born youths between 11 o'clock in the forenoon and 5 o'clock in the evening. At 2 o'clock it was thought that the natives had no chance, and that they must be beat. However as the day's play advanced, the Australian's recovered all they had lost in the morning, and at length won the game. A prettier day's play than that was certainly never witnessed in the Colony. (Ref: HOW DID SPORTS BEGIN? - R. Brasch 1971.)

This I believe is the origin of the fierce rivalry and intense passion that is such a vital ingredient of all sport and general competition between Australia and England.

Development of the ground began in earnest in 1892, wisely earning income from a wide range of ground users and spectators. The benefits of couch grass were well known by this time, and it is probable that the WACA ground was vegetatively planted with couch grass originating from the cuttings brought here for Government House by Governor Weld in 1870. When the Mayor of Perth, Alexander Forrest officially opened the WACA in 1893, landscaping was flourishing and roads and paths were in place, but the playing surface was still developing. Even though the original swamp was raised half a metre it was still subject to inundation and was affected by the rise and fall of the river often causing the pitch to hold moisture. Moisture in the pitch and inferior clay made it conducive to spin bowling when the first game of cricket was held in the summer of 1894 and during the first years of cricket at the WACA ground. The pitches were usually slow and unpredictable until wicket soil from Merri Creek in Victoria, and from Bulli in NSW were imported in 1908. In 1920 the WACA located a better type of soil from the Harvey River area of Western Australia and by the end of 1923 it was in use at the WACA and several metropolitan grounds. By 1925 there was a noticeable improvement in the wickets and the fast, true, and even-paced, bouncy WACA WICKET legend was born.

The WACA has always played a leading role in turf grass management and research and development and in 1946 supported its head groundsman J. Claughton and his assistant Roy Abbott, as well as groundsmen and greenkeepers from other grounds and sports turf facilities to form the Turf Culture Association.

Many of these men had recently returned from WW1 service, and had at the end of hostilities had the opportunity to visit famous cricket and football grounds in Europe including the Oval, Lords, and Wembley stadium. They had shared experiences with their overseas counterparts and came home full of ideas and enthusiasm and were keen to put them into practice. Early minutes of the Association reflect their knowledge, determination, and professionalism.

Delegates from the WACA regularly attended and contributed to monthly meetings which were held at the ground until 1975 when meetings were suspended.

Roy Abbott succeeded J. Laughton as Head Groundsman and as President of the Turf Culture Association in 1951. Roy retired from his position as curator after nearly 30 years of outstanding service in 1980. Roy was on the committee of the Turf Culture Association since its inception in 1946, and when meetings were suspended in 1975 he had been the President for a quarter of a



44

'Australia in the field', a capacity crowd at a day/night International Cricket match. (Photo courtesy of West Australian Cricket Association)

century during which time his presidency had never been opposed.

During his thirty years at the WACA ground Roy had been fascinated with the improvement in the fineness of the leaf in ever expanding colonies of turf. He was never sure if the improvement was due to pockets of inherent fertility, or moisture retentive soil, or whether a natural mutation process was making inexorable progress. But he always wanted to harvest grass from these areas to establish a turf nursery for a new cricket ground.

The Agricultural Department has always taken a keen interest in the WACA, with agristologists Harry Elliott and Frank Ryan, often working closely with Roy Abbott to formulate fertiliser mixtures for specific requirements, and then overseeing manufacture from various sources to ensure quality control.

John Maley who had earned an international reputation for his innovative production, preparation, and turf management of wickets and cricket grounds around Australia for World Series Cricket succeeded Roy on his retirement from the WACA in 1980. John was ably assisted by Gary Long who having served his apprenticeship at the WACA had gone on to become a curator at the GABBA in Queensland and at Football Park in South Australia. Throughout the heady days of World Series Cricket both John and Garry flew back and forth across the country ensuring that all wickets met the exacting standard required by WSC administration.

By 1980 the WACA ground outfield was in need of renovation and John then developed a five year program to replace the centre wicket block. By 1985 it had been decided to completely redevelop the oval and immediately after the last cricket match of the 1985 cricket season, one hundred years after its official opening, major reconstruction began.

The existing turf surface was removed and replaced by a sophisticated perched-water system, incorporating controlled drainage, an efficient watering system and high quality and consistent depth sand layer. To ensure that the finished surface was above the 100-year flood level of the Swan River, the finished surface was raised 300mm above its original height.

When John Maley left the WACA ground, a fresh approach was tried for the turf department when the combined skills, of Scott Hamilton and Ken Johnston were engaged. Scott and Ken and their team made a positive contribution but were denied the time needed to achieve the objectives that they intended. Dave Crane who had been an important member of Scott and Ken's team succeeded them and proved to be a fastidious wicket maker and turf manager, and a patient and wonderful trainer and motivator of his staff. Dave resigned early in 1998 and was succeeded in May of that year by the present curator Richard Winter.

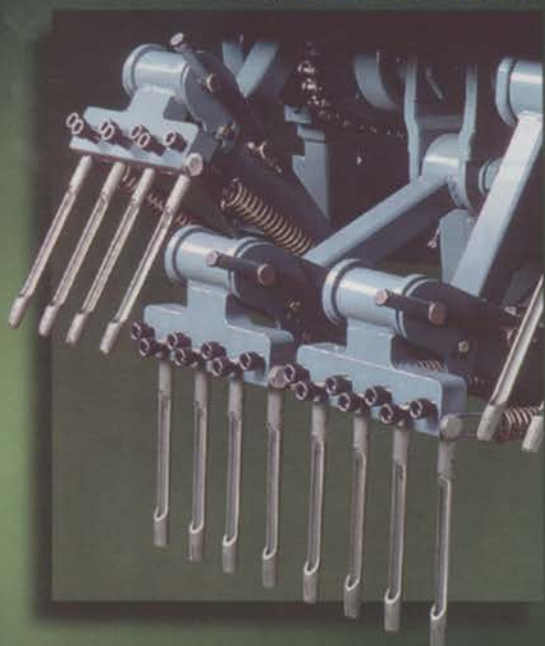


The WACA ground in 1891 just two years after acquisition of the land. (Photo courtesy of West Australian Cricket Association)



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Richard has already stamped his personality on the WACA environment and has shown that he has the ability to be an outstanding curator. He has developed a strong bond with his assistant Rohan Mathews, and gets the respect and support of the rest of the team many of who have been at the WACA for many years. One of Richard's special projects is to ensure the long-term supply of suitable wicket soil to maintain the characteristics and integrity of the unique WACA wickets forever. The present Harvey River wicket soil source is diminishing and it has proved necessary to locate a fresh source capable of reliable supply well into the next century.

Soil scientist Adrian Peck and soil surveyor Bill McArthur volunteered their time and expertise to help find a reliable source. They studied reference maps of the coastal plains and surface defects, and used their extensive local knowledge to identify deposits of black clay. Exploration of fire breaks revealed rich coloured clay and information provided by local farmers led them to potential sites. Once the sites were identified consultations with the Department of Land Administration officers helped to identify the landowners and facilitated negotiations. Soil samples have been analysed by the state Chemical Laboratories, a reliable supply has been assured, and excavation of the new wicket soil is due to commence early this year.

Like an oversize village-green the WACA ground has been at the epicentre of Western Australian sporting interests and social activities since the ground was acquired in 1889.

It is a wonderful and thrilling thing to meet friends and watch sport played at the highest level at the WACA. It is a magnificent venue for many sports and one of the world's great cricket grounds.

RICHARD WINTER PROFILE

Richard Winter, The WACA curator weighs up the strengths of the new wicket soil. Photo: Nick Bell.

