WORLD ATLAS OF

THE GREATEST COURSES AND HOW THEY ARE PLAYED



ORIGINS OF THE GAME

At its heart, golf is a natural game. Although there is some question whether or not it derived from the Dutch game of *kolven*, which was played on the open ice to a target but not a hole, the game of golf evolved to its present form on the coastal links of Scotland.

pen land near the coast, too sandy for farming, supported the growth of fine-bladed grasses, providing pastures that were loosely maintained by herds of grazing sheep, horses and cows. The high northern latitudes provided long summer days, so that the Scots could venture out for an evening of sport after a full day of work, and the Gulf Stream currents provided weather mild enough to play nearly all year round. On the links a makeshift ball could be hit great distances and still found at the other end to be played on. Thus the game of golf was born.

THE EARLIEST COURSES

The original courses and clubs were formed in coastal towns by local players. There were no accepted standards for golf courses, so each was adapted to the size and shape of its setting. Leith Links, on the outskirts of Edinburgh, had just five holes, while St Andrews's long strip of undulating turf (see page 40) provided room for 11 holes out and 11 back on the same route, and the Old Musselburgh Links (inside a horseracing track) is the oldest nine in the world, unchanged since 1870. None of these holes was long by today's standards, since the best players could achieve drives of only 160–180 yards (146–165 metres) with feather-stuffed balls and the rudimentary clubs.

On the courses, the hazards were natural ones. Scrapes of sand formed by the combination of

Top right: Westward Ho! is laid out over common land, where local residents have the right to graze their sheep, cows and horses. It provides an excellent example of how hazards are born and develop, and why the Rules of Golf distinguish about what types of animal scrapes deserve relief.

Right: The West Links at North Berwick is distinguished by an old stone wall running through the course. The wall is utilized to great effect as a hazard on two or three holes, giving the course a character all its own.





PRESTWICK GOLF LINKS

The original 1851 layout

The original routing of Prestwick Golf Club by Old Tom Morris was a compact affair, with holes crisscrossing one another and one green played twice in the 12-hole loop. As golf became more popular, such efficient routings had to be scrapped for safety reasons, but this was the course played for the early Open championships.

Of Prestwick's original layout, seven of the greens still survive. The old 1st (Back of Cardinal Hole) and 2nd (The Alps) have become the current 16th and 17th respectively. The shared 3rd and 6th green is now the 2nd. The 4th (The Wall Hole) is now the 3rd green and the 5th (Sea Headrig) and 10th (Lunch House) are the modern-day 13th and 15th greens.



animal activity and wind erosion were eventually formalized into bunkers, while larger sand dunes at the edge of the course provided formidable hazards to be carried. Narrow water courses that snaked their way across to the sea were the first water hazards, and at North Berwick (see left) even the ancient stone walls were incorporated into the local golf course. By the 1840s the wealthier golf clubs had begun to pay someone to maintain their

courses, and soon afterwards revetted bunker faces or wooden bulkheads were introduced to fight ongoing bunker erosion.

CONSISTENCY OF CHALLENGE

There are several variations on how 18 holes came to be the standard. It is probable, however, that a decision by the Society of St Andrews Golfers to consolidate to 18 holes was followed by a resolu-

tion to hold the first Open Championship, in 1860, over 36 holes. This meant playing three times around the 12 holes of Prestwick (see above), laid out by Old Tom Morris, but conveniently only twice round St Andrews, or four times round Musselburgh. Thus 18 holes was cemented as the standard, just before the game was exported to the rest of the world by two generations of immigrant Scots professionals.

THE GOLDEN AGE

The early part of the 20th century saw a great economic boom that made possible a similar one in the construction of golf courses, and a new generation of golf-course architects rushed to meet the demand.

ome Golden Age architects, such as James Braid and Donald Ross, were professional golfers who crossed over to design, but the majority were men who loved golf as a recreation, whether they were wealthy amateurs developing their own clubs (such as Charles Blair Macdonald, George Crump and Henry C. Fownes) or professional golf architects (Harry Colt, Dr Alister MacKenzie, Charles Alison, A.W. Tillinghast and William Flynn). These were well-educated men, and they brought a new sophistication to the subject of design; many wrote books on their own design philosophies.

GREATER VARIETY

The rising tide of wealth in America and in Europe in the years either side of the First World War meant that golf courses were now economically viable even on poor soils or poor sites that would require a great deal of construction, including tree clearing and rock removal. Greens were sculpted from the terrain and bunkers started to be used as prominent visual features, with each designer developing his own particular style.

New business models for golf courses were also developed in this same period. The American 'country club', for example, positioned golf as a central component in the leisure time of wealthy families, while the first 'destination' golf resorts were developed by railway companies and property developers, from Pebble Beach (see page 244) to Gleneagles (see page 66) to Banff Springs (see page 258).

However, this golfing boom suddenly stopped at the start of the Great Depression from 1929, when funds to support new courses became unavailable. Many more courses closed in the 1930s than new courses opened. The only work was provided by publicly funded jobs programmes that developed municipal courses, and in isolated prosperous corners of the world such as South America and Japan. When boom times returned after the Second World War, most of the Golden Age designers had retired or died.

GREAT ARCHITECTS OF THE GOLDEN AGE

The following golf-course designers were some of the greatest of the Golden Age.

Charles Blair Macdonald (1855–1939)

A stockbroker from Chicago, Charles Blair Macdonald became a top-notch golfer at St Andrews while at university there in the 1870s, and missed the game terribly when he returned to America. In 1892 he founded the Chicago Golf Club, and in 1895 was its representative at the founding of the United States Golf Association (USGA), as well as the organization's first US Amateur champion. After 1900, Macdonald became fascinated by the idea of creating an American course founded on the principles of the



George Crump was the founder and designer of Pine Valley (see page 186), with some help from Harry Colt and advice from friends including A.W. Tillinghast and George Thomas.

best British links, and he found the ideal property on Long Island, where he built the National Golf Links of America (NGLA). Thereafter, he was in great demand to create courses all over the USA, but in fact he participated in only a few, leaving the rest of the design work to surveyor Seth Raynor who had assisted him at NGLA.

