Keeping it Green

December 2009

AUSTRALIAN GOLF ENVIRONMENTAL INITIATIVE NEWSLETTER

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Keeping it Green Editorial Enquiries

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Henley Course - Hole 1

FLOODPLAINS WONDER

Design and construction of the Henley Course at The Heritage

By Tony Cashmore. Photos courtesy Gary Lisbon Golf Photography

HENLEY Golf Course was born in strange circumstances, possibly even unique.

First, it was the second course proposed at The Heritage, an exclusive residential enclave some 25 kilometres outside Melbourne's CBD. The first course, The St John, was designed by the Jack Nicklaus team; it is a quintessentially American parkland course, supported by a lavish clubhouse and adjacent boutique hotel. Substantial villas and units line some of its fairways. A strong golf club with a larger proportion than usual of good players is examined by its demands.

Henley was to have an utterly different visual and golfing character: Still of championship length and club flexibility, it was to be the '"alternative" course for members and their guests. It was to have no residential infrastructure at all – a most unusual and happy situation today for the architect.

Second, it was to start and finish at only one place, on the other side of the Yarra River – some 900 metres from the clubhouse – and reached by golf carts and

Henley Course - Green 5 in foreground

ferry carts. Players can elect to use pull-trolleys and walk once at the starting hole, or continue with the carts. So it's an out-and-back course with a halfway house after the 9th hole.

Third, much of the course is built on the river floodplains, but with a significant hill situation on its far side that needed to be used, and which required most careful routing design. (How to meld convincingly the generally flattish golf holes on the floodplains with a 40-metre high vast hill quadrant in the site exercised me greatly.)

Fourth, from a planning and construction viewpoint, there were of course strong environmental constraints in protecting not only the river, but also its ancient billabongs and ox-bows distributed through the floodplain. These had become contaminated with poisons and weeds, due to the property having been used as a cattle farm for many years They were ugly mud holes; the river flowed sluggishly most of the time, and was a torrent after major rain events. The fish and frogs and small bird life which used to have found habitats here no longer could. Part of Henley's design philosophy was to avoid using any of the large billabong and ox-bow areas, and I was even denied the option of playing over them! We were to "reinstate" their habitat and environmental values, and then leave them alone for ongoing management.

The somewhat strange and convoluted routing of the course was determined to a large extent by that need to respect utterly these extensive waterbodies and their surrounds.

The situation was not helped by having a small group of "pretend" environmentalists living up on another boundary; they delayed the whole construction program by years, using whatever powers they could to persuade authorities that Henley should not be built. They just did not want a golf course and players below their lofty perches. For them, it was inconveniently irrelevant that the St John Course, constructed some seven years earlier, had demonstrated how environmental and habitat values in the riparian zones of the river, and in the adjacent part of the river itself, had been re-instated magnificently by the course design and the creation of diverse new wetlands: fish which had not been seen for 60 years were now thriving over there, the chortling of frogs not heard for decades opened the night, and birds flew happily from new-made nests.

Henley had to continue this valuable program. Good golf course architects know far more about developing habitat and environmental values in a site than people who decry golf for self-serving and uneducated reasons. Vast areas of the once degraded floodplain have now been devoted to diverse habitat wetlands and native low bushland. The lakes are crystal clear and fish are abundant in them. Stands of trees indigenous to the conditions have been planted on the higher land, well away from play lines, but these will form fine backdrops to some greens and to some dogleg corners up there.

And finally, the site was part of a major holding and

attenuating basin for the river's flood events, requiring an absolute balance between areas to be filled and retaining the capacity of that basin. Further, the age-old broad travel routes for floodwaters diagonally across the plain to the river could not be modified to any extent with elevated "barriers" to those escaping flows.

The planning for Henley on the plain, and the designed elevation differences there between play areas and the created lakes, result from all these restrictions and requirements.

The lake areas have the same total excess capacity as the volume of filling on the plain required to form a dry and drainable golf course.

Large overland swathes of tough grasses in swales interrupt the flow of fairways to respect the exit routes for floodwaters – holes 1, 2, 3, 5, 7, 8, 9, 17 and 18 are all affected by this.

Some unwanted extensions to waterbodies for flood events were demanded by authorities late in the construction program: as examples, the water on the left of the 17th fairway must one day be pulled back to its original extent, and the long lake in the flood swale on the right side towards the green on this hole will hopefully be allowed to be filled in again, and returned to open, mown grasslands.