The WACA wizards, who mould the clay, nurture the roots rhizomes and stolons and groom the glass at the WACA. (Photo: Nick Bell)



Age	28
Home State	ACT
Turf Background	Apprenticeship served Belconnen golf course and Maluka Oval
Appointments	Murrumbidgee Country Club and Parliament House Parks & Gardens
Overseas appointment	Eden Park New Zealand Curator
Highlights	Work experience with Les Burdett at the South Australian cricket Ground
Achievements	Introducing couch grass cv: (Windsorgreen) into Eden Park
Goals	To consistently maintain first class wickets and top quality playing surfaces at the WACA ground for all sports



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translocation of the endangered

Green and Golden Bell Frog

to Long Reef Golf Course



The Long Reef Golf Club, situated 20 km north of Sydney was recently presented with the Metropride Keep Australia Beautiful Council Award for Community and Environmental Education for the Green and Golden Bell Frog Project. The project aims to successfully re-establish a population of Green and Golden Bell Frogs to Long Reef Golf Course. It will be judged as successful if the frogs breed and can exist for a period of at least five years (Pyke and White 1997).

The collaborative project involves the Long Reef Golf Club (LRGC), The Australian Museum, Warringah Council and Taronga Zoo. Once common in Sydney, the Green and Golden Bell Frog is now endangered and listed on Schedule 1 of the NSW Threatened Species Conservation Act 1995. Its numbers have declined dramatically due to pollution, loss of habitat and *Gambusia*,

the plague minnow or mosquito fish, which predate on Green and Golden Bell Frog eggs and tadpoles (Pyke and White 1996).

Through an EPA Environmental Trust Grant the Long Reef Golf Club was able to rehabilitate existing wetlands and to redirect stormwater into ponds on the course. These ponds treat the water using native aquatic vegetation and provide an irrigation source for the golf course. The wetlands provide excellent habitat for frogs with the Striped Marsh Frog and the Common Brown Froglet being found in large numbers.

Dr Graham Pyke, Principal Research Scientist at the Australian Museum, identified the rehabilitated wetlands at LRGC as an ideal location for the Green and Golden Bell Frog after reading about the wetland project in the local newspaper.

by Kathryn Wem



In January 1998, 1400 Green and Golden Bell Frog tadpoles were released into four of the seven wetland ponds and two other golf course ponds that were created especially for the Green and Golden Bell Frog. The tadpoles were bred at Taronga Zoo from a population of Green and Golden Bell Frogs taken from Rosebery, Sydney where development destroyed the original site. The site of this population is closer to Long Reef than any other known population (White and Pyke 1996). Samples of the tadpoles are screened before release to ensure that they are not infected with any potentially contagious pathogens. Seventy metamorphlings (immature frogs) were also released in April 1998.

The regular monitoring program, undertaken collaboratively by the LRGC, the Australian Museum and community members, concentrates on the Green and Golden Bell Frog, but has also included other frog species living on the golf course. The most common frog are the Striped Marsh Frog and the Common Brown Froglet, occasionally recorded are Peron's Tree Frog, Spotted Marsh Frog and Dwarf Tree Frog. Daytime frog surveys are carried out weekly during the breeding season (Sept to April) and once

water for tadpoles at specific locations so that the size and stage of development of tadpoles caught can be recorded. Any egg masses found in the ponds are also recorded. Night frog surveys involve walking slowly around the ponds using a powerful light to locate any frogs either in the water or on the pond edge. Frogs are captured, and their location and behaviour recorded, as they are for daytime surveys. Also recorded is the estimated location and species of any calling frog.



Progress of the Green and Golden Bell Frog

Of the 1400 tadpoles that were released into six ponds in January 1998, capture/recapture analysis indicated a population of about 200 frogs from March to May. However since winter the number of Green and Golden Bell Frog sightings have declined and from capture/recapture analysis the estimated population is now about 20 frogs. It is difficult to know whether the decline in numbers between autumn and spring is due to death or emigration. Other study sites have shown that immature frogs move away from the breeding sites and return when they have reached mature adult stage. It is therefore possible that there is a significantly larger population located on the golf course but is not closely associated with the ponds. The Green and Golden Bell Frog is presently seen mainly at night during the weekly surveys but is sometimes seen sitting in the aquatic vegetation on a sunny day.

every four weeks the rest of the year, when the frogs are relatively inactive. A regular time is allocated so that the monitoring takes place when the number of golfers using the course is generally low. Frogs found underneath man made shelter boards are captured so they can be measured, weighed and microchipped (with the same microchips used in cats and dogs). Microchipping provides each frog caught over 45 mm with its own number. This allows growth rates and movements to be monitored when a frog is recaptured. The purchase of monitoring equipment such as vernier callipers, spring balances, microchips, microchip scanner and implanter was made possible through the Sydney Northern Beaches Catchment Management Committee Small Project Funding. A pool net is used to sweep the

It is proposed that there will be an introduction of tadpoles each year for the next three years or until the Green and Golden Bell Frog breeds on site. This will enhance the numbers of adult Green and Golden Bell Frogs at the golf course. With such a dramatic decline in population numbers in NSW, this program addresses the long term conservation and recovery of the Green and Golden Bell Frog. In the next five years this endangered frog will hopefully become successfully established in this unique urban environment.

References available from the author.
Photographs by Trent Penman

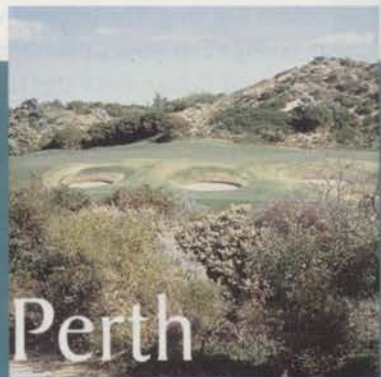


↑ ONE OF THE PONDS CONSTRUCTED SPECIFICALLY FOR THE GREEN AND GOLDEN BELL FROG



4th National Turfgrass Seminar

Burswood Resort, Perth



Secret Harbour Golf Club

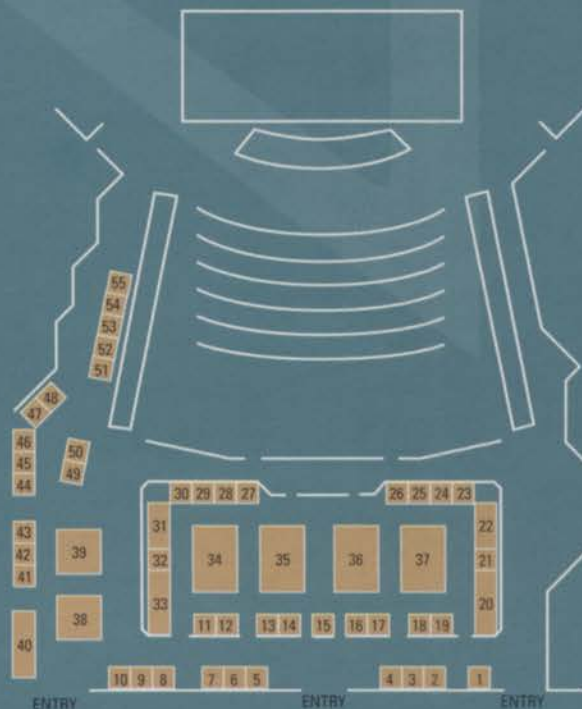


Professor Bruce Martin and Walter Woods head the line-up for the AGCSA's 4th National Turfgrass Seminar to be held in Perth in July 1999. Walter Woods, the legendary ex-Golf Course Superintendent from the Royal and Ancient St. Andrews Golf Links will discuss changes in turfgrass management philosophies during his Superintendents life. Professor Bruce Martin, from Clemsen University will present a keynote address on the topic, "Disease Management in Turf - Strategic Planning to stay on course" and two workshops on the topics "Developing Integrated Nematode Management Programs" and "Optimal Disease Control for Bentgrass Greens". The theme for the seminar is better management and the program is divided into three workshop streams. Delegates have a choice of two-hour workshops and must pre-register on the registration form in advance of their attendance in Perth. The AGCSA has negotiated social golf for delegates on the Thursday following the event for those wishing to sample the fine golf courses available in Perth. Evening workshops focus on Public Speaking and will be presented by the Australian Institute of Management.



Secret Harbour Golf Club

The 1999 AGCSA Golf Championships, presented in partnership with the Toro Company, will be held on Sunday July 18th at the Secret Harbour Golf Club.