Most influential courses: NGLA (see page 166), Chicago (see page 222), Mid Ocean (see page 272), Yale, The Creek Club.

William Herbert Fowler (1856–1941)

Although W.H. Fowler did not take up golf until his mid 30s, he was soon a scratch player. His first design, Walton Heath, received great critical acclaim and further commissions soon followed. He spent some time working in the USA. Some of his designs, such as The Berkshire, were codesigned with Tom Simpson.

Most influential courses: Walton Heath (36 holes), Saunton (36 holes), Beau Desert, Lake Merced, Eastward Ho!, Westward Ho!.

Willie Park Jnr (1864-1925)

This pioneer in the field of golf architecture was Open champion in 1887 and 1889. He started designing courses in the 1890s, but made a strong impact only when he designed the first top-class inland courses in England – Sunningdale (Old) and Huntercombe – just after 1900. Huntercombe was the first golf course to be integrated into a housing development, and notably included a man-made, two-tiered green, apparently a first. Willie Park Jnr also became the first British architect to work extensively in continental Europe. In 1916, he emigrated to North America and pursued a very busy practice until he fell ill in 1923, whereupon he returned to Scotland and died there two years later.

Most influential courses: Gullane (Nos. 2 and 3), Western Gailes, Silloth-on-Solway, Sunningdale (see page 100), Huntercombe, Notts., Royal Antwerp, Mount Bruno, Olympia Fields (North), Maidstone (see page 182).

Willie Park Jnr was not only a two-time Open champion, his professional's duties also included greenkeeping, which was of immense value when it came to the construction of new courses abroad.





Harry Colt's success at golf-course architecture caused some professional golfers to suggest that only professionals should lay out courses and led briefly to a controversy over the rules of amateur status.

Harry S. Colt (1869–1951)

Harry Colt was a fine golfer for the Cambridge team and a regular competitor in the Amateur Championship. In 1901 he took the job as club secretary at Sunningdale GC, and from that base started to design other courses in the heathlands. After the First World War he formed the partnership of Colt, Alison & MacKenzie (Alister MacKenzie later being replaced by John Morrison), with the younger partners taking the international work.

Most influential courses: Rye, Sunningdale (New), Swinley Forest, St George's Hill, Royal Portrush (36 holes; see page 114), Falkenstein (see page 148), St Germain (see page 136), De Pan, Muirfield (see page 60), Toronto Golf Club, Hamilton (see page 260), Kennemer (see page 126), Royal Zoute (see page 130).

Dr Alister MacKenzie (1870–1934)

Alister MacKenzie trained in medicine at Cambridge, and as an army doctor in the Boer War became fascinated by the art of camouflage, which he brought to golf-course construction. In 1907 he was involved in the formation of Alwoodley GC near his home in Leeds, and thereafter abandoned medicine to pursue golf architecture full-time. After a brief partnership with Harry Colt, he travelled the world, settling in America while also working in Australia and South America.

Most influential courses: Alwoodley (see page 92), Lahinch, Royal Melbourne (West; see page 286), Royal Adelaide (see page 290), Cypress Point (see page 248), The Valley Club, Pasatiempo, Crystal Downs, Augusta (see page 206), The Jockey Club (36 holes; see page 278), Kingston Heath (see page 292), New South Wales.

Donald Ross (1872–1948)

Brought up in Dornoch, Scotland, Donald Ross apprenticed as a club maker to Old Tom Morris in St Andrews. At the suggestion of Royal Dornoch club secretary John Sutherland, Ross emigrated to Boston, where like all Scottish professionals he helped lay out the course where he served as professional, Oakley Country Club. He gained recognition as a designer with his layout at Pinehurst, North Carolina, for Oakley member Leonard Tufts, and for 40 years thereafter was the game's prolific architect, with 400 courses to his credit.

Most influential courses: Pinehurst (90 holes), Oakland Hills, Oak Hill (36 holes), Inverness, Scioto, Seminole (see page 212), Plainfield, Holston Hills, Wannamoisett, Teugega CC.

Albert Warren Tillinghast (1874–1942)

'Tillie' was born in Philadelphia, the son of a successful businessman. He played in a number of US Amateur championships and visited Scotland, where he met Old Tom Morris. After his first course design, which was for a private course that subsequently became Shawnee, his career as an architect took off. Despite his great designs, A.W. Tillinghast was an unsuccessful businessman and eventually lost interest in golf.

Most influential courses: Shawnee on the Delaware, San Francisco, Somerset Hills, Winged Foot (36 holes; see page 172), Quaker Ridge, Baltimore (Five Farms), Baltusrol (36 holes), Breckinridge Park, Bethpage State Park (90 holes; see page 176).

Tom Simpson (1877–1964)

A talented golfer from a wealthy family, Tom Simpson was in the Cambridge University golf team and played much of his early golf at Woking, witnessing for himself the influential design changes of Stuart Paton and John Low. He eventually abandoned his legal career and became a business partner of W.H. Fowler. The flamboyant Simpson looked after most of the firm's work in continental Europe. His designs show originality and flair.

Most influential courses: Cruden Bay (see page 64), New Zealand, Fontainebleau, Morfontaine (see page 134), Royal Antwerp (new course), Royal Golf Club des Fagnes.

