BICYCLE
Introduction: The Bicycle Revolution 8

1817–1899: BICYCLE IS BORN
Created out of necessity following a shortage of animal feed in Europe, the initial craze for the first “running machines” was later followed by widespread popularity, as a series of design advances gave rise to the first true bicycles. This was a time of experimentation, when most of the features seen on modern bikes were first developed.

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1900–1945: COMING OF AGE
While bicycles were once the preserve of the rich, mass production brought them within reach of the working class.
classes, for whom they became an essential part of life. Bicycles gave the freedom to travel for work and pleasure, bringing greater independence and, eventually, equality. Design advances saw bicycles becoming lighter and faster, as well as safer and more comfortable to ride.

1946–1959: THE GOLDEN AGE

This was a challenging era for the bicycle industry, as postwar prosperity and a mood for change among the public caused a decline in bicycle sales, while those of automobiles rose. Bicycle racing, however, increased in popularity, and many of the first cycling stars came to prominence, becoming household names.

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THE 1960s: CYCLING GOES POP

After a period of decline, the 1960s brought a revival in bicycle sales, as manufacturers, most notably Schwinn in the US, targeted the youth market with radical new bike designs. The adult bicycle market also improved with the introduction of small-wheeled bikes, which were well-designed, easy to ride, and perfect for urban cycling.

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The 1980s: Bicycle Evolution

As bicycle racing became ever more professional, so the 1980s saw a drive to make bikes lighter, faster, and more aerodynamic, with frames made from aluminum, magnesium alloy, and carbon fiber. This was also a defining era in cycling beyond the race track, as mountain biking, in particular, became hugely popular. Their designs evolved rapidly, and there were soon models with front and rear suspension, and complex gears. In contrast, BMX bikes remained true to the original design—simple and robust.

The 1970s: New Waves

Where the 1960s brought exciting new bicycle designs that inspired a new generation of cyclists, this decade saw the rise of entirely new cycling disciplines. Road racing remained hugely popular, especially in Europe, but in the US, more adventurous bicycle sports were emerging—BMX and mountain biking—to take the world by storm.
THE 1990S: GOING GLOBAL

Increasing concerns about air pollution and global warming saw the rise of campaign groups advocating the bicycle as a sustainable alternative to the automobile. Commuting by bicycle became common in many cities.

AFTER 2000: BICYCLES FOR ALL

Bicycle designs, components, and materials continue to advance, with hydraulic braking, electronic gear-shifting, and battery-assisted propulsion becoming available. Cycling has become an integral part of urban living once more, and many cities now offer bicycle rentals.

BICYCLE COMPONENTS

This chapter explains the basics of bicycle engineering, detailing how important components function.
Nowadays, children can learn to ride a bicycle in no time thanks to a new invention—the “balance bike.” They no longer need to resort to the unnatural equilibrium of stabilizers to avoid overbalancing. Now anyone can discover the carefree joys of balancing on two wheels immediately.

But how many people realize that the balance bike is actually 200 years old? First built for adults in 1817, and called a draisine, after its inventor, or Laufmaschine (running machine), it was seen as a possible alternative to traveling by horse following the eruption of Mount Tambora, Indonesia, which led to the so-called “year without a summer”, and a shortage of animal feed.

The inventor was aware that people were reluctant to take both feet off firm ground, which restricted possibilities for propulsion. The biggest factor limiting the popularity of this new man-machine-road system was potential rider anxiety. It took 50 years for people to feel safe enough to put both feet on pedals, in 1864, eased by the roller-skating boom started on American rinks. Once mastered, the bicycle became the freedom machine for the young at heart. Turn-of-the-20th-century memoirs are full of happy reminiscences of increased opportunities for travel and encounters with the opposite sex. Young couples quickly learned to evade their chaperones by taking to the bicycle. And, once married, they could use a tandem for their honeymoon.

Meanwhile, in the early 20th century, French cycle touring clubs invented a system of “diagonales”—routes crisscrossing the whole of France—which they even rode at night. Pioneering round-the-world cyclists increased the distances traveled, often passing through dangerous and remote areas. Indeed, the first circumnavigation of the globe as far as possible on dry land was achieved on a bike. Today, transcontinental cycling has become a form of mass tourism, undertaken by increasing numbers of riders. Records for the fastest journey following specific routes are broken repeatedly.

On a more practical level, as bicycles became more affordable from the late 1890s onward, factory and office workers used them to reach better housing in the suburbs. The bike also became a means to deliver goods, mail, and telegrams faster. In cities and suburbs, doctors, midwives, and clergy used bikes as a quicker and more convenient way to reach the people they served. Moreover, firefighters, paramedics, the police, and the military all took advantage of the speedy bicycle. All the special-purpose motor vehicles of today had bicycle forerunners; the late Victorian equivalent of the automobile was a bicycle. Gradually, these precursors are returning to today’s town and cities in updated forms: the messenger bike, the police bike, and the pedicab.

In the cycling boom of the 1890s, particularly in the US, bicycle sales provided rich pickings for businessmen involved in the manufacture and sale of bicycles and accessories. This was disastrous for competing transportation service sectors. Businesses concerned with the supply and care of horses, such as livery stables and feed providers, were also hit hard. In 1896, such businesses lost an estimated $112 million in New York alone. In rich households, the demand for grooms and other horse-care staff was much reduced, too.

Apparently unrelated businesses were affected as well. Young married couples who might once have scrimped and saved for a piano now bought two bicycles instead for the same price.
And when it came to an extravagant birthday or Christmas gift, the bicycle put gold pocket-watches out of fashion: cyclists now wanted wristwatches, which were easier to read while cycling.

Cycling even impacted smoking habits: Americans smoked a million fewer cigars each day, because they could not easily smoke while riding a bike. Cycling also led to people reading fewer books and newspapers, and consuming less alcohol: instead of sitting around, they were out riding their bikes. Even theaters and music halls suffered lower attendance, which had the domino effect of barbers losing the once-obligatory shave before the theater visit.

Hat-making, custom tailoring, and shoemaking also declined considerably. Cyclists used cheap “off-the-rack” club uniforms and bought inexpensive beach shoes, thus creating the ready-made clothing industry. And, for a short while, until step-through frames became commonplace for women’s bicycles, women wore the puffy trousers pioneered earlier by Amelia Bloomer’s “rational dress” so giving female emancipation a decisive push. Corsets were supplanted, too, by “emancipation garments” such as the newly invented bra. Meanwhile, men adopted the lightweight, woolen clothing and underwear promoted by the German lifestyle reformer Dr. Gustav Jaeger. The Irish author and playwright George Bernard Shaw, an avid cyclist, was an early adopter of Jaeger’s so-called “normal clothing.”

The bicycle also had a major impact on road improvement in the US. As the eminent automobile historian James J. Flink said: “No preceding technological innovation—not even the internal combustion engine—was as important to the development of the automobile as the bicycle.”

Tony Hadland & Hans-Erhard Lessing
Bicycle Historians

"Few articles used by man have created so great a revolution in social conditions as the bicycle."
US CENSUS BUREAU, 1900
THE BICYCLE IS BORN
1817–1899
VÉLOCIPÈDES

DOMBRET & JUSSY

ST. ETIENNE LOIRE

Aoh! enfoncées les Machines Anglaises

Aoh!
Like many of the world’s greatest inventions, the machine that gave rise to what we now know as the bicycle was born of necessity. A string of poor harvests in Europe from 1812 led a German civil servant to develop a human-powered form of transportation to counter the reliance on horses, which were in short supply due to a scarcity of animal feed. Karl von Drais christened his 1817 invention the Laufmaschine (“running machine”), after the swift walking movement required of the rider in order to propel it forward. Although his design lacked pedals, Drais’ breakthrough was the realization that forward motion and balance could be maintained on just two wheels, an idea that he attributed to watching ice skaters. The Laufmaschine—also called the draisine, velocipede, or dandy horse—quickly caught on, sparking a craze across Europe. By the 1820s, however, it had died out because of safety concerns. The idea was revived in the 1860s, when pedal cranks were added to the front wheel of a velocipede in Paris. The inventor of this revolutionary improvement is not known—several claims were made in subsequent decades, none of which could be proven beyond doubt—but the first manufacturer to produce such machines on an organized scale was Pierre Michaux, in 1867. Like von Drais’ Laufmaschine before it, the pedal velocipede—soon nicknamed the “boneshaker” after its jarring ride—was instantly popular. For the first time, people could propel themselves while balancing on two wheels, with their feet off the ground. The bicycle was born.

“On your velocipede!” That is the rallying cry loudly repeated by a few intrepid Parisians, fanatics of this new means of locomotion ...”

LE SPORT, 1867
Early Bicycles

The first human-powered, two-wheeled device was the Laufmaschine. Invented and patented in 1817 in Germany by Karl Drais, it combined the three main principles of the bicycle, namely, methods of propulsion, steering, and balance. The rider progressed by pushing with their feet while steering with the handlebar to maintain balance. The next development came in the 1860s, when Parisian firm Michaux modified the Laufmaschine. By attaching cranks and pedals to the front wheel, Michaux enabled the rider to propel the bicycle with their feet clear of the ground. These bicycles were known as velocipedes.

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This was the first commercially successful bicycle, and several thousand of them were built throughout Europe. The Laufmaschine was commonly known as the hobby horse or dandy horse. In 1817, Karl Drais traveled 8 miles (13 km) on it in less than an hour.

Rear saddle mount
The saddle was suspended on leather straps to provide a crude type of suspension. It was mounted on two anchor points, one at the front of the frame and another at the rear.

Chest mount
Stuffed with horse hair, the upholstered chest mount provided a padded area of resistance against which the rider could push when scooting. This was necessary to accelerate the bicycle.

Saddle adjuster
Winding the ratchet increased the tension of the leather straps that supported the saddle; turning the ratchet reduced sag. The heavier the rider, the more tension required.

Front frame detail
A carved and painted wooden box was used to house the wooden mechanism that allowed the handlebar to turn the front wheel. Hiding these areas made for a more elegant-looking bicycle.

Wooden handlebar
A simple, one-piece bar with circular wooden bar ends controlled the direction of the bicycle. The vertical shaft and lack of offset made the steering twitchy and sensitive to minor adjustments.

Curved forks to absorb road shocks

Rear saddle mount

Chest mount

Saddle adjuster

Front frame detail

Armrest moves in unison with the rider

Seat suspended on straps
**Michaux Velocipede 1865**

- **Origin**: France
- **Frame**: Wrought iron
- **Gears**: Single-speed
- **Wheels**: Front 38 in (96 cm), Rear 30 in (75 cm)

The Michaux company modified the Laufmaschine, attaching cranks and pedals to the front axle. The metal frame and wooden wheels with iron tires made for an uncomfortable ride over cobbled streets—hence the nickname “Boneshaker.”

**Kirkpatrick Macmillan Velocipede 1839**

- **Origin**: UK
- **Frame**: Wood
- **Gears**: Single-speed
- **Wheels**: Front 30 in (75 cm), Rear 40 in (102 cm)

Kirkpatrick Macmillan, a blacksmith, is generally credited with inventing the rear-wheel-driven bicycle. Macmillan constructed one of these bikes using non-rimmed wooden wheels—the front wheel was steerable and the larger rear wheel was driven by cranks linked to pedals via connecting rods.

**Transitional Velocipede c. 1870**

- **Origin**: Europe
- **Frame**: Wrought iron
- **Gears**: Single-speed
- **Wheels**: Front 38 in (96 cm), Rear 18 in (45 cm)

The problem with the velocipede was that it needed a tall and athletic rider. To make it easier to ride, manufacturers started producing bicycles with increasingly small rear wheels, while retaining the large front wheel. In effect, these bicycles were part velocipede, part ordinary.
Great Manufacturers

Michaux

Although the jury is still out on whether Pierre Michaux invented the machine his name became synonymous with, he was one of the first to produce velocipedes on an organized scale. Behind the scenes was a cast of characters—including the brains behind the venture, the Olivier brothers—whose roles were just as pivotal.

THE EMERGENCE OF the pedal-crank velocipede in 1860s Paris was one step in an evolutionary line that stretched back to Karl Drais’ Laufmaschine or draisine of 1817. It is regarded as a key moment in the history of the bicycle, and blacksmith Pierre Michaux is closely associated with this phase. The draisine had to be propelled by scooting along in a running motion, which required large strides and wore out the rider’s boots. The technological advance that ensured the velocipede caught on was the addition of cranks and pedals, which meant the rider could drive the front wheel on the flat and uphill. While velocipedes with three or four wheels, sometimes driven by hand- or foot-driven cranks, had developed over the intervening decades, none had achieved widespread acceptance.

Born in Bar-le-Duc in northeastern France in 1813, Michaux moved to Paris at the age of 41 following the failure of an earlier business. He worked for a carriage-maker before setting up his own workshop in 1858 at cité Godot-de-Mauroy, off the Champs-Élysées. As a blacksmith, Michaux had expertise in fonte malleable (malleable cast iron), which seemed to be a cost-effective process for making the frames. He had the tools and skills to shape the other metal parts—forks, sprung saddle, and handlebars—that together made up the “boneshaker” bicycle. The velocipede’s wheels, bearings, and brakes were all influenced by parts on the horse-drawn carriages of the day.

Michaux received the backing of a wealthy industrialist family, the Oliviers. René and Aimé Olivier—both engineering students at the École Centrale in Paris—had been captivated by the idea of the velocipede and in 1863 Aimé sketched a design for a pedal-less velocipede in a notebook. A drawing of a design with toe rests was also found in an 1864 notebook entry of their father, Jules, who owned a series of chemical works.

Michaux was not the first potential manufacturer to have dealings with the Olivier brothers. Charles Sargent, a Paris coach-maker, had built a...
worked with them. However, it was 1864, while Pierre Lallement, who prototype velocipede for them in 1866. The first-generation Michaux velocipede, with its serpentine frame, is released. The velocipede is so popular that by the end of the year, up to 150 independent manufacturers are producing them in France. The first-generation Michaux velocipede features patented improvements by the Oliviers and Georges de la Bouglise—a cord-operated brake, adjustable cranks with self-righting pedals, and wheels that have self-lubricating axles. Michaux velocipedes win a royal seal of approval from the 12-year-old Prince Imperial, Louis-Napoléon. In April, the Oliviers sever the link with Pierre Michaux in a court case. A new craze
Left is a late-19th-century book showing the social aspect of Michaux velocipedes, while on the right is a c. 1869 sketch for a Compagnie Parisienne poster.

“On peut faire des choses encore plus...”

LA VIE PARISIENNE, 1868, DESCRIBING THE MICHAUX VELOCIPEDE

A year later, news of pedal velocipedes began to be reported in the newspapers. Chinese officials touring Western Europe in 1866 described draisines and velocipede-like vehicles, which riders “propelled by foot pedaling … they dash along like galloping horses” on the streets of Paris. In April that year, French newspaper Le Journal de l’Ain described three young men riding cranked velocipedes. In November, Lallement filed the first known patent for a velocipede, submitting to the US authorities a design that was virtually identical to Michaux’s. The velocipede is so popular that by the end of the year, up to 150 independent manufacturers are producing them in France. The first-generation Michaux velocipede features patented improvements by the Oliviers and Georges de la Bouglise—a cord-operated brake, adjustable cranks with self-righting pedals, and wheels that have self-lubricating axles. Michaux velocipedes win a royal seal of approval from the 12-year-old Prince Imperial, Louis-Napoléon. In April, the Oliviers sever the link with Pierre Michaux in a court case.

Serious production of Michaux’s velocipedes began in 1867. His workforce grew from four, including himself and his son Ernest, to around 15. The first-generation velocipede of that year featured a serpentine, malleable cast-iron frame to which a leather saddle was mounted via an elongated spring; this provided suspension to offset the jolts of the road. The wheels had wooden spokes and iron “tires,” the front wheel being slightly larger—around 36 in (91 cm) in diameter—than the rear. Braking was achieved by pedaling backward or twisting the handlebars to activate a leather strap, which pushed a brake block against the rear wheel. By 1868, Michaux had grown to 60 employees. With velocipede-mania taking off, existing carriage-makers jumped on the bandwagon. Suspicious of Michaux’s ability to run the business at a profit, René Olivier instigated a partnership agreement, forming Michaux Cie in May 1868. Michaux was put in charge of running the workforce and production in Paris, and the Oliviers handled purchasing, publicity, and accounts from Lyon.

Production of a second-generation velocipede that featured a series of patented improvements from the Olivier brothers and de la Bouglise began that same summer. The new frame was made from stronger forged iron rather than the malleable cast iron of Michaux’s design, and was shaped in a single diagonal beam that terminated in forks for the rear wheel, replacing the weaker serpentine frame. The riding position was raised so that the rider’s feet were off the ground, a trend that would culminate in the high-wheeler “penny farthing” design.

Despite the popularity of the new velocipede, all was not well at Michaux Cie. A rift between the Oliviers and Michaux, who had helped himself to cash from the business, led to liquidation of the company in April 1869, although Michaux continued to trade under his own name until the end of the year. The Oliviers founded Compagnie Parisienne, “Formerly House of Michaux,” in April 1869, investing heavily in the company, refitting the workshops, and adding new designs, such as wire-spoked wheels. The outbreak of the Franco-Prussian War in 1870, the wave of the velocipede craze in 1872, and poor management meant that just five years later, the company folded. The Michaux brand, along with the contribution of the Oliviers, was consigned to history.
High-Wheelers

The 1870s saw several advances in metallurgy, including hollow frame tubes and wire-spoked wheels. Together with the ever-increasing diameter of front drive wheels—which allowed both a smoother ride and more ground covered with each revolution of the pedals—this led to the introduction of the high-wheeled ordinary bicycle or penny-farthing. It was considered a dangerous machine since the rider could be thrown off headfirst in the event of a fall. However, it was simpler, lighter, and faster than the velocipedes of the time, and although it cost the equivalent of several weeks’ wages, it was very durable. The inspiration for high-wheelers was the huge drive wheel of Crampton locomotives. Paris-based mechanic Eugène Meyer patented the suspension wheel used in high-wheelers, using radial wire spokes. Coventry’s James Starley improved on this with tangential spokes, which are still the norm today.

### Ordinary Bicycle c. 1870

- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: Front 50 in (127 cm), Rear 18 in (45 cm)

This penny-farthing was manufactured by Coventry Machinists, the largest of 200 cycle-makers in Coventry, UK. Originally sewing-machine makers, they were renowned for high-quality workmanship. Many individuals leading the development of bicycles worked there, including English inventor James Starley.

- **Rear brake mechanism**: This cord-operated spoon brake was reminiscent of cranked Parisian velocipedes. To avoid skidding when braking, riders had to shift their weight onto the rear wheel.

- **Hollow-tubed frame and forks**

- **Solid rubber tire**

- **Hollow-tubed frame**

- **Wire-spoked wheel**

- **Large front wheel**
High-Wheelers

19

Inner-tubed tires for a safe and comfortable ride

Large, driven rear wheel

Strong, triangular main frame

Foot-operated brake on rear tire

The American Eagle reversed the layout of the big and small wheels of the normal high-wheeler. This prevented the rider from falling head-first but left them susceptible to being thrown backward while riding uphill. The Eagle was one of the first bicycles to introduce inner-tubed tires.

Pedals

Eagle Bicycle Manufacturing Co. offered detachable toe clips for its nickel-plated steel pedals. These helped keep the cyclist’s feet on the pedals when riding.

Sprung-hairpin seat post

Mudguards for bad weather

Inner-tubed tires for a safe and comfortable ride

Treadle mechanism

Alternately pushing the treads pulled leather drive straps away from drums on either side of the wheel. A spring with freewheel rewound the strap, raising the treadle.

Marsch & Kretzschmar Safety Star 1887

Origin: Germany
Frame: Steel
Gears: 2-speed
Wheels: Front 18 in (45 cm), Rear 42 in (107 cm)

The Star featured several new developments. The rear wheel was driven by sprung leather straps and the ratchets could be adjusted to give different gear ratios. The treads (foot pedals) were operated either independently or together, and allowed riders of different heights to ride the same machine.

Sercombe-Bolte Telegram Hybrid 1892

Origin: US
Frame: Steel
Gears: Single speed
Wheels: Front 30 in (75 cm), Rear 24 in (60 cm)

Manufactured by Sercombe-Bolte, the Telegram featured smaller wheels than the ordinary or Eagle bicycles. It was popular with female riders and Western Union messengers.

Hub gear

Planetary gears inside the front hub made the wheel rotate twice per turn of the cranks. And so the 30-in (75-cm) wheel acted like a 60-in (150-cm) one.
ONE OF THE PIONEERS OF THE TRICYCLE was Briton James Starley, an irrepressible and generous-spirited inventor who progressed from fixing and improving sewing machines to modifying Michaux-style boneshakers. This led to the creation of early high-wheelers, one of which he adapted to allow a female rider to sit adjacent to the front wheel, rather than astride it. The new machine was highly unstable, and so a third wheel was added, resulting in Starley’s first tricycle.

One of Starley’s later tricycles, the 1877 Salvo—dubbed “Royal” after Queen Victoria purchased two of them in 1881—was groundbreaking in its technology. The first tricycle to be equipped with pedals and a chain, it also boasted a differential drive—an arrangement of interlocking cogs on the axle that allowed the left and right wheels to rotate independently, which improved cornering.

The Salvo was successful in the UK, where tricycle manufacturing was at its cutting edge. The trend then caught on in the US, and exports to Europe, Asia, and Australia followed. Since Starley freely offered his ideas for use by other engineers, the Salvo also played an important role in advancing the technology used in bicycles, tricycles, and even automobiles—differential gears and chain drives were integral to the first cars.

Starley Royal Salvo

A sedate older cousin to the more daring, upstart high-wheeler, the Starley Royal Salvo represented a refined form of cycling for leisurely, genteel riding. The stability and comfort of tricycles eliminated the risk of falling inherent in riding high-wheelers and boneshakers. The Salvo was the most advanced tricycle of its day when it debuted in 1877, and featured several innovations still central to bicycle technology today.

Hand-operated brake lever

Gear-change lever

Differential gear, located in the axle-drive mechanism, allows the wheels to turn independently

Rear balance wheel to prevent the machine from tipping over backward
They have become a fascinating and exhilarating means of exercise and locomotion.

*THE WORLD, LONDON, 1878 DESCRIBING TRICYCLES*
THE COMPONENTS
While the Salvo appealed to a growing number of curious admirers of the bicycle who were looking for a less risky form of enjoyment, its success was also due to its advanced features and high-quality construction. With a lever-operated brake, front-wheel steering, cranks and pedals, radially laced wheels, and even a light, the Salvo was at the cutting edge of tricycle technology.

Almost every professional cyclist would love to win the Paris–Roubaix, but few can handle its challenging nature. A cobblestone surface is demanding for any cyclist, and so this race is one that requires strong, fearless, and skilled racers. In 1896, most of the roads of northern France were surfaced with cobbles; today, the race organizers have to search for cobbled roads.

Roubaix is in the French département of Nord (part of Nord Pas de Calais), on the Belgian border. This was once the industrial heartland of France, full of coal mines, steel mills, and textile factories. Cobblestones were the perfect surface for horse-drawn carts and, later on, heavily laden trucks. The mines, factories, and mills employed large numbers of workers and, although the work was hard, this new working class had some leisure time and enjoyed watching cycle racing. To cater to this enthusiasm, two textile manufacturers, Théodore Vienne and Maurice Perez, built a velodrome in the town, on Rue Verte. It opened in 1895, and legendary American sprinter Major Taylor made one of his first European appearances at an early track event at the velodrome.

Vienne and Perez needed publicity to help promote their ambitious program of events in the velodrome. They thought that staging the finish of a big road race from Paris would grab attention. With the help of the major French cycling newspaper, Le Vélo, these two industrialists conceived the first Paris–Roubaix in 1896.

The very first event
The first race was 174 miles (280 km) long. It started outside the offices of Le Vélo in Paris and traveled north, through the région of Picardie to Amiens, then Doullens, where it veered northeast to Arras, and then north again to Roubaix. Unfortunately, half of those who had entered the race did not even start. Most of them had never seen the roads of northern France, and tales of how bad they were put them off. It was raining on race day, too. Soon after the start, the field split up. Professional pacers riding tandems paced the top competitors to maintain a good speed. Exposed, rolling roads in Picardie were the first obstacle. Not only were roads cobbled for most of the way, but the surfaces also worsened the farther north the riders went.

In the end, Josef Fischer of Germany won in a time of 9 hours and 17 minutes, having ridden at an average speed of 18.7 mph (30.2 km/h). He entered the velodrome some 25 minutes ahead of the next rider, Charles Meyer of Denmark. However, when Fischer entered the stadium, the crowd, who had been enjoying some track racing and were informed of the progress of the Paris–Roubaix riders by telegram dispatches, were strangely muted. They were shocked by his appearance; he was covered in coal dust and mud from the roads, and dried blood because of several crashes along the route. Only two more riders finished within an hour of Fischer. They were Frenchman Maurice Garin, who would go on to win the first-ever Tour de France seven years later, and a Welsh rider, Arthur Linton. It was 119 years before another German, John Degenkolb, won the race in 2015.
Challenging surfaces on the “Hell of the North”
Belgian rider Jürgen Roelandts tackles a tricky corner in the 2015 Paris-Roubaix. The cobbled sections are rated from one to five stars according to severity, and are also legally protected and maintained by enthusiasts known as Les Amis de Paris-Roubaix.

“You must be strong to ride so far over cobblestones, and I am strong, I know that about myself.”
JOSEF FISCHER, RACE WINNER, 1896

RESULTS
First: Josef Fischer, Germany
Second: Charles Meyer, Denmark
Third: Maurice Garin, France

THE COURSE
This map shows a recent Paris-Roubaix race. The 1896 race followed main roads, which were all cobbled, but as time passed these roads were improved and resurfaced. Paris-Roubaix was in danger of losing what made it unique—and gave it the nickname “l’enfer du Nord” (“the Hell of the North”): the cobbled surfaces. And so in 1968, although the race still ran from Paris to Roubaix, the course was changed and the route redirected onto cobbled back lanes, known as the cobbled sectors of the race. They start after Saint-Quentin in the Aisne département, and are linked in zigzag fashion by smooth roads.

The modern race
The race now starts 50 miles (80 km) north of Paris in Compiègne. The riders hit the first of 27 cobbled sections after the first 62 miles (100 km).
Early Tricycles

For those who were afraid to ride a bicycle, or physically incapable of doing so, there was the three-wheeler. Tricycles started appearing very after the draisine in France, the UK, and the US, and some had mechanical drive systems. In the 1840s and 1850s, carriage-makers produced tricycles in small numbers, mainly as invalid carriages or toys. But with the arrival of the pedal-propelled bicycle, from the mid-1860s onward, came a surge of tricycle development. For a while it was unclear whether the bicycle or the tricycle would become the dominant form of personal transportation.

![Boardwalk Tricycle c. 1880](image)

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Three-wheelers such as this were available to rent on boardwalks. The hand chain drive was easily mastered and speed was not important. The driver steered by pulling the lever on the left side.

Alternative Designs

In the 1890s, competitive cycling governing bodies had not yet standardized the racing bicycle. Thus, designers got creative: for example, by combining features of the high-wheeler and the back-to-front Star bicycle to avoid headers and tipping backward. This creativity dwindled as the diamond-framed safety bicycle became the standard.

![Unknown Manufacturer c. 1880](image)

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<tr>
<td><strong>Gears</strong></td>
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<tr>
<td><strong>Wheels</strong></td>
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</table>

This machine could be called “The Unknown” as there is very little information available about it. The larger central wheel aligns with the front and back wheels when a rider is sitting on the bicycle.
Bridle rod links front wheel to handlebar

Antelope Tricycle 1884
- Origin: UK
- Frame: Steel
- Gears: Single speed
- Wheels: Front 22 in (55 cm), Rear 44 in, 42 in (112 cm, 107 cm)

Made by Thomas Smith & Sons of Birmingham, this tricycle shows the influence of the high wheeler in its two large rear wheels. Steering is by bridle-rod linkage. The saddle is positioned behind the rear axle, so there is a small “anti-tilt” wheel between the rear wheels.

Columbia Tricycle 1888
- Origin: US
- Frame: Steel
- Gears: Single speed
- Wheels: Front 24 in (60 cm), Rear 40 in (102 cm)

Pope Manufacturing built tricycles in response to a resurgence in their popularity in the late 1880s. Albert Pope used the heavy tricycle to attract the public to his lighter, two-wheeled safeties. This model has a hand-operated band-brake, a loop suspension in the front wheel, and the typical heavy shock system under the saddle.