4th National Turfgrass Seminar

Saturday 17th
Sunday 18th

PRELIMINARY PROGRAM- 4th NATIONAL TURFGRASS SEMINAR

Awards Judging
Golf Championship, Trade Show Set-up
6.00pm-8.00pm Welcoming Cocktail Reception
3.00pm-6.00pm Registration

DAY	TIME	STREAM A	STREAM B	STREAM C
MONDAY JULY 19th	8.00AM-9.00AM	OPENING SESSION Showroom, Burswood Convention Centre Walter Woods Opening Presentation		
	9.00AM-11.00AM 11.00AM-1.00PM	TRADE SHOW WORKSHOP 1A "WA Water Use Study" – Digby Short, Univ. of WA "VGA Low Input Fairway Grass Trial" - Phil Ford, NMCOT "Auststep Trials" John Neylan, Turfgrass Technology	TRADE SHOW WORKSHOP 1B Thinking Superintendents: Jeff Lane: "Poa control through better management techniques" Trevor Strachan – "Construction of Port Kennedy Resort" Dion Warr – "The use of Global Positioning Systems in Golf Course Management"	TRADE SHOW WORKSHOP 1C "Challenges in restoring native flora and fauna on golf courses" David Aldous, Burnley College
	1.00PM-3.00PM 3.00PM	LUNCH/TRADE SHOW TRADE SHOW CLOSE	LUNCH/TRADE SHOW TRADE SHOW CLOSE	LUNCH/TRADE SHOW TRADE SHOW CLOSE
	3.00PM-5.00PM	WORKSHOP 2A "Developing Integrated Nematode Management Programs for Turf" Professor Bruce Martin, Clemson University, South Carolina	WORKSHOP 2B Thinking Superintendents – Robert Macdonald – "Water Management in Lakes at the Joondalup Country Club" Paul Bevan: "Zoysiagrass- A hands on assessment at The Glades Golf Club"	WORKSHOP 2C "Natural Turfgrass Management" David Aldous, Burnley College
TUESDAY 20th JULY	7.00PM-9.00PM	WORKSHOP 3 Public Speaking- Session 1: Presented by the Australian Institute of Management Pre-registered delegates only		
	8.00AM-10.00AM	WORKSHOP 4A "Optimum Disease Control for Bentgrass Greens" – Bruce Martin, Clemson University, South Carolina	WORKSHOP 4B Thinking Superintendents: Trevor Strachan: "Tournament Preparation" Wayne Millar: "Installation of New Irrigation System at Lake Karinyup" (to confirm)	WORKSHOP 4C "A look at biological products in turf management" John Neylan, Turfgrass Technology
	10.00AM 1.00PM-3.00PM	TRADE SHOW WORKSHOP 5A "Staff Counselling and dispute resolution procedures" – Australian Institute of Management	TRADE SHOW WORKSHOP 5B AGCSA Award Winners	TRADE SHOW WORKSHOP 5C "Washdown Bays, Specifications and Your Responsibilities". Environment Protection Agency
	3.00PM-4.30PM 4.30PM 5.00PM 7.00PM-9.00PM 8.00AM-11.00AM	TRADE SHOW TRADE SHOW CLOSES AGM WORKSHOP 3 continued – Public Speaking, Session 2 KEYNOTE ADDRESSES "Disease Management in Turf – Strategic Planning to Stay on Course" Bruce Martin, Clemson University, South Carolina "Managing St Andrews", Walter Woods	TRADE SHOW TRADE SHOW CLOSES AGM	TRADE SHOW TRADE SHOW CLOSES AGM
WEDNESDAY JULY 21st	11.00AM-12.00 12.00-3.00PM 7.00PM-11.00PM	LUNCH TOUR DINNER Joondalup Golf Club, Gosnells Golf Club	LUNCH TOUR DINNER	LUNCH TOUR DINNER
THURSDAY JULY 22nd	Golf Options			

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The turf side encompasses seed, fertiliser, chemical and turf machinery. Each group contains products carefully selected to meet the requirements of today's market. Large volumes of turf seed are imported and sourced locally each year and supplied to a wide range of customer groups including the golf, racetrack and local government sectors. T&I's leading varieties include Olympic Fine Ryegrass, Statesman Tall Fescue and Cato Bentgrass. Fertiliser is also another major part of the T&I business with a large range of various fertiliser blends available. Included in these are their own soluble Greensmaster and granular Turfmaster range as well as the Scotts Controlled Release range. They also

distribute selected key products from the Patons Liquid range and Organic Crop Protectant's range. T&I also have distribution rights to the "Chipco" and "Nufarm" product range of chemicals and they also have their home brand "Even Wetta" and "Broadban" products. In addition, tractor mounted machinery can be obtained through T&I including the TR50 Turf Renovator which has been a very successful unit over many years. This

machinery has been designed and built by T&I machinery (now Turfmach) over the last 11 years. They also carry a large range of irrigation product groups with leading brands including Rain Bird, Hunter, Vinidex, and Philmac and have recently added the Ponds and Pumps range to their showroom outlets. T&I have always insisted on employing staff technically orientated with the turf industry. With some twenty field representatives covering various territories throughout Australia and eleven outlets catering for both the trade and retail markets, T&I is strategically located to provide service, technical know how and commitment to the turf industry. With the recent expansion of the T&I business and its successful merger with the irrigation specialist, Huggall & Hoile, the company plans to continue its growth and provide even better service to the turf market.



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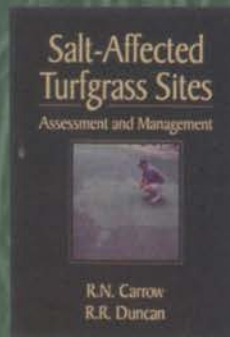
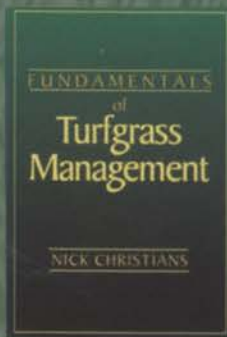
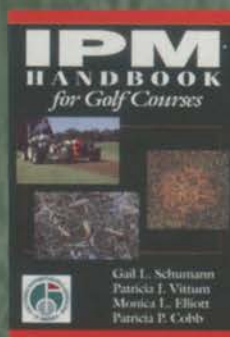
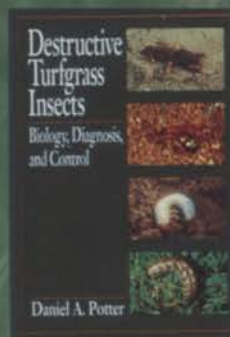
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A Place to Call Home for Australian Golf

A new recreational and golfing complex planned for the Mornington Peninsula - incorporating a new home for Golf Australia - was announced today by the Australian Golf Union. President of the AGU, Dr. David Cherry said the AGU had entered into an agreement with the owners and developers of the land, Moonah Developments, for the complex to become the new home for all the AGU's activities.

↓ THE DUNES GOLF COURSE LOCATED ON SIMILAR GREAT GOLFING TERRAIN ADJACENT TO THE PROPOSED DEVELOPMENT.



"The AGU has been looking for a home for its various golf related activities for some time. "We believe that the 200-hectare parcel of land known as "Moonah" presents the ideal opportunity for locating all our activities at the one venue. "In time, the Championship course proposed for Moonah will also become a regular venue for the Australian Open Golf Championship. "I have no doubt that the development, incorporating all its associated recreational activities, will turn the region into the Mecca of Australian Golf for both domestic and international golfing enthusiasts," Dr. Cherry said. The property is situated on the strip of sandbelt land known as the "Cups" - between the National Golf Club (Cape Schanck) and the Dunes Golf Course (Rye).

The principal elements of the proposed world class facility are:

- ▶ 36 hole Championship golf course and complex
- ▶ The Australian Golf Academy (incl. the AIS Golf Academy)
- ▶ The Australian Golf Hall of Fame and AGU Museum
- ▶ A 4 star hotel/conference/ accommodation centre
- ▶ Golf Course residential development and
- ▶ A winery/restaurant

AGU Executive Director, Colin Phillips, stated that an expansive practice facility, based on the Scottish model, will also form part of the development. The facility will recreate all types of golf course conditions and will involve the use of a range of grass types, a range of mowing heights, and several different bunker types. Mr. Phillips said "there will be nothing else like it in Australia."