All this said, Henley has turned out much as I wanted it to. It has a strange character, visually having something of a "links" feeling over the floodplain areas in its long ripples and undulations, folded hillocks, deep and wild-wrought bunkers and absence of trees. Tall, sere grasslands and low bush distinguish very broad play zones for the front nine, and again for holes 17 and 18. And yet all this is set in marshes, wetlands and lakes; you are never far from looking at water in some guise.

From hole 10 however, the course climbs towards the high ground. Holes 10 and 11 are good dogleg par-4s over interesting ground, with the 11th green (drivable for long hitters) tucked into a bend of a tree-clad creek. Hole 12 is a fine par-3 over wetlands, far vineyards as a backdrop, while the par-5 13th uses a deep valley, the only access possible in gaining the elevation up to the hill climax. Generous in its rising fairway from the high tees, it narrows around a corner to a plateau green, a creek defending its left flank.

Hole 14's drive is diagonal across the irrigation lake, formed high up here by damming a valley – a true risk-and-reward long par-4 examination. The little 15th plays across a lake to a complex green set wide and narrow, with a forested hill as backdrop.

And then hole 16, a very strange but well-accepted beast. It had to link this high ground back to the floodplain, the elevation change being some 40 metres – just a little more than Augusta National's 10th hole uses. It is about 470 metres long, but a par-4. We hopefully solved the problem of an intractable rock prow across the wide drive zone by creating a slow-stepped descending plateau there, from which the large green can be approached after a careful long drive (to lose the drive right means awful trouble) with

Henley Course - Green 6

as little as a 6-iron. The hang-time for both the drive and that second shot is exhilarating, and hole 16 has become something of an icon for members and visitors.

The present problems noted with hole 17 will eventually be resolved, and it is a fine par-5 in essence with at least four ways of plotting strategy depending on a player's strength and skills. And the long par-4 18th to a huge convoluted green will soon have the visual character designed for it: at present the journey home to the river is a little bland, if challenging.

But there are design matters on the front nine which would benefit from discussion: a Cashmore golf course will always force some controversy, please God, and Henley is no exception.

Some holes here do not sit well with the strong player who demands the right to take driver at every tee and hit as far as possible down every fairway, hopefully being straight enough to avoid trouble on the sides.

Henley in its generous fairways actually rewards the powerful drive on most two- and three-shot holes very well, but I do not believe this must be a universal dictum, especially with modern equipment in the hands of these leviathans making a mockery of any length two- and three-shot examinations. No rough or bunkering suitable for most players can contain them. The statement that it is good to put the driver into the hands of a fool has become, therefore, less and less valuable today.

So the shortish par-4 opening hole is best played to the broad ridge rather than belting a driver into the floodway's longer grasslands beyond 250 metres: the approach to the green needs backspin.

And the 2nd's par-5 examination asks for a drive to be more and more accurate the longer it is, the fairway fast narrowing to less than 20 metres after the 240-metre mark. The hole is comfortably short, a strategically interesting three-shot test for most players, and does not advantage great length from the tee in any case.

But the main controversy is at hole 9, after the tiny par-3 8th, its green without bunkers, yet fiendishly difficult to solve. With hole 9 I deliberately set a "virtual" limit to the drive length on a 430-metre long par-4. Unless brave and very accurate, the long driver is asked to place the tee shot out at 240 metres maximum on a large plateau before the land sweeps down in a narrow chute to a small plateau terminating at wetlands out at 280 metres. This designed situation virtually forces a long second over confronting bunkers at the green, or deliberate play to the left of them, leaving a short pitch in to the flag on a vast green.

It is rated number one on the card so everyone gets a shot here.

Is it wrong to ask the really strong golfer to better use his brain rather than his innate strength on one hole in 18? To gain advantage in a different way? Is there no sublime pleasure now in sending a screaming long iron or hybrid shot to the sanctuary of the green, rather than the ubiquitous short iron play into greens these strong players crave and demand everywhere?

Well, for the moment anyway, Henley's hole 9 is criticised by "them". In the full flowering of this young course, when the turf reaches the standard wanted for it, and the play lines become better defined, I will gladly wear that criticism. The course is big enough to have hole 9 in its saddlebag.

drumMUSTER

The drumMUSTER program which recently celebrated 10 years of operation is a national program developed specifically for disposing of properly cleaned, empty farm chemical containers. The aim is to take these materials out of the waste stream and instead reuse the plastic and steel through recycling.

drumMUSTER was developed as a cooperative joint venture between farmers, manufacturers, distributors and local government, and importantly was developed without legislative instruction or direction from government. It is a program developed by people from the entire farm chemical supply and use chain, and benefits farmers, ratepayers and the greater Australian community.