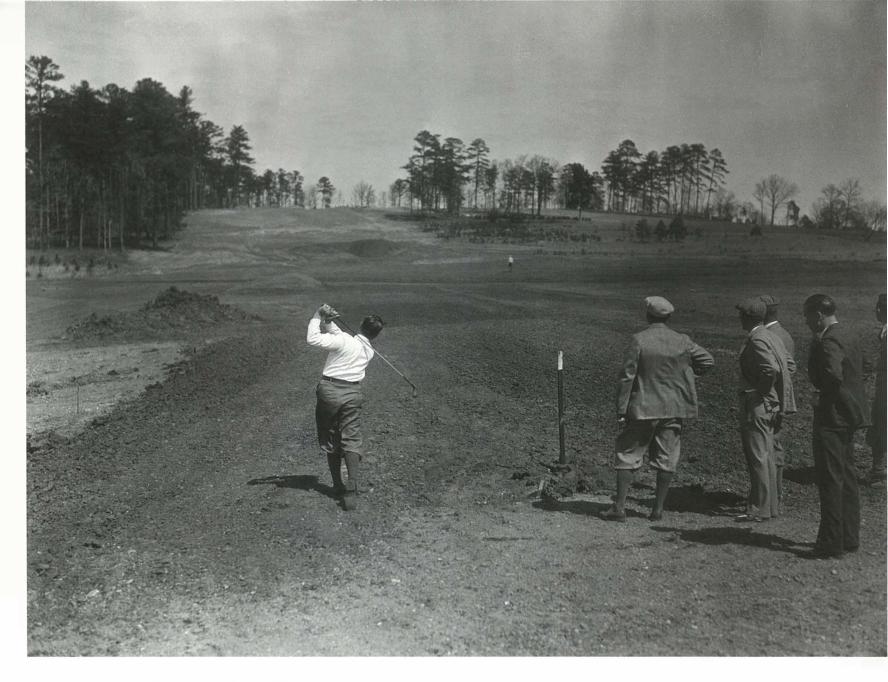
Charles Hugh Alison (1882–1952)

Alison was one of the finest players in the Oxford & Cambridge Golfing Society and was mentored by Harry Colt, with whom he remained a partner for his entire career. Since Colt did not like to travel far, Alison was put in charge of most of the firm's projects on other continents, working in America, South Africa and even Australia. He is remembered most of all for his seminal designs in Japan, where he mentored the early Japanese designers Kenya Fujita and Seiichi Inoue.

Most influential courses: Hirono (see page 306), Kawana (Fuji), Kasumigaseki (East), Bryanston (South Africa), Milwaukee Country Club, Bob O'Link, Royal Hague (see page 128).

William S. Flynn (1890–1945)

As the first golf course superintendent at Merion in Philadelphia, William Flynn assisted Hugh Wilson in the construction of the championship East Course,



Bobby Jones hits practice tee shots to test the position of a fairway bunker on the 8th hole at Augusta National Golf Club in 1932, as Dr Alister MacKenzie (second from left) stands by the tee stake to watch.

and he also played a significant role in the development of the West Course. The notoriety of Merion as a championship site made Wilson a popular designer, but his health limited his ability to pursue any work. Flynn therefore assumed Wilson's position as an architect and built a considerable number of great courses around Philadelphia and also in the south-eastern USA and as far west as Denver. Flynn and engineer Howard Toomey formed a partnership in a construction company, which built most of Flynn's designs as well as a design for Walter Travis (Westchester) and one for Charles Alison (Burning Tree).

Most influential courses: Merion (see page 190), Lancaster, Lehigh, Huntingdon Valley (27 holes), Kittansett, Cherry Hills, Indian Creek, Cascades (see page 200), The Country Club (see page 184), Shinnecock Hills (see page 178), Pocantico Hills (a reversible golf course for the Rockefeller family).

Stanley Thompson (1894–1952) Most influential of all Canadian golf architects, Stanley Thompson formed his own company after military service in the First World War, and designed Jasper Park and Banff Springs for the two Canadian railway companies in 1925 and 1927, respectively. This cemented Thompson's fame in Canada; few American designers of the era woked in Canada because he was so dominant. He earned large amounts of money and enjoyed spending it just as quickly. He was a mentor to several later architects, most notably a young Robert Trent Jones, who became a partner of Thompson after finishing his studies at Cornell.

Most influential courses: Jasper Park, Banff Springs (see page 258), St George's, Highlands Links (see page 264), Capilano, Gávea Golf and Country Club.

THE MODERN ERA

After the end of the Second World War, the business of golf-course architecture was essentially reinvented from scratch. A postwar housing boom and the growth of leisure time among the middle classes triggered demand for large numbers of new courses, for which there were only a handful of designers trained to meet the need.

hief among the designers was Robert
Trent Jones Snr, the Cornell-educated
golf architect who had trained under
Stanley Thompson. Jones capitalized on the
opportunity to dominate the business on a large
scale, eventually designing projects in 35 countries
by leaving construction plans that could be
followed by local contractors. His main competitor, Dick Wilson, a former project manager for
William Flynn, preferred to build one or two
courses at a time and confined his work to the
eastern United States. Both men's designs featured

grand sweeping contours instead of small detail in the contouring of greens and bunkers, but this was synonymous with this epoch of mass-produced homes and streamlined cars.

CHANGE IN CLIENT NEEDS

In the modern era, a designer's clients were no longer groups of men wanting to establish a golf club, but instead were corporations seeking to create a resort, or housing developers or wealthy individuals attempting to do the same. Trent Jones's clients included the Rockefellers, the king

of Morocco and the Aga Khan. Modern courses are businesses that compete with one another, trying to be more photogenic and better-conditioned than their competitors – and capital costs have spiralled in the process.

Trent Jones was also the first designer to market his own name commercially and thus heralded the era of 'signature designs'. For 20 years the trend towards bigger and bolder designs continued unchecked, fuelled by the advent of motorized golf carts in the USA, until the opening in 1969 of Harbour Town Golf Links, designed by Pete Dye and Jack Nicklaus, provided a prominent counter-example. Since then, the surging golf economy has allowed the business of golf architecture to splinter into many different camps, with each architect developing a personal style in a market big enough to allow for a wide variety of choices. Some designers, including Pete Dye, Jack Nicklaus and Greg Norman, attracted clients who wanted championship-calibre courses and the tournaments they might attract. Others, like the team of Bill Coore and Ben Crenshaw, found a niche as 'minimalist' designers best suited to work with attractive property. And other designers developed their own individual styles, from the rock-and-roll aesthetic of Mike Strantz or Jim Engh to the immaculate order of Tom Fazio's designs. Indeed, as marketing has become centred on the architect's name, demand for new faces has increased to distinguish new courses from their neighbours.