Rex Cycle 1897
- Origin: US
- Frame: Steel
- Gears: Single speed
- Wheels: Front and middle 28 in, Rear 14 in (70 cm, 35 cm)

The Rex has hard tires and a third wheel attached to a flexible bar, which offered riders more comfortable rides on rough roads. It had limited success due to the cost of materials and construction.
Safety Bicycles

The dangers of the high-wheeled bicycle led to the rise of the new “safety” bicycle—so named because the rider sat closer to the ground and farther behind the front wheel, and so was less likely to fall headfirst over the handlebars. Two key developments made this possible. The first was the arrival of the chain drive, which meant a gear ratio could be chosen independently of the wheel size. The second was the invention of the pneumatic tire, so the smaller wheels could provide a more comfortable ride. In 1885, British inventor John Kemp Starley used these new innovations on the Rover Safety Bicycle. By 1893, high-wheelers were no longer mass-produced.

Française d'Armes et Cycles
Hirondelle “Superbe” 1890

| Origin | France |
| Frame | Steel |
| Gears | Single speed |
| Wheels | Front 26 in (65 cm), Rear 30 in (75 cm) |

An unusual safety cycle, the Hirondelle Superbe featured a sprung frame made from a single tube. It had a small front wheel and a large rear drive wheel, radial spokes, shock-absorbing spiral handlebars, and an adjustable sprung saddle.

Swift Sprung Safety 1888

| Origin | UK |
| Frame | Steel |
| Gears | Single speed |
| Wheels | 30 in (75 cm) |

This Swift had a sprung saddle and leading-link front-fork suspension, which gave the cyclist a more comfortable ride than a rigid safety machine. It was a practical bicycle, with small wheels and a chain drive, and it was easier to mount than the ordinary.

Front suspension
A pivoting link joins the front fork to the axle, allowing vertical movement and softening bumps for the rider.
SAFETY BICYCLES

Made by the Crypto Cycle Co., London, this was the final development of the front-driven safety bicycle. Easy to maintain, it features a low, forward seat and a choice of gears for climbing hills or fast road work.

**Crypto Alpha Bantam c. 1896**
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 2-speed
- **Wheels**: 24 in (60 cm)

Originally a manufacturer of cabinet furniture for the music industry, the Tonk Manufacturing Co. of Chicago made bicycle frames and wheel rims out of 16-ply, laminated, bent hickory wood. Tonk claimed that Old Hickory was the first wooden safety cycle.

**Tonk Manufacturing Co. Old Hickory 1898**
- **Origin**: US
- **Frame**: Wood
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

These bicycles were based on Danish inventor Mikael Pedersen’s design, featuring a hammock-type saddle and triangulated tubes. Produced between 1897 and 1914, they cost six times as much as mass-produced roadsters.

**Dursley Pedersen 1898**
- **Origin**: UK
- **Frame**: Lightweight steel
- **Gears**: Single or 3-speed
- **Wheels**: 26 in (65 cm)

Built by the Stoddard Manufacturing Co., Dayton, OH, the Cygnet featured a radical loop-frame design, which had tubes on either side. The bicycle was made to a high-quality specification, but very few were built.

**Cygnet Lady’s Bike 1898**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (66 cm)

- Pneumatic tire for a smoother ride
- Adjustable gearing on front (driven) wheel
- Laminated wood mudguard
- Metal clips strengthen stress points
- Wooden chainguard protects rider’s pants
- Frame has no joints at corners
- Rigid, bottom-bracket mounting point
- Pneumatic balloon tires
- Frame mounted on front fork frame
- Hammock-type saddle strung between frame points
- Forward riding position puts weight on driven wheel
- Forward riding position puts weight on driven wheel
- Adjustable gearing on front (driven) wheel
- Laminated wood mudguard
- Metal clips strengthen stress points
- Wooden chainguard protects rider’s pants
- Frame has no joints at corners
- Rigid, bottom-bracket mounting point
- Pneumatic balloon tires
Columbia Military Bicycle

Several armies were experimenting with bicycles by the time the safety bicycle evolved. The earliest American formal military bicycle unit was the First Signal Corps of the Connecticut National Guard, formed in 1891. It was equipped with the Columbia Military bicycle, a solid-tired, diamond-frame safety bike with front suspension and numerous attachments for carrying military equipment, including a rifle and bayonet. The owner of the Columbia Bicycle Company, Civil War veteran Colonel Albert Pope, promoted military use of bicycles.

IN 1817, GERMAN INVENTOR KARL DRAIS SUGGESTED the use of his draisine—the first bike—by military messengers; 20 years later, a lecturer at the UK's Royal Military Academy postulated the use of draisines by infantry. By 1875, the Italian army was using bicycle messengers. Formal military cycling sections were established in the UK and Spain in 1887. Authorities had to decide the appropriate specification for a military bicycle: the tried-and-trusted ordinary (nicknamed “penny farthing”) or the new safety bicycle? They also needed to look into the most advantageous military role for bicycles.

A British military committee decided that the best use was as a convenient replacement for the horse, for rapidly moving infantry and their equipment long distances. After considering designs by more than 50 bicycle-makers, the committee opted for the safety bicycle because it was more compact, lighter, faster, and easier to handle. American military leaders came to similar conclusions.

The Columbia Military model of 1890 was an ideal choice. The bike boasted attachments for carrying every piece of equipment an infantryman might need. It had solid tires rather than the new, unproven, and fragile pneumatics, and, to give a comfortable ride over rough terrain, it had front suspension and a well-sprung saddle.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Origin</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer</td>
<td>Albert Pope</td>
</tr>
<tr>
<td>Year</td>
<td>1890</td>
</tr>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>Single speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>Front 30 in (75cm), Rear 28 in (70cm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 50 lb (23 kg) plus equipment</td>
</tr>
</tbody>
</table>
“A bullet hitting a cycle ‘only requires the gunsmith’s aid’, but a horse ‘cannot be carried to the repair shop’.”

JIM FITZPATRICK, QUOTING CONTEMPORARY WRITERS IN THE BICYCLE IN WARTIME (1998)
THE COMPONENTS

These reflect contemporary state-of-the-art cycle technology, adapted to the specific needs of the army. For example, a decision was made not to adopt the newly available pneumatic tires, which were easily punctured and difficult to repair. Instead, solid tires were used, but comfort was provided by lightweight front suspension and a saddle with sophisticated, two-stage springing.

1. Leather saddle with coil-sprung chassis on flexible gooseneck seat post  
2. Pannier and bayonet case  
3. Block chain, with alternate solid links  
4. Leading-link front suspension with coil springs  
5. Flat pedal with ball bearings and rubber blocks for good grip on army boots  
6. Ammunition case containing 60 rifle cartridges  
7. Brake lever and rod linkage to rear spoon brake  
8. Acetylene lamp on sprung bracket
Early Racers

The combination of safety bicycles with pneumatic tires and geared drive by chainrings allowed professional cycle racing to develop rapidly during the 1890s. Races took place on banked tracks known as velodromes and attracted large numbers of spectators. In continental Europe, racing on public roads between cities became very popular (although it was not allowed in the UK). The frames of racing cycles were made of lightweight steel tubing joined by cast lugs, and the wheel rims were made of wood. Sloping frame angles, a high bottom bracket, and a long wheelbase improved performance and stability at high speeds. Drop handlebars helped the rider sit lower down, minimizing wind resistance.

**Howe Path Racer 1894**
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

This racer featured an unorthodox safety frame with a sloping top tube and track ends at the rear axle mounting. In order to reduce overall weight, the bicycle did not have mudguards and had only a front brake, which applied pressure to the tire.

**Victor Flyer Racer 1895**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

The Victor Flyer model was built by Overman Cycles for track and road racing. It was equipped with pneumatic tires and had a long wheelbase to ensure stability at high speeds. The bicycle weighed 23 lb (10 kg).

**Toolkit**
With the birth of pneumatic tires, punctures were a new hazard, so carrying tools to fix them was a wise choice.

**Drop handlebars for riding comfort**

**Stopping short**
This model featured spoon brakes that pressed directly on the front tire. They were ineffective on wet road surfaces and wore out the tires.

**Wheel axe supported on ball bearing to minimize friction**

**Rear-mounted saddle puts rider’s weight on driven wheel**

**Sloping top tube allows for a higher riding position**

**Pneumatic tires on wooden rims**

**Track ends allow quick wheel changes and easier tire repair**
Zimmy Pneumatic Safety 1896

Origin: UK
Frame: Steel
Gears: Single speed
Wheels: 28 in (70 cm)

Developed by the Nimrod Cycle Co., Bristol, this model was built for, and named after, the renowned American racing cyclist A.A. Zimmerman. The bicycle weighed just 20 lb (9 kg) and was popular with racers around the world.

Iver Johnson Truss Frame 1896

Origin: US
Frame: Steel
Gears: Single speed
Wheels: 28 in (70 cm)

This bicycle had an unusual frame design. There was an extra tube connected to the seat tube, as well as top and down tubes. All of this strengthened the frame, which helped efficiency, and gave the rider more precise steering.

Adler Road Racer Model No. 41 1897

Origin: Germany
Frame: Steel
Gears: Single speed
Wheels: 28 in (70 cm)

Marketed by Adler as their road-racing model, this bicycle featured pneumatic tires on wooden rims and a slim but rigid leather saddle. Weighing only 23 lb (10 kg), the Adler No. 41 was another lightweight bicycle.

Senior Wrangler Scorcher 1896

Origin: UK
Frame: Steel
Gears: Single speed
Wheels: 28 in (70 cm)

Aimed specifically at road racing, this radical design allowed the rider to lean low over the front wheel, reducing wind resistance. This machine had a long wheelbase and was one of the first racers with brakes on both wheels.
The First Tandems

The idea of two riders sharing a two-wheeler dates back to Karl von Drais’ early designs. Thereafter, tandems have been found in every stage of cycle development and in almost all forms of bicycles and tricycles. The normal arrangement today is one rider behind the other—the front person, or “pilot,” steers the bicycle, and the rear rider is the “stoker”—but in the 1890s, women sat up front while men pedaled, braked, and steered from the back. Either way, the bicycle is powered by two riders, but has the frontal area of one, giving it a distinct aerodynamic advantage. Occasionally, a side-by-side “sociable” configuration has been used. A tandem also enables a vision-impaired rider to enjoy cycling as a stoker with a sighted pilot.

In 1895 Arnold Schwarzenegger Company was founded in Chicago by two German immigrants—bike builder Ignaz Schwinn from the Adler works, and successful meat packer Adolph Arnold. Over the years, a dedicated dealer network enabled the Schwinn brand to achieve the status of an American household name—until its bankruptcy in 1992.

A tandem for three Mr. Schwinn sat at the rear of the tandem, with his wife at the front, and their son Frank was between them in his own special safety seat.

Schwinn Bicycles

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SCHWINN BICYCLES

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A tandem for three Mr. Schwinn sat at the rear of the tandem, with his wife at the front, and their son Frank was between them in his own special safety seat.

Olympic Tandem Tricycle 1895

Origin: UK
Frame: Steel
Gears: Single speed
Wheels: 26 in (65 cm)

This tandem is so named because it was made specifically for the company’s founder Ignaz Schwinn and his wife. With the financial backing of fellow German Adolph Arnold, Ignaz had founded Arnold, Schwinn & Company in 1895 in Chicago.
Colonel Albert Pope, founder of Columbia, first built bicycles after being passed by high-wheel riders when out on his horse. This tandem was used for reconnaissance as well as carrying people and supplies.

The Punnett tandem sold for around $100, but was never a commercial success. The company claimed it was easy to ride, steer, mount, and propel. It could be used by one or two riders, but everyone who looked at it thought that weight would be an issue.
1900–1945

COMING OF AGE
STURMEY-ARCHER
2 SPEED GEAR

THE GEAR THAT MAKES CYCLING EASY
WE FIT IT HERE
As the 20th century dawned, bicycle use underwent a demographic revolution. The bicycle’s boom and bust of the late 19th century had been fueled by its popularity among the middle classes of Europe and the US, who had the money and leisure time to enjoy the craze of the day. But as cycling began to go out of fashion—challenged by other new forms of personal transportation, including the automobile—the bicycle found popularity as a working-class machine.

Falling costs, partly due to the spread of mass production and new manufacturing techniques, meant that bicycles became more affordable for working men and women. The social effects were soon noted: while the bicycle had brought new freedoms for women in the 1890s and contributed to the female emancipation movement, in the new century the increased mobility it afforded was a factor in the social changes occurring in many countries. Workers could travel under their own steam in their leisure time, meaning that relational webs—including marriages—could stretch farther beyond the immediate locality.

Technologically, innovation was rife. Gears that could be changed at the push of a lever were available in the early 1900s, while frames became stronger and lighter with the use of steel alloys engineered by the aircraft industry in the 1930s. Bicycles found uses beyond recreation and personal transportation, such as for postal deliveries, police patrols, military purposes, and even—in the form of two connected tandems—as ambulances. No longer a prestige item reserved for the elite, the bicycle had fully entered the mainstream.

“Few articles ever used by man have created so great a revolution in social conditions as the bicycle.”

US CENSUS REPORT, 1900

Key Events

- **1900s** Cycling becomes more comfortable thanks to the invention of the freewheel, allowing the rider to stop pedaling while coasting downhill, and to brake reliably at the bottom.
- **1901** The US-designed Sofa Bicycle, one of the earliest recumbent designs, is promoted in Europe.
- **1902** The world’s first 3-speed hub gear is released by Sturmey-Archer, providing reliable gear-changing at the push of a lever.
- **1903** The Tour de France is held for the first time. Bicycle racing moves toward road racing, away from its historical base of track cycling.
- **1914–18** Bicycles—including folding designs for scouting—are used on both sides in World War I.
- **1930s** Despite the rising popularity of tandems and touring, bicycle use falls in many countries, especially the US, as lobbying from the auto industry ensures the dominance of the car.
- **1933** Manufacturer Schwinn introduces the balloon-tired Streamline Aerocycle for the only sector to enjoy healthy sales in the US—the children’s market.
- **1939–45** Bicycle use increases around the world because of gasoline shortages during World War II.

△ A machine for workers
Bicycles became essential for many businesses, especially those involved in communication, with models designed specifically for the purpose (see pp.62-63).

△ Made for the family
Tandems became particularly popular in the interwar period, which coincided with rising living standards and increased leisure time for many working families.

△ A poster produced by manufacturer Sturmey-Archer in 1902 advertised its innovative new gear hub mechanism.
Pre-1930s Racers

At the turn of the 20th century, Europe’s enthusiasm for competitive cycling soared. The advent of the Tour de France in 1903 and the Giro d’Italia in 1909 gave people something to watch, and bicycle manufacturers a stage on which to promote their products. Bicycles at this time were constructed of heavy varnished steel, and in some races, riders were expected to propel these weighty machines over more than 250 miles (400 km) in a single day. Early models often lacked a rear brake, and cyclists would control their speed by pushing the pedals backward. Most bikes were made to be used with single fixed gears. To change gear, therefore, riders had to pull over and turn their drive wheel around, or fit a different cog, when they approached hills or tough terrain.
**Opel ZR 3 Rennrad 1927**

- **Origin:** Germany
- **Frame:** Lugged steel
- **Gears:** Single speed
- **Wheels:** 28 in (70 cm)

Between its inception as a manufacturer of sewing machines and its current status as an automobile giant, Opel spent many years as a leading bicycle producer as well as a sponsor of a successful racing team. This model's lugged frame was painted in Opel's signature yellow and black.

**Tom Lunn Gamage 1928**

- **Origin:** UK
- **Frame:** Steel
- **Gears:** Single speed
- **Wheels:** 28 in (70 cm)

London department store Gamages began producing basic racing bicycles as the popularity of cycling boomed. This model featured a forward-facing dropout at the rear wheel, which allowed easy wheel replacement in the event of a flat.

Low-slung handlebars

Drop handlebars with a long forward throw helped the rider adopt a lower position to help generate more power when sprinting.

Leather toolbag strapped to saddle

Quick-release wheel hub

Quill road pedal with metal toe clips

Taped handlebar

Quill stem held handlebar in place
Post-1930s Racers

By the 1930s, most racing bicycles featured drop handlebars, as well as front and rear brakes. Component manufacturers, such as Campagnolo (see pp46–47), were beginning to refine the multi-gear mechanism that would later become known as a rear derailleur. Colorful paint finishes, chrome detailing, and elaborately designed frame lugs helped manufacturers differentiate their bicycles from the competition. Pump mounts featured as standard, and in 1937 the Tour de France organizers allowed the use of more durable gears and metal rims.

▽ Chater-Lea Sports 1928
- Origin: UK
- Frame: Steel
- Gears: Single speed
- Wheels: 28 in (70 cm)

Chater-Lea had a reputation for building quality lightweight bicycles and components. A two-arm, fluted chainset came with this model, with additional lights and mudguards for riding in poor weather.

▽ Bianchi 1930
- Origin: Italy
- Frame: Steel
- Gears: 3-speed
- Wheels: 27 in (68 cm)

Following a succession of high-profile continental race victories, Bianchi established a reputation for building robust, lightweight racing machines. Using a system of rods attached to the rear stays, the rider could change gear without needing to stop. Bianchi frames were often painted in celeste, their signature light green color.

▽ Bowden Touriste
- Rim brakes with cork pads

A precursor to derailleur gears, this bike featured rods that lift the chain onto the cogs in the rear hub.

▽ Handlebar tape made of cloth

Round drop bars with Chater-Lea brakes

Round, single-gauge steel tubing

Hand-beaten leather saddle

Leather saddle attached with copper rivets
**POST-1930s RACERS**

- **CF Davey 1932**
  - **Origin**: UK
  - **Frame**: Steel
  - **Gears**: Single speed
  - **Wheels**: 27 in (68 cm)
  
  Produced for the budget-conscious rider, the Davey’s simple lug pattern and shot-in seat stays kept the frame-build costs to a minimum. The luxury of a rear brake or gears was not available on this bicycle.

- **Baines Brothers VS 37 Whirlwind 1941**
  - **Origin**: UK
  - **Frame**: Steel
  - **Gears**: 3-speed
  - **Wheels**: 27 in (68 cm)
  
  Baines created the unusual gate design to eliminate whip when accelerating. The “37” in the model name referred to the length of the wheelbase in inches and gave an idea of this short bike’s maneuverability.

- **WEJ '59 Special Race Frame 1934**
  - **Origin**: UK
  - **Frame**: Steel
  - **Gears**: Single speed
  - **Wheels**: 27 in (68 cm)
  
  British frame-builder W.E.J. claimed its frames were constructed with the precision of an aircraft and featured a plane on the brass head badge. The high-end frame featured shot-in stays that were welded lower to the seat post, enabling a more compact rear triangle to reduce flex.

- **LETOURNEUR PACE BIKE 1941 (REPLICA)**
  - **Frame-mounted dual brakes**
  - **Leather toolbag with tools for changing the rear sprocket**
  - **Steel pedals with leather toe straps**
  - **Down tube gear-shifters**
  
  The original bicycle was built by Schwinn for French-born speed cyclist Alf “The Red Devil” Letourneur, to help him break the motor-paced 100 mph (160.934 km/h) speed barrier. He first achieved a record speed of 91.37 mph (147.04 km/h) in 1938, which he bettered three years later in California, reaching 108.98 mph (175.38 km/h) and becoming the first person to exceed 100 mph (160.934 km/h) on a bicycle.

**The Red Devil bicycle** The enormous chainring and small rear cog gave this bicycle incredibly high gearing, enabling it to achieve high speeds from a rolling start.
Great Manufacturers
Campagnolo

Of all the great names of cycling, Campagnolo is perhaps the brand most associated with the historic racing spirit of the bicycle. More than 85 years after it was founded, this family-run business, based in Vicenza, northern Italy, is still producing beautifully designed and highly-coveted components built to the most exacting standards.

GENTULLIO “TULLIO” Campagnolo was an amateur cyclist who, in the 1920s, experienced first-hand the punishing reality of racing at a time when competitive cycling was viewed as a Corinthian endeavor in the purest sense. Although the details of the tale have been challenged by historians, the story of Tullio’s company begins with him racing in a blizzard-swept competition in November 1927 in the Dolomite mountains of northern Italy. At the time, racing bicycles had only two gears—two cogs mounted on either side of the hub. In order to change gear, the rider had to dismount, remove the rear wheel from the bicycle, flip it 180 degrees, then reinsert it into the frame so that the other cog could engage with the chain. Tullio claimed that while leading the Gran Premio della Vittoria race up the Croce d’Aune pass, he was forced to stop to change gear, but his fingers froze on the wing nuts that secured the wheel to the bicycle frame. As a result, Tullio’s chances of winning evaporated. Tullio, the son of a hardware store owner, was ideally placed to tackle the mechanical problems of the racing bicycle, which had changed little since the late 19th century. His solution to the wheel-change problem came in 1930, when he perfected a quick-release skewer that allowed the wheel to be removed from the bicycle frame with the turn of a lever. Tullio’s
A market leader for decades
Left is a 1950s poster depicting Campagnolo-sponsored riders; on the right is the 2015 Super Record EPS groupset.

During the 1960s and 1970s, Campagnolo reigned more or less unchallenged over the high-end racing scene. It introduced the Nuovo Record groupset in 1965; then, in 1973, the Super Record set new standards of style, performance, and lightweight design. However, the influx into the world market of cheaper components from Asian competitors, notably Shimano of Japan, led to the loss of Campagnolo’s market-leading position in the 1980s.

Campagnolo fought back in the 1990s by focusing on its core market of high-end road cycling. It became the first company to produce factory-built wheels, while in 2000 the 10-speed drivetrain was introduced—moves that were later copied by Shimano. Although Campagnolo no longer dominates the bicycle industry, it maintains its niche position as purveyor of the finest cycling components that money can buy, as well as its lineage as a family-run firm rooted in the history of cycle sports.

“The history of Campagnolo is the story of modern cycling.”
MARKETING SLOGAN, 2008
Touring and Leisure Bikes

The popularity and increasing affordability of the automobile caused a decline in recreational cycling in the US, where bicycles were considered toys, and most were made for teenagers and children; cruisers imported from Germany with rugged balloon tires were fashionable. In Europe, cycling remained an adult activity and bicycles with multispeed gearing were increasingly common. Cyclo-touring became popular, and riders would explore the countryside on single- and multi-day trips.

△ Alexander Rocket Bicycle 1930s
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

Despite the curved metalwork, the Rocket was a heavy machine. Made in Texas, the bicycle was popular with paperboys and couriers. Few remain, as with the advent of WWII and the need for metal, Americans had to turn in bicycles for scrap.

△ Shelby Airflow 1930s
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

Manufacturers wanted to create a comfortable ride on unpaved 1930s roads. Shelby’s solution was a front suspension system with sliding spring. The Airflow was made from seamless steel tubing; its joints were hand-filed.

△ Hesperus-Werke “J-Rad” 1922
- **Origin**: Germany
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: Front 20 in (50 cm), Rear 26 in (65 cm)

Zeppelin engineer, Paul Jaray, patented this recumbent machine when his children started cycling. Lever-driven via cables, rather than by pedals, the J-wheel was a precursor to the chopper-style bicycle of the 1970s. Its relaxed operation was popular with wealthier cyclists.

△ Elgin Bluebird 1936
- **Origin**: US
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: 26 in (65 cm)

The Bluebird was equipped with built-in speedometer, headlight, fake “fuel” tank, sleek mudguards, and a chrome-plated handlebar. Produced in Massachusetts, its high cost meant it was never a big seller.
“A bicycle goes nearly all the way towards making a healthy man!”

CYCLE TRADES OF AMERICA, 1920

Joe Cooke, the owner of a custom bicycle shop in Birmingham, built the Imperial Petrel “Superigid,” which had semicircular tubes at the front and chainstays for extra stiffness.

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: 27 in (68 cm)

Joe Cooke chose the name because he thought the bird symbolized speed and grace.

Head badge
The Imperial Petrel head badge has a striking design. The frame’s name, “Petrel,” after the bird, is picked out in dark blue.

Reflector
Prismatic reflectors were invented in 1924. In the US today, all new bicycles must have reflectors as specified by the Consumer Product Safety Commission.

Front lamp
This bicycle was ahead of its time as it was sold with lights. Today, many US states and municipalities require front and rear lights when riding after dark.

Gears
Most hub gears at this time, such as this lightweight 2-speed, used a toggle chain to link the control cable to the gear lever, via the hollow wheel axle.

Gear-shifter
The Sturmey-Archer quadrant shifter was a shift lever mounted on the top tube. It connected the control cable to the toggle chain in the wheel axle.

Acrylic-covered handlebars, whose hooked shape gave them the nickname of “jug handles”

Alloy brake levers

Handmade Brooks leather saddle

Pump mounted on frame

A bicycle goes nearly all the way towards making a healthy man!
Diamant Model 67

A lightweight, steel-framed racing bicycle boasting an array of aluminum components, the Model 67 *Berufsfahrermodell* (professional racer’s model) was the pinnacle of the Diamant stable in the late 1930s. The oldest German bicycle brand still in existence today, Diamant pioneered a range of technologies and manufacturing techniques—from chain design to metal-alloying processes—and enjoyed its glory years as the premium Eastern Bloc racing brand from the 1950s to the 1990s.

**FOUNDED BY BROTHERS** Friedrich and Wilhelm Nevoigt in 1882 to produce sewing machines, Diamant manufactured its first bicycle in 1895. With innovations such as the 1898 twin-roller chain—which was stronger and offered better gear-shifting than existing block-chain designs—the brothers earned a reputation for building high-quality, lightweight racing bicycles. The Model 67 was first produced in 1936 prior to the Berlin Olympics, where it was ridden to two gold medals by the German cycling team. Ernst Ihbe and Carl “Carly” Lorenz won the men’s tandem 2,000 m, while Toni Merkens won the men’s 1,000 m sprint.

Built around a lightweight yet stiff frame—made from thin-gauge steel tubes, joined with aluminum lugs—the Model 67 was finished to the highest possible standard. Production of the Model 67 continued until 1954, when the mantle of Diamant’s flagship lightweight racing bicycle was passed to the new Model 167. As part of East Germany’s centrally planned economy, Diamant produced racing bicycles for many Eastern Bloc cycle teams and academies. Diamant bicycles were used in a host of victories up until the 1990s, including Täve Schur’s Peace Race triumphs in 1955 and 1959. The brand was acquired by the Trek Bicycle Corp. in 2002.

**SPECIFICATIONS**
- **Origin**: Germany
- **Designer**: Unknown
- **Year**: c. 1939
- **Frame**: Chromoly steel
- **Gears**: 3-speed
- **Brakes**: Caliper
- **Wheels**: 28 in (70 cm)
- **Weight**: Approx. 24 lb (11 kg)
“Exact work, **solid design**, and **first-rate** materials make **Diamant bicycles** the **top German** brand.”

**Diamant Advertisement, 1893**

- **DIAMANT MODEL 67**
- **Blue paint scheme with chevron highlights**
- **Bicycle pump mounted on the frame**
- **Drivetrain** comprising a 48-tooth chainring and three sprockets
- **Pantographed engraved aluminum components**
- **Twin aluminum water bottles mounted on the handlebars**
- **Blue paint scheme with chevron highlights**
- **Rear brake cable housing**

**Diamant logo**
The “smiling boy” is thought to be a caricature of either a sponsored racer or the company’s advertising manager.
THE COMPONENTS

Diamant developed the equipment and in-house expertise to forge own-brand, aluminum-alloy components, allowing the pantographed pedals, cranks, stem, handlebars, seat post, bottle, and wheel wing nuts to take center stage on the Model 67. The wooden-rimmed wheels were the lightest and strongest racing rims available in the 1930s, while the Fichtel & Sachs 3-speed rear derailleur offered reliable, chain-activated gear-shifts.

1. Lohmann leather racing saddle  
2. Fichtel & Sachs 3-speed derailleur with short length of mini-pitch chain  
3. Handlebar with aluminum-alloy brake levers and Diamant-branded bottles  
4. 48-tooth chaining  
5. Fichtel & Sachs gear lever  
6. Aluminum stem with pantographed Diamant branding  
7. SPORLUX caliper brake mounted on front fork  
8. Aluminum-alloy wing nuts
Recumbents and Trikes

The first recumbents were developed soon after the advent of pneumatic-tired safety bicycles. Although the lower seating position meant they were more aerodynamic, they had little commercial impact until the 1930s, when there was a wave of interest, particularly in France. Interest in tricycles diminished rapidly once the safety bicycle became dominant. There was a US-led revival in the 1970s that spread across the Western world.

Despite the new vogue for balance bikes kicked by the feet, tricycles were still thought to be necessary to teach children vigorous pedaling. Reminiscent of the cranked Parisian velocipedes, their basic design has changed very little during the last 150 years, apart from “stand-on” models designed to accommodate passengers.

### Mochet Velocar 1933
- **Origin**: France
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20in (50 cm)

French manufacturer Georges Mochet began producing recumbents in the 1930s. The aerodynamic advantage of these bikes was so great that even mediocre riders could win races. Consequently, they were soon banned from mainstream cycling events.

### Triumph Moller Auto-Cycle 1936
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 22in (55 cm)

Designed by Danish engineer Holger Møller, the Moller Auto-Cycle was made under license in the UK by Triumph. Like a car, it had a steering wheel, which operated a patented steering system. British champion cyclist Evelyn Hamilton promoted the bike, but few were sold.