DrumMuster - WA

GCSAWA President, Mr. Darren Wilson would like to inform all Western Australian golf course superintendents that that the GCSAWA have arranged for Drummuster to install bulk storage containers onsite at Wembley Golf Complex and Gosnells Golf Club. Members can drop off their emptied and rinsed containers at these two locations. Please give either Darren or Brad Sofield a courtesy call before coming over to drop them off.

Contact details are;

Brad Sofield	0414 554 195
Darren Wilson	0411 310 511

DrumMuster - QUEENSLAND

Drum Muster's Southern Queensland regional consultant Colin Hoey states that the drumMuster program "continues to provide sustainable pathways for empty clean chemical containers used in the Queensland golf course maintenance industry." He also states "Since the inception of the service in late 2007 there has been steady improvement in the number of clients and it is pleasing to see the number of repeat clients. The environment is always under scrutiny and participation guarantees drums are recycled and don't end up in undesirable destinations."

Data collected by drumMuster since December 2007 from participating Queensland golf courses states;

- 7,505 drums recycled
- 41 individuals courses participating
- Over 8 tonnes of steel and plastic recycled
- 200+ cubic metres diverted from landfill
- End to end the drums would stretch 2.68 kilometres

For clubs interested in participating in drumMuster in Queensland, please contact your local council or Colin Hoey on 0428 964 576.

For golf clubs interested in participating in the drumMuster program please contact the consultant in your region.

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The Rise and Fall of Pesticide Popularity

Phil Ford, 2009

In the past issue of 'Keeping it Green' regular contributor Phil Ford spoke on the relationship between soil health and its effect on overall plant health. In this issue he discusses the origins of pesticide usage and the rise of the anti pesticide movement.

The Rise and Fall of Pesticide Popularity

Since the 1960's most of the training in pest management centred on the simplistic selection and use of the appropriate pesticide for a situation. This view is outdated, and training now emphasises IPM, with pesticides being just one of a number of pest control strategies that can be employed. It is interesting to look at the developmental history of pesticides.

There are many references in early Chinese, Greek, Egyptian and Roman literature to pesticides. Some were based on simple preparations of elements such as arsenic, lead and sulphur. Homer, for example, refers to 'pest averting sulphur' in around 1000 B.C. Other early pesticides were based on plant extracts from tobacco, pyrethrum and helleborus. The natural alkaloids present in these species were nerve toxins and the plant material (crushed sap, or a 'tea' made from soaked plant material) could be used as an insecticide. Ancient Chinese agriculture used certain plant species in the crop rotation, especially the Brassica family (Mustard, Cabbage etc), to reduce insect, nematode and fungal disease problems. Although they weren't aware of it, the decomposing residue of these plants released cyanide gas, creating a 'biofumigation' effect.

Old Generation Pesticides based on elements

In the 1800's the use of simple inorganic compounds (mostly based on metal elements such as copper and arsenic) became more widespread and commercialised. Bordeaux mix, for example, a mixture of copper sulphate and hydrated lime, was used as a fungicide in the grape regions of France, and is still used as a fungicide today. (Note: fungicides based on copper are not usually used on turf, as grasses are very sensitive to copper toxicity).

In the early 1900's, chemists began to formulate and commercialise other inorganic pesticides based on metals such as lead, mecury, arsenic and cadmium. These were usually simple compounds (eg: Lead arsenate, disodium methyl arsenate etc). Elements are indivisible and eternal, and not biodegradable. This creates two problems for the environment and for humans – they are long residual (indefinite, actually), and they can accumulate in the environment, the food chain, and in the body. The arsenic in DSMA you might apply to fairways this summer, for example, will still be in that soil long after you're dead and gone.

By the 1930's a revolution occurred in pesticide chemistry, with the use of 'organic' pesticides that used a 6 carbon ring as their basic framework. The first organic pesticides (1930s) were a combination of the carbon-ring structure with one of the old elemental metallic toxins. Phenyl Mercuric Acetate (PMA) was an example of one such organo-metallic compound. The mercury does the actual work of killing the fungus, but it is carried on an organic (6 carbon) frame which allows it to bond to leaf tissue, and is more readily absorbed by the fungus itself, so it is more effective.