The downhill approach to the 9th at Mauna Kea Golf Course, Hawaii. Robert Trent Jones saved the cost of importing thousands of cubic feet of topsoil by crushing down the indigenous lava rock to produce a fine soil.

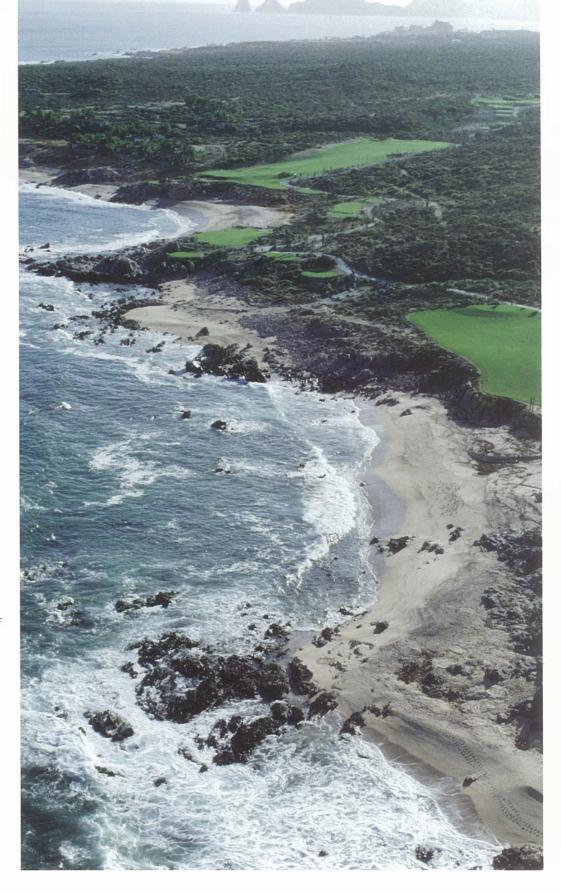
WORLDWIDE BOOM

The development of golf architecture in new overseas markets has been rapid in the past 30 years, and the biggest names in design are now global in scope. Construction in Japan flourished throughout the 1980s and collapsed abruptly in the 1990s, once it was realized that many private memberships had been bought for their investment value, without enough golfers to back them up. However, today there is great growth of new facilities in China and in South Korea, driven by their interest in attracting international business, and by the success of several Korean players on the US LPGA tour, which has helped to popularize the game.

The growth of the game in continental Europe has been steady since the successes of the European Ryder Cup team made golf a prominent sport in Spain, Germany and Italy, instead of just a diversion for visiting foreigners; and the emerging market countries are now starting to pursue golf as their economies permit. Interestingly, many of these new courses have been designed by Americans or have been built in the 'American' parkland mould; yet, in contrast, the trend in American courses has been to revert to treeless courses modelled after the links, with minimal earthmoving.

There is also a lot of new growth in exotic locales desalinated water for irrigation starts to remove an important hurdle to development.

from the Caribbean to the Emirates, as the viability of



The success of this Jack Nicklaus design at Cabo del Sol at the tip of Baja California set off an incredible boom of development in a once sleepy fishing retreat, including a dozen new courses charging US \$250 green fees.

DESIGN THEORY

The key to good golf architecture is to solve a paradox – to create a hole that is challenging to the good player while remaining both interesting and playable for the golfer of lesser skill.

ood players are generally seen as the experts on the subject of what makes a golf hole a good one, yet a course will not be successful unless it proves popular with a wide range of players.

Early golf courses were designed by the best players and were largely a test of golfing prowess. Hazards were placed on the fairways to require a good carry off the tee and flanking the fairway as well. A straight drive was rewarded by punishing the wayward shots of others, with little concern for whether those others would play again.

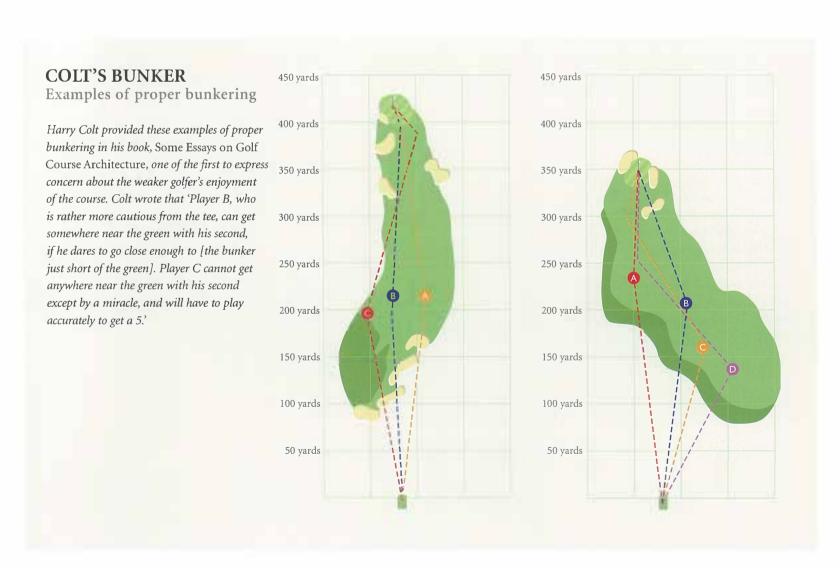
A NEW CONCEPT

One of the first true design theorists was John Low, from St Andrews, who drew the line between playability and sympathy for the weaker player. Low bemoaned the tendency of early architects to tilt the green towards the player to help them stop their approach shot. Instead he insisted that all players should learn the game and that greens tilted away from the line of play offered an incentive to improve without unduly penalizing the majority. He also answered those who were perplexed by the idea that a hazard could be found

within the fairway, by writing that: 'No hazard is unfair no matter where it is placed, as it is the duty of the player to avoid it.' Low's modifications to Woking, near London, at the dawn of the 20th century inspired a generation of designers who looked up to him, including Harry Colt, Charles Alison and Tom Simpson.