### Selbach Special Racing Tricycle 1932
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: Front 26in (65 cm), Rear 27in (68 cm)

Maurice Selbach was a builder of high-quality lightweight cycles based in southeast London. Many Road Records Association milestones were broken on Selbach racing tricycles, which were very rigid and held the road well. They were also available with tapered tubing.

### Child's Tricycle 1913
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: Front 14in (35 cm), Rear 12in (30 cm)

This child's tricycle is typical of its time. Like the French velocipedes of the 1860s, this tricycle is propelled via a pair of simple cranks attached to the front wheel. To minimize cost, this machine had solid rubber rather than pneumatic tires.

**Designed for Children**

Despite the new vogue for balance bikes kicked by the feet, tricycles were still thought to be necessary to teach children vigorous pedaling. Reminiscent of the cranked Parisian velocipedes, their basic design has changed very little during the last 150 years, apart from “stand-on” models designed to accommodate passengers.
At a time when most cycle components were made of steel, this high-quality, lightweight racing tricycle featured some aluminum alloy parts. Its Super Champion derailleur gearing was designed by record-breaking Swiss road racer Oscar Egg.

The concept for this tricycle came from a US radio and TV show based on the adventures of an aircraft pilot called Sky King. With its aerodynamic flair, the tricycle imitated the style of the hero's plane. The example shown here is a modern replica.
In the late 19th century, there were many political campaigns around the world led by women, demanding greater equality with men. This coincided with the spread of biking, and the two grew entwined, with the bicycle becoming emblematic of the drive for women’s rights. Women took to biking as readily as men, and in 1895, American Annie Kopchovsky became the first woman to cycle the globe. Women’s riding clubs and races, such as this race in 1900s Paris, were common.
Women’s Bikes

As bicycles became cheaper and increasingly available, more women gained access to them and the personal freedom they offered. The women's version of the safety bicycle was well established by the early 1900s. The position of its frame and handlebars gave the rider an upright riding position, and the frame’s step-through design meant that a woman wearing a dress could easily mount and ride her bike. Additionally, these bicycles were often equipped with a skirt guard to prevent dresses from getting tangled in the rear wheel. Over time, women discarded their restrictive dresses and replaced them with divided skirts or bloomers for bicycle riding.

![NSU Damenrad Women’s Bicycle 1915](origin Germany) (Frame Steel) (Gears Single speed) (Wheels 26in (65 cm))

Originally a manufacturer of knitting machines, NSU (later renamed Neckarsulmer Fahrzeugwerke AG) began producing bicycles in 1892. Its Damenrad women’s bicycle featured a reinforced step-through frame and large-section balloon tires.

![Decker GMBH Edelweiss c. 1935](origin Germany) (Frame Steel) (Gears Single speed) (Wheels 26in (65 cm))

This high-quality bicycle was designed using a twin step-through frame that featured a patented bicycle stand and an unusual “made to measure” leather suitcase attached to the rear carrier. It also had the Edelweiss model emblem on the seat tube.

![BSA Women’s Sport Petronella Bicycle 1936](origin UK) (Frame Steel) (Gears 3-speed) (Wheels 26in (65 cm))

Women competing in club racing and time-trialing events needed sports bicycles. The Petronella had a short wheelbase, lightweight frame, and 3-speed Sturmey-Archer gears. Its brakes were the powerful caliper-type design.
### SH Cycles Women's Bike 1940s

**Origin:** Japan  
**Frame:** Steel  
**Gears:** Single speed  
**Wheels:** 26 in (65 cm)

This high-quality women's roadster featured a reinforced step-through frame, with a bolt-on rear carrier and rear-mounted kickstand. The fully enclosed chaincase protected the rider and ensured a long chain life.

### Semler Women's 1942

**Origin:** Netherlands  
**Frame:** Steel  
**Gears:** Single speed  
**Wheels:** 26 in (65 cm)

A typical women's roadster, this bicycle featured a cut-away diamond frame with parallel down tubes and a sprung saddle. The skirt guard, chaincase, and mudguards kept the rider safe, clean, and dry. The rack behind the saddle could be used for transporting items.
Great Races

Giro d’Italia 1909

The Giro d’Italia, like the Tour de France, was born out of a battle between two newspapers. From the outset it was a race of brutal distances, brave competitors, and passionate supporters.

Newspapers were big business at the turn of the 20th century since the press was the only way most people could find out what was happening in the world. The Tour de France (see pp.178–79) resulted from a circulation war between two sports newspapers, L’Auto and Le Vélo. L’Auto organized the first Tour in 1903 to boost its circulation, and, within a very short time, its sales outstripped its rival’s.

In this case, the two rival Italian papers were the Corriere della Sera and La Gazzetta dello Sport. The Corriere had planned a race, but La Gazzetta’s editor, Tullo Morgagni, convinced the paper’s owner, Emilio Costamagna, and its cycling editor, Armando Cougnet, to get in first, buoyed by the success of two single-day races the paper had organized: the Milan–San Remo and the Giro di Lombardia. On August 7, 1908, La Gazzetta announced its plan for a round-Italy race.

Covering long distances was a big draw in cycling in those days. Most people did not travel far, and in rural areas many rarely left their own villages. The fact that professional cyclists covered massive distances under their own power on relatively simple machines captured people’s imaginations.

Riders pushed to their limits

The first Giro d’Italia started in Milan on May 13, 1909, with a 248-mile (397-km) stage from Milan to Bologna, and ended on May 30 with a 128-mile (206-km) stage from Turin to Milan. There were six other stages in between: the shortest was 142.5 miles (228 km) and the longest a massive 235-mile (378-km) loop around the top half of the country, with the capital, Rome, at its southernmost tip; thus there were fewer but much longer stages.
than there are today. Riders covered a total distance of 1,530 miles (2,448 km) in 18 days; 127 of them started, but only 49 made it to the final finish line.

The winner of the first Giro d’Italia was decided on points awarded in the finishing order on every stage. This was done to avoid problems that beset the 1904 Tour de France when biased supporters stopped and held back riders to allow their favorites to gain time. Scoring on points rather than time meant there was no incentive for spectators to get involved in that way. However, it also meant that the winner, Luigi Ganna, was not the quickest rider over the entire course. If the 1909 race had been decided on time (as the race is today) then the third-place rider, Giovanni Rossignoli, would have won by quite a margin.

One issue did affect the first Giro d’Italia—cheating by the riders. Three of them were disqualified before the start of stage three because there was no record of their having passed through control points. It was later discovered that they had covered part of the route by train. However, the race was a great success overall. Huge crowds turned out to watch the riders: an estimated 30,000 watched the Milan finish. Ganna was a worthy winner. He had already won Milan–San Remo that year, and had been fifth in the 1908 Tour de France. His prize money helped him set up a bicycle factory in 1912. This inaugural race boosted La Gazzetta dello Sport’s circulation immensely, and it has been an annual event ever since, except during the two world wars.

“My backside is on fire.”
LUIGI GANNA, WHEN ASKED WHAT HE FELT WHEN HE CROSSED THE FINISH LINE AFTER WINNING

The first Giro d’Italia was a truly international race. Other competitors included the French rider Lucien Petit-Breton and the Belgian Cyriel Van Hauwaert, so the first Giro d’Italia was a truly international race.

RESULTS
First: Luigi Ganna, Italy
Second: Carlo Galetti, Italy
Third: Giovanni Rossignoli, Italy

THE COURSE
The first Giro avoided the high mountain ranges of Italy that the modern race passes, but there were still some stiff climbs, including the ascents to Roccaraso, Rionero Sannitico, and Macerone on stage three between Naples and Chieti, the steep Passo Bracco on stage six from Florence to Genoa, and the Collé di Nava on stage seven from Genoa to Turin. As well as top Italian racers, other competitors included the French rider Lucien Petit-Breton and the Belgian Cyriel Van Hauwaert.

Key Facts:
- **First**: Luigi Ganna, Italy
- **Second**: Carlo Galetti, Italy
- **Third**: Giovanni Rossignoli, Italy

To support the announcement of the new race, the paper also carried advertisements for the race sponsors, which were either bicycle or tire manufacturers.
Bikes for a Purpose

In the early 1880s, bicycles were already being used for utilitarian purposes by individuals, small businesses, and large organizations. As cycling became widespread, so the variety of purposes for which they could be used increased. Specialist machines were built for sports use, such as bicycle football and hockey. Individual designs for bicycles that could make work easier were also developed. Shopkeepers and service providers realized that they could use bicycles to market their goods over a wider area, thus increasing sales. Telephone orders could also be dispatched within hours with the use of bicycles.

Frischauf Cycle Ball Bicycle 1920
- **Origin**: Germany
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

The Icebike was manufactured by the Chicago Ice-Bicycle Apparatus Co. It used a standard roadster frame and the rear wheel had spikes bolted through its rim. The front fork had a large skate attached for steering. A similar design is used today to ride on ice.

Wolfe American Icebike c. 1920
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

Cycle football began in 1893 and quickly became popular in Europe and the US. The ball was controlled by the movement of the wheels and by the rider’s head. The bicycles used had very low-ratio fixed gears, low saddles, no brakes, and high handlebars.

Express AG Gymnastics Bicycle 1920
- **Origin**: Germany
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

Artistic cycling is a tightly regulated international competition sport featuring athletes performing gymnastic and ballet-style exercises on bicycles. The bicycles used must conform to an exact specification.
Halfords Vanette 1937

**Origin:** UK  
**Frame:** Steel  
**Gears:** Single speed  
**Wheels:** Front 18 in (45 cm), Rear 26 in (65 cm)

The Halfords Co. manufactured and distributed components for the auto trade. They also made bicycles and had a fleet of “Vanettes” to deliver their goods to customers. With its stepover frame, large front carrier rack, and comfortable saddle, this bicycle was used extensively in the UK.

Wall's Ice Cream Delivery Tricycle c. 1930

**Origin:** UK  
**Frame:** Steel  
**Gears:** Single speed  
**Wheels:**  
- Front 18 in (45 cm)  
- Rear 26 in (65 cm)

The commercial tricycle was used by tradesmen of all types. Wall’s introduced its first Ice Cream Delivery Tricycle in 1923, and by 1939 there were 4,000 on the road. There were two makers of these tricycles: Warrick & Co. and Alldays & Onions.

G.P.O. Elswick Gents’ Carrier 1938

**Origin:** UK  
**Frame:** Steel  
**Gears:** Single speed  
**Wheels:** 24 in (60 cm)

The British red postman’s bicycle was one of the best-known carrier cycles. Specially developed for its purpose, several manufacturers made them to the Post Office’s specification. These bicycles were robust and made from durable materials.
Bicycles at War

Bicycle-mounted infantry messengers and ambulance carriers were used extensively during WWI. Bicycles were popular on account of the fact that they were light, quiet, and, unlike horses, did not require feeding. The models used at the time were normal roadsters, with front carriers, rifle clips, an inflator pump, and puncture repair outfits. Through WWII, bicycle use in Europe was limited mainly to messenger duties and air-drop operations, which involved paratroopers jumping out of planes with specially designed folded bicycles to reach comrades behind enemy lines. Bicycles continued to be used widely by the military after WWII, especially in Asia, and the last dedicated bicycle infantry unit, belonging to the Swiss army, was disbanded in 2003.

**Royal Enfield Rifle Bike c. 1940**
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

This special military model was basically a standard roadster bicycle with a rear carrier, rifle clips, and heavy-duty tires. It had a sprung saddle, stove-enamelled paintwork, and rubber pedal grips. Gearing was limited to a single-speed freewheel.

**Militärvelo MO5 c. 1940**
- **Origin**: Switzerland
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

First produced in 1905, this model was used by the Swiss army until 1989. Designed to carry equipment, it featured a heavy-duty frame onto which cases and racks were attached. In order to stop when loaded, it also had three types of brakes.
BICYCLES AT WAR

Schwinn Military Touring WWII 1940s

Origin: US
Frame: Steel
Gears: Single speed
Wheels: 26 in (65 cm)

Founded in 1895, the Schwinn Co. was noted for its high standards of bicycle construction. Its Military Touring model featured an all-welded frame, chainguard, and kickstand. Braking was provided by a rear coaster hub brake. Schwinn produced 10,000 of these bicycles per year during WWII.

Columbia Bike 1941

Origin: US
Frame: Steel
Gears: Single speed
Wheels: 26 in (65 cm)

The Columbia featured heavy-duty spokes and wheel rims fitted with balloon tires. The twin top tubes gave the bicycle extra strength, enabling it to carry payloads weighing up to 200 lb (91 kg). The bike itself weighed 55 lb (25 kg).

BSA MK2 Para Bike 1943

Origin: UK
Frame: Steel
Gears: Single speed
Wheels: 26 in (65 cm)

This model was specially developed for and used in all major airborne landings during WWII including D-Day and Arnhem. Paratroopers could fold the bicycle in half and carry it with them as they jumped from aircraft. Once on the ground, they could easily unfold the bike for use.
1946-1959
THE GOLDEN AGE
Le Parisien

Le film officiel du Tour de France 49

L’équipe
In the wake of World War II, during which the bicycle had enjoyed a resurgence thanks to its affordability and practicality, sales of new machines rose throughout Europe in a brief wave of optimism. US soldiers returning home helped to spread new trends, bringing a taste for lightweight, geared European bicycles to a market unaccustomed to such quality. But the boom was dampened as postwar prosperity ushered in new forms of recreation—cars, shopping malls, and movie theaters all eroded the public interest in pursuits tinged with the austerity and hardship of those wartime years.

The bicycle’s gradual decline in popular use contrasted with the road-racing scene, which entered its golden age. The centerpieces of the racing calendar—from hard-fought, one-day “classics,” such as the cobbled, springtime Paris–Roubaix race, to excruciating, three-week “Grand Tours,” foremost of which was the Tour de France—were by now well established. It was in the postwar era that the first superstars of the sport emerged, such as the flamboyant Italian Fausto Coppi. The young upstart to his elder rival Gino Bartali, Coppi rode with elegance and style, and celebrated success off the bike with similar panache, bringing Hollywood-style glamour to the world of cycling for the first time.

Around the world, the Japanese bicycle industry—long a skilled follower of overseas technological trends—began to challenge the powerhouses of Germany, the UK, and the US. The bicycle itself still carried European colonialist overtones, but its usefulness as a working tool was beginning to be appreciated by local populations in many developing countries.

“He seems to caress the handlebars, while his torso seems fixed by screws in the saddle. His long legs stretch to the pedals like the limbs of a gazelle.”

ANDRÉ LEDUCQ, FORMER TOUR DE FRANCE WINNER, DESCRIBING FAUSTO COPPI

Key Events

- **1940** Tungsten Inert Gas (TIG) welding, a precise method of joining metal tubing, is first used to build bicycle frames, following its invention in the aerospace industry.
- **1940s** Bicycles play a part in the steady sprawl of cities across Asia, providing transportation for workers and a means for businesses to operate.
- **1947** The first postwar Tour de France is won by a Frenchman, Jean Robic.
- **1950** Forty years after the birth of cyclo-cross in northern Europe, the first World Championships is held in Paris.
- **1951** Campagnolo releases the Gran Sport, a parallelogram-design rear derailleur that vastly improves on existing gear-shifting devices.
- **1956** Japanese manufacturer Shimano releases its first derailleur gear-shift mechanism after decades of producing 3-speed hub gears.
- **1958** Women’s cycling is recognized at world championship level, with road and track events being contested.
- **1958** The Chinese bicycle industry reaches the Communist party’s target of 1 million machines.
Racing Bikes

Postwar Europe witnessed a revival in bicycle racing despite austerity. Bicycles became lighter and stiffer, with nearly all high-end frames constructed from Reynolds 531—a type of steel tubing made by Reynolds in Birmingham. The tubing remained a standard of excellence for many decades and the choice of many high-quality frame-builders. Alloy component manufacturers refined their products, leading to a marked improvement in the reliability of gearing and braking. The resurgence of six-day racing across velodromes in Europe during the winter drew big crowds, and several manufacturers set up cycle teams to promote their products to the masses.

**Schwinn Paramount 1940s**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 27 in (68 cm)

The Paramount was a highly sought-after model among American racers. The high-quality frames were handmade in Chicago and offered in a range of custom options including full chrome plating for a sparkling mirror finish.

**Cinelli Pista 1947**
- **Origin**: Italy
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 27 in (68 cm)

Italian builders chose Italian tube-maker Columbus rather than British Reynolds. The result, they claimed, was a high-quality lightweight machine that offered a unique ride. Cinelli chose reinforced round chrome fork blades, providing additional stiffness.

**Thanet Silverlight 1948**
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 27 in (68 cm)

Expensive and slow sellers, Thanet’s most famous model was the Silverlight frame with cradled bottom bracket and crossover seat stays. The early builds had silver-soldered brackets that proved to be weak, and later frames used lugs to strengthen the joints.
Frejus of Turin has an impressive track record, having won the world championship in 1930, 1933, and 1948. The frames were sleek and minimal, going against the trend for fancy lugwork. Frejus used unusual geometries that created a short top tube, which reduced the torsional twist of the frame under acceleration and sharp cornering.

Frejus 1949

<table>
<thead>
<tr>
<th>Origin</th>
<th>Italy</th>
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<tbody>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>4-speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>27 in (68 cm)</td>
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</tbody>
</table>

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Hercules 1950s

<table>
<thead>
<tr>
<th>Origin</th>
<th>UK</th>
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</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Butted steel</td>
</tr>
<tr>
<td>Gears</td>
<td>4-speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>27 in (68 cm)</td>
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</table>

British firm Hercules was known for its roadster and leisure bicycles. The tiny Hercules model was ridden by champion Eileen Sheridan, who set many long-distance records.

Vagant World Record Bicycle 1950

<table>
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<tr>
<th>Origin</th>
<th>Germany</th>
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</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>Single speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>27 in (68 cm)</td>
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</tbody>
</table>

This bicycle was custom-built for German speed cyclist, Karl Heinz Kramer, and was ridden by him when he set the moto-paced bicycle speed world record of 96 mph (150.5 km/h) in 1950. It featured a reversed front fork for when the front wheel hit the roller at the back of the pace motorcycle.

Custom chainring to maintain high speed

Super-narrow tubular tires glued to wooden rims
Great Manufacturers

Raleigh

The most iconic name in British cycling, Raleigh was the largest bicycle manufacturer in the world for much of the 20th century. Synonymous with quality, reliability, and value, Raleigh kept a constant focus on overseas markets that ensured it was one of the first truly global cycling brands.

Raleigh can trace its roots back to 1885 and the establishment of a bicycle workshop on Raleigh Street, Nottingham, UK, by Englishman Richard Morris Woodhead and a Frenchman, Paul Angois. As well as repairing bicycles for customers, Woodhead and Angois began to produce small numbers of their own bicycles, which they branded Raleigh after the address of their premises.

The quality of the first Raleigh bicycles was such that they attracted interest from overseas, notably in Saint-Étienne, at the heart of the French cycling industry. But Angois and Woodhead’s business skills were no match for their bike-building expertise. It took investment first from William Ellis in 1887, then Frank Bowden in 1888, to stabilize the enterprise.

Bowden became the driving force behind Raleigh, encouraging his partners to increase their output and efficiency, and to promote innovative features, such as a patented gear-changer. The Raleigh name was registered in 1889 and Bowden became the company chairman, director, and majority shareholder. The brand’s identity was completed with the creation of a head badge adorned with a heron, borrowed from Bowden’s family crest.

Raleigh rode the bicycle boom of the 1890s, expanding into new premises in Nottingham to allow production to increase. As part of its global ambitions, Raleigh signed the first-ever cycling world champion, New Jersey native Arthur A. Zimmermann, as a sponsored athlete. Zimmermann had won the sprint and 6.2-mile (10-km) races at the 1893 World Championships in Chicago, and this association increased Raleigh’s international appeal. Launched in 1902, the Sturmey-Archer hub gear—which would become a mainstay of the company—offered reliable gear changes, low maintenance (since the gear-changing mechanism was housed inside the hub, away from dirt and water), and low cost. The hub gear was soon to be found on Raleigh bicycles the world over.

Although Raleigh was a British brand, its focus was cast firmly overseas. Bowden had pushed for a European sales network from the earliest days of the company, and by the turn of the 20th century, exports reached as far afield as South America, India, and Australia. Assisted by the UK’s colonial connections, Raleigh’s international breadth ensured that it was well placed to ride out localized ebbs in demand.

The 1960s brought major changes at Raleigh. First, it turned down the opportunity to partner with radical cycle designer Alex Moulton. When in turn Moulton launched his F-Frame small-wheeler to acclaim in 1962, Raleigh scrambled to catch up. Raleigh’s answer was the Raleigh Small Wheel (RSW), but it was inferior to the Moulton in both design and construction.

The other major change was Raleigh’s acquisition by Tube Investments (TI), a group of British metal-tubing engineering firms. When it merged with TI’s existing stable of cycling brands, including international names Philips and Hercules, Raleigh became the largest bicycle manufacturer in the world, with Nottingham its manufacturing heart. By the late 1960s the company was producing more than four million bicycles a year, 75 percent of which were destined for the export market. Through its overseas factories and sales agreements with foreign firms, Raleigh produced more than 60,000 unique models to meet local requirements.

One of Raleigh’s most iconic bicycles, inspired by the US trend for wheelie bikes, such as the Schwinn Sting-Ray, was a

“Why keep on walking? Ride a Raleigh—the all-steel bicycle.”

1925 Advertisement

In 1946 the Raleigh factory covered 27 acres (11 hectares) and had 5,000 employees. In 1952 a new factory on a 40-acre (16-hectare) site employed around 7,000.

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**Bicycles for all**

From this 1899 advertisement to 1950s color art, Raleigh bicycles were promoted for leisure use and endorsed by professionals.
children’s bike—the Raleigh Chopper. It went on sale in the UK in 1970 and was an instant hit, selling 1.5 million units in the UK alone during the ten years of its manufacturing. Raleigh’s other headline-grabbing move in the 1970s was to sponsor a professional cycling team for the first time. The TI-Raleigh team won a phenomenal 50 races in its first season of 1974, and went on to win the Tour de France with Dutch cyclist Joop Zoetemelk in 1980—the only time that the race has been won on a British bicycle.

Raleigh found itself fighting decline in the 1980s as competition from cheaper Asian bicycle producers saw sales slide at home and abroad. TI sold the Raleigh brand in 1987 to the Luxembourg-based corporation Derby International, which sold the Nottingham factory site in 1999 without securing new premises. Raleigh’s UK-based frame-building operation ceased, and, four years later, bicycle assembly also came to a halt. The Raleigh division of bicycles is now owned by the Dutch bicycle group Accell. While its manufacturing heart is no longer located in Nottingham, Raleigh retains a design and distribution site in the former hub of the UK cycle industry.
Leisure and Utility Bikes

For European countries involved in World War II, the period from the end of hostilities until the end of the 1950s saw cycling boom and bust. Having satisfied pent-up demand in the immediate postwar period, the industry went into steep decline. As national economies improved, people turned to mopeds, scooters, and cars. Utility bikes were designed to be low-maintenance and to be ridden in ordinary clothes, for business or pleasure, but specifications and preferences varied widely from country to country. Europeans tended to use the same bike to commute, shop, or for leisure activities, while Americans cycled mostly for pleasure.

### Raleigh Roadster 1950s
- **Origin:** UK
- **Frame:** Steel
- **Gears:** 3-speed
- **Wheels:** 26 in (65 cm)

Roadster-style bicycles were Raleigh's best-selling bikes during this period, and it offered a wide range of models. The Sports Tourists featured Sturmey-Archer hub gears, Dynohub lighting, and a leather Brooks saddle. A women's model was also available.

### Monark Silver King 1948
- **Origin:** US
- **Frame:** Aluminum alloy
- **Gears:** Single speed
- **Wheels:** 26 in (65 cm)

The Silver King bicycle had been around since 1934 and was made of heat-treated aluminum alloy. The 1948 version featured hex tubing, which made the bike stronger and lighter overall.

### Miele Mellor 1950
- **Origin:** Germany
- **Frame:** Steel
- **Gears:** Single speed
- **Wheels:** 26 in (65 cm)

Miele started making bicycles in the 1920s, producing a wide range of models. Its 1950 Touring model was noted for strength and reliability. It featured a rear luggage rack, a chainguard, and a dynamo driven by the front wheel to power lighting.
Chrome was key to the popularity of both the men's and the women's versions of the Schwinn Black Phantom bicycle. Other similarities included the knee-action spring system and overall style of the Black Phantom, one of the icons of Schwinn's bicycle history.

The Crescent originated in Chicago's Western Wheel Works as the "affordable bicycle for working people." In the early 1900s, production moved to Sweden, where a leading manufacturer continued the brand. This women's model came with a sprung leather saddle.
With its trademark “Celeste” color scheme and race-proven pedigree, the Paris-Roubaix is emblematic of Italian brand Bianchi’s status as the oldest bicycle manufacturer in the world. After opening a workshop in Milan in 1885, Edoardo Bianchi became renowned as a maker of bicycles ridden by Italian royalty and as the name behind some of the finest lightweight steel racing machines available. Bianchi is associated with Fausto Coppi, whose 1950 Paris-Roubaix win inspired this bike.

**KNOWN TO BICYCLE AFICIONADOS** as a “classic lightweight”—a vintage steel-framed racing bicycle—the Bianchi Paris-Roubaix was manufactured in 1951 to celebrate Fausto Coppi’s success in the Paris-Roubaix race the previous year. The most daring, debonair racer to grace cycling’s golden era, Coppi won countless races on Bianchi bicycles, even winning the Giro d’Italia–Tour de France double in both 1949 and 1952. For no small reason was the Italian known as Il Campionissimo (the Champion of Champions).

In fact, far from being a new model designed specially for the purpose, the Paris-Roubaix was the new name for Bianchi’s existing top-of-the-line bicycle, the Folgorissima. Roughly translated as “super lightning,” the Folgorissima had first been released in 1949 to mark the introduction of Campagnolo’s improved single-lever version of the Cambio Corsa gear-shifter, and had itself replaced Bianchi’s top-level racer of the 1940s, the Folgor (“lightning”). Following this same marketing strategy, Bianchi again rebranded its top-level bicycle in 1954 as the Campione del Mondo, marking Coppi’s World Road Championship win of the previous year.

Made from double-butted steel tubes joined by Bianchi’s own malleable-cast, chrome-finish lugs, the Paris-Roubaix was equipped with the highest-quality parts available. Campagnolo’s four-speed Cambio Corsa gear mechanism was the highlight; by 1951 it too had taken the name Paris-Roubaix, such was the magnitude of Coppi’s win.

**SPECIFICATIONS**

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<tr>
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<td>Wheels</td>
<td>28 in (70 cm)</td>
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<tr>
<td>Weight</td>
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“Bianchi Celeste is the most distinctive color scheme in the sport.”

BIANCHI, ON ITS BLUE-GREEN LIVERY

Bianchi Celeste paint scheme, said to derive from the eye color of Queen Margherita of Savoy

Custom-made steel crankset on the original Paris-Roubaix featured a trio of Bianchi “Bs” arranged around the chainring

Chromium-plated lugs for the head tube

Aluminum alloy brake lever

Bianchi-made threaded headset

Bianchi logo
The Bianchi logo features the founder’s name emblazoned across an eagle and crown, symbols of the House of Savoy, the Italian royal family.

Clips and straps to hold racer’s feet to the pedals
THE COMPONENTS

Many of the original parts that adorned the Paris–Roubaix were custom-made for Bianchi by other Italian manufacturers. The stem and handlebars were produced by Ambrosio and engraved with the Bianchi name, while the hubs listed as Bianchi were almost certainly manufactured by either Campagnolo or Fratelli Brivio. The lightweight aluminum wheel rims were produced by Nisi of Turin.

1. Brooks leather saddle with spare tire  
2. Campagnolo Paris–Roubaix derailleur and toothed rear dropout  
3. Universal brake levers with rubber padded hood covers, mounted on Coppi steel handlebars with Bianchi stem  
4. Campagnolo gear-shifter  
5. Down-tube-mounted pump  
6. Bianchi racing pedals with clips and straps  
7. Universal caliper brake  
8. Front hub with Campagnolo quick-release lever
American Children’s Bikes

Having eagerly adopted affordable cycling, the US then became the first nation to abandon the bike in favor of the automobile after World War II. Attempts to revive the American market for adult bicycles had little success, so the US cycle industry focused on selling machines as playthings for juveniles. Bikes became kinetic toys, sometimes cashing in on the popularity of cartoon characters and often imitating the motorcycles that young riders aspired to.

“It’s low-cost transportation and it helps boys make money.”
HORACE HUFFMAN ABOUT THE PAPERBOY’S BIKE

Huffy Radio Bike 1955

<table>
<thead>
<tr>
<th>Origin</th>
<th>US</th>
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</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>Single speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>26 in (65 cm)</td>
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</table>

Built by the Huffman Manufacturing Co. of Dayton Ohio, this bicycle had a tube-type radio in the “tank.” The bike was available in red, blue, or green. It was dropped from the Huffy range after 18 months; around 8,500 were built.