Dr. Cherry said the proposed golf components of Moonah have been designed to satisfy the AGU's brief for a world class championship course which is recognised as environmentally sustainable. Complementing the varied Cups landscape, the design philosophy is 'minimalist', closely working with the natural terrain, with a minimum of earth works and little disturbance to the existing vegetation.

"World renowned golf course designers and architects, Thomson Wolveridge & Perrett have planned the Moonah complex to provide exemplary courses, consistent with the AGU's philosophy," Dr. Cherry said. State Minister for Tourism, Louise Asher said the Moonah concept has great tourism potential.



"The Moonah Links concept and the associated recreational, golfing and accommodation facilities provide a great opportunity to attract visitors to the region," Ms.

Asher said. An economic evaluation of the development predicts a conservative \$40 million annual boost to the Mornington Peninsula economy as a result of the development. The project is also expected to create a considerable number of new jobs on site, which will significantly contribute to reducing the high unemployment rate in the local area.



Toro Appointed Distributor for Foley and SISIS

Toro Australia Pty. Ltd. has been appointed exclusive distributor of the Foley United range of grinding equipment throughout Australia and New Zealand and the SISIS range of turf management machinery in Australia. Foley United, manufacture a range of semi-automatic and fully automated bed-knife and spin/relief grinders whilst the SISIS range includes scarifiers, spreaders, top-dressers, walk-behind aerators, brushes and seeders. SISIS also manufacture equipment such as beach cleaners, which will be

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available through Toro on special order. In-field support for the SISIS and Foley ranges will be provided through Toro's commercial field sales and service personnel. In addition to selling the Foley United equipment, Toro Australia is also providing its customers with a specialist reel and bed-knife grinding service, using the latest model grinders. Mr. Cameron Russell, Toro Australia's Commercial Business Unit Manager said that, "All Foley United grinders are designed for accuracy of sharpening and ease of set-up and operation." Further information on the Foley United and SISIS range of products and the new Toro bed-knife and reel grinding service can be obtained from Toro Australia Pty. Ltd. by telephoning (02) 9687 2366 or by faxing on (02) 9687 2313.

DGE Opens Sydney Office

DGE has recently announced the opening of its NSW Office in Milperra, Sydney. Andrew Watson, has been appointed as NSW Manager and can be contacted on 0419 215 929 (mobile) or on 02 9774 5087 (office).



Andrew has extensive experience in the Turf Industry, having worked as 2 IC at the Bonnie Doon Golf Club. The new office and appointment of Andrew come as DGE moves into its 43rd year of operation in the Australian Golf industry.

Horticulture Associations Meet to Discuss Training Reform Agenda

The major national associations in amenity horticulture met in Melbourne in December to discuss skills acquisition and recognition in each industry sector and a range of training issues. Co-ordinated by Greg McPhee from the Nursery Industry Association of Australia, the delegates to the meeting reached agreement on a number of points including:

- > **that** there was general support of the concepts espoused in the Training Reform Agenda, particularly the move from a State or regional basis to a National approach
- > **that** there had been little or no opportunity for the National Associations to have input into the process from a national perspective
- > **that** a letter be sent to the Rural Training Council of Australia to seek greater consultation and involvement with National Associations rather than seeking the views of the State ITAB's only.

Most Amenity Horticulture Associations present indicated that they are each heading down the path of developing their own skills recognition system and trying to link this in with the new national standards. All expressed concern over the involvement of Tafe in the assessment process, particularly where Tafe personnel were not supported by

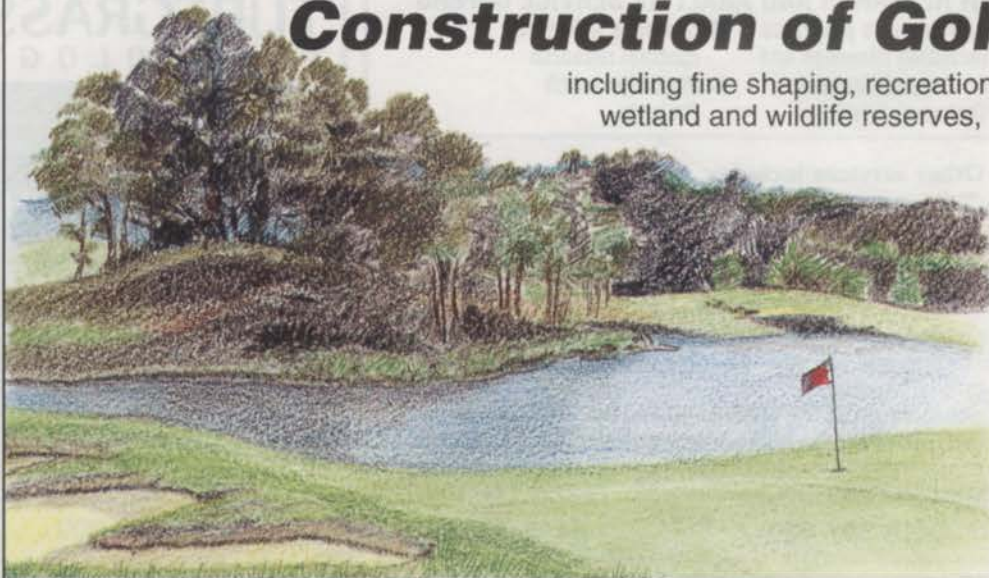
current practitioners in the relevant industry in the assessment process. The group has sent a joint letter to the Rural Training Council of Australia expressing the above views and calling for greater involvement and representation for national associations.

Hunter Industries Announces Acquisition of Legacy Golf Line

Hunter Industries has announced the acquisition of the popular Legacy Golf line of irrigation products from Buckner Incorporated of Fresno, California. Hunter will acquire the Genesis Central Satellite and the Viking Decoder Control Systems, which have been marked with Hunter golf rotors and sold under the Legacy Golf Irrigation banner since 1995. "This acquisition signals Hunter's absolute commitment to the manufacture and marketing of golf course irrigation products," reported Richard E. Hunter, CEO, Hunter Industries. "The purchase of the Legacy Golf line is an important step in Hunter's long-term growth strategy to become a major supplier of golf course irrigation equipment worldwide," he said. Hunter Industries, which is based in San Marcos, California, will continue to produce Legacy Golf control systems in the Fresno area. Legacy rotors, including the G-60, G-70 and G-90, will be manufactured at Hunter plants in San Marcos and Cary, North Carolina. All golf products will be marketed under the Legacy by Hunter trade name. Hunter first introduced a line of golf rotors in 1989.

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These sprinklers became part of the Legacy Golf Irrigation product-line in 1995, and have been sold to golf courses worldwide under the Legacy name since then. The Legacy line is a direct descendent of golf's "first family" of golf course irrigation products, dating back to 1912.

New Toro Appointments

Toro Australia Pty. Ltd. has announced the addition of two new area managers to the Irrigation Business Unit of the company and a new National Sales Manager for the Irrigation Division.

The new additions are Messrs. Michael Lenehan and Rod Lehpamer, whilst Patrick O'Shannessy, will take up the role as National Sales Manager.

Mr. Lenehan, who has a Bachelor of Business (Agricultural Communications) degree from the University of New England, has been appointed NSW Area Manager.

He will be responsible for the sales and support of Toro's residential, commercial and golf irrigation products throughout New



MR. MICHAEL LENEHAN



MR. PATRICK O'SHANNESY



MR. ROD LEHPAMER

South Wales and will be servicing irrigation dealerships, councils, specifiers, landscape developers and golf course superintendents.

Mr. Lehpamer is Toro Australia's new Area Manager for Victoria and Tasmania and will have similar responsibilities to Mr. Lenehan. He has had a very close working relationship with the golf industry, having worked at Royal Melbourne Golf Club for 9 1/2 years as a greenkeeper, before starting his own business as a landscape, irrigation and turf consultant.