LATER STRATEGIES

Many designers of the Golden Age were amateur enthusiasts who had an intellectual interest in the game and who sought to reward skill over strength.



They therefore placed fairway bunkers so these defended an ideal landing area in the fairway. Once designers realized that many poor drives were punished simply because the next shot was much longer and more difficult as a result, the number of bunkers declined. Thus the 'strategic' school of golf-course design was born.

Bobby Jones wrote of Augusta (see page 206) in the 1930s that a tee shot might present one of four different rewards to the player: 'a better view of the green, an easier angle from which to attack a slope, an open approach past guarding hazards, or even a better run to the tee shot itself'.

The upper echelon of courses reward not just long and straight hitting but also the player who can control the trajectory and distance. Challenges that good players appreciate are: to fade or draw the ball to better hold a tilting green; to play with control off an uneven stance; to stop an approach quickly over a bunker; or to run the ball through an opening between hazards. Likewise, the great

courses offer the opportunity for recovery play both simple and spectacular.

VARYING EXPECTATIONS

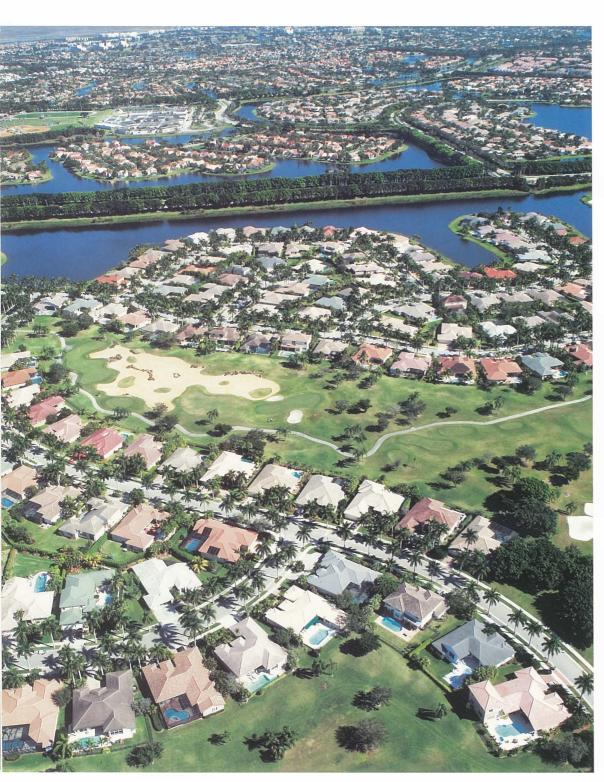
Ultimately, though, golf architecture is a subjective art, and each golfer enjoys the game on their own terms. Many players are out to revel in the beauty of Nature, and these players are captivated when the features of the course highlight the features of the property, placing tees on prime viewing spots or bringing a natural stream into play. Others are out to enjoy the camaraderie of the game, so they do not want to have to play on separate tees according to their differing abilities. Golfers who play friendly matches will have a very different perspective on the propriety of a severe bunker than they would in a medal competition, where a single wayward approach might cost them three strokes to par. A poor shot for a good player would still be a career shot for the beginner, so it cannot be punished uniformly.

The 14th hole at Gleneagles (King's Course), a James Braid design. This very short par-four hole can be driven by low-handicap players, but deep bunkers before the green extract severe penalties for a wild attempt. Shorter hitters have several different areas to place their tee shot, depending on their ability and on how aggressive they choose to be.



ROUTING THE COURSE

After more than a hundred years, during which 25,000 golf courses have been constructed worldwide, a golfer's idea of what a course ought to be has become more standardized, yet the placement of the 18 holes still gives each course its unique quality.



arly courses were as different as the linksland on which they were built, because golfers in those days would never have thought to change the landscape to fit the game. Such limitations are no longer accepted by today's architects.

IMPORTANT DESIGN AIMS

Among an architect's real goals in routing the course is to make the best use of natural features on the property, as Donald Ross did in bringing one of two ridges at Seminole (see page 212) into play on 14 of the 18 holes. It is also important to explore the various aspects of a beautiful property, as Alister MacKenzie did by routing Cypress Point (see page 248) from links to forest to high dunes to forest to links to rocky coastline.

A golf course should ideally be as easy to walk on as possible, and green sites should be positioned so the subsequent tee can be close by. A variety of uphill, downhill and sidehill lies should be provided along the route: for example, at Merion (see page 190), players are asked at the 5th to play a left-to-right shot with the ball well above their feet, and at the 18th they must hit a high iron shot off a downhill lie, as Ben Hogan famously did to secure his spot in the 1950 US Open play-off.