Radio power source
Made of thin metal, the radio’s “Power/Pak” was attached to the rear rack of the bicycle and powered by triple-life A and B batteries.

Comfortable seats
Along with the large tires, the well-padded and fully sprung seat ensured a smooth and comfortable ride—ideal for cruising the streets.

Music on the move
A three-vacuum-tube radio was built into each bicycle. The radio featured a volume control, tuner, and powerful antenna that could tune in stations up to 100 miles (160 km) away.

Futuristic headlight
The battery-powered light attached to the front mudguard emitted a golden yellow light. Its design was reminiscent of the Space Age styling featured in The Jetsons.
Huffy Convertible Super Girls’ Model 1949
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in (50 cm)

This bicycle was the first Huffman product to be called a Huffy and it had a huge impact on the US market for children’s bikes. A key feature was the small-diameter balloon tire, which meant that the bicycle was in scale with its rider.

Shelby Donald Duck Bicycle 1949
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in or 24 in (50 cm or 60 cm)

This bicycle was a commercial success for the Shelby Cycle Co. A children’s favorite, it was the first to tie in with Walt Disney’s character of Donald Duck, whose head below the handlebars had a quack-quack horn and flashing eyes.

J C Higgins Girls’ Balloon Tire Bicycle 1950s
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in (50 cm)

J C Higgins was a brand name used by US mail order company, Sears Roebuck. This bicycle was built in girls’ and boys’ versions. The pseudo-motorcycle styling features front suspension, rear-wheel fairing, and streamlined rear rack.
Touring Bikes

From its very advent, the bicycle opened up the opportunity for independent travel. Over time, touring bicycles were included in the catalogs of all major manufacturers. Touring on two wheels rapidly gained popularity in Europe during the 1930s due to the rising affluence of the working classes and the influence of the Outdoor Movement. Touring bikes were designed to be ridden comfortably over extended distances and typically had a long wheelbase for stability. Front and rear mudguards were essential, as was the provision for carrying some luggage. These bicycles also had a wide range of gears to cope with different terrains.

△ Maclean Club Model 1948
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 3- or 4-speed
- **Wheels**: Front 26 in (65 cm), Rear 27 in (68 cm)

The Maclean Co. was formed in 1922. Its Club Model frames were made using Reynolds 531 tubing—a combination of manganese, molybdenum, and carbon steel. The bicycles were built to the buyer’s specification with either derailleur or Sturmey-Archer gears.

△ R O Harrison 1950
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 5-speed
- **Wheels**: 26 in (65 cm)

Founded in 1933, R O Harrison Cycles was a London-based manufacturer of high-quality, classic lightweight frames. Its 1950 model had a typical touring fork rake and frame angles, and came equipped with pump hanger pegs.

**Twin tubes**
Bicycle frames needed to be lightweight and rigid, and many manufacturers of the time produced frames with twin top, seat, or down tubes.

**Battery power**
The earliest lights were illuminated by a flame, fueled by oil or carbide, and could be dangerous. Battery-powered lights were not only safer, but also produced more light.
TOURING BIKES

Maclean Ekla 1949
 Origin: UK
 Frame: Steel
 Gears: 10-speed
 Wheels: 27 in (68 cm)

This top-of-the-line bicycle was made using high-quality Ekla decorative lugs and fork crowns brazed onto the Reynolds 531 tubes. It was equipped with 10-speed derailleur gears, a Brooks saddle, and Weinmann brakes with hooded levers.

E & P Stricker 1950
 Origin: Germany
 Frame: Steel
 Gears: 3-speed
 Wheels: 26 in (65 cm)

Made by E & P Stricker of Bielefeld, Germany, this was a typical example of the Western European postwar touring bicycle. It featured a kickstand, an alloy chainguard, and a sprung seatpost for extra comfort when riding.

Gillott Clubman Touring Bike 1951
 Origin: UK
 Frame: Steel
 Gears: 3-speed
 Wheels: 27 in (68 cm)

Renowned worldwide for high-quality craftsmanship and attention to detail, A S Gillott produced bicycles for competition, club riding, and touring from its shop in Camberwell, London. This Clubman model featured wheels with alloy rims and large flange hubs, as well as alloy brakes to reduce weight.
The Flying Pigeon, based on the UK’s 1932 Raleigh Roadster, began production in July 1950. Workers had been asked to design a strong, durable, and light machine, and this one was the brainchild of a worker named Huo Baoji. It was adopted as the approved form of transportation within the People’s Republic of China, and the country became known as the kingdom of bicycles. Bicycles were one of the three must-haves for every citizen, the other two being a sewing machine and a watch.
Bikes at Work

As early as 1881, tricycles were used by the British postal service to deliver packages and letters, and the bicycle too was quickly adapted to carry goods. Purpose-built designs were introduced, enabling bikes to deliver various types of goods, messages, and newspapers. Butchers and bakers delivered their products on bikes, craftsmen used them to carry their tools when they worked on customers’ premises, and military forces adopted them for light transport duties. As cities grew congested with vehicles, bicycles became a convenient alternative because they were easy to maneuver, took up less parking space, and did not require costly fuel.

Knife Sharpener’s Bicycle 1950s

| Origin | Germany |
| Frame | Steel |
| Gears | Single speed |
| Wheels | 65 cm (26 in) |

Knife sharpeners used special bicycles that not only helped them reach their customers but also powered grindstones. Used across the world, these bikes were based on normal roadsters but had an additional drive mechanism to rotate the grindwheel. They were also equipped with carriers for tools and water.

Stand and rack
The rear rack was easily converted to a kickstand by the operator. The rack would swing around onto the floor and suspend the rear wheel, providing a stable base when sharpening tools.

Toolkit
A frame-mounted metal case was integrated into the shape of the bicycle frame. The box housed the worker’s tools, and a hinge on the side of the box allowed easy access to the contents.

Chainring
This bicycle featured an ornate five-arm, chrome-plated chainring. The cover was designed to stop the rider’s clothes, and any metal from the grinding wheel, from jamming the bicycle chain.

Bottle dynamo
This unit resembled a bottle and created power for a front light. A roller placed on the sidewall of the bicycle tire would engage when the wheel moved forward, generating electricity.
Grooved wheels

The wooden wheels featured deep grooves that helped the rider stay on the high-wire cable.

This bicycle was designed for making deliveries, and featured a large wicker basket mounted above a small front wheel. It had a retractable front stand and a reinforced frame. Rider comfort was aided by a sprung saddle and rubber grips on the handlebar.

Triumph RAC
Patrolman's Bicycle 1950s

- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

This 1950s Triumph was used by patrolmen of the Royal Automobile Club (RAC), which provided roadside assistance to motorists in the UK. Based on heavy-duty roadster models, it had a rear rack for tools and displayed the organization’s badge.

Bismarck Cargo
Bicycle 1950s

- **Origin**: Germany
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: Front 18 in (45 cm), Rear 26 in (65 cm)

This purpose-built carrier was produced by Bismarck, a renowned bicycle manufacturer known for its high-quality and durable machines. It featured a reinforced step-through frame, front and rear carriers, and a sprung saddle. The kickstand provided stability when loading.

Schwinn Typhoon Circus
High-Wire Bike 1959

- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

Based on a Schwinn cruiser, this bicycle was adapted for high-wire circus riding. The wheels were made of solid wood with a slot running around the circumference to retain the wire. The fork and handlebars could be made immovable.
Great Races
Cyclo-Cross World Championships 1950

Modern cyclo-cross races are held in park or woodland circuits, but they once took place in the center of many towns and cities, where they were highly popular. One race held in Paris, France, the Critérium International de Cyclo-cross, became the first official cyclo-cross world championship event.

THE SPORT OF CYCLO-CROSS began in the early 1900s as a winter activity for road racers. The races were single-lap courses that took in several villages over a wide area. Riders were left to find their own route, and the only rules were that they had to go through the villages in a specified order and that they were not allowed to use roads. As the riders navigated between places using the church towers or spires, the races became known as steeplechases. As the sport developed, with more competitors joining in, and spectators wanting to watch, organizers started using circuits in woods and parks, and even towns and cities, where street obstacles mixed up the terrain. The latter proved very popular because they were accessible to spectators.

The famous Critérium International de Cyclo-cross was introduced in 1924 in Lille, northeastern France, but moved to Paris in 1934 and became an annual event until 1939, when, like many cycling races in France and French-speaking Belgium, including the Tour de France, it was suspended with the start of World War II because it was too difficult to organize. However, once the Germans had gained control of occupied France, they encouraged some racing, hoping that it might help win over local hearts and minds. The Critérium International de Cyclo-cross was one of the races allowed, and it started again in 1941 and was held on a circuit in the Montmartre district of Paris. The circuit itself was around 4,921 ft (1,500 m) long and very hilly—there were no flat sections. It included city streets, a strip of off-road through Square Willette, and the steps that lead up to the famous Basilica de Sacré Cœur. The riders raced over a total distance of 10.5 miles (17 km) and had to run up and down some 1,400 stone steps, carrying their bicycles on their shoulders. The race was suspended again in 1942, but returned in 1947.

In 1949 the race was switched to the Plateau de Gravelle, still in Paris, but this time in an area that provided more off-road riding in the Bois de Vincennes. As before, it was a multi-lap course and, apart from the road start and finish, it used woodland trails and open parkland, with one very steep descent into and out of the Trou du Diable (Devil’s Hole). It was quite a tough course, with a lot more natural obstacles than are found on a modern cyclo-cross course, including large boulders that riders had to scramble up and down.

The Critérium International de Cyclo-cross had long been regarded as an unofficial cyclo-cross world championship and it became the official World Championships in 1950. Ridden on the Plateau de Gravelle course in Paris, it was won by a Frenchman Jean Robic, who knew the course well because he had raced on it the previous year. Robic led a clean sweep of four French riders to take the second biggest victory of his career after the 1947 Tour de France.

“I knew I would win. Roger Rondeaux offered a certain resistance, but I was confident I would beat him.”

JEAN ROBIC, NEVER A BELIEVER IN FALSE MODESTY
RESULTS
First: Jean Robic, France
Second: Roger Rondeaux, France
Third: Pierre Jodet, France

RACE EVOLUTION
The Critérium International de Cyclo-cross moved from Lille, in eastern France, to Paris in 1934. The race was held on a variety of circuits until 1941, when the street circuit in the spectacular Montmartre district was first used. This area remained home to the race until 1949, when it switched to the Plateau de Gravelle circuit near the Bois de Vincennes in southeastern Paris because this location provided more off-road riding. It was on this circuit that, when the Union Cycliste Internationale began to regulate the event, the Critérium International de Cyclo-cross was designated the first official cyclo-cross world championship in 1950.

KEY FACTS
Belgians dominate the world in men’s cyclo-cross racing to such an extent that it can be as hard to win their national cyclo-cross championship titles as it is to win the world title. In the last 20 years, Belgium has won a total of 12 men’s world titles, while the Netherlands (in second place in the ranking) has won four.

Champion Erwin Vervecken leads the 2008 Belgian championship

Carrying the bikes up the steps to Sacré Coeur
Cyclo-cross riders have to carry their bicycles along the sections that they cannot ride, even in modern races. On every lap of the 1950 Montmartre circuit, riders were faced with several long flights of stone steps. The longest was the stretch that runs parallel to the funicular railway that climbs to the Basilica of Sacré Coeur.

The two courses
Map A (inset) shows the early route around Montmartre and the Sacré Coeur. Map B (inset) shows the area covered by the Plateau de Gravelle circuit in southeastern Paris.
Tandems

In the UK and other European countries involved in World War II, the period from the end of hostilities until 1959 saw a cycling boom-and-bust: having initially satisfied the pent-up demand put on hold by the war, the bicycle industry then went into steep decline. As the economy improved and people turned to motorized transport—mopeds, scooters, motorcycles, and cars—struggling British cycle-makers were not interested in tandems, though a few specialists did build custom machines. In Germany and the US, major manufacturers also produced a few tandems, since it was thought riding two-up could be fun for couples and kids.

Harry Rensch started building bikes under his own name in London in the 1930s. By 1940, he was producing tandems with a curved ST to enable a short wheelbase and two pairs of thin lateral frame braces. Rensch launched Paris Cycles in 1943.

Full coverage front and rear fenders

Powering a tandem
Having two riders means there is twice the leg-power to drive a tandem, but also a greater weight to propel. To overcome this, many touring tandems featured gears.

Sprung saddle for extra comfort

Rensch Curved Seat Tube
Tandem c. 1948
Origin UK
Frame Steel
Gears 5-speed
Wheels 27 in (68 cm)

Bauer Women’s Tandem 1949

Origin Germany
Frame Steel
Gears 3-speed
Wheels 26 in (66 cm)

The Bauer-Werke company was founded in 1911 by Ludwig Bauer in Frankfurt-Heddernheim, Germany, and it began producing bicycles in 1922. Bauer offered a complete range of models from everyday bikes and tandems like this one to racing machines.
Paris Touring Tandem 1950
Origin: UK
Frame: Steel
Gears: 10-speed
Wheels: 27 in (68 cm)

Deeply influenced by French lightweight bicycle design, his Paris touring tandem is fillet-brazed, which avoids the need for lugs to join the tubes together.

Child’s Tandem c. 1950
Origin: UK
Frame: Steel
Gears: Single speed
Wheels: 14 in (35 cm)

This rare tandem tricycle was made by an unidentified maker. The British toy brand Triang made a similar machine in the early 1950s. Unlike the Triang, this tandem has bolt-on top tubes. The machine has been repainted and the saddles are not original.

Schwinn AS Tandem 1955
Origin: US
Frame: Steel
Gears: Single speed
Wheels: 26 in (65 cm)

The Schwinn AS (Arnold-Schwinn) tandem featured heavy-duty spokes and frame. The chainguards protected the rider’s clothing from grease and snapping. The curved tubing under the rear seat added to the overall style of this machine.
The 1960s

CYCLING GOES POP
CYCLING GOES POP

With the age of the automobile in full swing, bicycle manufacturers looked to the auto industry for ways to popularize their products. First to capitalize on the youth-centered trend of customizing bicycles with motorcycle parts was Schwinn, who released the Sting-Ray children’s bike in 1963. With its motorcycle-style, top-tube-mounted gear lever, high-backed “banana” saddle perched over a larger rear wheel, and swept-back handlebars, the first “wheelie bike”—so called for the ease with which its rider could lift the front wheel—was instantly popular and much copied. The popularity of wheelie bikes in the 1960s contributed to a resurgence in the bicycle industry around the world, with sales in the US topping 4 million that decade for the first time. Demand spread to other sectors of the market, with 10-speed racing cycles becoming popular in the US, where sales of European imports and homegrown imitations both blossomed.

A completely new concept was born when the Moulton F-Frame was introduced in 1962 in the UK. Designed by the engineer who had developed the rubber suspension of the radical Mini car, the F-Frame was a complete rethink of all the principles that shaped the bicycle, from the conventional diamond frame to the size of the wheels. The result was a small-wheeled bicycle with suspension and a step-over frame aimed squarely at the popular market. Ideal for short trips, easy and comfortable to ride, and especially appealing to women, the F-Frame soon became a fashionable icon for the new Pop era.

“The bicycle is the most civilized conveyance known to man. Other forms of transport grow more nightmarish. Only the bicycle remains pure in heart.”
IRIS MURDOCH, THE RED AND THE GREEN, 1965

Key Events

- **1960** Racing is televised live for the first time at the Tour de France, increasing the appeal—and advertising potential—of the sport.
- **1960s** The bicycle is fully assimilated in many parts of Africa and Asia, becoming an important economic asset in local cultures.
- **1964** Jacques Anquetil becomes the first cyclist to win five Tours de France.
- **1965** The resurgence in US cycling is marked by the revival of the League of American Wheelmen, founded in 1880 but dormant since the early 1950s.
- **1967** The issue of drug-taking comes to prominence after the death of British star Tom Simpson, who had taken amphetamines, during the Tour de France that year.

△ Death on the Tour de France
Following an autopsy of his body, it was found that as well as taking amphetamines, Tom Simpson had also consumed alcohol. He died of heart failure.

- **1968** Cycling’s greatest endurance record, the Hour Record, is pushed to a distance of 30.25 miles (48.653 km) by Ole Ritter of Denmark.
- **1968** In honor of her dominance of women’s cycling, Beryl Burton (UK) is invited to compete in the male-only Grand Prix des Nations in France.

△ A Christmas advertisement published by Schwinn in 1967 featured its Sting-Ray model, the must-have kids’ bike of the year.

△ How many Bee Gees can you fit on a Moulton Standard? The three Gibb brothers and Colin Peterson in London, 1961
Cruiser Bikes

Designed in the US, the cruiser has its origins in the 1933 Schwinn B-10E. Aimed at the youth market, it was styled to look like a motorcycle. It also introduced low-pressure balloon tires to the US. Cruisers had an upright riding position, robust construction, and a soft ride. Their heavy weight and single-speed transmission made them unsuitable for hill climbing but ideal for cruising along beaches and riding on suburban streets. These bikes were popular in the US until the 1960s, when imports of lighter European machines made them unfashionable. Since the late 1990s, there has been a resurgence in popularity of cruisers.

The Bowden Spacelander featured an unusual bike design. It was made of molded fiberglass and was expensive for its time. Only 544 Spacelanders were ever made and its rarity makes it a collectible bike.

The Bowden 300 was a follow-up to the Bowden Spacelander. It too had a fiberglass frame, and with only 8-10 bikes ever made, it is even rarer than the original Spacelander.
**Columbia Thunderbolt Women’s Model 1963**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

This middleweight model showed the influence of European light roadsters on American bicycle design. The Columbia Thunderbolt retained vestiges of the classic US cruiser, including the hint of a fuel tank and the chainguard with its rocket fin.

**Hiawatha Astro Flite 1960s**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

Hiawatha was the name of the famous 1930s American steam train, and Gambles Hardware Stores adopted the same name for its bicycles. Competing with lightweight European imports, the imitation motorcycle tank of earlier cruisers gave way to a sleeker shape, incorporating a battery-operated headlight.

**Schwinn Typhoon 1966**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

The Typhoon was part of the Schwinn lineup from 1962 to 1966. It did not have high-end features such as a tank or other extras but was a sturdy, well-made bike at a reasonable price. It had a strong, cantilevered frame, and its middleweight tires and tubular enameled rims made it an efficient, hard-working bicycle.
Great Manufacturers

Peugeot

Peugeot has been at the heart of the French transportation industry for more than two centuries, and its story traces the evolution of vehicle technology in the late 19th century. One of the most distinctive racing teams from the 1960s to the 1980s, Peugeot's successes included a record ten Tour de France wins.

BICYCLE PRODUCTION was a logical step for a family of industrialists that had made its fortune in steelmaking. Founded in 1810, the Peugeot company produced everything from tools and clock springs to razor blades and coffee grinders from the steel made at its factories in the Doubs region of eastern France.

The first Peugeot bicycle was built in 1882 by Armand Peugeot, grandson of company co-founder Jean-Pierre II. Made to the “ordinary” or high-wheeler design—known as Le Grand Bi in French—it led to the mass-production of bicycles under the Cycles Peugeot name. Production began at the company’s Beaulieu factory, which had been purchased in 1857 to produce fine steel hoops for ladies’ skirts—a product that gave Peugeot the technology and expertise to produce the fine steel spokes for making bicycle wheels. The first tricycles and “safety” bicycles were released to the public in 1886, resplendent with the distinctive Peugeot lion motif.

The 1880s and 1890s were a time of rapid technological progress, and Peugeot was typical of many engineering firms of the time. The bicycle had not yet been pigeonholed as being powered by human legs alone, and engineers—including Armand Peugeot—at various companies were working on motorized propulsion for bicycles, tricycles, and quadricycles. Peugeot’s first automobiles were introduced in 1890, and over the next 100 years the company’s vehicle range included bicycles, mopeds, motorcycles, and automobiles. By the late 19th century, Peugeot’s range of bicycles included tandems, tricycles, quadricycles, and a road bike available in 12 different models, and at the turn of the century the company was building around 20,000 bicycles a year. Peugeot was ideally poised to capitalize on France’s new national race, the Tour de France, and entered a team in the second staging of the event in 1904. The following year brought the first of four consecutive victories for Peugeot: Louis Trousselier won in 1905, René Pottier in 1906, and Lucien Petit-Breton in 1907 and 1908, all on Peugeots.

Following the expansion of automobile production owing to the needs of the French military in World War I, in 1926 Peugeot’s motorcar and two-wheeler—including both...
### Peugeot \( \text{\textcopyright 1970 Cycleurope} \)

**Lion motif**

The Peugeot lion, 1970s

**PEUGEOT \( \text{\textcopyright 1980 Cycleurope} \)**

**PEUGEOT \( \text{\textcopyright 2010 Cycleurope} \)**

**Peugeot poster art**

Printing became an art form in the Belle Époque due to advances in color lithography. These early advertisements reflect Peugeot’s appeal to leisure and racing cyclists.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1882</td>
<td>Armand Peugeot builds the company’s first bicycle, a Grand Bi high-wheeler.</td>
</tr>
<tr>
<td>1886</td>
<td>Peugeot’s first production bicycles and tricycles are released for sale.</td>
</tr>
<tr>
<td>1890</td>
<td>Paul Bourillon wins the sprint World Championships on a Peugeot bicycle.</td>
</tr>
<tr>
<td>1890s</td>
<td>Peugeot offers prizes for the development of flying bicycles. The Wright brothers later use bicycle technology for the first powered flight.</td>
</tr>
<tr>
<td>1898</td>
<td>The Peugeot team’s “Foreign Legion” of anglophone riders—including Stephen Roche and Robert Millar—wins a series of major races, raising the global profile of professional cycling.</td>
</tr>
<tr>
<td>1901</td>
<td>Peugeot was losing ground to its competitors, as its policy of using only French-made components was proving expensive at a time when cheaper parts made in Asia allowed it to be undercut. The professional cycling team was disbanded in 1986, and soon after that, Peugeot ceased in-house production of bicycles. The Peugeot name lived on as a brand licensed to various companies around the world, but the once-great pillar of French bicycle manufacturing was no more.</td>
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### Peugeot

“Peugeot ... winning on the roads and tracks of Europe since 1894.”

**ADVERTISING SLOGAN, 1970**

bicycles and motorcycles—divisions separated. The P-10 bicycle, equipped with both front and rear brakes, wooden rims, Dunlop tires, and a tool kit, arrived in 1927. The P-10 designation remained in Peugeot’s range for decades, always signifying the top-of-the-line model.

Despite the disruption of World War II, during which Peugeot’s output was commandeered by the occupying German forces, production jumped from 162,000 bicycles in 1930 to 222,000 in 1935, by which time around 3,500 workers were employed in the Beaulieu factory.

New technology was introduced in the form of stainless-steel bicycle frames for the PX-10 road-racing model, which featured French-only components from companies such as Mafac, Simplex, and Stronglight.

The 1960s marked an upturn in the fortunes of the Peugeot brand, largely thanks to the high-profile successes of its professional cyclists. In 1963 the Peugeot team wore a new black-and-white grid-patterned strip, designed to be more visible in the monochrome photography and TV pictures used to report on the major races.

Roger Pingeon (Belgium), and Eddy Merckx (Belgium) all won major races for the team. By 1977 the Peugeot team had won the Tour de France ten times.

The brand’s strong performance continued into the 1970s, as Peugeot benefited from the US-led bicycle boom that saw lightweight, 10-speed European racing bikes become highly sought after. Global supply of Peugeot bicycles increased when the company moved production to a new state-of-the-art manufacturing plant in Romilly, near Paris, in 1972.

In 1983 Peugeot introduced the PY-10FC, one of the first mass-produced bicycles to use carbon fiber as a frame material. Claimed to be 30 percent lighter and eight percent stiffer than a steel-framed equivalent, it had carbon-fiber tubing bonded to aluminum lugs, with front forks and rear stays also made from lightweight aluminum. And technological innovation was not restricted to road cycling—in 1984 Peugeot released the VTT1, the first production mountain bike to be built specially for the French off-road market.

However, Peugeot was losing ground to its competitors, as its policy of using only French-made components was proving expensive at a time when cheaper parts made in Asia allowed it to be undercut. The professional cycling team was disbanded in 1986, and soon after that, Peugeot ceased in-house production of bicycles. The Peugeot name lived on as a brand licensed to various companies around the world, but the once-great pillar of French bicycle manufacturing was no more.

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Track and Road Racers

Spurred by increasing awareness of the value of exercise and interest in professional bike racing, bicycle sales boomed in the late 1960s. American manufacturers such as Schwinn began producing their own versions of lightweight racing bikes. Roadsters and beach cruisers were abandoned in favor of models with lightweight frames and drop handlebars. Bicycles continued evolving over the course of the decade, and the number of gears increased to seven, with the option of two or three chainrings in front. The average speed at races increased thanks to the availability of lighter components and narrower tires, as well as the improved reliability of the machines.

▼ Torpado 1960s

<table>
<thead>
<tr>
<th>Origin</th>
<th>Italy</th>
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<tbody>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>6-speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>28 in (70 cm)</td>
</tr>
</tbody>
</table>

First launched in 1908, Torpado soon earned a reputation for making highly capable performance racing bicycles. These were painted in signature pearly turquoise. Top models featured internally routed cables.

Seat cluster
Each lug was individually chromed for a polished finish. The seat stays featured scalloped top eyes, creating a carved-away appearance.

Rear derailleur
The Campagnolo Gran Sport rear derailleur was one of the more expensive components. The Campagnolo range was popular because it offered reliable shifting.

Front derailleur
Campagnolo founder Tullio Campagnolo named this part after his son, Valentino. The steel-based component shifted the chain from the big chainring to the smaller inner ring.

Brake levers and brakes
A classic example of a “non-aero” lever, the brake cable was routed externally rather than hidden under the tape. Often riders would hand-drill holes along the steel lever to reduce weight.

Torpado head badge
The metal head badge is made from brass or alloy, and features the Torpado logo set in front of a globe motif. Detail was picked out in enamel paint.
Cinelli Super Corsa 1968
Origin: Italy
Frame: Steel
Gears: 6-speed
Wheels: 28 in (70 cm)

With their high-quality Columbus Italian tubing, Cinelli bikes drew the attention of riders worldwide. Their beautifully crafted frames featured Campagnolo components. The Super Corsa was favored by the Italian Olympic team.

Hetchins Magnum Bonum 1962
Origin: UK
Frame: Steel
Gears: 6-speed
Wheels: 28 in (70 cm)

Hetchins was a high-end British manufacturer known for its racing and performance machines. It was famous for its curly lug patterns, which made the frames unmissable even from a distance.

Verhoeven Type Competition 1960
Origin: Germany
Frame: Steel
Gears: 5-speed
Wheels: 28 in (70 cm)

Constructed from Reynolds 531 steel, the Verhoeven was one of the mid-range road bikes available to amateur racers. Its cables were held in place by chrome clips. The gear-shifter was located at the end of the handlebar for ease of use when riding "in the drops.”

Condor Professional 1963
Origin: UK
Frame: Steel
Gears: 6-speed
Wheels: 28 in (70 cm)

Condor established a reputation for quality lightweight builds and many competitive racers aspired to ride its professional model. This London-based brand is one of few to have survived to the modern day.

Forward-facing dropout allows quick wheel change

Pale metallic blue is a classic Cinelli color

Front mudguard made from thin shaped metal

Cable stops brazed to the frame

Water bottle cage mounted with clips

5-speed cassette

Clincher-style tire with inner tube
Bicycles were manufactured on an industrial scale in many countries by the 1960s, such as at the Raleigh factory in Nottingham, England, which was capable of producing a new bike every minute. Despite being mass-produced on such a scale, and in modern factories, all bicycles of the era were still assembled by hand, with workers systematically adding the many components to the frame.
Track-Racing Bikes

Outwardly, bicycles built for 1960s track racing looked very similar to the machines of the early 20th century. On closer inspection, however, the quality, weight, and design had changed a great deal. Lower front ends created more aerodynamic riding positions. Stiffer frames handled better at high speed and resisted the lateral stress generated by riders accelerated from a standing start. Lugs became less ornate as complex construction used more material, which increased weight; by simplifying the lug pattern, builders could make lighter bicycles. The heavier leather and copper-rivet saddles went too, riders preferring plastic or lighter synthetic perches for their machines.

BERYL BURTON

Despite a childhood plagued by health problems, Yorkshire-born cyclist Beryl Burton went on to become one of the world’s most successful female cyclists of the 20th century. She not only won over 90 races and achieved seven world titles during her career, but also set the women’s 12-hour time-trial world record in 1967, which at 277.25 miles (446.20 km) still stands in 2016. She even handed fellow competitor Mike McNamara a candy as she passed him.

Beryl Burton was a household name in 1960s Britain and was awarded the OBE and MBE. She is seen here at a champions’ meeting in London. She died in 1996 at age 58.