Mr. O'Shannessy is well known in the turf industry, having spent the last six years with Toro Australia, working initially in sales to the golf market in New South Wales and then nationally. Mr. O'Shannessy will be responsible for the management of Toro Australia's national sales team. Cameron Russell, Business Unit Manager for Toro said following the now finalised changeover from the previous distributor network to direct sales in all States, there was a need for greater co-ordination of the national sales force. Mr. O'Shannessy will be based in the Sydney headquarters of the Toro Irrigation division.



RESEARCH PROJECTS



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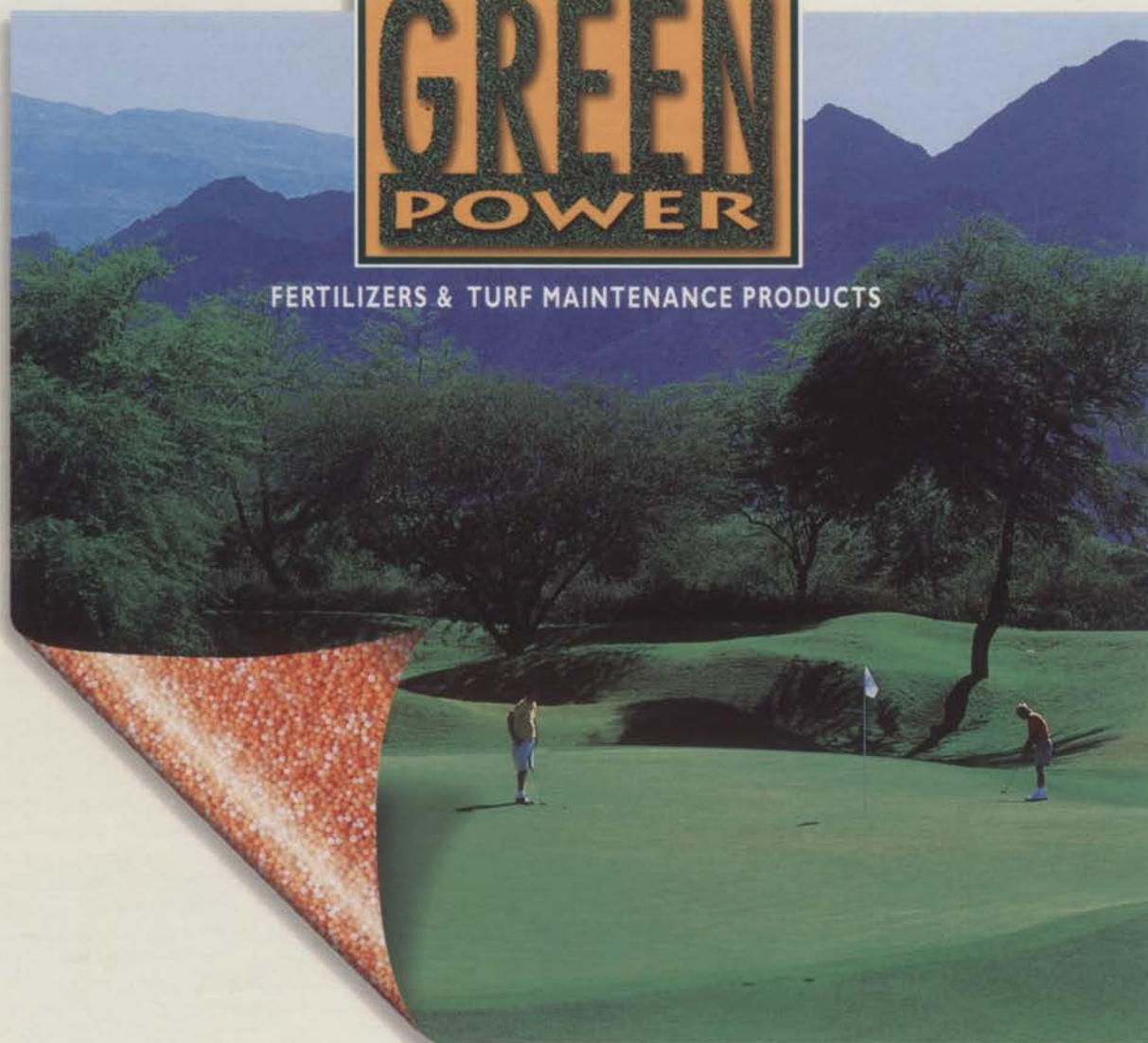
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state reports

GCSAQ

Presidents Report

The weather up here has been all over the place. Spring started off like Summer with some high temperatures catching everyone on the hop. We then went through a bit of a cold snap and had a long dry spell, which was broken with wide spread rain just before Christmas.

Both Royal Queensland and the Hyatt Cooloom staged tournaments with good television coverage showing both courses to be in immaculate condition. Congratulations to Kelly Hyland and Bob Schmidt and their respective teams on the presentation of their courses. Long serving Indooroopilly Superintendent Neil Surman has decided to hang up his hole changer after over 20 years in that position. The club gave Neil a send off and a camping fridge to keep the beers cold. Russell Thompson has left Toowoomba City Golf Club and Blair Littlechild has taken over as Superintendent at Maclean Golf Club.

In October the Queensland Golf Industry Awards were presented at the Sheraton Hotel Brisbane at a gala dinner in front of 600 people from all sectors of the Golf Industry. This awards night was an amalgamation of the Queensland PGA, Queensland Golf Union, Superintendents Association of Queensland, Secretary Managers Association and Queensland Women's Golf. The concept was to bring all areas of the industry together to recognize the efforts of high achievers. Twenty-seven awards were presented ranging from Professional Golfer of the year to Best Resort Club and Club Employee of the year. The Golf Course Superintendent Association of Queensland presented four awards;

- > Golf Turf Apprentice of year won by Trent Prendergast of Nudgee College Golf Club,
- > Golf Course Environment Award won by Martyn Hedley of Carbrook Golf Club,
- > The Turf Industry supplier of the year won by T&I Supplies and accepted by Barry Harkin, and the
- > Golf Course Superintendents Achievement Award won by Allan Woods of Murwillumbah Golf Club.

A great night was had by all and it will be on again next year.

I wish all of you a happy, healthy and prosperous New Year.

Jon Penberthy

President GCSAQ

NSWGCSA

Presidents Report

Congratulations are extended to the AGCSA Board for making the decision of producing our own magazine, Australian Turfgrass Management. It is a very positive and progressive move for the industry. Weather conditions have been variable with some golf courses deluged by storms, whilst other courses nearby face near drought conditions. The vagaries of the weather and associated conditions were once again highlighted with the running of the Australian PGA at NSW Golf Club. The course was flooded in August of 1998 with rain leaving surface water lying in low areas for over a week. Two and a bit months later, drought conditions facilitated the spreading of a bush fire which subsequently desiccated large portions of this classic course. It will be interesting to monitor the speed and extent of the regeneration of the coastal scrub. There is

no doubt about it - Gary Dempsey will surely have some interesting memories to write when he eventually puts pen to paper! The normal diseases are once again attacking the Sydney Bentgrass as it becomes stressed with long hot and humid weather. Anthracnose and Pythium spp. once again predominate. Thanks are extended to John Odell for once again organising the Christmas harbour cruise. This non-sponsored event proved a popular day for industry personnel to relax without the pressures of business. Our first association event for the new year will be the Rube Walkerdon Cup and State Championship to be held at Concord Golf Club on Monday 12th April. This will be many members first chance to play on 18 holes on the A4 creeping bentgrass.

Wishing all Superintendents a successful 1999.