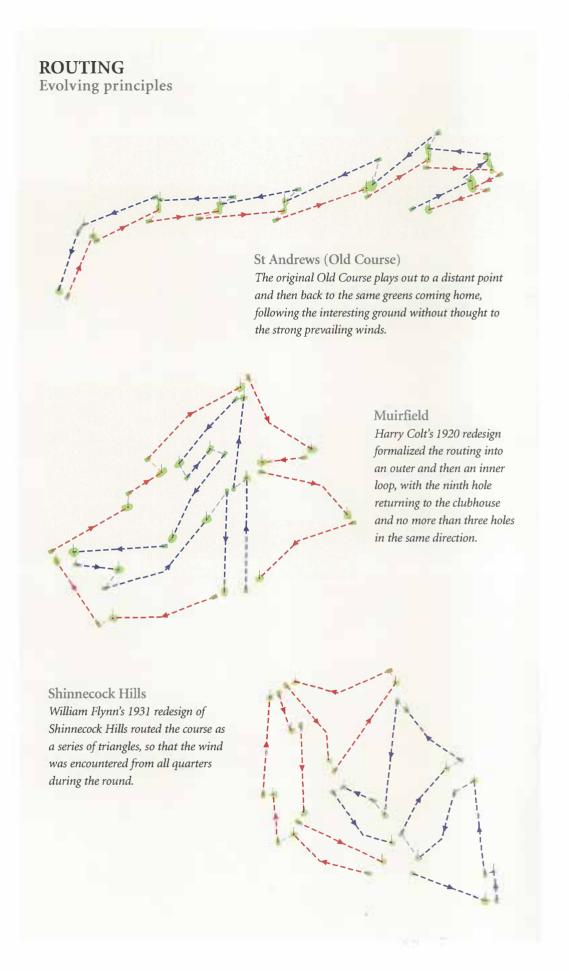
Modern development courses such as Weston Hills in Florida are designed completely from scratch. Every bit of natural vegetation has to be scrapped in favour of earthmoving to get such flat sites to drain and then the areas surrounding the course are relandscaped with the addition of houses.

An interestingly routed course will also include frequent changes of directions in windy places – such as William Flynn's routing for Shinnecock Hills (see page 178), which forms a series of small triangles attacking the wind at every angle. Finally, it is essential to provide as much variety as possible within the 18 holes in terms of hole lengths and configurations.

DIFFERENT PRIORITIES

Sadly, many modern courses are routed with factors other than golf in mind. On many modern projects the siting of housing takes precedent over the position of the golf holes, which are forced to the lower parts of the site so that the houses can look down on them.

Marketability also plays an increasing role in design. In some cultures it is considered essential for a course to have a par of 72 balanced evenly between the two nines, even though iconic courses such as Pine Valley (see page 186), Shinnecock and Muirfield (see page 60) do not. Likewise, in America it is essential for modern courses to exceed 7,000 yards from the back tees, even if few of their members would ever play from there, because the perception that a course is tournament-tough commands greater respect – and higher prices.



GREENS AND BUNKERS

Design strategy for a golf course is enforced by details such as its greens and bunkers. These are also sculptural elements that separate the true craftsmen of the profession from the rest.

DESIGNING PUTTING GREENS

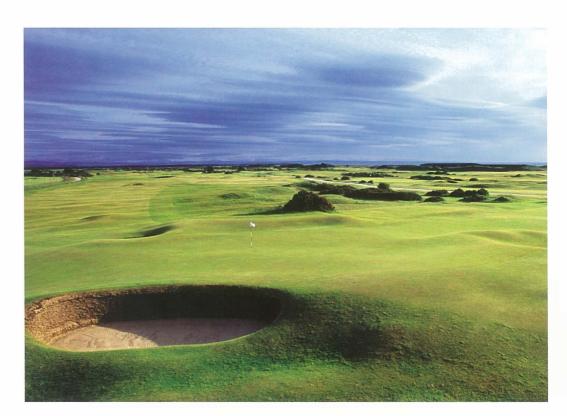
No feature is more important to play than the putting green. It is the venue not only for holing out — allowing an average of two putts per hole — but also for receiving the approach shot, or a recovery shot if the green has been missed. Of the several general types of green, one that is tilted towards the player allows the approach to stop more easily, but if the tilt is more than 3 per cent the player must try to stay below the hole or face a fast putt that may run well past. A green with less tilt makes it harder to stop the approach, but putting is less severe.

A green tilted away from the line of play requires the golfer to account for a bit of run after the approach shot lands, while a putting surface tilted from left to right holds more easily an approach shot that comes from the right side of the fairway (or vice versa), rewarding the golfer who can place the drive at will.

The size of the putting surface is also important. A large green makes a bigger target for the approach shot, yet may be divided into several levels or sections to assist good putting, while a small green requires a more accurate approach shot and the player who succeeds will be faced with a relatively easy putt.

Top right: The 2nd green at St Andrews as seen from the left. The deep bunker in the foreground is actually more in play directly behind the flag on the 16th hole; the moguls and contours in the right of the photo guard hole locations sufficiently while playing the long approach at the 2nd.

Right: The 3rd green at The Hideout Golf Club in Utah is set on a promontory offering views across the course and thus requires few bunkers or other hazards to defend it.









BUNKER STYLES

These also vary tremendously, both in their appearance and in how they affect play. The early links bunkers were mostly quite small, reflecting their hand-dug nature and also the need to minimize wind erosion. However, their abrupt contours imposed a steep penalty when golfers found them and they came into play often because golf was played more along the ground in those early days. As the game moved inland, where erosion was less of an issue, bigger bunkers were built to reflect the scale of the property, and architects took more freedom to express themselves in the sizes and shapes and edging of their bunkers. Yet, over time, some of the origin of bunkers as rugged hazards has been lost to obsessive grooming and notions of fairness.

Above: The home green at Royal West Norfolk Golf Club is defended by a wide cross-bunker. Railway sleepers were used to shore up the face of the bunker to keep it from being enlarged by wind crosion and eventually swallowing up the green.

Top right: The par-3 5th at Royal Melbourne (West) illustrates the 'flashed' modern bunkers popularized by Alister MacKenzie and by other designers of the Golden Age. In the sandbelt of Melbourne, these bunkers are dug straight into the native sandy soil; the fine sand binds tightly, giving rise to the sharp vertical lips that make these bunkers unique.

Right: Ernie Els extricates himself from a stacked-sod pot bunker at Muirfield during the Open Championship. Most of these bunkers are quite small but quite severe; they play much larger because the contours of the surrounding tightly mown ground gathers balls into the hollows.