Being an organic formulation, a molecule of PMA can be biodegraded. Microbes can attack the carbon bonds, and after a certain period the concentration of the PMA compound will decrease. But what about the mercury itself? It's an element, of course, so it's not going anywhere. So the environmental problem remained.

New Generation Pesticides based on 6-carbon ring

Around this time the first all-organic pesticide compounds were developed. It was discovered that certain organic molecules had biological activity, especially the ability to disrupt certain biological pathways (eg: respiration, photosynthesis, cell wall construction etc). Their toxicity wasn't to do with them carrying toxic metals, it was to do with their characteristic molecular size and shape allowing them to block or disrupt biological pathways in the target pest. These 'new generation' pesticides didn't need to contain toxic elements such as arsenic, lead, cadmium or mercury, which meant no accumulation of these elements in soil or the food chain.

The new generation, fully organic pesticides are biologically active molecules. In many cases this allows greater bonding and/or uptake by the target. In fact many of these compounds were systemic, and could enter and travel within the plant. The organic compound Dichloro diphenyl trichloroethane (DDT) was first synthesised in 1874, but it wasn't until 1939 its efficacy as an insecticide was exploited. Its use for control of the mosquito-borne disease Malaria ensured a rapid adoption of the new insecticide and its analogues (chlordane, dieldrin, aldrin and lindane – the 'Organochlorines', or 'Chlorinated Hydrocarbons').

The Organochlorines enjoyed a boom in popularity and use from the 1940s right through to the 1970s. These compounds all carry chlorine, but chlorine in itself isn't toxic (table salt, for example, is about 50% chlorine). It's the characteristic shape and size of the organochlorine molecule that gives it the ability to disrupt a specific biological pathway (nerve function, in this case).

Another insecticide group that developed rapidly was the Organophosphate group (eg: chlorpyriphos, diazinon, azinphos, fenamiphos, Gusathion, Parathion, Malathion – basically any insecticide with 'phos' or 'fos' or 'thion' in the name). These compounds all carry phosphorus, but again

phosphorus isn't toxic in itself, it's the particular size and shape of the molecule that gives it the ability to target a specific biological pathway (nerve function, again). Early OP compounds were developed as chemical weapons in the First and Second World Wars, and many existing chemical weapons are still organophosphate based. Following the Second World War American companies gained access to German research on OP's, and the development of these insecticides took off.

Nearly all modern pesticides are organic molecules that don't carry specific toxic elements such as arsenic, mercury or lead. Their toxicity is based on their biological activity and their ability to disrupt a specific biological pathway in the target pest. This means these compounds are usually quite rapidly biodegraded to simple, harmless end products. But does that mean these new generation pesticides are less toxic? Not at all, in fact their LD_{50} can be much lower than some of the old generation pesticides. But they are biodegradable, have better bonding and uptake, and they are more specific in their targeting. And in many cases they can be detoxified in the human body, rather than accumulate like the old elementals.

Pesticide Popularity

In general terms pesticides enjoyed enormous popularity in the period from the Second World War through to the '60s and 70s. Their development was coupled to a boom in plant breeding, and the greater production of fertilizers. In countries such as India the phenomenon is known as the Green Revolution, where high yielding crop varieties and crop production systems transformed their agriculture from a subsistence economy to an economy able to generate export income. Conservationists and environmentalist would argue that the Green Revolution crop varieties are high input genetics, with their yield completely dependant on high pesticide, fertilizer and water inputs. Given that pesticide and fertilizer production is highly geared to energy prices, the danger is two-fold – first, that oil itself is a non-renewable resource, and second that energy prices may rise in the future. Nevertheless, the Green Revolution in India has fed its population and allowed a certain measure of economic independence.

During that period from the war through to the 70s pesticides have not only increased agricultural productivity, but reduced the incidence of many other economic pests (eg: rodents, termites, fleas, lice, environmental weeds etc). Their impact is felt widely through both the developed and the less-developed countries, reducing the amount of agricultural produce that is consumed, killed or damaged by pest organisms.

The Anti-Pesticide Milestones

In 1962 the ecologist Rachel Carson (1907 – 1964) released the book 'Silent Spring' , which raised concerns about the indiscriminate use of pesticides. The effect of DDT on bird life, in particular, gave rise to the title of the book. The book raised environmental awareness of an American society that was learning to question authority and protest on all sorts of issues. The resulting political pressure resulted in a radical tightening of the controls on the development, sale and use of pesticides throughout the world, and the eventual banning of the organochlorines.