Mark Parker

President NSWGCSA

VGCSA

Presidents Report

Here we are in a New Year with Australian Turfgrass Management as the AGCSA's official journal. We wish Phil George and the AGCSA every success in establishing Australian Turfgrass Management as the leading turf industry publication. The 1999 VGCSA calendar has been updated this year to a 12-page format with 6 new sponsors. We have also produced a diary, which will provide all VGCSA members with forthcoming dates for our annual events. The sponsors have generously supported this new concept and we ask that you support them. If you have not received your calendar in the mail or you would like extra copies, give me a call. Our last meeting for 98 was held at Torquay Golf Club with Shane Jacobsen the Host Superintendent. Stuart Laing, formerly superintendent at Beacon Hills Golf Club and now at Long Reef Golf Club in Sydney

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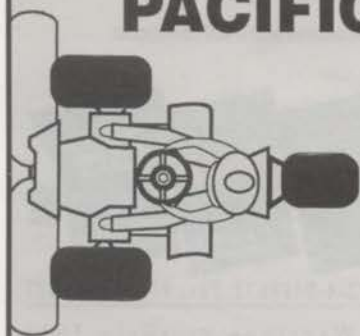
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was our guest speaker. Stuart discussed some of the differences in turf management required in the Sydney location. James Agar from GEST Superannuation also addressed the meeting with details on the Superannuation trust. Turfgrass Technology were our sponsors for the day and kindly donated the golf prizes for the 3 Man Ambrose event and the happy hour. I can't remember when Bruce Stephens last went from a VGCSA golf event empty handed. Col Cowden and Bill Reid ably assisted Bruce. Those attending enjoyed the Christmas Party at Luna Park in early December but generally support for the day was poor. Thank you to Brett Balloch for coordinating the day and we look forward to feedback from members with ideas for a social event in 1999. We welcome Mark Prosser and Martin Greenwood as newly appointed Superintendents at Commonwealth and Kingston Heath respectively and look forward to their future involvement in the VGCSA. Congratulations to Mark Burchell formerly assistant at Riversdale, to Superintendent at Heidelberg and we look forward to seeing Mark at future meetings. Mark takes over from Mick Gossip after a long tenure at Heidelberg. Mick has been one of the identities of the VGCSA over many years and has made a significant contribution during this time. We wish Mick well in his future endeavors and hope he maintains contact with his industry friends.

The President's Cup hosted by Royal

Melbourne Golf Club in December 1998 was an outstanding event. Jim Porter and his staff were confronted by less than ideal weather conditions but managed to present the course in impeccable condition.

The combined Turf research project "Organic Alternatives in Putting Green Management" with the VGA Turf Advisory board has been approved by the board and is set to get under way in 1999. Turfgrass Technology will be coordinating the project and we will shortly be looking for possible trial sites. Our first meeting for 1999 is on the 15 February at Kingston Links. There is then a long gap to the next event, which is the AGM at Yarra Yarra on 17 May. I look forward to seeing as many of you as possible at these days.

Richard Forsyth

VGCSA President

GCSAWA Presidents Report

Firstly, on behalf of the GCSAWA, I must congratulate the AGCSA in taking the bold move to produce its own publication. I think all members would realize that this is a natural progression for the association and I am sure that the experience and professionalism of the AGCSA staff will ensure that the new magazine will be a great success.

On the local front, the hot weather has hit and hit hard, already Superintendents, their staff and courses are looking forward to the cooler weather of Autumn. All of us over here in W.A are looking forward to the National Seminar to be held over here in July of this year. I hope that the eastern states Supersi will make the trip West en-masse and enjoy the great golf courses and hospitality. We had a record turn out for the Xmas function held at the Indiana Tearooms in Cottesloe Beach, which was fantastic. The scenery and location was superb and (who was that bloke with the dreadlocks). I look forward to seeing all the turf managers at upcoming functions

Craig New

President GCSAWA

TGCSA Presidents Report

Well what a Christmas break it has been with 75mm of rain falling on Christmas night, it was well received as golf courses in Tassie were starting to show the strain of summer. Rainfall for the year of 1998 in the south of the state at Claremont Golf Club was 530mm. Our December Industry and Machinery Day was well attended this year by 40 delegates from all over the state. The year of 1999 has already been planned

PRESIDENTS PEN

Firstly, may I take the opportunity to wish AGCSA members and turf industry practitioners a prosperous 1999. The AGCSA was once again involved in providing Course Quality Officials for the recent successful Holden Australian Open supported by Toro Australia. The CQO program gives the association a great opportunity to foster closer working relationships with the AGU and IMG and associated groups. As you know the AGCSA has been busy since November preparing for this, the first edition of the AGCSA's new magazine, Australian Turfgrass Management. I'm sure you will find it an enjoyable and interesting read. As you can see the magazine is pitched at the wider turf industry reflecting the diverse nature of its circulation. Australian Turfgrass Management is the only magazine owned and operated by the turfgrass industry for the benefit of the industry. The magazine will be distributed



to AGCSA members, TGAA Members, VGA members, golf clubs, municipal councils, turf growers, horse racing and training facilities, bowling clubs and other key industry sectors including all educational institutions. This represents the most comprehensive circulation in the market.

The aim of the magazine is to:

- > Support turfgrass management professionals by providing well - researched and relevant editorial.
- > Maximise returns for advertisers by developing complete marketing solutions for their products and services.

What sets us apart is our commitment to and understanding of the industry, and our desire to ensure that the magazine reflects the professional nature of the modern turf practitioner. This magazine is driven by

quality and not the need to make profits. At all times, anyone with ideas, suggestions or leads for stories can contact Phil George, our editor, in the knowledge that by doing so they are supporting the industry's own magazine. Members will have received a registration and nomination form for the 1999 AGCSA National Seminar and AGCSA Awards program respectively in the last AGCSA ACTION Newsletter. The National Seminar in Perth is shaping up well, and despite the distance is already attracting a large number of delegates. The AGCSA Awards Program is also continuing to grow and we must acknowledge the trade supporters of the program including John Deere, Textron, Chipco and Scotts.

The AGCSA March roving workshops is just around the corner and I look forward to the opportunity of catching up with members then.

Peter Frewin
President, AGCSA

with four field days and hopefully this year we can squeeze in a family day BBQ with jumping castles and games for the kids (and some Superintendents).

Our AGM Golf Day this year will once again be held in Launceston in August and will be sponsored by Toro. There will be buses running from the north and south of the state. The T.G.C.S.A. is currently looking to help fund some turf trials that the University of Tasmania is conducting. One of the trials will be on shade tolerance on turfgrass, hopefully we as an association will get some good information from these trials which we can then pass on to all our members as it becomes available. All the best for the New Year.

Mark Potter

President TGCSA

SAGCSA

Presidents Report

Summer is now upon us and for so early in the season it has been hot. Sponsors Coopers Turf Services and Toro took us to Royal Adelaide in October, where Mark Prosser showed us alterations and discussed preparation for the Holden Australian Open. The rough even at that stage was knee to waist high and had not yet been cut. Predictions were that anyone who broke par would win the Open and this turned out to be the case. The greens and fairways were in magnificent order and Mark and his staff should be congratulated on the way the course was presented. I would also like to take this opportunity to thank the many Superintendents and their staff for acting as course quality officials. Steven Newell and his staff must also be congratulated for their efforts in presenting Kooyonga for the Ford South Australian Open. Our Picnic Day at Belair National Park was again very well attended and special thanks to Brian Cooper for organising games for the kids and for being a good crayfish catcher. Events in early 1999 include A.G.C.S.A., workshop in February, meeting at Murray Bridge in March and a 2 day trip to Riverland in May. I would like to thank Mark Prosser for his

involvement in our association and wish him well in his appointment at Commonwealth and know he will do as good a job there as he did at Royal Adelaide.

We wish the A.G.C.S.A. Board all the best with the new magazine and may it be a great success.

In closing I would like to thank all sponsors for the year and we hope they keep on supporting the association and the turf industry in general.

Bob Dellow.

President SAGCSA

VGA

The Victorian Greenkeepers Association is proud to have a regular article in the turf industry's new magazine, Australian Turfgrass Management. Our regular articles will keep readers up to date with VGA activities and member benefits.