Carlton Fixed-Wheel Racer 1962
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

Purchased by Raleigh in the 1960s, Carlton made affordable, good-quality bicycles. The frame featured complicated lug work similar to famous Hetchins designs. The mirrorlike finish was achieved by building the bicycle from chrome-plated Reynolds 531 steel tubing.

Viking Vitesse 1963
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

Viking shot to prominence when champion cyclist Beryl Burton rode this Vitesse to win Gold in the 1963 World Championships. Viking’s range of machines was aimed squarely at the competitive cyclist, and included variations for racing and track.
Faliero Masi Special 1968
- **Origin**: Italy
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

In his workshop beneath the Vigorelli velodrome in Milan, Italy, ex-pro racer Faliero Masi crafted bicycles that were stylish and truly exceptional. Although the machines were very expensive, Masi always had a long waiting list that included professional cyclists. He once proudly claimed, “I have no competitors, only copiers.”

Goldia Bahnrad 1965
- **Origin**: Switzerland
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

Offered with the ubiquitous Reynolds 531 tubing, Goldia bicycles were refined and elegantly finished. Always completed with the best components, the bicycles were ridden by world-class cyclists during the six-day track racing series. This machine had a Campagnolo Record crankset and wheels and a Cinelli bar and stem.

Tommy Godwin 1964
- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

A specialist track cyclist in the 1940s and 1950s, Godwin won double bronze for Great Britain in the 1948 London Olympics. He worked for bicycle-maker BSA and built many of his racing bicycles himself, so he could choose the best components.
Moulton Deluxe

A radical redesign that marked a departure from the traditional diamond-frame bicycle, the Moulton Deluxe boasted comfort, sturdiness, and practicality that belied its miniature stature. The archetypal F-Frame model in Moulton’s five-bike range at the 1962 launch, the Deluxe was designed as a utility bike capable of around-town urban use and fully loaded cycle touring. Its head-turning modern looks were intended to appeal to a new swath of bicycle users, including female riders.

SPURRED ON BY THE 1956 Suez Crisis, when car owners increasingly looked to the bicycle as a form of transportation because of high gas prices, British engineer Alex Moulton set about rethinking bicycle design for the modern age. His solution was to create the unisex F-Frame, which dispensed with the traditional top tube and seat stays in favor of a more rider-friendly, stepover frame design.

In common with all the original F-Frame Series 1 models, the Deluxe featured a horizontal steel beam projecting over the rear wheel for carrying luggage, since practicality was an integral part of the Moulton design concept. Smaller wheels with high-pressure tyres gave better maneuverability and less aerodynamic drag than standard-size bicycle wheels, and also lowered the Moulton’s center of gravity to improve its stability when riding with luggage attached. Rubber suspension on the front and rear forks counteracted the harsh ride of the small wheels.

The Deluxe continued to be produced until 1966 and was one of the bestsellers of the original Moulton range. Still in production today, the original Moulton design has been overhauled and refined numerous times, with models ranging from the separable-frame Stowaway and drop-handlebar Speedsix series to the AM Spaceframe design and lightweight New Series, all achieving a loyal following.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Origin</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer</td>
<td>Alex Moulton</td>
</tr>
<tr>
<td>Year</td>
<td>1962</td>
</tr>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>4-speed</td>
</tr>
<tr>
<td>Brakes</td>
<td>Caliper</td>
</tr>
<tr>
<td>Wheels</td>
<td>16 in (40 cm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 30 lb (13.6 kg)</td>
</tr>
</tbody>
</table>

**Tires** inflated to 60 psi (4 bar)

**Middlemores** vinyl-covered saddle

**Quick-release** seat-post lever

**Leather** luggage carrier

**Rear reflector**

**Rack-mounted** pump

**Rear suspension unit** with a rubber spring that adjusts to the weight of the rider

**Pivot** for rear-suspension arm
"An aesthetic object, the Moulton is a delight to use—flexible, responsive, and comfortable to ride."

NORMAN FOSTER, ARCHITECT

MOULTON DELUXE

107

Carrying handle located at frame’s center of gravity

Mudflap attached to front fender

Steel rim with chrome plating

Mount points for front rack

Steel frame assembled with pop rivets, then brazed for extra strength

Telescopic suspension system with both coil springs and Moulton-designed rubber spring

Mounted handle located on frame's center of gravity

Headlight bracket

Fully enclosed brake and gear cables

Adjustable, GB Hiduminium-branded, lightweight aluminum-alloy stem and handlebars

Moulton logo

The distinctive double-M logo was colored blue on all the early F-frames. Moultons were designed—and some were also made—in Bradford-on-Avon, UK.
THE COMPONENTS

The Moulton Deluxe featured higher-quality components than most other models in the Series 1 range. Aluminum parts were lighter than steel components, while a four-speed Sturmey-Archer hub gear offered extra power. Although the exact parts varied as the Moulton range evolved, customers could choose from a range of options, such as a front-wheel, hub-mounted dynamo to power a headlight.

1. Middlemores vinyl-covered saddle  
2. Seat-tube junction with quick-release lever for height adjustment  
3. Rack-mounted pump  
4. Sturmey-Archer FW four-speed hub gear  
5. White polythene chainguard  
6. Front fork with GB aluminum caliper brake  
7. Moulton-branded Adie bell  
8. Brazed cross tube with pop rivets  
9. Rubber “bellows” for front suspension  
10. Front-wheel fender with mudflap
Small-Wheeled Bicycles

The Moulton bicycle, introduced in the UK in 1962, was a revolutionary development of the classic bicycle, aimed at commuters. It quickly became another symbol of the Swinging Sixties, along with miniskirts and Mini cars, and several other manufacturers followed Moulton and brought out their own small-wheeled models. A key aspect of the Moulton was its rubber suspension, which meant it handled far better than versions made by other manufacturers. The small-wheeled bicycles became popular for short-distance riding in town. Some were also designed to be folded small enough that they could be transported in a car or bus.

- **Royal Enfield Revelation 1965**
  - **Origin**: UK
  - **Frame**: Steel
  - **Gears**: 3-speed
  - **Wheels**: 20 in (50 cm)

Probably the best of the non-Moulton small-wheeled bicycles, the Revelation had a rigid frame and the same wheelbase as a standard bicycle. It was supplied with front and rear racks.

- **Raleigh Twenty 1968**
  - **Origin**: UK
  - **Frame**: Steel
  - **Gears**: 3-speed
  - **Wheels**: 20 in (50 cm)

This bestseller addressed the problems of the RSW 16. Its larger wheels gave it a smoother ride and improved steering. It was sold in fixed and folding “Stowaway” versions.

- **Helkama Jopo 1960s**
  - **Origin**: Finland
  - **Frame**: Steel
  - **Gears**: 2-speed
  - **Wheels**: 24 in (60 cm)

The Jopo small-wheel featured a strong pressed-steel frame that was welded together for durability. The main down tube was hinged so that the bicycle could be folded easily. The seat and head-tube angles offered a comfortable ride.

- **Moulton Bicycle 1962**
  - **Origin**: UK
  - **Frame**: Steel
  - **Gears**: 3-speed
  - **Wheels**: 16 in (40 cm)

In 1962 Moulton launched its small-wheel bicycle. It was an overnight sensation, and triggered a small-wheeler boom that helped to reverse the postwar decline in bicycle sales. In 1967 the company was taken over by Raleigh, and in 1971 it launched this Mk3 model.
This was a small-wheeled bicycle manufactured by the Sears Co. of New York. It featured an unusual triple-tubed frame that could be split into two parts. The chainguard and chainring were made of pressed metal.

This bicycle, unlike the Moulton, did not have any suspension and relied on wide balloon tires for a soft ride, but they were slow and hard to pedal. The large rear holdall and hub dynamo-powered lighting were popular accessories.
Touring Bikes

From the late 1960s, demand for bicycles increased across Europe and the US. Manufacturers responded with a wider choice of models aimed at both the conventional adult market and younger riders; mass-production techniques enabled them to build good-quality bicycles at affordable prices. Component and accessory suppliers also increased the range of gears, brakes, stems, and hubs available to meet riders' needs. The use of light alloy components was commonplace, and improved performance and durability. The design of derailleur gears developed, and a 10-speed gear range became standard for touring bicycles.

**Bertin C37 c. 1968**

Origin: France
Frame: Steel
Gears: 10-speed
Wheels: 27 in (68 cm)

André Bertin was a successful professional racer who founded a bicycle manufacturing business that built a range of high-quality, lightweight cycles that could be adapted for touring. The C37 model featured open cable guides, a lugged frame, and alloy components.

**Puch Bergmeister 1960s**

Origin: Austria
Frame: Steel
Gears: 10-speed
Wheels: 27 in (68 cm)

This was a premium lightweight model aimed at sports tourers and club riders. In standard form, it featured a leather saddle, center-pull brakes, derailleur gears, and lightweight wheels. This example has been stripped down for racing.

**Edward O’Brien’s Tracker c. 1968**

Origin: UK
Frame: Steel
Gears: Single speed
Wheels: 26 in (65 cm)

Built by O’Brien’s of Coventry, this model was aimed at the teenage rider. It was designed to resemble a US speedway bike, and featured a dropped seat tube, chrome plated front-fork bracing, large-section tires, and high-rise handlebars.
### George W Stratton Mixte 1969

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>5-speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>27 in (68 cm)</td>
</tr>
</tbody>
</table>

This George W Stratton was a top-of-the-line bike. Its mixte-style frame meant it had twin tubes running from the headset to the rear axle. This provided a low stepover height while retaining the rigidity of the diamond frame.

### Dawes Galaxy 1969

<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>10-speed</td>
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<tr>
<td>Wheels</td>
<td>26 in (65 cm)</td>
</tr>
</tbody>
</table>

A lightweight touring bike introduced as a standard production model at a time when most touring bicycles had to be custom-made and were very expensive, this bicycle quickly became popular and is still in production.
The race, also known as the Ronde van Vlaanderen, or De Ronde, is, like the Paris-Roubaix, one of the cobbled classics. It is the biggest race in Flanders, the cycling-crazy region of Belgium that has produced more road-cycling champions than any other country.

INAUGURATED IN 1913 as a result of newspaper circulation wars, this famous race takes place annually in the spring. The 53rd Tour of Flanders, in 1969, is famous for the virtuoso performance of Belgium’s Eddy Merckx. He had already won many road races, but a win in this, his “home” race, had so far eluded him. It is hard to say which one of Merckx’s 500-plus victories in men’s professional cycling was his greatest, but this is definitely a candidate.

The race took place in April. Conditions were dry at the start, but there was a strong wind blowing across the route. The cyclists started by riding west from Ghent to the Belgian coast, then went inland to the Flemish Ardennes—the hills where the race is decided.

Eddy Merckx was backed by one of the greatest-ever teams—Faema. Races may have one winner, but team members work together to ensure that it is one of their members. Faema made the race hard from the start, using the coastal stretch to split the peloton. A large group formed at the front, which was reduced to 12 men, including Eddy Merckx and three of his teammates (Jos Spruyt, Julien Stevens, and Bernard Van de Kerckhove—all Belgians) after the first climb. Also in the group were Italians Felice Gimondi, Franco Bitossi, Michele Dancelli, and Marino Basso, two more Belgians (Frans Verbeck and Georges Claes), a Dutchman (Eef Dolman), and a British rider (Barry Hoban). Merckx set an incredible pace on all the hills, and one or two riders dropped away from the front group on almost every climb. When it was down to six riders, Eddy Merckx made his attack.

MERCKX BREAKS AWAY

With 43 miles (70 km) to go, Merckx hit the front on one of the final climbs and accelerated. At the summit, he was five seconds clear of the next rider, who was five seconds clear of the one behind him, and the gaps continued to grow on the way down. The group had been broken by Merckx’s acceleration, and it was several seconds before they were organized enough to chase him. But Merckx had the scent of victory and was pulling away fast. With 31 miles (50 km) still to go and fearing Merckx had made his move too early, his team manager drove alongside and asked him if he was sure he was doing the right thing. Merckx made it clear that he was.

The weather worsened throughout the day. By this stage it was pouring rain and the temperature had dropped to near freezing. But Merckx was oblivious to it. He crossed the finish line in Meerbeke 5 minutes and 36 seconds ahead of the next rider, Felice Gimondi. The following rider finished a couple of minutes behind Gimondi. Merckx never won the Tour of Flanders again.

Advertising the races

Posters advertise the annual race (left) and others promote riders. On the right is Merckx in 1972 wearing the world champion’s rainbow jersey.

“\nWhen Merckx attacked I kept thinking he’s got to ease at the top, but he didn’t, he just kept going faster.\n”

BARRY HOBAN, 1969

...
Merckx in his bid for victory

By the time Merckx began to break away from the main group, conditions were terrible, with driving rain making the cobblestone surface of the climb very slippery. But he brushed it all aside and rode hard all the way to the finish.

**KEY FACTS**

**RESULTS**

First: Eddy Merckx, Belgium
Second: Felice Gimondi, Italy
Third: Marino Basso, Italy

**THE ROUTE**

The route varies slightly from year to year. Eddie Merckx’s 1969 race began in Ghent and finished in Meerbeke, in eastern Belgium. In 2009 (the race shown in the map below), the Tour of Flanders race began in Bruges (Brugge in Flemish). Parts of the route are completely flat, but it includes a number of hellingen (hills)—indicated by the green triangles—which are where this race is won and lost. Each of the hellingen is short, but steep, and most have a cobblestone surface. The modern race still begins in Bruges, although it now finishes in Oudenaarde. In 2015 the riders covered a distance of 165 miles (264.9 km).

**Route map for the 2009 Tour of Flanders**

This race covered 161 miles (259.7 km) and included 16 hellingen. It was won by the Belgian rider, Stijn Devolder, who also won in 2008.
Children’s Bikes

In the 1960s, there was a huge difference between children’s bikes on either side of the Atlantic. Most British and European bikes designed for children were scaled-down versions of adult machines, and included everything from miniature racing bikes in Italy to junior Moultons in the UK. Americans had more disposable income than Europeans, which is reflected in the styling of the children’s bicycles built for the US market. The banana-seat-bike craze started in 1963 in the US and dominated for the rest of the decade, but these bicycles were not popular in UK and Continental Europe. This changed with the launch of the Chopper bicycle at the end of the decade. It was designed for the American market but not heavily promoted in the UK and Europe until 1970.
**Sears Spaceliner 1966**

- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

The Sears Roebuck mail-order company had Spaceliners built for them by the Murray Ohio Manufacturing Co. The bikes had a distinctive fake fuel tank that looked like the number “7.” The Spaceliner was available in adult and children’s versions.

**Schwinn Lemon Peeler 1968**

- **Origin**: US
- **Frame**: Steel
- **Gears**: 5-speed
- **Wheels**: Front 16 in (40 cm), Rear 20 in (50 cm)

Schwinn’s Sting-Ray, launched in 1963, was the market leader in the banana-seat-bike craze. In 1968 Schwinn followed this up with the Krate series, which included the “Lemon Peeler.” This clearly influenced Raleigh’s Chopper design.
As the amount of traffic increased in towns and cities during the 1960s, bicycle safety, especially for the young, became a concern. In the UK, the Cycling Proficiency Test was first launched in 1947 and gradually introduced across the country. Children were given lessons in how to ride safely, usually at their school, after which there was a test. The program still exists and is now called Bikeability.
Leisure Bikes

The postwar decline in European cycle commuting led manufacturers to concentrate on the adult leisure market. Colorful sporty roadsters replaced robust but antiquated utility bicycles. British three-speed racers had impressed the American troops stationed in the UK during World War II and, as cruisers went out of fashion, large consignments of these bikes were exported to the US. Professional club cyclists still bought high-quality lightweights, but many more people purchased cheaper, mass-produced “English racers.” By the end of the 1960s there was a “10-speed” boom in the US, with drop-handlebar sports bikes selling in huge numbers.

**Triumph Palm Beach 1964**
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: 26 in (65 cm)

**Hercules 2000 1960s**
- **Origin**: Germany
- **Frame**: Aluminum
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

Designed for everyday cycling, the Palm Beach was built by Raleigh and sold under the Triumph brand, which had long been associated with the manufacture of motorcycles. It featured a two-tone color scheme, a Sturmey-Archer three-speed hub, and dynamo-powered lights.

Sold under license as a Hercules 2000, this bicycle was originally produced by Klaue-Bremse in the 1950s as their HK-Rad. It featured a cast-aluminum cross frame, and a unique, patented internal rear hub brake developed by German engineer Hermann Klaue.
After President Eisenhower’s doctor promoted cycling for health and fun, American adults became interested in bikes again. They wanted lighter machines and, by the 1960s, Western Auto Supply Co. had slimmed down their cruisers, removing the iconic fake fuel tank.
The 1970s
NEW WAVES
The 1960s had seen the bicycle’s fortunes revived by an influx of mostly youthful riders, who took to two wheels in greater numbers than ever before. A decade later, many of those who had been hooked by the thrills of the wheelie bike began to shape the bicycle into still more forms and variations, as a new wave of creative energy gave rise to the sports of BMX (bicycle motocross), mountain-biking, and triathlon (cycling, running, and swimming).

Although riding customized bikes around motocross-style tracks occurred in multiple places and at different times around the world, the movement that gave rise to BMX sprang to life in the US. Among the teenagers who experimented on BMXs was Scot Breithaupt, a motocross rider who began to hold contests on full-size motocross tracks in California in 1970 for youngsters riding modified wheelie bikes. At around the same time, a group of enthusiasts began riding modified 1930s Schwinn cruisers, which they christened “clunkers,” down off-road trails in Marin County, CA. Their development of bicycles that could withstand the punishment of steep downhills and bumpy terrain gave rise to the fat-tired machines that became known as “mountain bikes” from the late 1970s.

Companies sprang up to cater to these new forms of cycling. US start-ups led the way, from Trek’s high-quality tourers and Gary Fisher’s early mountain bikes, to Cannondale and Klein, who innovated with aluminum frames. Low-cost Japanese components and bicycles also broadened the choices available to cyclists.

“You won’t believe what kids can do with bicycles! They do everything grown-up motocross racers do, except they do it with pedal power.”

PROMOTIONAL POSTER FOR YAMAHA GOLD CUP BMX RACE, LOS ANGELES, 1974
Early 1970s Racers

Improvements in the quality of materials available to frame-builders and manufacturers resulted in some of the finest traditional racing bicycles. Europe remained the heartland for frame-building and components through the 1970s, with the British company Reynolds leading the way for frame tubing and the Italian manufacturer Campagnolo for essential components and drivetrains. Many Italian and French brands, too, gained popularity with discerning cyclists. However, being able to stroll into a bike shop and walk out with a top-end machine was still some years off: quality racers still had to be constructed by hand and each component specified and installed by a skilled mechanic.

### Jacques Anquetil 1970
- **Origin**: France
- **Frame**: Steel
- **Gears**: 10-speed
- **Wheels**: 28 in (70 cm)

A five-time Tour de France winner in the 1960s, Anquetil was a big name in the racing world and his bikes were popular with recreational riders. The bikes used affordable Huret gears and featured fashionable Mafac center-pull brakes.

### Carlton John Atkins Pro Cyclo-Cross 1971
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 6-speed
- **Wheels**: 28 in (70 cm)

British cyclist, John Atkins, was the leading cyclo-cross rider of the era and is still considered the best British cross racer of all time. His Carlton was made using Reynolds tubing, with generous clearances for his favored Clement Grifo tubular tires.

### Carlton Truwell-Campagnolo Team Bike 1971
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 12-speed
- **Wheels**: 28 in (70 cm)

Raleigh acquired Carlton bicycles in 1960. Its Special Bicycle Development Unit continued making bikes under the Carlton name. This model had stylish “shot-in” stays and a Campagnolo Record groupset with bar-end shifters to minimize reach for fast shifting.
**Early 1970s Racers**

**Peugeot 1972**
- **Origin:** France
- **Frame:** Steel
- **Gears:** 12-speed
- **Wheels:** 28 in (70 cm)

This amateur sports model, with a steel mixte frame design, had a half-chromed fork. It lacked brazed-on extras, so its owner had to clamp the bottle cage to the frame. It featured Simplex front and rear derailiers.

**Endorsement**
The name of a great cycling hero helped sell bicycles. Jacques Anquetil was nicknamed “Monsieur Chrono” for his ability to ride against the clock.

**Mafac center-pull brakes**
These brakes made it easier to keep the blocks clear of the rim, provided it stayed true.

**High-flange hub**
These hubs were fashionable because riders believed they made for a sturdier wheel. They certainly had greater lateral strength, which was good for track sprinters.

**French Wolber tires with low-profile knobby tread**

British bicycle manufacturer, Ken Ellerker, produced this machine for grass track racing—a popular sport in northern England—at his Hull bike shop. The bicycle featured a Reynolds 531 double-butted track frame, cycle-cross tires, and a chrome finish.

**Ellerker Grass Racing Bicycle c. 1975**
- **Origin:** UK
- **Frame:** Steel
- **Gears:** Single speed
- **Wheels:** 28 in (70 cm)

This amateur sports model, with a steel mixte frame design, had a half-chromed fork. It lacked brazed-on extras, so its owner had to clamp the bottle cage to the frame. It featured Simplex front and rear derailiers.

**Wide tires for smooth ride**

**High-flange hubs**

**French Stronglight double crankset**

**Campagnolo track crankset and pedals**

**Mafac center-pull brakes**
Late 1970s Racers

From the beginning of the 1970s through the end of that decade, there was little change in the evolution of top-end, high-quality bicycles. Apart from an experiment or two with titanium frames, steel remained the manufacturers’ metal of choice for all models—from traditional roadsters to the most expensive racing bikes. As roads improved, however, the geometry of the bike developed, resulting in livelier handling and a stiffer frame. The number of sprockets on the freewheel also went up from five at the beginning of the decade to six by the end.

△ Sesia 1976

<table>
<thead>
<tr>
<th>Origin</th>
<th>Italy</th>
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<tbody>
<tr>
<td>Frame</td>
<td>Steel</td>
</tr>
<tr>
<td>Gears</td>
<td>12-speed</td>
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<tr>
<td>Wheels</td>
<td>28 in (70 cm)</td>
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The Sesia was a classic Italian custom-made bike with a steel frame, elegant cutout lugs, and chrome stays. The side-pull brake calipers were the Flash model by Italian brand Modolo.

△ Pinarello Special 1976

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<th>Origin</th>
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<tr>
<td>Frame</td>
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<td>Gears</td>
<td>12-speed</td>
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<tr>
<td>Wheels</td>
<td>28 in (70 cm)</td>
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Giovanni Pinarello of Treviso made sought-after racing bicycles built with Columbus tubes and understated finishes. Campagnolo’s Super Record crankset was the pros’ choice.

△ Mercier Service des Courses 1976

<table>
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<th>Origin</th>
<th>France</th>
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<tbody>
<tr>
<td>Frame</td>
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<td>12-speed</td>
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<td>Wheels</td>
<td>28 in (70 cm)</td>
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The Mercier Services des Courses was an iconic 1970s racing bicycle, and this example was similar to the bikes ridden by Joop Zoetemelk and his Gan-Mercier team in the 1975 Tour de France. The French-built frame used Reynolds S31 tubing and forks, with stylish cutout long-point lugs. It featured a full Campagnolo Nuovo Record groupset with Mavic rims, and would not have looked out of place in the pro peloton.
Bicycle frames made of titanium are stronger and lighter than their steel counterparts. Titanium has inherent shock-absorbing properties, and is resistant to fatigue and corrosion, so frames do not need to be painted, allowing the beauty of the finished metal to shine through. The first titanium bicycle frames were produced in the 1960s by British company Speedwell, which manufactured them in small numbers. By 1974, Teledyne of the US was producing them in larger quantities. After the collapse of the Soviet Union, Russia released large amounts of titanium, which contributed to a substantial drop in price.

Most titanium frames are assembled using tungsten inert gas (TIG) welding. This is necessary because it protects the weld from atmospheric pollution, which can weaken it.

<table>
<thead>
<tr>
<th>Schwinn Paramount Titanium 1970s</th>
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<tr>
<td><strong>Origin</strong></td>
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<td><strong>Gears</strong></td>
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<td><strong>Wheels</strong></td>
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Schwinn’s Paramount models had been the US firm’s flagship racing bikes since the 1930s. This model was pared down for lightness with a Huret Jubilee rear derailleur and Campagnolo chainset with intricately drilled chainrings.

**BIRTH OF TITANIUM FRAMES**

Belgian bike retailer Kessel marketed its own Eddy Merckx models as the great champion was coming to the end of his racing career. The bicycles were built with Reynolds double-butted tubes and fork, and a Campagnolo groupset.

![Bicycle frame with Huret Jubilee rear derailleur and Campagnolo chainset]
Great Manufacturers

Colnago

One of the most prestigious names in cycling, Colnago combines the master craftsmanship of its founder with more than 60 years of racing success at the highest level. Ernesto Colnago experimented with frame geometry, aerodynamic designs, and titanium and carbon-fiber materials long before rivals saw their potential.

FROM ITS ORIGINS in the workshop of the young mechanic Ernesto Colnago, who built frames for amateur racers, to its current position as a premium cycling brand, Colnago has always made bicycles for the performance market. Ernesto Colnago's grounding as a frame-builder and mechanic for professional cycling teams imbued his company with a strong ethos of functionality, innovation, and elegance from the very beginning.

Ernesto began his career in 1945 at the age of 13 as a welder's assistant at the Gloria cycle factory in Milan. An avid amateur racer, he accrued a succession of wins before breaking his leg in a crash after sprinting to fourth place at the Milano–Busseto race in 1951. Ernesto's resulting immobility led to a period in which he built replacing the company's original eagle logo. The ace symbolized the blooming of the spring flowers by the roadside of the Milan–San Remo spring classic, which had just been won by Italian Michele Dancelli on a Colnago bike—an all-Italian victory

“...the whole thing revolves around my love for bicycles...”

ERNESTO COLNAGO

for Colnago's expertise grew quickly. Ernesto was soon working with the Italian national team, and in 1960 one of his bicycles was ridden to a gold medal at the Rome Olympics.

The 1970s cemented Ernesto's reputation as a master craftsman of racing bicycles of the highest quality. Colnago's distinctive ace-of-clubs motif was developed in 1970, that led Ernesto to joke, “I had an ace up my sleeve that day.”

The following year Eddy Merckx joined the Molteni team and brought his racer's instinct to the Colnago design and construction process. Fastidious in his scrutiny of every measurement and component of the bikes he rode, Merckx partnered with Ernesto to take Colnago bicycles to the cutting edge of cycling technology. In return, his profile as the most successful cyclist of the era—and arguably, of all time—also lent further prestige to the Colnago brand.

While Colnago was founded on racing success, the survival of the business depended on appealing to recreational cyclists and amateur racers. Colnago offered “off-the-rack” racing bicycles in around 15 sizes—far more than most other companies—but could build made-to-measure bicycles for customers too. Extra details, such as chromed

Creative tools

Ernesto Colnago, seen here in 1960 in the Cambiago workshop with brother Paolo, deploys artistry and a mechanic's touch.

Hour Record ride

Although the bicycle ridden by Merckx for his 1972 record was branded with the Belgian's name, it was custom-made by Colnago.

Carbon revelation

Italian Franco Ballerini won the Paris–Roubaix race twice, in 1995 and 1998, on Colnago's flagship carbon-fiber race bike, the C40.
lugs, subtle ace-of-clubs cut-outs on the frame, and “pantographed” engravings on components, soon drew a loyal following.

The 1980s saw innovations come thick and fast. First Colnago launched the Master racing bicycle, built with custom-drawn, crimped steel tubes—giving an indented tube profile rather than the standard circular or elliptical cross section—to increase frame stiffness. In 1987, Colnago produced a collaboration with Ferrari: a concept bike with a car-style gearbox instead of derailleurs, and hydraulic brakes. Two years later the Ferrari relationship gave rise to the C35, a hand-wrapped, carbon-fiber monocoque bicycle that was 20 years ahead of its time.

Colnago has a long history of sponsoring professional racers. It entered its most celebrated phase of team sponsorship in the 1990s when it became bicycle supplier to the Mapei team. This period coincided with the Colnago C40, the first all-carbon-fiber bicycle frame to be ridden in the punishing conditions of professional cycling. The Mapei riders found that, particularly in races over cobblestones—a terrain in which short-travel suspension forks were popular at the time—the carbon-fiber frames produced a noticeably more comfortable and stable ride than their steel counterparts.

As Colnago entered the 21st century, the realities of global manufacturing forced a change in the long-held policy of construction solely on Italian soil. From 2005, mid-range Colnago bicycles were made in Taiwan by the A-Team, a grouping of Taiwanese firms including Giant and Merida. Yet Colnago’s creative center and design heartbeat remains at its Italian headquarters in Cambiago, where all of its top-end bicycles are still produced.
Touring Bikes

The fitness boom in the US and beyond influenced cycling with new models aimed at those who wanted to ride for fun and exercise. The traditional touring scene remained strong, especially in Europe, where hand-built custom frames continued to be the only choice for a quality load-bearing machine. Innovation of parts and materials, and multiple bike types, were some years off, but by the end of the 1970s the nascent mountain bike scene in the US was creating waves that would finally drag the cycling world into the modern era. Touring bikes would benefit greatly, in time. Until then, however, racing-bike frames were commonly adapted for touring purposes, and equipped with optional or aftermarket mudguards, water-bottle holders, and luggage racks.