The use of Agent Orange in Vietnam has further damaged the reputation of pesticides. Agent Orange was the herbicide 2,4,5-T, which was widely used for tree and shrub control (eg: blackberries). It was used in Vietnam to defoliate the jungle hideouts of the Viet Cong. 2,4,5-T contains by-products called dioxins, (eg: TCCD), which are some of the most toxic products known to man, and even small doses (in parts per billion) can cause cell abnormalities and other toxic side effects. Exposure to the chemical in Vietnam led to claims for compensation by veterans both here and in the US, although no court ever upheld the claims due to inconclusive evidence. A survey report titled 'The Morbidity of Vietnam Veterans' was released by the Australian Dept. of Veterans Affairs in 1998. The survey had a 79% response rate, with more than 40,000 responses, and found that more than 25% of male veterans had been diagnosed with some form of cancer, and that the rate of genetic defects in offspring of male veterans is three to four times that expected from the general community. In the case of Agent Orange the anti-pesticide lobby was coupled with the prevailing anti-war sentiment, with both being seen as the tools of capitalism and oppression.

Another major blow to the reputation of pesticides occurred in 1984, in the Indian city of Bhopal. A leak from a pesticide factory owned by the US company Union Carbide killed 3,500 people. A further 200,00 suffered injury or ongoing ailments related to the leak. After a long court battle, the company was required to pay $470 million in compensation to the victims. There have been other industrial accidents involving pesticides, but this was the worst. Again the anti-pesticide sentiment was linked to suspicion of big business, capitalism, and the exploitation of an under-developed country.

In a purely local context, pesticide use on golf courses has suffered poor publicity. One case involved a lady golfer who seems to be one of those small percentage of people in the population with extremely high sensitivity to synthetic chemicals. She connected her bouts of illness to occasions of playing golf when pesticides were being applied. The second case involves an application of Nemacur killing ducks who came up at night to forage on the sprayed greens. The EPA investigated the case, and were very close to banning the use of Nemacur in turf. A third case you are all familiar with, Warringah Golf Club.

These cases highlight the need for risk management analysis and the other environmental management tools when using a pesticide. Society and the media are always ready to jump on any pesticide problems on a golf course.

COASTAL MOONAH WOODLAND ON THE BELLARINE

Barwon Coast in partnership with other agencies and land managers on the Bellarine Peninsula has received funding from the Commonwealth Governments Caring For Our Country Community CoastCare Grants Program for a Coastal Moonah Woodland project.

The project which is modelled on a similar scheme that extends across the Mornington Peninsula will assist land managers in gaining further understanding of the values and better management practices for the ongoing preservation and conservation of Coastal Moonah Woodlands at a local level.

The project aims to conserve and where possible, enhance the current extent and quality of Coastal Moonah Woodland; investigate and refine understanding of this plant community; assist in the development and consistency of data recording across the Bellarine; and create greater understanding of this botanical community's values among residents and visitors to the Bellarine.

As part of the project, Barwon Coast held a skills development training day during August for project partners managing Coastal Moonah Woodland communities. Representatives from the Department of Sustainability and Environment, Parks Victoria, Bellarine Catchment Network, City of Greater Geelong, Gordon Institute of TAFE, Barwon Heads Golf Course, Friends of Edwards Point, Breamlea Coast Action and private landowners attended.

The training provided valuable information on characteristic and indicator species of this community, and helped develop skills on collecting consistent valuable data on flora that will contribute to the development of a field and best practice management guide. With regard to the Barwon Heads Golf Club, participants were very surprised at the quality of the flora in the non playing surfaces and the club has been praised for its efforts in managing them.

Barwon Coast Community Liaison Officer Maddie Glynn said that more than 30 interested people were given an insight into this threatened community by experts.

"Participant numbers exceeded our expectation and unfortunately we were unable to cater for all those wishing to take part. This clearly demonstrates land manager and individual interest in conservation methods and greater understanding of vegetation communities on the Bellarine", Ms Glynn said.

Those who attended the skills development training will get to fly solo during September and December when all groups involved start collecting valuable data on this threatened plant community.

Enquiries about the project can be directed to;
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AGEF SUPPORTER PACKAGES

The Australian Golf Environment Foundation (AGEF) has a range of supporter packages to suit corporate, club and individuals that may wish to contribute to fostering future research and knowledge into golf and the environment. For more information on how to become involved with the AGEF, contact John Geary at the AGCSA on (03) 9548 8600 or email jgeary@agcsa.com.au

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