The VGA and other turf trades are in negotiation with Micheal Borthwick from the AWU to update the award classification from 7 to 5 adult classifications which should improve wages for turf professionals. Meetings are also being held with TAFE colleges and the ITAB's, in relation to the new course structure for Apprentices and Trainees, which the VGA believes includes too much on the job training and is therefore too easy for apprentices to graduate on a points system. On other fronts, Federation week is coming up in Adelaide in May and we are presently looking to confirm our team places. We are hoping to have about 30 people, so if you are interested, please let the VGA committee know. The annual VGA Singles Championships were held at Richmond Union Bowls Club on the 5th January. In a fluctuating match Ian Jarvis came out on top of Alan Elliot. As a general reminder membership fees are now overdue, so if you haven't paid up, please do so quickly. The VGA wishes the turf industry's new magazine, Australian Turfgrass Management every success and re-iterates our support for the magazine.

Toby Lumsden

TGAA

Presidents Report

To all our members and sponsors welcome to a New Year and a new publication. The TGAA endeavours to stay at the forefront of turf industry developments and are proud to be part of Australian Turfgrass Management. 1999 looks set to be a bumper year for the TGAA (Vic). The committee has taken the initiative in presenting a variety of seminars and field days to educate and entertain with these years' activities. On March 23 the TGAA will be staging a field day to inspect the AUSTEP trial site at the Keysborough Golf Club. The TGAA have helped with funding for this very comprehensive trial to take place. A personal invitation will be sent to all members shortly. On May 5th we will be holding a seminar in conjunction with the Bursars Association. More details available shortly. The 1999 Turfgrass Trade Fair is on at the new improved facility at Sandown Racecourse on August 4th and 5th. The new facility is completely under cover so please come and support our many sponsors O.H.S Week is in OCTOBER so we will be using this opportunity to have a morning session on

Dangerous Goods, their storage and handling, plant safety, and maintenance along with other activities like:

- Back awareness
- Cholesterol Checks
- Blood Pressure Checks
- Sun Spot Checks
- Dehydration information etc.

We hope you find some or all of these activities of relevance to you and your work. The Committee decided to save the turf wicket seminar for 2000 as the Trade Fair is scheduled at the same time we usually hold the MCG Fixture. The TGAA WEBSITE is near completion so stay tuned for the address to keep up to date with all the TGAA NEWS and Industry tidbits. Looking forward to a great year and hope to see you at some stage throughout the year. May it be fulfilling and rewarding.

ROBERT SAVEDRA

President TGAA

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Gopher

Horticultural Crop Monitoring has just released the "Gopher" soil moisture monitoring system into the Australian Turfgrass Industry. The "Gopher" uses new technology to provide accurate measurement of soil moisture in the root zone. The "Gopher" reveals plant water usage, evapotranspiration levels and deep leaching losses. With a unique electro-capacitance sensor head this soil probe gives precise soil water content from 5cm-1m + depth. A hand held field logger with LCD display and large non-volatile memory allows storage of 48 soil profiles at each of 54 field sites (that's 3 sites/hole on an 18-hole golf course). Readings can be taken rapidly (about 30 sec's/site) and immediately "water used", "water needed" plus graphics information and site history can be obtained in the field. Windows PC software is provided allowing data to be downloaded to the PC to view more detailed water use graphs. The "Gopher" is lightweight and easily carried on a motor bike. And best of all the price is coming down as technology advances. The

"Gopher" sensor, probe, logger, software and most extras is now retailing at under \$2000.



↑ Soil Moisture Readings can be taken rapidly with the new Gopher Soil Moisture Monitoring device.

PERFECTOSE - GT from Priya Chemicals

Priya Chemicals, an Indian based company has released PERFECTOSE - GT to the Australian market. According to the President of the company, Dr. R. Angle, Perfectose-GT is an amino acid chelated calcium product exclusively developed to correct calcium deficiency of turfgrass and other plants. "The calcium chelated in PERFECTOSE-GT is readily available and easily absorbed by the leaves and/or roots of the plant regardless of soil and environment conditions," he said. He added that, "the amino acids used increases the absorption and transport of nutrients through the leaves into the plant. The calcium absorption is increased along with enhancing of translocation of this essential nutrient to growing points of the plant. These biologically active free amino acids obtained by enzymic hydrolysis improves photosynthesis and offer maximum protection from stress."

PERFECTOSE - GT is environmentally safe and non phytotoxic. It is tank mix compatible with normally used agrochemical products such as soluble fertilizers, fungicides, insecticides, plant growth regulators etc., except growth regulators and weedicides. Applied together PERFECTOSE - GT improves efficiency of these treatments by increasing their absorption and translocation within the plant.

APPLICATION: PERFECTOSE - GT can be applied as a foliar spray through fertigation. An immediate response is observed when PERFECTOSE - GT is applied as foliar by making entire leaf wet until runoff. This product can be used to prevent and control calcium deficiency in plants and maintain turfgrass leaf turgidity and quality.

Further information can be found on the Priya Chemicals web site at www.priyachem.com

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New Factor 30+ Sunscreen

Deb Australia has launched its SPF30+ occupational sunscreen Deb Sun, which can halve the risk of skin damage to outdoor workers. "The Cancer Council recommends that people use a very high protection broad-spectrum sunscreen with a sun protection factor of 30 plus," said Deb Australia managing director Roger Heap. "The council also says that by applying an SPF30+ sunscreen rather than SPF15, you halve your risk of sunburn," he said. Deb Sun is among the first SPF30+ sunscreens for the occupational market. The product is formulated for groundsmen, construction workers, school children, outdoor engineers, farmers, forestry workers, tourism operators, fishermen, open cut miners, roofing contractors and all other people exposed to the sun during their working day. Pack sizes include a 125ml pocket and purse bottle, a 250ml bottle for toolbox or glovebox, and a one-litre collapsible cartridge which fits Deb Australia's new Deb Sun wall-mounted dispenser. Deb Sun uses a microfined zinc oxide formulation because this is the only sunscreen ingredient that offers broad spectrum protection from both UVA and UVB rays. The sunscreen is smooth, non-sticky, and non-irritating to the skin. Its water-in-oil base increases resistance to heavy perspiration and towel drying, so keeps on protecting during heavy work and heat. It also leaves less white residue on the skin. Legislation now requires employers to provide sun protection equipment for outdoor workers, as well as training in its use. Employees are obliged by law to use sunscreen and other protective equipment if it is made available. The company offers full technical support and advice, including site evaluations, product trials, installations and on-site training as required.

For further information about Deb Australia and its representation in your State or territory, phone Roger Heap on (02) 9755 3388 or fax (02) 9755 3259.

LOKSAND Released in Australia

Plasticisers Ltd., has launched a newly designed fibre for use with sand to create a more cohesive, durable and weather-resistant surface for both sports surfaces and landscape areas. LOKSAND is a unique concept of precisely crimped polypropylene fibres, which interlock in the rootzone mix, creating both greater stability and improved impact resilience. Sports surfaces world-wide already enjoy the benefits of Plasticisers fibres, but the company believes that their latest innovation will bring even greater success to a system which has revolutionised the preparation and performance of both turfed and non-turfed areas for golf, equestrian sports, soccer and rugby. Test results have convinced the company that the new profile of LOKSAND fibres will accelerate the speed and efficiency with which grass surfaces respond to impact and, by making a firmer bond between sand particles, increase root stability and wear resistance. "The affect of the crimped profile" says Keith Bailey, MD of Plasticisers, "is twofold - firstly it provides crucial interlock, which resists the natural tendency of sand to deform under impact and secondly it gives a spring-effect which rapidly restores surface uniformity after distortion by load.

"The fibre we previously produced for this market has helped transform many playing surfaces which have, in turn, effectively changed the way in which some of our equestrian arenas to be subject to restricted use in water."