THE BUSINESS OF COURSE DESIGN

Modern golf architects must have an understanding of many disciplines, from design to land planning, from agronomy to civil engineering, from business to construction. Most of all, they must understand golf and the psychology of the game, or as George Thomas, the architect of Riviera (see page 254), wrote: 'He must play golf and love it.'

ecause the profession of golf architect is so specialized, and too small to demand the support of university programmes, nearly everyone in the business starts out as an apprentice to an established firm. This mentorship usually explains much about the designer's approach to the business: whether they hope to achieve quality control through meticulous planning or hands-on construction; whether their practice will be regional or international in scope; and whether they will attract clients with aspirations to host championships or ones who simply want to commission affordable and playable courses.

ROLE OF THE CLIENT

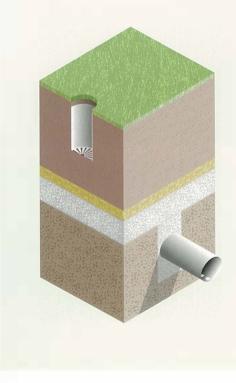
In the early days the players themselves were both the clients and the end-users, and even in the Golden Age most courses were built strictly for golf, so the architect could make the most of the 150 acres he was given.. Today, many courses are the centrepiece of large-scale housing or resort developments and all too often these other uses override the golf architect's ideas. If the course is threaded through houses, all of its natural setting may be stripped away for homes.

Because the value of waterfront real estate is measured by the linear metre, many 'coastal' projects have just a single par 3 playing along

USGA PUTTING GREEN CONSTRUCTION

A cross-section

This diagram illustrates how modern greens are built with layers of sand mix, coarse sand, gravel and drainage pipe to provide a perfect growing medium.





The 5th hole at Beau Desert is an excellent example of the guile of architect Herbert Fowler, with a drive to a low fairway, angled across the line, followed by an uphill pitch to a three-level green, highest in the middle!



the water or else a hole that lies towards a green on the coast with the next hole playing back inland. One of Jack Nicklaus's finest designs at El Dorado in Mexico originally had four holes along the Sea of Cortés, but three of these were moved so they could be replaced with housing by a subsequent owner, and the fairways were divided into housing lots that sold for more than US\$100 million.

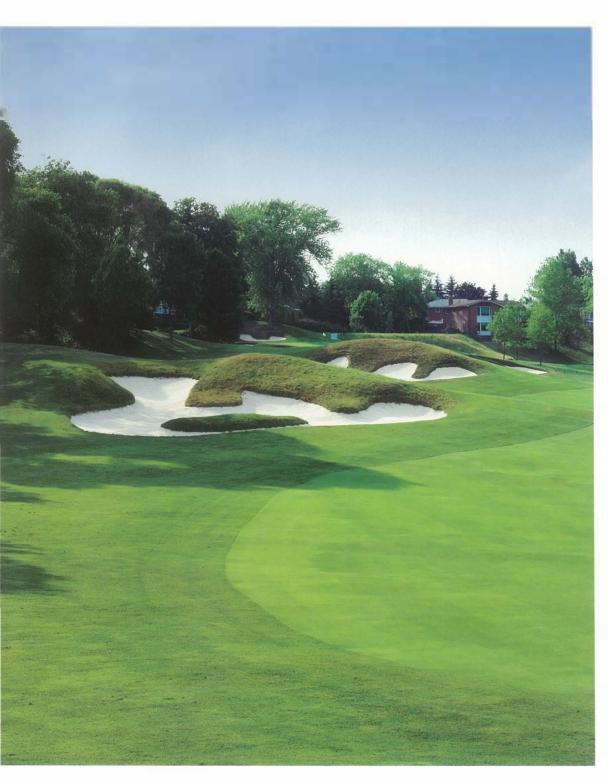
TEAMWORK

Golf courses are now so elaborate in their construction that no architect works alone. Each project requires an enthusiastic team of engineers, earthmovers, shapers, irrigation contractors and a golf-course superintendent to make the vision a reality. The success of any new course depends on how well this team works together.

Harry Colt's design for St George's Hill, in England, was one of the very first projects to combine golf with a realestate development. In contrast with the photograph on page 22, the homes are buffered from the course by woods and are set much further back from the fairways, creating one of the most desirable residential communities around London.

THE LIFE OF A GOLF COURSE

A golf course is not a static piece of architecture but a living entity composed of grass, trees and shrubs. It must be actively looked after in order to preserve its playing character. If maintenance is not entirely in harmony with the intent of the design, the character of the course will eventually alter.



hange happens more quickly than most golfers imagine. Trees grow upwards and outwards, blocking recovery shots from wayward drives, while the shapes of the greens and the dimensions of the fairways adjust imperceptibly each day with another pass of the mower. Such modifications were particularly felt in the 1930s and 1940s, when the Great Depression and Second World War forced most private clubs to cut back sharply on maintenance costs. Even when those clubs recovered financially, many had forgotten the nuances of the original design.

In addition to these natural physical changes, the perspective of golfers is constantly shifting as well. New equipment allows players to hit the ball farther, so fairway bunkers may be carried more easily, and golfer safety has become much more of an issue now that the game has become more popular. Our modern culture has inexorably changed golf-course design and golfers now demand holes that are 'fair' from a medal-play standpoint, refusing to accept the rub of the green as a natural component of the game.

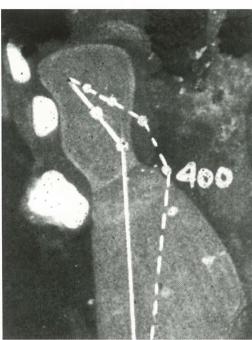
MEETING DEMAND

Higher expectations of maintenance are presented weekly via colour television and the reality of the greenkeeper working within the constraints of the weather has been assaulted by demands for uniform conditions throughout the playing season. The advent of fairway irrigation in the 1950s caused many American clubs to narrow their fairways and then to plant trees to cover up the unirrigated rough areas that were once part of the fairway.

These fairway bunkers on the 12th hole at St George's Golf and Country Club, Toronto, were restored by architect Ian Andrew based on photographs of Stanley Thompson's original work, complete with steep lips and islands of turf in the sand.