Schwinn Varsity Sport 1972

- **Origin**: US
- **Frame**: Steel
- **Gears**: 10-speed
- **Wheels**: 27 in (68 cm)

The Varsity was a versatile American sports and commuting bike. The handmade steel frame, with lugless front end, was equipped with fenders, rack, dynamo lights, and additional horizontal brake levers. Gear levers were clamped to the stem and could be operated without taking hands off the bar.

Val de Loire 1970

- **Origin**: France
- **Frame**: Steel
- **Gears**: 5-speed
- **Wheels**: 26 in (65 cm)

This charismatic French touring or city bike had wheels with balloon (ballon) tires, giving a cushioned ride. The brake levers were fixed to the center or underside of the bars, and there were dynamo-powered front and rear lights.

Drivetrain

At the front, this model featured one-piece cranks with double chainrings and guard, with a derailleur at the rear.
"Sports touring" was a term aimed at the recreational rider who might ride only on weekends for short periods. Schwinn’s answer was a hand-finished chromoly frame with many unbranded alloy parts resulting in a machine weighing some 30 lb (14 kg). Handlebar-mounted gear-shifters offered fast thumb shifts.

Schwinn Sport Tourer 1976

- **Origin**: US
- **Frame**: Steel
- **Gears**: 10-speed
- **Wheels**: 27 in (68 cm)

Jack Taylor Tour of Britain 1979

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 12-speed
- **Wheels**: 28 in (70 cm)

Jack Taylor Cycles was a well-respected manufacturer of touring bicycle frames in the UK, and was noted for its finely crafted lugs. This model featured oval-section front forks and Campagnolo gears. It was suitable for road racing or touring, when equipped with fenders and racks.
Raleigh Chopper

One of the style icons of the 1970s, the Raleigh Chopper brought motorcycle-inspired cool to a generation too young for motorized two-wheelers, injecting irreverence and exuberance into a previously conservative area of bicycle design. Drawing directly from the US craze for Easy Rider-style bikes, such as the Schwinn Sting-Ray, Raleigh repackaged the wheelie bike for the UK market and then exported the Chopper design around the world to many of its overseas markets.

WHEN THE FIRST RALEIGH CHOPPER children’s bikes appeared in UK bicycle shops in late 1969, the effect was dramatic. With its hot-rod-inspired looks and components, from the “ape-hanger” swept-back handlebars to the curved “sissy bar” seat rail, the Chopper was so popular that it rapidly sold out of its initial release of 500 units—a sign of the success that was to follow over the next 10 years.

Just as the Schwinn Sting-Ray had done in the US six years earlier, the Chopper struck a chord with the youth bicycle market in the UK and elsewhere. Raleigh already had some experience of the wheelie-bike craze—its North America division brought out the Rodeo (1966) and Fireball (1968) in an attempt to take on Schwinn, whose Sting-Ray dominated the sector. Many of the Chopper’s design features first appeared on these two models, including the top-tube-mounted gear-shifter and padded vinyl seat.

The feature that set the Chopper apart was its straight-tubed frame, which differed from the curving cruiser-style tubes of its US precursors. In other ways it shared the precarious riding characteristics of most other wheelie bikes, with the rear-slung saddle and small front wheel combining to place the rider’s weight over the rear wheel, making wheelies and skittish front-wheel handling inevitable.

### SPECIFICATIONS

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<td>Designer</td>
<td>Ogle Design/Alan Oakley</td>
</tr>
<tr>
<td>Year</td>
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<td>Frame</td>
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<tr>
<td>Weight</td>
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“Chopper—a machine inspired by the screaming rubber and roaring fantails of the dragster racing bike.”

RALEIGH CHOPPER AD, 1970

First used in the early 1900s, the Raleigh logo’s heron motif came from the family crest of company chairman Frank Bowden.
THE COMPONENTS

The Chopper was available in several different models and component packages during the course of its 10-year production run. Single-speed, hub-gear, and derailleur-gear versions were released, while a drop-handlebar model—the Sprint—was also introduced. The biggest overhaul of components was for the MK II Chopper in 1972, which featured a redesigned frame to counter the MK I’s tendency to suffer snapped seat tubes.

Mountain biking became a global phenomenon in the 1980s, but had its roots in the previous decade. It was pioneered by a group of thrill-seeking cyclists in California, USA, who rode their modified “klunkers” on the dusty trails of Mount Tamalpais in Marin County. These pioneers included Joe Breeze, shown here (far right) on his hand-built Breezer #1, the first modern, all-new bike designed specifically for the sport. Almost 40 years on, Breezer bikes are still available.
BMX Bikes

BMX is an abbreviation of “bicycle motocross.” The modern form of the sport as recognized today began in California in the late 1960s. BMX was an instant hit with the youth of the day, and by 1974 there were 130,000 BMX bikes in California alone, and 100 dedicated tracks. The bikes were simple, with squat diamond frames often reinforced with gussets, and 20-in (50-cm) wheels with wide tires. For strength, manufacturers welded the fork blades directly to the steerer tubes. They used one-piece cranksets. BMX bikes soon spread around the world. A sport that many commentators thought would be a flash in the pan, BMX is still popular 50 years later.

### Huffy Thunder
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20in (50 cm)

American maker Huffman produced many bikes under the huffy name. Early 1970s' versions still showed the influence of Sting-Ray design, and had a sturdy steel frame to sustain jumps and stunts.

### Webco Monoshock
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20in (50 cm)

Webco Inc. was an early BMX bike maker that operated out of Venice, CA between 1974 and 1980. Some of its bikes had distinctive five-spoke, Motomag magnesium alloy wheels made by Skip Hess.

### BMX Suspension

The Monoshock was developed for dirt racing, not stunts, and the suspension was designed to help the bike cope with harsh off-road conditions.
**Schwinn Sting 1978**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in (50 cm)

The Sting was a premium hand-built BMX bike and one of Schwinn’s top-of-the-line models until the 1980s. The “tri-oval” chromoly frame was unique to Schwinn, with oval-shaped ends at the joints for greater strength. The bike was available with red or blue accessories.

**Skyway 1974**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in (50 cm)

Skyway was best known for producing BMX wheels, having introduced its eponymous five-spoke Tuff Wheel in 1974. However, the company also developed and manufactured complete bikes up until the late 1980s.

**Mongoose Motomag 1970s**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in (50 cm)

Having started out producing Motomag wheels, Skip Hess diversified by making entire BMX bikes under the Mongoose brand name. At its peak, the company made about 600 frames a day at its factory in Chatsworth, CA. The Motomag model featured Hess’s trademark wheels and was produced from 1975 until 1981.
Great Races
Ironman Triathlon 1979

The Ironman triathlon—a 2.4-mile (3.8-km) swim, followed by a 112-mile (180.3-km) bicycle ride, then a full 26.2-mile (42.2-km) marathon run without a break—started as a friendly challenge between a small group of people in Hawaii.

There is a lot of debate about when the first swim–cycle–run event took place. There was a well-documented run–cycle–swim event in Mission Bay, CA, in 1976, while there were three-sport events in France as long ago as the 1920s. These events consisted of the three triathlon disciplines, but the order varied. The first recorded swim–cycle–run sequence took place in Marseilles in 1927, and may have been the first-ever triathlon as we know the sport today.

The idea for the Ironman Triathlon came about in Hawaii in 1977, when a group of friends were chatting at the awards ceremony following the round-Oahu running race (Oahu is the third largest of the Hawaiian Islands). The friends had different sporting interests and were debating who were the fittest: swimmers, cyclists, or runners. US Navy Commander John Collins suggested they have a race that combined three established endurance challenges: the Waikiki Roughwater Swim, the Oahu Bike Ride, and the Honolulu Marathon.

The Oahu Bike Ride is in fact 115 miles (185 km) long, but to make the start of the cycle...
“Sometimes ignorance is bliss. It never occurred to me something could be difficult or challenging or whether I’d win or lose.”

TOM WARREN, 1979

race coincide with the end of the swim and the finish dovetail with the start of the marathon, Collins cut its distance to 112 miles (180.25 km). The Waikiki Swim is 2.4 miles (3.9 km) and a marathon is 26.2 miles (42.2 km), and so that is how the distances were decided upon. The name Ironman then came about because Collins wrote some basic rules that ended with: “Whoever finishes first, we’ll call him the Ironman.”

THE EARLY RACES

On February 18, 1978, 15 men started the first-ever Ironman and 12 of them finished. The winner was American Gordon Haller, with a time of 11 hours, 46 minutes, and 58 seconds.

The following year, 1979, saw 50 athletes sign up to take part, but the race was postponed for a day because of bad weather. The seas were still very rough the following day, so only 15 competitors were willing to go ahead, including former national cycling champion Lyn Lemaire, the first woman to compete. Tom Warren, a fitness enthusiast from San Diego, led out of the swim stage by four minutes. It took him only four minutes to change into his cycling kit, then he really stretched his lead. Warren was 21 minutes clear by the end of the cycle leg. He had a big margin to play with during the marathon, but that in itself caused him problems. “Knowing I’d won and had only to go through the motions was difficult at one point,” he explained. He also said that he had not found the shift between disciplines such a problem, because it was something he had been doing for years. At the time Warren was swimming 5 miles (8 km) and running 13 miles (21 km) a day, and cycling whenever he could.

Warren won the 1979 event, cutting half an hour off Haller’s 1978 time. Lemaire finished fifth overall in a time of 12 hours 55 minutes. Speaking after the race, Warren said: “There’s normally a tailwind around the back of the bike course, so I pushed the first third really hard in anticipation of that tailwind, but when I got around the back side the wind had shifted, so it was just hard all the way…”

The Ironman grew fast, and in 1981 it moved to the Big Island of Hawaii, where it has been held since. Owned by the World Triathlon Corporation (WTC), the Hawaii Ironman is its world championship, with qualifying events around the world.

KEY FACTS

RESULTS
First: Tom Warren, US
Second: John Dunbar, US
Third: Ian Emberson, US

THE MODERN COURSE

The Ironman begins with the swim section in Kailua Bay. The transition between swimming and cycling and the final marathon stage are in Kailua-Kona.

The map here shows the modern cycling route, rather than the original round-Oahu route. After cycling, the athletes have to climb up Palani Road to the Queen Ka’ahumanu Highway to run their marathon—an extreme test of fitness.

Coastal cycle route
The athletes ride out and back along the Queen Ka’ahumanu Highway—the Hawaii Island Belt Road. This route is very exposed and windy, with no shelter; the conditions can be extremely hot and humid.
The 1970s witnessed the biggest boom in bicycle purchases since the 1890s. Across the globe, people were hit by pedal-powered fever, and it resulted in a new wave of bicycle designs, some more successful than others. The traditional roadster remained popular, but the boom welcomed all sorts of bicycles of different shapes and wheel sizes. The 1973 oil crisis saw an increase in the cost of driving a car and made bicycle commuting a more attractive option. Low-priced town bikes, which were increasingly manufactured in Asia, offered inexpensive transportation for recreation and exercise.

**Motobécane Tourer Women’s Model 1974**

- **Origin**: France
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (65 cm)

French manufacturer Motobécane enjoyed a good reputation as a builder of lightweight, quality racing bikes. During the bicycle boom of the 1970s, the brand stretched its wings and capitalized on the market’s desire for easy, fuss-free town bicycles, which it sold at very reasonable prices.

**Mercier Step-through Tourer Women’s Model 1970s**

- **Origin**: France
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 26 in (66 cm)

This classic women’s town bike sold by the thousand to riders in suburbia. The Loop featured a basic steel frame with tubes joined by lugs. A chainguard stopped the rider’s pants from getting caught in the chainrings. The rear wheel powered dynamo lights.

**Hercules Auto Velo 1973**

- **Origin**: Germany
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 16 in (40 cm)

Designed to help industrial workers get from A to B, this was an early version of a folding bike. The bicycle had a robust chromoly-steel frame and a quick-release lever hinging the down tube. The fold method was clunky and did not catch on.

**Zweirad-Union AG Victoria 1970s**

- **Origin**: Germany
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 16 in (40 cm)

Sold in many West German department stores, the Victoria had a crude fold system: a single lever was released and the frame hinged back on itself. The chopper-style handlebar gave an upright riding position, and a rack over the back wheel was provided for cargo.
The BSA Shopper mobilized people in British towns during the 1970s and sold by the thousand. Scaling down the bike to a simple frame with a short, low down tube and small wheels made it easy to maneuver and just light enough for day-to-day errands.

Cavallo, Italian for "horse," was a bicycle based on the movement of a jockey. The riders placed their feet on platforms and moved their body up and down, activating the hinged frame and driving power to the rear wheel. German manufacturer Hercules produced the Cavallo, but needless to say, the new system of bike riding did not catch on—adults were too shy to use it in public.
Children’s Bikes

Traditionally, children’s bicycles had been smaller versions of adult roadsters. The 1970s saw a new craze for children—the chopper bike. American manufacturer Schwinn was the first to mass-produce the bike, and by the mid-1970s Raleigh had several chopper models to its name. The popularity of the style was overwhelming. For the next two decades, children played around on nothing else but these pedal-powered, miniature, motorbike-inspired bikes, which evolved into the 1980s’ must-have bike, the BMX.

Schwinn Sting-Ray Apple Krate 1973

- **Origin**: US
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: Front 16 in (40 cm), Rear 20 in (50 cm)

With its central gear-shifter, motorcycle-style seating, and unique front suspension, the Schwinn Sting-Ray was coveted by many North American children. Ads proclaimed the Sting-Ray was “the bike with sports-car styling.” Britain’s version of the bicycle was the Raleigh Chopper.  

- **Front suspension**
The Sting-Ray featured unique front suspension. At the front, a steel coil spring attached at the headset, while hinges on the front fork absorbed the shocks from the front wheel.

- **Rear derailleur**
Schwinn made its own components for its bicycles; the rear derailleur used rollers or jockey wheels to keep the chain in line while a sprung mechanism pushed the chain up and down the rear cogs.

- **Rear caliper brake**
A dual-pivot, side-pull caliper brake was one of the most popular bicycle brake designs. One arm pivoted at the center and the other at the side, pulling the brake pads onto the rim.

- **Gear-shift**
The Apple Krate was unique because it was one of the first bikes to have 5-speed gearing. The chrome-finished lever, with its larger rubber handle, looked similar to a car gear lever.

- **Front drum brake**
Braking at the front was controlled by a large aluminum drum brake in the center of the wheel. When the brake cable was pulled, it pushed two pads in the drum against the braking surface.
After the launch of the Raleigh Chopper, manufacturers around the world followed suit, creating their own chopper bikes. The Bonanza, inspired by the US television series, had dynamo-powered front and rear lighting and a drum brake.

British designer Alex Moulton famously created the rubber suspension system for the Mini motorcar. His revolutionary bikes used rubber springs and small wheels, and became incredibly popular, spawning several models, including bicycles for children.

After the launch of the Raleigh Chopper, manufacturers around the world followed suit, creating their own chopper bikes. The Bonanza, inspired by the US television series, had dynamo-powered front and rear lighting and a drum brake.

At the top of every child’s Christmas list in the UK when production started in 1976, the Grifter was heavily influenced by motocross bikes of the time, with its chunky off-road tires, extra-wide handlebar, and even a throttle-style, 3-speed grip twist shifter.

Flandria was known for its prowess in making first-class adult racing bikes; aspiring young champions could also get a slice of the action with Flandria’s range of smaller road bikes. These models were often equipped with a coaster brake and dazzling white tires.

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The 1980s

BICYCLE EVOLUTION
By the early 1980s the experimentation and ingenuity of the “clunker” riders was beginning to bear fruit, yielding a new breed of bicycle that would take the world by storm. Stronger, straight-tubed frames, custom-brazed from chromoly steel, replaced the organic curves of the modified cruisers of the 1970s, which had proved unable to withstand the bumps and drops of off-road riding. With the addition of 18-speed derailleur gears and knobby tires, the mountain bike was so named because of its ability to be ridden on harsh off-road terrain.

Away from the California cottage industry that created the mountain bike, a new trend was spreading among road and track cycling: aerodynamics. Due to the slowing effect of wind resistance—which at speeds of more than 15 mph (24 km/h) is estimated to require 90 percent of a rider’s energy output to overcome—reducing and shaping the front profile of rider and machine had long been recognized as a holy grail that could increase speed while reducing effort.

In 1984, aerodynamic improvements were among the factors that enabled Italian Francesco Moser to smash the 14-year-old Hour Record of Eddy Merckx, which many had considered unbreakable, by 4,521 ft (1,378 m). Because he was riding a low-profile bicycle with a cow-horn handlebar and carbon-fiber disk wheels, and wearing a skinsuit, helmet cover, and overshoes made from Lycra, Moser’s ride heralded a new era in scientific training and equipment refinement that would shape the development of cycling.

“I’m lucky that mountain biking wasn’t around when I was 20, because I wouldn’t have won the Tour de France. It’s my kind of sport.”

GREG LEMOND, THREE-TIME WINNER OF THE TOUR DE FRANCE

Key Events

- **1980** Pioneers Gary Fisher and Charlie Kelly sell off-road bicycles under the company name “MountainBikes,” using frames built by Tom Ritchey.
- **1981** Specialized commissions received for first mass-produced mountain bike, the Stumpjumper (see pp.162–65), based on Tom Ritchey’s frame design.
- **1982** Race Across America (RAAM) is held for the first time, covering 2,968 miles (4,777 km) from Santa Monica, CA, to the Empire State Building in New York City.
- **1982** Shimano realizes the potential of the mountain bike, and so releases the Deore XT groupset for off-road use.
- **1984** Women’s cycling events appear at the Olympic Games, held in Los Angeles, for the first time.
- **1984** US sales of mountain bikes reach one million.
- **1986** Pete Penseyres wins RAAM using aero-bars—a handlebar extension developed for triathlons.

△ An unfair advantage

Moser’s bicycle gave him such an advantage during his Hour Record that the organizers, the Union Cycliste Internationale, banned it.

△ Moulton mountain bike

In 1988 the small-wheeled Moulton Space-Frame AM-MTB full-suspension mountain bike is launched.

△ The LA Summer Games of the Olympics in 1984 included three road races and five track events.

- **1989** Greg LeMond wins the Tour de France on the final day’s time-trial, using the aerodynamic gains of aero-bars, a teardrop-shaped helmet, and a disc rear wheel to overhaul a 50-second deficit.
Early 1980s Racing Bikes

The 1980s was the final decade of the traditional all-steel bicycle, with frame-builders using the same working practices as previous generations. Tubes were lugged or lugless, both employing skilled brazing techniques. Everything from the choice of the paint to the wheels was specified by the customer, and the hubs, spokes, and rims were assembled by a trained wheel-builder. Derailleur gears operated by friction levers remained the norm, but the number of available gears went up to eight sprockets on the multiple freewheel by the end of the 1980s.

 Fuji Racer c. 1980
- **Origin:** Japan
- **Frame:** Steel
- **Gears:** 10-speed
- **Wheels:** 28 in (70 cm)

An example of Japanese bicycle-making at its finest, the Fuji had a beautifully crafted steel frame and finely pinstriped chrome lugs. The home-grown Sugino chainset was drilled for lightness. The bike had quality SunTour gears and brakes.

 Colnago Superissimo 1982
- **Origin:** Italy
- **Frame:** Steel
- **Gears:** 12-speed
- **Wheels:** 28 in (70 cm)

With its eye-catching chrome lugs, fork, and rear dropouts, the Colnago Superissimo had all the hallmarks of classic Italian style. Its Campagnolo groupset and Vittoria tires made it a very desirable bicycle.

 Raleigh Team c. 1980
- **Origin:** UK
- **Frame:** Steel
- **Gears:** 12-speed
- **Wheels:** 28 in (70 cm)

Modeled on the Dutch TI-Raleigh team cycles, the team replica machines built at the Nottingham factory for retail could almost pass for the real thing. Both were handcrafted from Reynolds tubing, with Campagnolo gears; the customer version had Nuovo components.

 CBT Italia c. 1980
- **Origin:** Italy
- **Frame:** Steel
- **Gears:** 12-speed
- **Wheels:** 28 in (70 cm)

The Italian bicycle by Construction Bicycles Tardivo (CBT) was the ultimate racing machine. The frame was made with Columbus tubes, the groupset by Campagnolo, and the bars from Cinelli. It had a chrome fork crown and delicate cutouts on the head-tube lugs.
**Vitus 979 Dural 1985**

- **Origin**: France
- **Frame**: Aluminum-magnesium alloy
- **Gears**: 12-speed
- **Wheels**: 28 in (70 cm)

Introduced in the late 1970s, by the mid-80s the Vitus 979 was a proven race winner under Irish pro Sean Kelly. The aluminum-magnesium alloy frame was much lighter than steel and the bike was equipped with French Mavic components.

**Colnago Speciale Competizione 1983**

- **Origin**: Italy
- **Frame**: Steel
- **Gears**: 12-speed
- **Wheels**: 28 in (70 cm)

Italian legend Ernesto Colnago added his own creative touches to the classic lines of the steel diamond frame. The bike had engraved chainrings and stem, and a bottom bracket shell cut out in the shape of the Colnago cloverleaf.
Late 1980s Racing Bikes

The introduction of different materials to make bicycle frames, combined with exciting new technology, heralded the start of a new era in cycling. At the start of the decade, racing cyclists' only option was to commission an artisan-built steel frame. By the end, the choice had expanded to factory-built frames made from materials as diverse as magnesium and carbon fiber. The days of the universal lugged-steel frame, assembled by individual craftsmen, were coming to an end with astonishing speed.

Frank Kirk demonstrated the potential of magnesium to revolutionize bike-frame manufacture—casting frames took a fraction of the time needed to make a frame from steel tubes. Light and stiff, magnesium failed to catch on.

Stelbel 1980s

- **Origin**: Italy
- **Frame**: Steel
- **Gears**: 16-speed
- **Wheels**: 28 in (70 cm)

Using welding techniques learned from his father while working on airplane fuselages, Stelio Belletti made the first Italian tungsten inert gas (TIG) welded frames. Joining tubes without lugs made for a lighter bicycle, and gave the builder more freedom in frame and fork design.
Claimed to be the world's first all-carbon-fiber bicycle frame, the Kestrel 4000 was aimed at the burgeoning triathlon market. Designed as a fast road bike for solo rides, the Kestrel was ahead of its time in employing an aerfoil down tube and seat stay, and a rear-wheel-hugging seat tube.

The Rossin road frame, named for the shop where it was built, was made with Italian Columbus tubes using a combination of smooth fillet-brazing and lugs. The influence of aerodynamic design was seen in Campagnolo's C-Record oval seat post, radical Delta center-pull brakes, and Cinelli's titanium handlebar stem.

Typical of the low-profile time-trial bikes of the time, the Concorde was designed to position the rider very low down to increase aerodynamic efficiency. The disc wheel and the centrally CBT mounted gear levers on the down tube also improve airflow.
CANNONDALE WAS FOUNDED on a single guiding principle: that products offering tangible, real-world advantages over existing technologies will succeed. This insight came to co-founder Joe Montgomery in 1970 as he watched a cyclist struggling under the heavy load of a backpack while pedaling uphill. In 1971, Montgomery, along with Ron Davis and Jim Catrambone, launched their enterprise. The first year also saw their first product—a lightweight, two-wheeled trailer that could be attached to the rear of any bicycle, allowing the rider to haul heavy loads with minimal effort.

From the beginning, the small company did things differently. In the early years, it catered chiefly to the outdoor luggage market, with cycling equipment as its focus. Everything was designed and made in a makeshift workshop above a pickle shop in Wilton, CT. The Metro-North train station near the workshop, Cannondale, gave the company its name. Its products soon gained a following, as the Cannondale brand began to be associated with quality, durability, innovation, and the latest in design and technology.

The company’s steady growth meant that it soon outgrew the pickle-shop loft, and a production plant was opened in Bedford, PA, in 1977. “Handmade in the USA” was a badge of honor for Cannondale products, and local production allowed tight control over quality, since the company could respond quickly to market changes.

Cannondale spent 12 years developing outdoor products before, in 1983, it announced its arrival as a full-fledged bicycle company with the ST-500 tourer. Cycle-touring equipment had come to dominate its output, so it was fitting that its first bike was a touring machine. A glossy, TIG-welded aluminum frame, with an oversized, large-diameter down tube and ovalized chain and seat stays, ensured that the ST-500 immediately stood out from the crowd of lugged, narrow-tubed steel frames. The use of aluminum was far from a publicity stunt: because of its lighter weight, it could be rolled into larger-diameter tubes, thereby creating a frame that was stiffer than steel, and would not rust. Oversized aluminum tubing also produced an immediate transfer of the rider’s energy to the rear wheel, as compared to the softer, springier qualities of a steel bicycle frame.

The following year, Cannondale introduced a road bike—the SR-900, equipped with 12-speed Campagnolo Nuovo Record gears—and the SM-500 mountain bike, which had 15-speed Shimano Deore XT gears. These lightweight, advanced bicycles were aimed squarely at the higher echelons of the market. In the years that followed, tandem, BMX, hybrid, and triathlon/time-trial bikes were all added to Cannondale’s stable. As well as building its own frames (protected by a US patent), from 1993 the company designed and produced a range of components.

From the late 1980s through the 1990s, mountain biking proved to be the field in which Cannondale’s technological improvements won the strongest following. In 1991, one of the first rear-suspension mountain bikes, the Elevated Suspension Technology (EST), was introduced. The EST frame was paired with a Girvin Flexstem handlebar-mounted shock unit. In 1992, Cannondale replaced the Flexstem with a redesigned frame that featured the Headshok suspension fork. This was unique in that it paired rigid fork blades with a telescoping shock that ran on precision needle bearings in the frame’s head tube. The design was lighter, better at absorbing bumps, and offered...
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1971</td>
<td>Cannondale is founded by Joe Montgomery, Jim Catrambone, and Ron Davis in Wilton, CT.</td>
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<tr>
<td>1983</td>
<td>The company produces its first bicycle, the aluminum ST-500 touring bike.</td>
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<td>1989</td>
<td>Cannondale Europe is founded in the Netherlands for distribution and sales.</td>
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<td>1991</td>
<td>Cannondale introduces its first full-suspension mountain bike, the EST.</td>
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<tr>
<td>1992</td>
<td>Headshok front suspension is released.</td>
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<td>1994</td>
<td>The Coda Magic crankset, with an external-bearing bottom bracket, is produced 10 years prior to its industry-wide adoption.</td>
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<td>1995</td>
<td>A short-travel version of the Headshok suspension unit is added to a road bike.</td>
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<td>1997</td>
<td>While leading the Tour de France for three days, Mario Cipollini rides a customized yellow Cannondale race bike to match his leader’s jersey.</td>
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<td>2000</td>
<td>Lefty suspension fork launched.</td>
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<td>2001</td>
<td>Cannondale introduces the BB30 bottom bracket, a large-diameter aluminum spindle design that is both lighter and more resistant to flex under the rider’s pedal strokes. It soon becomes an industry standard.</td>
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<td>2003</td>
<td>After a bold but ill-fated attempt to expand into high-performance motorcycles and all-terrain vehicles (ATVs), Cannondale seeks bankruptcy protection and is acquired by one of its creditors, Pegasus Partners.</td>
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<td>2004</td>
<td>“Legalize my Cannondale” campaign is launched to promote the carbon-aluminum-framed Six13 road bike, which weighs less than the legal minimum for a competition road bike. Cannondale is acquired by Dorel Industries, a sports-recreation conglomerate; investment in product development, testing, and manufacturing continues. In 2009, production moves to Taiwan.</td>
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<tr>
<td>2008</td>
<td>The SuperSix EVO Hi-MOD 2016 is released. With exceptional stiffness-to-weight, it is named “Best Bike in the World” by Germany’s Tour magazine.</td>
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<tr>
<td>2011</td>
<td>Following industry trends, Cannondale introduced a carbon frame in 1997, but, true to type, added innovation. The Super-V Raven mountain-bike frame featured an aluminum skeleton surrounded by a carbon-fiber skin. This combination was used in 2004 for the Six13 road bike, which was so light that weights were added to meet UCI regulations, inspiring the “Legalize my Cannondale” campaign. Today, the “Handmade in the USA” tag is gone, but Cannondale continues to thrive.</td>
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**Italian flair**

The exuberant, irreverent personality of Mario Cipollini, seen here riding the CAAD3 in 1997, was a perfect match for Cannondale’s colorful marketing style.

![Headshok logo](https://example.com/headshok.png)

**Headshok logo**

Grabbing the headlines

Damiano Cunego promotes Cannondale’s “illegal” Six13 model at the 2004 Giro d’Italia.