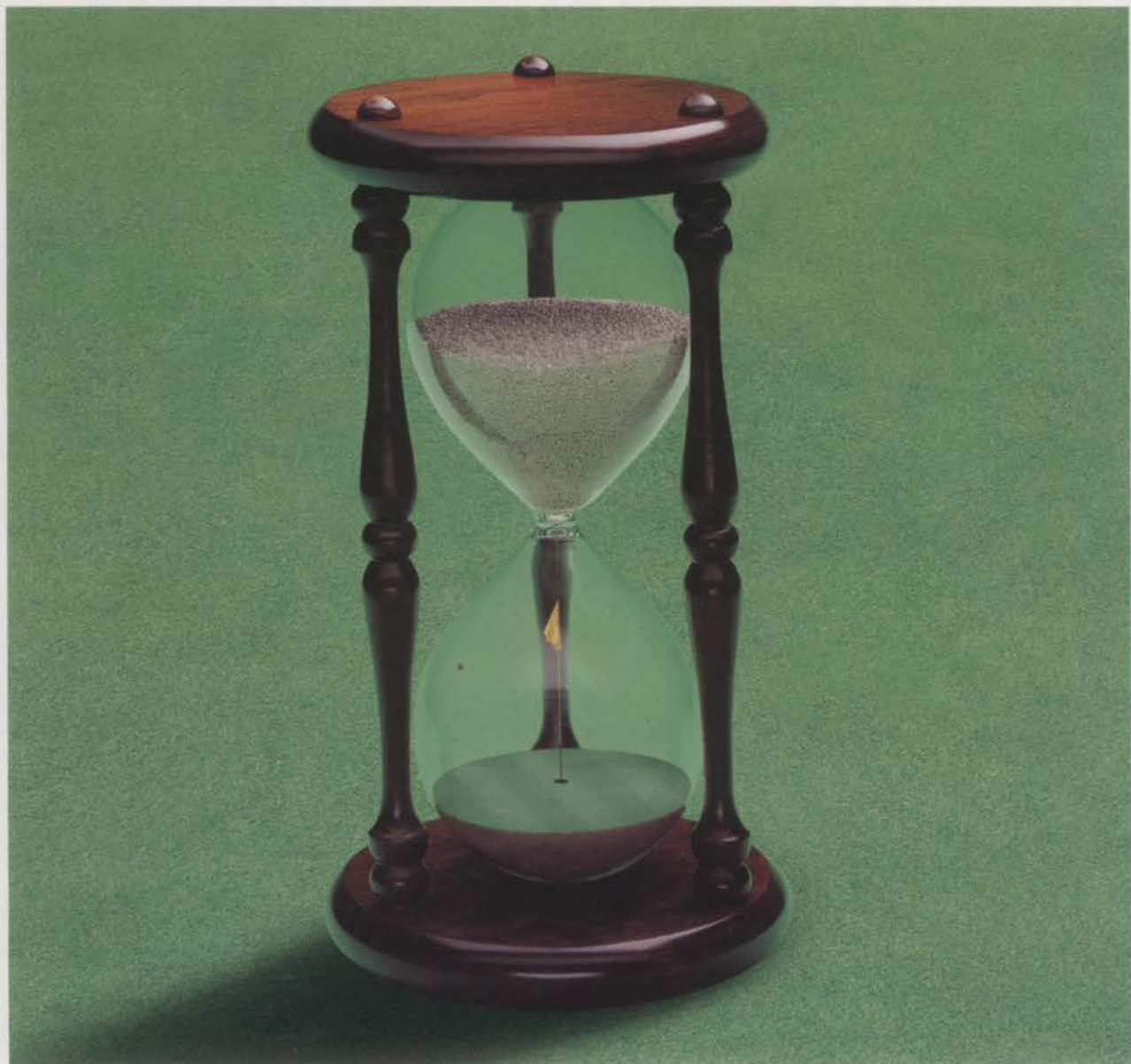
Foley Grinders

The Accu-Pro grinder, claimed to be the fastest and easiest bedknife grinder available today, is a semi-automatic model with a unique bedknife mounting system, fast angle set-up and operator protection features. The Accu-Master unit is a totally enclosed, automated reel grinder, and is designed to eliminate the need for a separate grinding room. It claims to offer superintendents and turf managers a total maintenance solution. Automated grind cycles and blade indexing features on the Accu-Master enable the operator to do other tasks while grinding reels. Toro Australia will be distributing the Foley range of grinders and will also be handling the Foley United range of Diamonite(tm) and Razor-Sharp(tm) lapping compounds to complement the grinders. More information can be obtained by contacting Toro Australia on (02) 9687-2366 or by fax on (03) 9687-2313.



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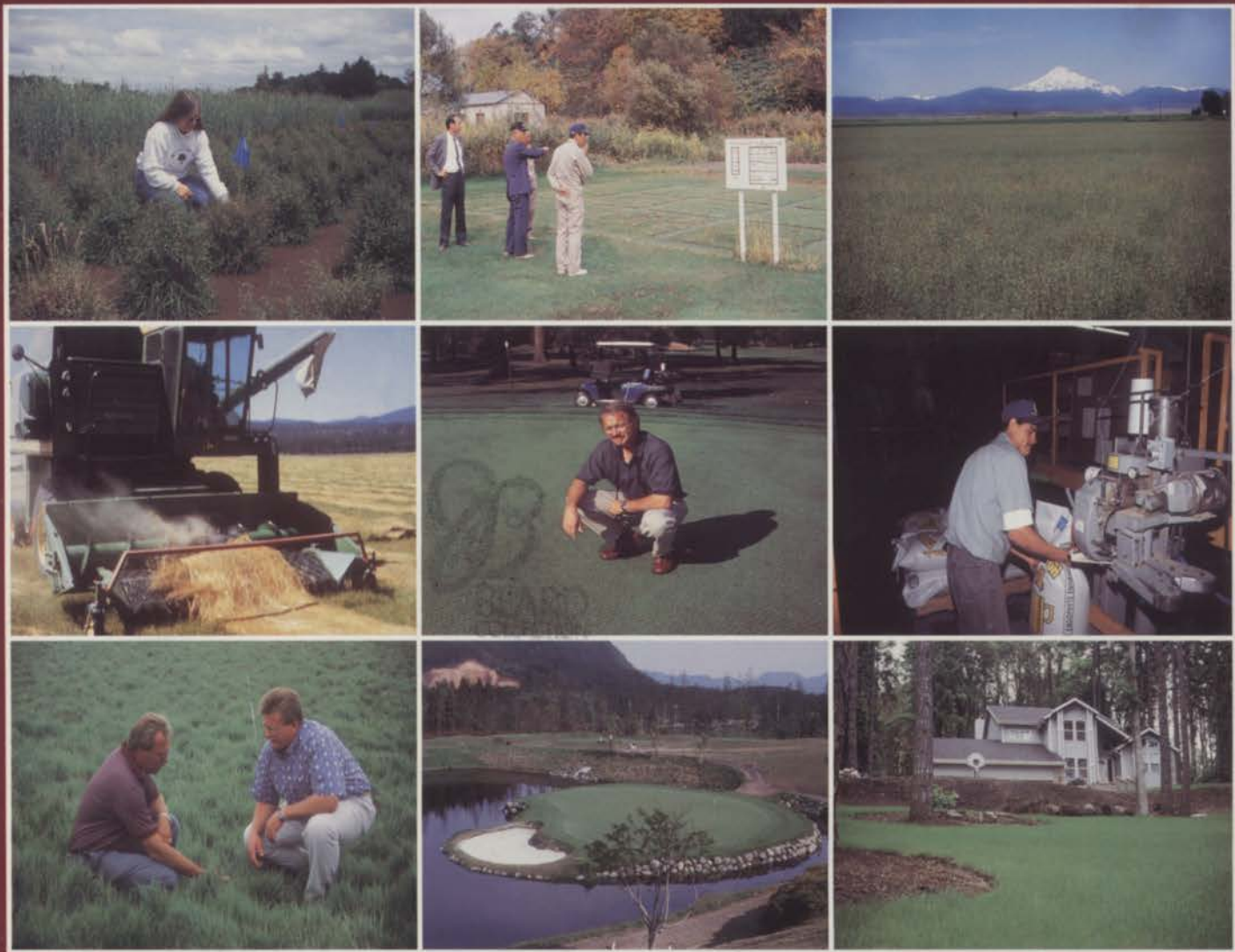
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