This plan-view aerial photograph of the 18th green of the West Course at Winged Foot (right), from the 1929 US Open, shows the green's irregular shape. Note how close the edge of the green came to the left-hand bunkers. By the time of the 1949 Walker Cup (above), the green's shape had become more rounded, so that there was enough ground for spectators to stand between green and bunker. In the process, hole locations closest to the bunkers were lost, to be restored by Tom Fazio in 2003.



Green speeds increased as maintenance technology became more advanced and clubs competed to keep their greens better than the club next door. Eventually the speed of the greens dictated that putts could not stop in certain portions of the green because of the tilt that had been designed to create interest – causing many clubs to recontour their greens.

SEARCH FOR PERFECTION

Last but not least, it is human nature that members, green chairmen and architects propose changes even to the best courses in an effort to make them better still, and to gain the satisfaction from doing so. In years past, these efforts were aimed at renovating older courses; more recently,

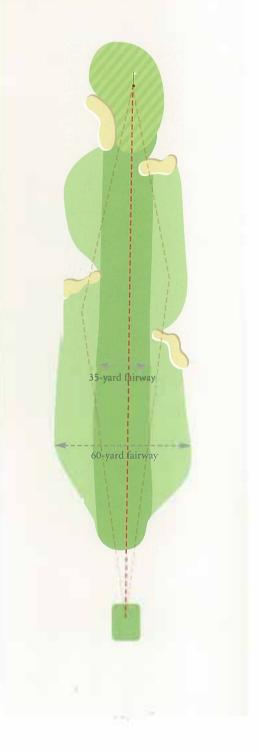
some clubs have recognized the merit of restoring lost features of the original design.

Yet restoration, too, is open to interpretation. Should the restorer put the course back exactly as it was, or lengthen a hole to re-establish the shot values of the original design, when the green required a long-iron approach? Was the course really its best on opening day in 1911, as set up for an historic championship in 1930, or as its members recall it set up for an event in 1971? And could not even great courses have evolved for the better in certain areas?

Such questions can never be answered definitively, for in the end golf architecture is a subjective art and the perspective of each golfer is biased by their own abilities.

REDUCED FAIRWAYEvolving fairway widths

When Golden Age fairways of 50–60 yards (45–55 metres) were first irrigated in the 1950s, fairway widths were reduced to about 30 yards corresponding to the effective radius of a single row of irrigation, taking alternate strategies out of play.



GOLF AND THE COMMUNITY

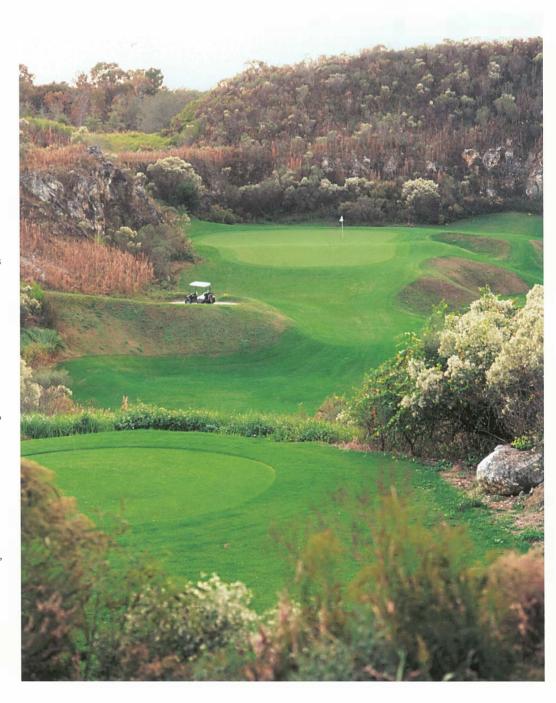
The original golf courses were an integral part of their coastal Scottish communities. They occupied the land that was unfit for other use – too sandy to farm and too close to the coast to provide a stable place for buildings – and they doubled as parkland right on the edge of town.

he same golf courses are now the centrepiece of tourism in those communities, providing the locals with a means of support as well and a source of pride, while continuing their recreational purpose of years past.

Less than 10 per cent of the population plays golf, however, so the non-golfing majority has a right to know that a golf course will be a good neighbour. This is a particular concern in those countries where golf is available only to the wealthy and well-connected, such as in Asia, Africa and increasingly in America, because the majority are likely to fight the development of a golf course if they gain no benefit from its existence. For this reason, new golf-course construction is being pushed to more remote regions where opposition is limited. By contrast, where golf is seen as inclusive and affordable, including in the UK, Australia and New Zealand, and for that matter in the mid-western USA, opposition to new construction is rare.

The supply of fresh water and the preservation of water quality are of primary concern to any community. Chemical and fertilizer use on golf courses must be limited and carefully monitored to minimize the risk of groundwater contamination and surface runoff, but fortunately the leaves and roots of fine turf provide excellent environmental buffers around water sources. Golf-course irrigation systems are also increasingly becoming one of the preferred users for the reclaimed water generated by neighbouring communities.

In America, and now on other continents as well, the majority of new golf courses are built as the centrepiece of 'golf communities', in which even non-golfing residents aspire to have a golf course as an extension of their back yards. While this has been a boon to the demand for new course construction, it remains to be seen whether it will be a long-term plus for the game itself. Many courses are handicapped because the golf takes second priority to the housing in the overall plan; others are built for their short-term marketing value, without a long-term case for golf supply and demand.



Some of the best modern courses have been the remedy for community eyesores. At Black Diamond Ranch, Tom Fazio used the remains of a limestone quarry to create five holes unlike anything else in Florida.



St Andrews is home to the oldest university in Scotland, yet the Old Course has arguably had an even greater impact on the town's economy and on the world at large. Even without Open championships, the course attracts tourists and has driven the development of six other courses owned by the town, as well as the nearby Kingsbarns course.