—

More precise steering than anything else at the time. When mated with the new Delta-V rear-wheel suspension, this provided not only a comfortable ride, but also a mountain bike that could be ridden aggressively fast over steep, rocky terrain.

In 1994, Cannondale co-sponsored one of the most successful professional mountain-bike teams ever. The team won a host of women’s and men’s cross-country and downhill races on Cannondale bicycles, providing vital product feedback. One of the flagship products to come from such testing was the Lefty, an evolution of the Headshok that moved the shock absorber from the frame’s head tube into a lightweight, single-bladed telescopic fork.

Cannondale moved into pro road cycling sponsorship in 1997 with the elite Italian team Saeco. This marked the first time an American brand had sponsored a European road team, and the first time such a team had raced on oversized aluminum frames. Any doubts about aluminum’s place in the peloton were soon erased, with Sacco’s Ivan Gotti winning the Giro d’Italia on a bright red Cannondale, and superstar sprinter Mario Cipollini winning two stages and wearing the race leader’s *maillot jaune* (yellow jersey) for four straight days in the 1999 Tour de France.
Aerodynamic Time-Trial Bikes

Inspired by the radical machines that had taken track racing by storm in the late 1970s, road Time-Trial bikes began to feature plunging front ends with a cut-down handlebar. By the mid-1980s, low-profile TT bikes were being ridden by amateurs hungry to copy their heroes in races against the clock. Reduced frontal area was soon followed by fairing or disc wheel, and by the end of the decade, bicycles also featured aerodynamic triathlon bars.

French road time-trial machines with radical designs gained mass exposure thanks to Renault-Elf riders such as Laurent Fignon and Greg LeMond. The flat-tubed Delta featured a low-slung handlebar and a short wheelbase.

Italian style and engineering came together in the Laser, one of the prettiest aerodynamic track machines. Designed by Antonio Colombo in response to new rules that outlawed nonstructural aerodynamic aids, its Columbus tubes were shaped to pass through the air with minimum turbulence.

**Rear derailleur design**
The 1985 Shimano Dura-Ace derailleur set a new standard by combining two inventions from other makers—dual spring-loaded pivots and a slant parallelogram cage.

**Gitane Delta E 1983**
- **Origin**: France
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

French road time-trial machines with radical designs gained mass exposure thanks to Renault-Elf riders such as Laurent Fignon and Greg LeMond. The flat-tubed Delta featured a low-slung handlebar and a short wheelbase.

**Cinelli Laser Track Bike 1984**
- **Origin**: Italy
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: Front 26 in (65 cm), Rear 28 in (70 cm)
AERODYNAMIC TIME-TRIAL BIKES

Rossin Time Trial Bicycle 1990s
- Origin: Italy
- Frame: Steel
- Gears: 16-speed
- Wheels: Front 26 in (65 cm), Rear 28 in (70 cm)

Founded in 1974, Mario Rossin quickly became known for innovative aerodynamics, and by the end of the 1980s Rossin was building bikes for many professional teams. The TT was a typical lo-pro with aero frame, and was equipped with Campagnolo’s Croce d’Aune groupset.

Schwinn Lo-Profile Time Trial 1987
- Origin: US
- Frame: Steel
- Gears: 6-speed
- Wheels: 28 in (70 cm)

This bike is an example of Schwinn’s forays into cutting-edge design. This machine’s steel frame had a faired-in section behind the seat tube to allow air to flow around the back wheel. The carbon bars and chainring were also ahead of their time.

Bottecchia TT 1989
- Origin: Italy
- Frame: Steel
- Gears: 16-speed
- Wheels: Front 26 in (65 cm), Rear 28 in (70 cm)

The Bottecchia frame was built with Columbus air tubing, and featured a steeply angled top tube and steel fork. This machine was similar to one ridden by Greg LeMond in the 1989 Tour de France, although his had Mavic components.

Aero components
It is questionable how much difference this aerodynamic Dia-Compe BC46 brake made to the bicycle’s speed, but it was certainly stylish.

Aero versus air-in
Aerodynamics were restricted when a slot was needed to get to the tire valve; the gap could be covered with adhesive tape to restore airflow.
Bicycles built to race around banked tracks resist design changes more than any other type of bike. Pared down to the absolute minimum, they have no need for brakes or anything other than one carefully chosen gear. Comfort is irrelevant on smooth wooden boards or concrete, and the wheels can be bolted into place since flat tires are rare. Weight is also not critical because there are no hills to climb. However, though this was largely the case in the early 1980s, advances in technology began to alter how track bikes evolved aerodynamically as the decade progressed.

GT American Olympic Team Pursuit Bike c. 1980
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: Front 24 in (60 cm), Rear 28 in (70 cm)

GT’s distinctive triple-triangle frames featured seat stays running almost parallel to the down tube. These Olympic team bikes were also radically designed to place the rider in the most extreme position. This example has been fitted with a non-original riser handlebar unsuitable for track use.

Moser Hour Record Bike 1984
- **Origin**: Italy
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

In 1984, Italian champion Francesco Moser broke the World Hour Record, completing 31.78 miles (51.15 km) in the hour. This radical-looking bike used disc wheels for the first time in such a record attempt. Under the swooping looks was a conventional steel frame designed to rotate the bike into a streamlined tuck on purpose-made bullhorn bars.
**Dave Marsh Motorpace c. 1985**

- **Origin**: UK
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: Front 26 in (65 cm), Rear 28 in (70 cm)

The high speeds of dernys (motorized bicycles) inspired the Dave Marsh, a highly specialized bike with reversed steel forks. The handlebars were braced to resist high gravitational forces on the banking at speeds well over 40 mph (64 km/h).

**Bianchi Pista c. 1980**

- **Origin**: Italy
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 28 in (70 cm)

Handcrafted from Columbus tubing and painted in the Italian maker Bianchi’s trademark celeste pastel, this Pista bike stood out with its kinked top and subtly curved seat tubes. Designed for speed, it was ideal for kilometer time trials and pursuit riding.
Specialized Stumpjumper

Although its fat tires and functional looks won few plaudits for aesthetics, the Specialized Stumpjumper was revolutionary in bringing off-road cycling to the masses. One of the first factory-built mountain bikes in the world, the Stumpjumper was a performance machine that helped pioneer this new form of cycling. Thanks to production in Asia, it was cheaper than the handmade bikes that dominated the new sport that had sprung up in California in the early 1980s.

THE STUMPJUMPER BICYCLE was the product of the business sense and cycling expertise of Mike Sinyard, the founder of Specialized Bicycle Components. Sinyard began importing high-quality road-bicycle components from Europe in 1974 and selling them to consumers, retailers, and manufacturers in the US. After supplying steel tubing to some of the pioneering frame-builders—including Tom Ritchey—who created the first purpose-built mountain bikes, Sinyard saw the potential of this new breed of bicycle. Basing the Stumpjumper around the design of the Ritchey-built MountainBike, he arranged factory production in Japan to achieve a lower retail price and higher volume.

Affectionately known as the “Stumpy” by its fans, the Stumpjumper was popular from the start—the first 125 frames sold out just six days after going on sale in 1981. Although lacking the elegance and refinement of its groupset-equipped road-cycling cousins, and crude in comparison to the lightweight, suspension-assisted machines that mountain bikes have evolved into, the early Stumpjumper was groundbreaking in its opening up of the great outdoors to more two-wheeled, off-road adventurers than ever before.

With components selected for durability and function, the Stumpjumper featured 15 gears for tackling steep, loose climbs and fast descents, while Specialized’s own Stumpjumper tires provided traction for a variety of surfaces.
"It's not just a bicycle, it's a whole new sport."

STUMPJUMPER ADVERTISEMENT, 1982

- BMX pedals for improved grip
- Touring crankset from French firm TA
- TIG-welded frame made from Special Touring Series chromoly
- Handlebars and stem modeled after BMX and motorcycle designs
- SunTour Mighty gear levers mounted on the handlebars
- Mafac cantilever brakes—normally found on tandems—to accommodate the wider tires
- Specialized logo

To give the brand connotations of the specialized, dedicated frame-builders in Italy, Mike Sinyard named his company Specialized.
THE COMPONENTS

The Stumpjumper's ungainly looks were partly due to the lack of purpose-made components for a sport that had not yet been named—mountain bikes were known as “clunkers” in the early 1980s. Parts were supplied by 11 different manufacturers, from French firm Mafac’s cantilever brakes and Italian motorcycle company Tommaselli’s brake levers to Japanese component specialist SunTour’s derailleurs and cogs.

1. BMX-style Specialized stem  
2. Lower head-tube junction with Specialized alloy headset and chromoly-steel, biplane-style fork  
3. Tommaselli Racer motorcycle brake lever and SunTour Mighty gear lever on Specialized IV steel handlebar  
4. Mafac tandem cantilever brake on Araya alloy rim  
5. SunTour aRX front derailleur and TA Cyclotourist crankset  
6. MKS BMX-7 pedal  
7. SunTour aRX rear derailleur and 5-speed cogs, ranging from 14 to 28 teeth
Early Mountain Bikes

In the 1970s, pre-war balloon-tired bikes were modified and ridden around northern California’s Marin County. Known as “Klunkers,” these led to the design of bikes specifically for off-road use. The first mountain bike, the “Breezer,” was created by designer and frame-builder Joe Breeze in 1977. Tom Ritchey followed in 1978, supplying frames to businessman Charlie Kelly and track racer Gary Fisher. Kelly and Fisher assembled their frames with components from cyclo-cross racing bikes and motorcycles and sold them through their company, MountainBikes. In 1981 Mike Sinyard’s company, Specialized, had 125 frames—the StumpJumper—manufactured in Japan. Although they were met with reserve and viewed by many as simply an adult’s BMX, the bikes nonetheless sold out. Frame-builders of all backgrounds began producing mountain bikes.

### Cannondale SM900 1987
- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 15-speed
- **Wheels**: 26 in (65 cm)

Cannondale made its first mountain bike frame in 1984. This SM900 showcased its signature large-diameter aluminum tubes and smooth welds. With a sloping top tube and high bottom bracket for good ground clearance. An agile bike, it used SunTour’s first indexed mountain-bike gears—XC 9000.

### Highpath Engineering 1985
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 12-speed
- **Wheels**: 26 in (63 cm)

A short, high, steep frame geometry meant the rider’s weight was centered—advantageous for all-day use rather than cross-country or downhill racing. The bike features 650B wheels, a wide bottom bracket, and wide hubs, as well as custom-made hub brakes with shoes that self-regulate for pad wear.

| Frame-mounted shoulder carrying strap |
| Nokian Speed Hakkapeliitta 650B tires with tungsten studs |
| Bottom bracket with custom press-fit bearings and grease injection port |
| Roller cam brakes, designed by Richard Cunningham of WTB in 1982 and licensed to SunTour |
| Hite-Rite saddle dropper by Joe Breeze and Josh Angel |
| Two-piece tubular steel cranks and bottom bracket by Bullseye |
| Hub brake |

Bespoke “Swing Cam” hub brakes with external cooling fins, sealed bearings, and long-action arms, activating brake shoes that self-regulate for pad wear.
**Earl Y Mountain Bikes**

**Trimble Inverse-4 1989**
- **Origin**: US
- **Frame**: Carbon fiber with aluminum inserts
- **Gears**: 21-speed
- **Wheels**: 26 in (65 cm)

constructed from a composite of 30 percent carbon fiber and 70 percent fiberglass. lighter parts used six plies, with up to 24 plies for higher-stress areas. The Trimble’s excellent stand-over height and elevated chainstays provided flex while also eliminating chain slap and allowing chain removal without tools.

**Overbury’s Pioneer 1988**
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 21-speed
- **Wheels**: 26 in (65 cm)

Fillet-brazed by frame-builder Andy Powell, this bike used Reynolds and Columbus steel tubing. A short, steep, rear triangle, and shallow head angle provided excellent climbing ability and quick, stable handling, leading to success in UK races.

**TBG Kona Explosif 1988**
- **Origin**: Canada
- **Frame**: Steel
- **Gears**: 21-speed
- **Wheels**: 26 in (65 cm)

Kona started in 1988, using design input from successful racer Joe Murray and frame-builder Paul Brodie. The sloping top tube and resulting smaller frame triangles provided greater stand-over height and a lighter stiffer frame, and all first-year models featured the “splatter” paint finish.

In 1988, Moulton Bicycles, UK, introduced what is arguably the first production full-suspension mountain bike, the AM-ATB off road bicycle. It was based on their steel AM Space-Frame and featured leading link suspension at the base of the front forks, and pivoting rear forks at the rear. While its 20-in (50-cm) wheels were ideal for general off-road cycling, they were less suitable for rough terrain.

**Moulton AM-ATB**
- **First-year Kona Project Two straight-blade, non-tapered fork**
- **Trimble Inverse-4 1989**
  - **Reinforcing sleeve on top of seat tube**
  - **Seat stay-mounted Shimano U-brake**
  - **12.5-in (32-cm) high bottom bracket for ground clearance**
  - **Team Issue tiger stripes and color-fade paintwork**
  - **Internal cable routing**
  - **Bonded aluminum dropouts, seat tube, head tube, and bottom bracket inserts**

- **Grease port on bottom bracket for easy maintenance**
- **Tange Prestige double-butted, TIG-welded frame**
- **Seat stay-mounted Shimano U-brake**
- **12.5-in (32-cm) high bottom bracket for ground clearance**
- **Team Issue tiger stripes and color-fade paintwork**
- **Internal cable routing**
- **Bonded aluminum dropouts, seat tube, head tube, and bottom bracket inserts**
Bikes for Leisure and Touring

As proof that the traditional European cycling scene did not have a monopoly on innovation, touring bikes from America began to branch out, favoring Japanese components and gears with ultrawide ratios inspired by the burgeoning mountain-biking scene. Steel's versatility and vibration-absorbing properties meant that it remained the material of choice for frames. Manufacturers could tailor their bicycle frames to suit sporty riders with lighter tubes and tighter angles, or add threaded inserts for extra racks and bigger frame clearances to accommodate the fatter tires required by long-distance travelers. For the ultimate handmade touring bike, however, the small specialist frame-builder was still the only choice for the discerning tourist.

### Raleigh Alyeska 1980s
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 18-speed
- **Wheels**: 28 in (70 cm)

This Nottingham-built steel tourer had chromoly main tubes and very relaxed geometry. The Alyeska was a comfortable, stable ride, with more than adequate room to add mudguards and fat tires. A triple chainset with alloy Japanese parts offered plenty of reliably efficient gears.

### Trek 520 1983
- **Origin**: US
- **Frame**: Steel
- **Gears**: 18-speed
- **Wheels**: 28 in (70 cm)

Trek USA's 520 had more of an all-around specification than a dedicated touring bike. It featured a solid Reynolds frame with a triple chainset that could tackle even the steepest hills in its lowest gear, and an Avocet saddle designed for a comfortable ride.

### Schwinn Voyageur 11.8 c. 1980
- **Origin**: US
- **Frame**: Steel
- **Gears**: 14-speed
- **Wheels**: 28 in (70 cm)

This rare chrome version of the sought-after Voyageur featured a frame handmade in Japan with Cro-Mo steel tubes, elegant lugwork, and a chrome fork with a generous rake. The Shimano gears, Sugino Super Maxy chainset, and SR bars were also Japanese.
**CJ Wallis Audax c. 1985**

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<tr>
<th>Origin</th>
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<tr>
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<td>Steel</td>
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<tr>
<td>Gears</td>
<td>21-speed</td>
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<tr>
<td>Wheels</td>
<td>28 in (70 cm)</td>
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Long-distance Audax bikes predated sportives and reflected the all-day challenge of combining comfort with performance. The CJ Wallis featured Reynolds tubing with elegant lugs, a triple chainset, cantilever brakes, and mudguards. This bicycle has an updated MTB drivetrain.

**Mercian King of Mercia 1980s**

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<tr>
<td>Wheels</td>
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Mercian Cycles of Derby, England, were renowned for their custom touring frames. The King of Mercia was hand-built using various grades of Reynolds tubing. Optional extras included rack mounts and hardware for water bottles. This bicycle has an updated MTB drivetrain.

- Brooks leather saddle— a touring favorite
- Ergonomic handlebars for comfort
- Long-reach rear derailleur for wide ratios
- Peg for top-tube-mounted pump
- Tan leather Brooks saddle
Experimental Design

Since the earliest days of bicycle production, new designs, materials, and technologies have been used in attempts to improve efficiency. There have been failures along the way, but also discoveries, and bicycles have been built using everything from wood to plastics, aluminum, magnesium, and carbon fiber. Frames have been made with single and multiple tubes and die-cast metals. The rider’s energy has been transmitted by chains, driveshafts, and rubber belts. Gearing has developed from single to 21-speed using derailleurs, multiple chainrings, and planetary hub gears.

Experiments with Plastic

Bicycle manufacturers thought plastic bicycles could be produced cheaply and would resist corrosion. However, cycle dealers, fearing difficulties with repairs, largely rejected the use of plastic. Some concept bikes, like the French Speelo plastic racer, were never even put into production for fear of negative reactions from the cycling press.
### Bickerton Folding Bike c. 1970

| Origin: UK | Frame: Aluminum | Gears: 3-speed | Wheels: Front 14 in (35 cm), Rear 16 in (40 cm) |

This folding bicycle had a lightweight aluminum-alloy frame, which folded using a central hinge. The handlebars swung down into the center, making it very compact and easy to carry; the folded bicycle could fit into the trunk of a Mini. Over 600,000 were built.

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### Strida 1987

| Origin: UK | Frame: Aluminum | Gears: Single speed | Wheels: 16 in (40 cm) |

This bicycle was aimed at city riders and commuters. Its simple construction, belt drive, and one-click folding mechanism meant it was simple to store and maintain, as well as light and easy to carry.

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### Itera Plastic Bike 1980-83

| Origin: Sweden | Frame: Plastic | Gears: 3-speed | Wheels: 27 in (68 cm) |

The Itera represented a Swedish attempt to shift bicycle-building into injection-molded plastic. The radical design suffered many development problems; it was very heavy, and did not handle well. The project ceased after only three years.

---

### Airframe c. 1980

| Origin: UK | Frame: Aluminum | Gears: 3-speed | Brake: 16 in (40 cm) |

This bicycle was built in small numbers until 2008. Made using narrow tubing arranged in triangles, it unfolded when the seat was pulled up and the rider’s weight forced the wheels apart, bracing the bottom tubes at the axles.
The craze for bicycle motocross, or BMX, was at its highest during the early 1980s. There was a period when seemingly every child and teen wanted a BMX bike. Riders performed incredible freestyle stunts for large groups of spectators—such as this one in Germany—and entered races. The latter consisted of several riders completing a course (often on bare earth) that comprised dips, ramps, and banked turns. Freestyle BMX, on the other hand, had more in common with skateboarding.
Freestyle BMX Bikes

By the 1980s, BMX had become an established sport with multiple disciplines and national federations. The International BMX Federation was founded in 1981, and in 1982 it hosted the first World Championships in Dayton, OH. BMX boomed along with skateboarding. Freestyle BMX saw riders perform daredevil tricks at every opportunity; they even used empty swimming pools to practice in. Meanwhile, dirt and tarmac tracks for BMX racing popped up on farms and in parks as the popularity of the sport went global.

### Hutch Trickstar II 1980s

- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in (50 cm)

Anodized in red, this was one of the first freestyle stunt bikes to appear on the market. Popular with riders, it had a twin top tube and small chainstay platforms, which gave the rider multiple areas to stand on.

### GT Performer 1985

- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 20 in (50 cm)

This 4130 chromoly steel freestyle frame was often sold with Mag three-spoke wheels that looked good, but lacked strength. Most of the components were GT branded. The Performer was produced for 15 years.

### Frame strengthening

For extra resilience, the seat tube passed through the top tube. The junction was further reinforced with a gusset.

### Tangle-free cabling

The front brake cable fed through the headset, and the rear brake cable through a gyro mounted on the steerer tube so that the rider could perform bar spins without the cables becoming tangled.
FREESTYLE BMX BIKES

Trick platform for stunts and grabs

Large rear pegs for stunts

Chromoly steel handlebars with "mushroom" rubber grips

Wide platform pedals with pins for grip

Brake cables run outside the frame on cheaper model

Haro FSX 1987
- Origin: US
- Frame: Steel
- Gears: Single speed
- Wheels: 20 in (50 cm)

The Haro was built using an affordable trimoly steel frame with an unconventional "two-into-one" top tube that created a standing platform. Bob Haro started out making custom number plates for top BMX racers. Haro's freestyle team dominated the sport for many years.

Schwinn Predator Freeform Pro 1987
- Origin: US
- Frame: Steel
- Gears: Single speed
- Wheels: 20 in (50 cm)

The Predator was a high-end freestyle stunt bicycle with features such as chromed standing platforms and dual position pegs. The front brake cable ran within the fork blade so that the cable did not touch the tire. The bicycle had wheels with 48 spokes to make it more robust.

GT Vertigo 1988
- Origin: US
- Frame: Steel
- Gears: Single speed
- Wheels: 20 in (50 cm)

The Vertigo was an entry-level bicycle that had a freestyle-design frame with a chromoly steel down tube and fork. It had stunt pegs and a gyro that allowed the handlebars to be spun 360 degrees without tangling the brake cables. The name "GT" derives from the name of company co-founder Gary Turner.
Leisure Bikes

A new style of bicycle began to creep into the market by the late 1980s—the all-terrain bike. To many new riders, the traditional leisure roadster seemed to be old-fashioned, heavy, and inefficient, and, although cheap, made for a sluggish riding experience. Instead of adding the usual gimmicks, manufacturers turned back to traditional wheel sizes and borrowed design cues from the new-style all-terrain bikes to create what would later be termed a “hybrid.” Bikes remained well-equipped for everyday errands and included mounts for racks and mudguards as well as tires suitable for mixed terrain. They offered a relaxed, upright riding position.

Raleigh Caprice 1985

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: 26 in (65 cm)

Raleigh was the main British bike brand of the 1980s, and their leisure bike catalog had a large range of models that all came equipped with racks, fenders, and kickstands. The Caprice had an added attachment for a basket.

Schwinn Tri-Wheeler 1980

- **Origin**: US
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: Front 20 in (50 cm), Rear 16 in (40 cm)

The Tri-Wheeler was an experiment that did not pay off for Schwinn. It was designed as a shopper with a rack at the rear, but was difficult to steer around tight corners and took up more space in a garage compared to a two-wheeler.

Trussardi 1983

- **Origin**: Italy
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: 28 in (70 cm)

This was an unusual folding bike designed for World War II soldiers. It was reintroduced in the early 1980s by Italian fashion brand Trussardi, which added saddlebags and leather details.

Raleigh was the main British bike brand of the 1980s, and their leisure bike catalog had a large range of models that all came equipped with racks, fenders, and kickstands. The Caprice had an added attachment for a basket.
**Raleigh Cameo 1987**

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 3-speed
- **Wheels**: 24 in (60 cm)

A traditional roadster-style bike, the Cameo was a brute that was very heavy but extremely affordable. It was constructed of plain-gauge steel and featured plastic grips, saddle, and chainguard.

**Condor Cadet 1988**

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 8-speed
- **Wheels**: 28 in (70 cm)

Offered in both women’s and men’s frames, the Cadet was a high-spec bicycle for everyday commuting with one eye on luxury. The sporty, lightweight frame was very close in style to a touring bicycle.
Great Races
Tour de France 1989

This annual round-France cycle race was introduced in 1903, but the 1989 event had the closest finish ever: only eight seconds separated the first- and second-place riders after 2,041 miles (3,285 km) of racing over 21 stages.

GREG LEMOND WAS THE FIRST AMERICAN to win the Tour de France, and now that Lance Armstrong has been stripped of his seven victories—having admitted to using performance-enhancing drugs—LeMond is also the only American to have won it. In all, he won three Tours, but it was this, his second, victory in 1989, that was the most dramatic and the least expected. LeMond had incredible talent. He had won the 1986 Tour de France at the age of 25, having finished third and second in the two previous events. The way he won in 1986 made it look like he could win the Tour for several more years. However, in late March 1987, LeMond was accidentally shot while on a hunting trip in California. Pellets of lead shot entered his lungs, liver, and kidneys. He lost 60 percent of his blood, and came within 15 minutes of dying. Thirty-six pellets had to be left in his body because it was deemed too dangerous to remove them. But while LeMond faced a long road to recovery, he was determined to race again.

FIT TO RACE
LeMond suffered numerous setbacks along the way. Shortly before the 1989 Tour de France, he was struggling with anemia, but once that was treated, his fitness and strength returned quickly and he was ready to race.

First, second, and third
There were three men at the center of the 1989 Tour. LeMond is seen here in the center wearing the yellow victor's jersey. His closest rival, Laurent Fignon, is on his left. Pedro Delgado, the 1988 Tour winner, who finished in third place, is second left.
The winner of the 1988 Tour, Spanish rider Pedro Delgado, started as favorite for the 1989 event. However, problems in the first two stages cost him time, only some of which he was able to make up. So with Delgado playing catch-up, the battle to win came down to a fight between two men: French rider Laurent Fignon, winner of the 1983 and 1984 Tours, and Greg LeMond.

Fignon had come through a difficult couple of years leading up to the race, but was back at full strength. He had already won the Giro d’Italia—one of cycling’s three Grand Tours—in June that year, and his form continued into the Tour de France in July.

LeMond’s performance was improving too, and he had a secret weapon. Cyclists had always known that wind resistance was their biggest enemy when trying to ride faster, especially if they were riding alone, but it was a skier who came up with a solution. Boone Lennon, once the coach of the US ski team, designed a device called a “tri-bar,” which could be bolted to standard handlebars. It enabled the rider to assume a ski-tuck riding style—a far more aerodynamic position than the standard one racers used in time trials.

TESTING THE NEW DEVICE
Lennon approached LeMond shortly before the 1989 Tour and asked him to test his invention. He did, and it made him faster. LeMond used the tri-bars in the first long time trial of the 1989 Tour, won it, and took the yellow jersey. He then lost the jersey to Fignon in the Pyrénées and retook it in the Alps, only to lose it again. By the start of the final stage of the Tour, LeMond was in second place, only 50 seconds behind Fignon.

Since 1975 the final stage of the Tour has been a road race that finishes with several laps of a circuit that includes the Champs-Elysées, in the center of Paris. In 1989 it was different. France was celebrating its 200th anniversary as a republic, so the organizers decided to mark the occasion by making the final stage a time trial from Versailles on the edge of Paris to the Champs-Elysées, a distance of 15.5 miles (24.5 km).

LeMond used his tri-bars and his new riding position, while Fignon rode a normal time-trial bike in a standard riding position. Fignon struggled with injury, and his bike setup was not as fast as LeMond’s. Slowly but surely, LeMond gained time on Fignon: coming into the finishing straight he had clawed back the Frenchman’s 50-second lead; gaining a further eight seconds, he won his second Tour de France.
Recumbent Bikes

In 1967, British-born engineer, David Gordon Wilson, organized a competition to design a bicycle. The first prize was awarded to a design for a recumbent cycle, which led to a renewed interest in this type of machine, and to Wilson’s involvement in the Avatar project. The foundation in 1976 of the US-based International Human Powered Vehicle Association (HPVA) also stimulated interest in recumbents, especially those with streamlined fairings. The first International Human-Powered Speed Championships had been staged by the HPVA the previous year. In 1980, interest in Europe was boosted when Wilson took an Avatar to Germany, and in the same year, the Aspro Clear Speed Championships were held in Brighton, England. Both events contributed to developments in recumbent bikes.

The Brighton Speed Championships of 1980 sparked development of fast recumbents. Mike Burrows built the first Speedy (right) as a training trike, but developed it into a successful racer, which was sometimes equipped with a fairing. The Kingsburys produced several variants of the Bean. British veterinarian, Pat Kinch, broke the Human-Powered Vehicle (HPV) World Hour Record in 1990 riding Bean I.

“**The laidback movement, more or less, prohibits stagnation.**”
MIKE BURROWS, TELEVISION INTERVIEW, 2007

The FoMac Avatar 2000 1980s

- **Origin**: US
- **Frame**: Steel
- **Gears**: 14-speed
- **Wheels**: Front 16 in (40 cm), Rear 28 in (70 cm)

First launched in the late 1970s, the Avatar was the first commercially available recumbent. The long wheelbase design offered comfort as well as being aerodynamic. David Wilson, Richard Forrestall, and Harold Maciejewski are credited with the design and with rekindling interest in the type. Australian Tim Gartside set a world speed record of 51.9 mph (83.5 km/h) on Avatar Bluebell in the US in 1982.

The Burrows Windcheetah SL Mark VI Speedy 1987

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 24-speed
- **Wheels**: Front 20 in (50 cm), Rear 28 in (70 cm)

This is a “tadpole” trike, meaning that it had two front wheels. (A trike with two rear wheels was a “delta.”) Mike Burrows, from Norwich, England, produced the first Speedy in 1981. This Mark VI version also had a fiberglass fairing (not shown), which made it noisy but very fast.
**Kingcycle Bean 1990**

- **Origin**: UK
- **Frame**: Steel and fiberglass
- **Gears**: 7-speed
- **Wheels**: Front 17 in (44 cm)

Buckinghamshire-based father and son John and Miles Kingsbury created the original Bean recumbent bicycle. It had a streamlined fiberglass monocoque shell that needed no internal frame. For the Hour Record attempt, they built a stretched version using the same shell molds, but it had an internal steel frame.

**Radius Peer Gynt 1980s**

- **Origin**: Germany
- **Frame**: Steel
- **Gears**: 21-speed
- **Wheels**: Front 20 in (50 cm), Rear 28 in (70 cm)

A classic, long-wheelbase European touring recumbent, the Peer Gynt was a premium bike, noted for its comfortable ride and load-carrying abilities. It featured rear suspension, hydraulic brakes, and dynamo lighting. Weighing 42 lb (19 kg), however, it was a heavy machine.

**Tour Easy Recumbent 1985**

- **Origin**: US
- **Frame**: Steel
- **Gears**: 24-speed
- **Wheels**: Front 20 in (50 cm), Rear 28 in (70 cm)

California-based Gardner and Sandra Martin began developing long-wheelbase recumbents in the mid-1970s. The Tour Easy evolved from their record-breaking Easy Racer speed machines. Partially faired Tour Easys won the 1982 and 1983 practical vehicle contests at the International Human-Powered Speed Championships. This classic design is still in production.
The 1990s
GOING GLOBAL
INTER NATIONALE FRIEDENSFAHRT
The fall of the Berlin Wall in 1989 and the subsequent collapse of the Soviet Union had surprising effects on the world of cycling. Riders from the Eastern Bloc countries had long been at the forefront of amateur racing but had been barred from entry in professional events, such as the Tour de France. Suddenly, a rich vein of talent—schooled under a highly organized system of clubs, academies, and training centers run in line with the rigorous Communist approach to competitive sports—flooded the professional ranks, with riders such as Uzbek sprinter Djamolidine Abdoujaparov winning races at the highest level.

Bicycle technology also benefited from the fall of Communism. Stockpiles of titanium—a valuable metal with the same strength but half the weight of steel—reserved by the USSR for military use were released for commercial purposes, with much of this aerospace-grade material finding new life as the frame tubing of high-performance bicycles.

Aerodynamic refinements continued at such a pace that, as the 1990s drew to a close, cycling’s governing body, the Union Cycliste Internationale (UCI), placed limits on the advantages that could be gained through equipment and rider position. The trajectory begun by Moser in 1984 culminated in the “Superman” position used by British rivals Graeme Obree and Chris Boardman, in which the arms were extended forward at full length. Both riders set new Hour Records before the UCI halted innovation by requiring the use of a standard drop-handlebar bicycle similar to that ridden by Eddy Merckx in 1972.

“It was the ultimate test—no traffic, one man in a velodrome against the clock. I didn’t tell myself that I will attempt the record, I said I would break it.”

GRAEVE OBREE, ON HIS 1993 HOUR RECORD ATTEMPT

Key Events

- **1990** Shimano releases the STI, a combined brake and gear lever that allows riders to change gear without removing their hand from the handlebars.
- **1990** The first UCI mountain bike World Championships is held in Durango, CO.
- **Early 1990s** Hybrid bicycles, which combine the comfortable position of a mountain bike with the speed and light weight of a road bike, begin to appear.
- **1991** Suspension forks—developed for mountain bikes to absorb the bumps of off-road riding—see limited use in cobbled road races.
- **1992** Trek releases the OCLV, one of the first mass-produced road bikes with a complete carbon-fiber frame.
- **1993** The first UCI BMX World Championships is held in the Netherlands.
- **1994** The Sachs PowerDisc, the first mass-produced hydraulic disc brake for bicycles, vastly improves the braking power available to mountain bikes.
- **1996** Mountain biking becomes an Olympic sport.
- **1996** Chris Boardman sets an Hour Record of 35 miles (56.375 km), the last record to be set before the UCI’s rule change.
Bikes for leisure

During the 1990s, there was a growing trend for revivalist models that took their design cues from bicycles of the 1930s, 40s, and 50s. Manufacturers moved production to Taiwan and China to create bicycles that were cheaper than ever before. Instead of simple bikes, they could now offer models that had retro appeal and were also affordable. Other cyclists, however, sought more modern designs that suited their lifestyles. That meant models that offered excellent performance and were easy to transport and store.

Performance Small-Wheelers

In the 1960s, Moulton small-wheelers were used to break several point-to-point speed records and for many long-distance tours—including England to Australia. By the 1990s, Moulton, Bike Friday, and Airmimal were making performance small-wheelers. Many could be taken apart or folded for transportation by air, rail, or road.

<table>
<thead>
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Hanz Scholz built the first Bike Friday in 1991 for his own needs. Tired of compromises, he wanted “a performance bike that could travel with me without hassles.” Since 1992, various Bike Fridays have been produced for sport, off-road, commuting, or, in this case, touring.
The revival of cruiser bikes in the 1990s hails the invention of the Monster Cruiser. Its huge wheels and wide 30 in (75 cm) handlebars gave a comfortable cruising ride. The novelty wheel size proved popular enough for the bike to remain in production today.

**Coker Cycles Monster Cruiser 1998**
- **Origin**: US
- **Frame**: Steel
- **Gears**: Single speed
- **Wheels**: 39 in (100 cm)

The Alex Moulton Space-Frame range was launched in 1983 and the AM7 was the original touring model. Its frame, made from Reynolds 531 tubing, was exceptionally rigid and could be split into two parts at a kingpin. The near-identical example shown here is from a 2009 limited edition.

**Alex Moulton AM7 1997**
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 7-speed
- **Wheels**: 17 in (44 cm)

The Alex Moulton Space-Frame range was launched in 1983 and the AM7 was the original touring model. Its frame, made from Reynolds 531 tubing, was exceptionally rigid and could be split into two parts at a kingpin. The near-identical example shown here is from a 2009 limited edition.
Great Manufacturers

Shimano

A product of Japan’s early-20th-century industrialization, Shimano has become the world’s largest bicycle component manufacturer. Making everything from gears and brakes to wheels and pedals, Shimano is the biggest supplier of original parts to companies assembling new bicycles, setting the benchmark for functionality and design.

SHIMANO IRON WORKS BEGAN LIFE

in Osaka, Japan as a small machine-tooling workshop measuring 430 sq ft (40 sq m), with one borrowed lathe. It was founded in 1921 by Shozaburo Shimano, a 26-year-old engineer with years of experience in bicycle component factories.

Catering to Japan’s growing bicycle industry, Shimano chose to build his company on the production of a single bicycle part—the freewheel. The most complex component on a bicycle at the time, the freewheel had been in existence for some decades, but Shimano identified it as a key component that was ripe for improvement. His Shimano 333 single-speed freewheel, released in 1922, met with immediate success, and by 1930 it was being exported to China, Korea, and Southeast Asia. By 1940 the company had grown to around 300 employees, and in 1945 bicycle hubs were added to the product line. For a brief period in the 1950s, Shimano produced complete bicycles, but the experiment was short-lived.

The late 1950s was a period of rapid growth: in 1956 the first derailleur was produced, and a year later a 3-speed internal-gear hub was released. Meanwhile, Shimano explored new technology in manufacturing techniques. After learning about cold forging—a method of pressing metal parts at room temperature—at a trade fair in 1957, Shimano immediately saw the potential for low-cost, precision engineering of its metal components. Assisted by industrial scientists and in partnership with a consortium of Japanese companies, Shimano pioneered the processes required. With this in place, Shimano sought to take to the world stage of bicycle manufacturing, and in 1962 the company secured its first contract in the US with Columbia Cycles, the first and oldest name in American cycling. Soon other doors began to open: Schwinn, the most popular brand in the US in the 1960s, placed orders for Shimano’s freewheels, and in 1965 Shimano opened a subsidiary in New York.

International growth in the 1960s was assisted by the company’s first bestselling product—the Skylark rear derailleur. Released in 1967, the Skylark shared similarities in design with existing derailleurs from rival manufacturers, but was more durable and precise in its gear-shifting.

The 1970s dawned with the opening of the Shimonomori factory in Yamaguchi, Japan. Designed to produce coaster brakes, it was the largest bicycle plant in the world.

Buoyed by strong sales thanks to the strength of the US market, Shimano sought to reach into every sector of cycling. Although children’s and utility cycling were served well by Shimano products, touring and road cycling had so far proved elusive. In 1973 Shimano launched the Dura-Ace groupset, aimed at the top level of road racing previously dominated by rival component manufacturers Mavic, Campagnolo, and Huret. Campagnolo had already shown that amateur and recreational bicyclists wanted to ride the same type of equipment as their professional bike-racing heroes. Developing parts for use in tough racing conditions also yielded technological benefits; innovations first tested by professional racers gradually appeared throughout Shimano’s range. After seeing the firm’s Dura-Ace groupset at a cycle show, Belgian cycling team Flandria took the bold step of using it for the 1973 racing season. Although Shimano’s groupset was functionally and cosmetically inferior to rival Campagnolo’s Nuovo Record—used by other teams—Flandria still won two stages of the Tour de France, and the team’s young star Freddy Maertens came second at the World Championship road race in Barcelona.
Although they remained in the shadow of Campagnolo’s stylish Italian components, Shimano parts slowly infiltrated the professional peloton. New designs such as the 333 freewheel in 1978 and indexed gears in 1984 showcased the company’s constant innovation, and were successful enough to distance Shimano from rival Japanese manufacturers. In 1989, Shimano permanently changed the nature of bicycle gears with the Shimano Total Integration (STI) concept, featuring a dual control brake and gear lever, combining the brake and gear levers in a single unit on the handlebars for the first time. Riders could now change gear without lifting a hand from the handlebars and could even shift and brake at the same time. This changed the way professional bike riders raced, allowing more spontaneous gear changes and rapid bursts of speed. For recreational riders, the improved safety was an immediate hit, and rival manufacturers scrambled to copy Shimano’s revolutionary idea.

Since the 1990s, Shimano has cemented its position as the world leader in every type of cycling. By investing heavily in research and development, Shimano has created products tailored to every sector, and pushed the technological boundaries with its Digital Integrated Intelligence (Di2) electronic gear-shifting system. Today, nearly half of the world’s annual output of new bicycles is equipped with Shimano parts.
Carbon-Fiber Racing Bikes

The 1990s were an exciting time for the high-end bike industry. Steel lost ground to aluminum, and the seismic shift toward carbon fiber meant that frames were stronger and lighter than ever before. Traditional diamond frames began to be superseded by the monocoque, allowing far greater freedom in terms of chassis design and looks. The biggest advance was in the creation of aerodynamic frame sets with winglike spars and wheel-hugging back ends. Shimano STI and Campagnolo Ergopower combined gear and brake changers, which spelled the end of the traditional down-tube lever.

Corima Puma track 1990s

| Origin | France |
| Frame | Carbon |
| Gears | Single speed |
| Wheels | 28 in (70 cm) |

Based in the Drôme region in southern France, Corima first made a name for itself with aerodynamic carbon disc wheels and, later, frames. The Puma all-carbon monocoque track frame was very similar to the one used by the UK’s Chris Boardman when he broke the Hour Record in 1993.

Greg LeMond TVT 1992

| Origin | France |
| Frame | Carbon fiber and alloy |
| Gears | 16-speed |
| Wheels | 28 in (70 cm) |

From the mid-1980s onward, TVT produced some of the very first carbon tubes used in the manufacture of bicycle frames. The TVT 1992 featured polished alloy lugs with carbon tubes bonded into them, and a full Campagnolo groupset with Delta brakes.
CARBON-FIBER RACING BIKES

Giant Cadex 980c c. 1995
- Origin: Taiwan
- Frame: Carbon
- Gears: 16-speed
- Wheels: 28 in (70 cm)

Giant was one of the first bike brands to offer an affordable carbon-fiber road bike. It had eight carbon tubes bonded to aluminum lugs with an alloy fork. Shimano's superb budget 105 groupset kept the price in check.

Rossin c. 1990
- Origin: Italy
- Frame: Carbon
- Gears: 18-speed
- Wheels: 28 in (70 cm)

Founded in 1974, Rossin became known for its finely crafted steel frames. By the end of the 1980s it produced a lugged carbon frame using DuPont carbon-fiber tubes joined by eye-catching lugs.

Colnago C40 c. 1998
- Origin: Italy
- Frame: Carbon
- Gears: 18-speed
- Wheels: 28 in (70 cm)

The now legendary all-carbon C40 was launched in 1993. Exquisitely finished, it was an instant success with the professional peloton. The “C” of its name stands for carbon, while the “40” refers to the number of years Colnago had been in production.

Look KG196 1990s
- Origin: France
- Frame: Carbon
- Gears: 16-speed
- Wheels: 28 in (70 cm)

One-piece monocoque carbon frames replaced carbon tubes with lugs in the early 1990s, and Look’s futuristic KG196 led the way. An early Shimano Dura-Ace STI was installed on this model.
Lotus Type 108

Sleek, aggressive, radically aerodynamic—the Lotus Type 108 is as visually stunning today as it was when it burst onto the boards of the Barcelona Olympic velodrome more than two decades ago. Developed in secret by design maverick Mike Burrows and motorsport specialists Lotus Engineering, the Type 108’s carbon-fiber monocoque frame and wind-tunnel-tested design were light-years ahead of the competition, and showed what could be achieved by ignoring the accepted conventions of bicycle design.

WHEN CHRIS BOARDMAN ended a 72-year barren spell for Britain’s Olympic cyclists, much of the attention was focused on the high-tech “Superbike” that he propelled—through sheer tenacity—to a gold medal in the 4,000-m pursuit.

The Lotus Type 108 evolved from the genius of British engineer Mike Burrows. He saw the full potential of carbon fiber as an incredibly strong, yet lightweight, material that could be molded into any shape, and he developed the Windcheetah Carbon Cantilever track bike in 1986.

When the Union Cycliste Internationale (UCI) relaxed its rules over bicycle design in 1990 to allow monocoque frames—made in a single, shaped form, rather than from multiple joined tubes—Burrows saw an opportunity to prove his design at the highest level: the Olympic Games. Through a chance connection with Lotus Engineering, a motorsport company whose driving ethos of faster, lighter, stronger was a perfect match with the goals of Burrows and British Cycling, the Windcheetah concept was further refined. Molded in an aerofoil shape—similar to an aircraft wing’s teardrop profile—the frame’s mono-blade front fork was matched by a single rear stay, creating a tiny frontal area that resulted in the most streamlined form possible.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Origin</strong></td>
<td>UK</td>
</tr>
<tr>
<td><strong>Designer</strong></td>
<td>Mike Burrows/Lotus Engineering</td>
</tr>
<tr>
<td><strong>Year</strong></td>
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<tr>
<td><strong>Frame</strong></td>
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<tr>
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<tr>
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<tr>
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</tr>
<tr>
<td><strong>Weight</strong></td>
<td>Approx. 20 lb (9 kg)</td>
</tr>
</tbody>
</table>
“It was like nothing people had ever seen before”
CHRIS BOARDMAN, ON THE TYPE 108

Lotus logo
The Lotus logo features the initials of one of its founders, Anthony Colin Bruce Chapman, who set up the automotive company in London in 1952, with Colin Dare.

Carbon-fiber monocoque frame made from unidirectional and balanced-weave carbon-fiber plies, set in an epoxy resin

Alloy headset bonded to frame

Triathlon-style handlebar extensions enable rider to adopt aerodynamically efficient position

Mono-blade fork blade shaped in an aerofoil—rounded at the front, trailing to a point at the edge

Elbow rests

One-piece chainring without cutout portions improves the bike's aerodynamic profile

Mavic 3G carbon-composite, tri-spoke wheel

Lotus Type 108

“It was like nothing people had ever seen before”
CHRIS BOARDMAN, ON THE TYPE 108
THE COMPONENTS

While the most striking feature of the Type 108 is the frame, each of the parts was selected—and, in some cases, custom-made—with low weight and aerodynamics in mind. In order to fit the Type 108’s unique design, French component company Mavic custom-built the hubs to allow the wheels to slide onto the axles, which were bonded to the mono-blade fork and frame.

High-Performance Racing Bikes

Exciting advances in technology, led by Japanese component giant Shimano, spelled the end for gear-changing with small levers located on the down tube. By the end of the decade, changing gears using combined brake-and-gear levers became the norm. Where forward-thinking designs for mountain bikes led the way, road bicycles eventually followed. Carbon fiber was yet to take over as the frame material of choice, while hand-built steel frames still faced stiff competition from aluminum and titanium. Aerodynamics was also being taken more seriously, with concealed cables, V-shaped rims, and reduced frontal areas.

**Gios Compact Pro 1990s**
- Origin: Italy
- Frame: Steel
- Gears: 14-speed
- Wheels: 28 in (70 cm)

The Compact's rear triangle had adjustable dropouts, allowing the back wheel to be moved to within a whisker of the seat post—the aim being to offer a responsive ride. The distinctive blue finish with chrome lugs added a dash of style.

**Cougar Lo-pro TT 1992**
- Origin: UK
- Frame: Steel
- Gears: 14-speed
- Wheels: 28 in (70 cm)

Before the advent of oval tubes and aerofoil carbon spars, frames such as the Cougar's beautifully crafted steel one were the best. Although the lugless Cougar was barely more aerodynamic than a standard frame, it looked fast even when standing still.

**Team Banana-Falcon Professional 1991**
- Origin: UK
- Frame: Steel
- Gears: 16-speed
- Wheels: 28 in (70 cm)

Team Banana-Falcon bicycles had a steel frame customized with Reynolds 731 tubing, the lightest steel tubeset at the time. The bicycles used Shimano's Dura-Ace groupset with the first version of its revolutionary combined braking-and-gear-change STI levers.

**Alan Road Bike c. 1990s**
- Origin: Italy
- Frame: Aluminum
- Gears: 18-speed
- Wheels: 28 in (70 cm)

Alan bikes were distinctively assembled with anodized tubes screwed and bonded into chunky aluminum lugs. They had a Campagnolo groupset combined with their deep-rim, early aerodynamic wheels, resulting in a fast, modern bike.
Colnago Titanio TT c. 1995

- **Origin**: Italy
- **Frame**: Titanium
- **Gears**: 18-speed
- **Wheels**: 28 in (70 cm)

Although light, compliant, and impervious to corrosion, titanium was expensive and tricky to weld into a bicycle frame, and it lost out to mass-produced carbon frames in the late 1990s. The Titanio was rare, exotic, and rust-free.

“It is very easy for me to make great bicycles, it is the only thing I do.”

**ERNEST COLNAGO, ONLINE INTERVIEW, 2007**
Lightweight Racing Bikes

Custom frame-builders—for more than a century the main purveyor of high-end bicycles—went into a sad decline as aluminum became the metal of choice. Mass-manufactured, it was lighter and more affordable than steel. TIG-welded aluminum frames were quick to make and production was outsourced to Taiwan and China where the quality was high and wages low. Racing cyclists abandoned steel in favor of lighter, cheaper frames, although steel still appealed to riders who appreciated the ride quality, wide range of sizes, and hint of luxury.

Cannondale Criterium 1990s
- Origin: US
- Frame: Aluminum
- Gears: 16-speed
- Wheels: 28 in (70 cm)

Aluminum racing frames from Cannondale were popular in the early 1990s. They were lightweight and had the ability to resist flex. The Criterium model was a short-circuit racer, equipped with French Mavic components and bar-end gear-shifters.

Pinarello Montello Cromovelato 1990
- Origin: Italy
- Frame: Steel
- Gears: 14-speed
- Wheels: 28 in (70 cm)

This model had a lightweight, steel frame made of Columbus tubing, and high-quality Campagnolo components. The name, Cromovelato, referred to the finish of the frame, where the thin layers of paint allowed the chrome plating to shine through.

Carrera Team Replica 1990s
- Origin: Italy
- Frame: Steel
- Gears: 18-speed
- Wheels: 28 in (70 cm)

This racing bike had the latest Nivacrom steel tubeset and was still being used in competition in the mid-1990s. It was flawlessly constructed with short-point lugs, shot-in seat stays, and a full chrome fork.
Dave Lloyd 650 1992

<table>
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<th>Origin</th>
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<tbody>
<tr>
<td>Frame</td>
<td>Steel</td>
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<tr>
<td>Gears</td>
<td>16-speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>26 in (65 cm)</td>
</tr>
</tbody>
</table>

Professional cyclist turned frame-builder, Dave Lloyd, created this lighter, smaller-wheeled 650 model that had improved acceleration. The Reynolds 753 tubing combined with a fillet-brazed frame, deep rim wheels, and Campagnolo components made it a fast racer.

Campagnolo drivetrain

The double chainring was paired with a 5-speed rear cassette, giving a total of 10 gears. The rear wheels featured quick-release hubs for rapid wheel changes.

Hercules Time-Trial Bike 1995

<table>
<thead>
<tr>
<th>Origin</th>
<th>Germany</th>
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</thead>
<tbody>
<tr>
<td>Frame</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Gears</td>
<td>18-speed</td>
</tr>
<tr>
<td>Wheels</td>
<td>28 in (70 cm)</td>
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</table>

This specialty time-trial bike had aerofoil-shaped down and seat tubes. In competitions, the Hercules would generally be equipped with a disc wheel at the back. The bike had a Shimano Dura-Ace chainset with a solid track chainring, and bar-end gear levers located on the ends of the narrow tri-bars.

Deep-rimmed wheels

Later Mavic wheels

Aero-bars with lowered base bars and aero extensions

Upside-down brake levers

Cables were fed through handlebar

One-of-a-kind custom paintwork

Flawless finishing on lugless tube
Touring Bikes

As the notion of taking an annual vacation on a bicycle loaded up with clothing, provisions, and maybe a tent began to lose its formerly widespread appeal among cyclists, the bike industry responded with more versatile machines. Lighter models came without the fenders and racks that were standard on traditional tourers. These items could be retrofitted, but many cyclists looking for a comfortable bike for all-day rides had no need of bad-weather or overnight extras. A wide range of gears, increased considerably with the addition of a triple chainset, remained common to all types of touring bikes.

- **Cannondale T700 1995**
  - **Origin**: US
  - **Frame**: Aluminum
  - **Gears**: 24-speed
  - **Wheels**: 28 in (70 cm)
  - Cannondale’s touring bikes were widely admired for the quality of their strong and light aluminum frames, with multiple mounting points for racks front and rear, bottle cages, and fenders. Gears were Shimano with a triple chainset and wide-ratio cassette. Shimano V-brakes also provided excellent stopping power when laden.

- **Nishiki Prestige 1990**
  - **Origin**: Japan
  - **Frame**: Steel
  - **Gears**: 16-speed
  - **Wheels**: 28 in (70 cm)
  - Handmade in Japan using Tange Cro-Mo double-butted tubing, the Prestige had the looks of a custom-made bike from a high-quality builder. With fender eyes and enough clearances around the forks and rear stays, the Prestige could also be equipped with fenders for light touring. Gears and chainset were from Shimano.

- **Novara Trionfo 1993**
  - **Origin**: US
  - **Frame**: Steel
  - **Gears**: 16-speed
  - **Wheels**: 28 in (70 cm)
  - Designed in the US and made in Taiwan, the Trionfo was a sign of the times as it became more economical to subcontract frame-building to Asia. Using Tange tubing, it was more of a sports bike than a tourer, but the smooth-riding frame and wheels made all-day rides possible too.
**Claude Butler Dalesman mid-1990s**

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 27-speed
- **Wheels**: 28 in (70 cm)

A touring-ready, long-distance machine from the famous British marque, the Dalesman came with fenders, rack, and bombproof wheels. Bar-end gear-shifters made changing gear possible with both hands in full control of a load. These were cheaper and more reliable than racing-bike STIs.

**Bridgestone RBT mid-1990s**

- **Origin**: US
- **Frame**: Steel
- **Gears**: 24-speed
- **Wheels**: 28 in (70 cm)

Grant Petersen was the gifted designer behind US company Bridgestone’s innovative, high-quality, Japanese-built bikes into the 1990s. The Road Bike Touring (RBT) made touring bikes look classy again with its elegantly relaxed, steel frame and forks.
The Seattle Police Department set up a bicycle patrol unit in summer 1987 because biking was an easy way to get around in urban areas. Early success meant that, by the following summer, a special squad had been formed. Over time, the bicycle units grew, and in 1995 they were equipped with mountain bikes so that the police could negotiate any area of the city with ease: roads, steps, or narrow passageways. Here, the bike unit is controlling a demonstration.
Great Races
MTB World Championships 1990

The very first official Mountain Bike & Trials World Championships took place in 1990 in Durango, CO, organized by the Union Cycliste Internationale (UCI). The first competition consisted of only downhill and cross-country events.

Before 1990, a couple of events were billed unofficially as world championships, one of which was held in Durango, CO. So it was no surprise when the UCI chose this as the venue for the first official World Championships in 1990.

The first championships consisted of two cross-country races (one for men and one for women) and two separate men’s and women’s downhill races. There was also an unofficial uphill event, but it never became part of the world championship program.

There was little specialization in the early days of mountain biking. Most competitors took part in both cross-country and downhill events and used the same bike for both. For example, British racer David Baker rode the downhill on his cross-country bike, which had no suspension; he just pumped the tires a little harder and wore leggings instead of shorts in an attempt to protect his legs if he crashed. The downhill course was one that had been used in a long-standing race known as the Kamikaze. It was a natural downhill route, with nothing altered to increase difficulty or make it safer. It even included a 33-ft (30-m) uphill stretch, which does not feature as part of the race now.

The first men’s downhill ended in an American clean sweep. Greg Herbold won on a bike equipped with the revolutionary RockShox RS-1 suspension forks, followed by Mike Kloser and Paul Thomasberg. Fourth-place John Tomac, another American, rode a bike with suspension forks, but it had drop handlebars. Tomac was an experienced mountain-bike race.
“It was in my hometown ... everyone was calling me the favorite ... I wanted to win.”

NED OVEREND, RACE WINNER, 1990
Hardtail Mountain Bikes

Mountain biking (MTB) boomed worldwide in the 1990s. Product designers, machinists, promoters—even aeronautical engineers—all introduced developments to this new form of cycling sport. Riders wanted the latest and best equipment, especially expensive “boutique” components. The availability of front or full suspension, new frame materials, and MTB-specific groupsets made this possible. Bicycles were extravagantly machined and finished in an array of exotic colors, and each one had its own “race-proven” merits. New bicycle standards were adopted, dropped, then reinvented. Sponsorship and marketing played a key role—the more exposure achieved by a bike or component, the better, and the first “million dollar” sponsored rider arrived.

Bontrager RaceLite 1992
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**Origin**: US  
**Frame**: Steel  
**Gears**: 24-speed  
**Wheels**: 26 in (65 cm)

Handmade from small-section, True Temper 4130 tubing, this bicycle had a frame that was both strong and light. Wishbone seat stays, reinforcing gussets, and toughened steel plate dropouts provided extra strength.

Specialized Epic 1991
---
**Origin**: US  
**Frame**: Steel  
**Gears**: 21-speed  
**Wheels**: 26 in (65 cm)

Ned Overend won the first UCI MTB World Championship on an Epic. These bicycles were hand-assembled at a rate of two per day, and were very expensive. The wound carbon tubes were made from nine layers of fibre, and externally tapered lugs reduced weight.

Flat handlebars  
This style became popular on mountain bikes as the sport's popularity grew. Brake levers and gear shifters on the bars were the norm.
Wheel made from tensioned Kevlar cord covered with alloy mesh

Pace suspension forks with reverse-mounted brakes

Klein Attitude 1993
- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 24-speed
- **Wheels**: 26 in (65 cm)

Gary Klein’s bikes were among the most expensive MTBs. The Attitude’s frame, Mission Control fork, and one-piece stem and bar were all made from thin-wall, 6061-T6 aluminium tubing.

Kestrel CSX 1992
- **Origin**: US
- **Frame**: Carbon fiber
- **Gears**: 24-speed
- **Wheels**: 26 in (65 cm)

Bevil Hogg and Tom French started Kestrel in 1986, and, with Brent Trimble, created the first monocoque, carbon-fiber frames. The CSX was its second production MTB; its geometry was perfected by Keith Bontrager.

Kestrel CSX 1992
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Pace’s “Load Dedicated” approach to frame design used varying tube sections (square, rectangular, and round), plus a round head tube with vertical webs. Depth of external butting varied according to stress forces.

Kestrel CSX 1992
- **Origin**: US
- **Frame**: Carbon fiber
- **Gears**: 24-speed
- **Wheels**: 26 in (65 cm)

Pace RC200 F3 1994
- **Origin**: UK
- **Frame**: Aluminum
- **Gears**: 24-speed
- **Wheels**: 26 in (65 cm)

Pace’s “Load Dedicated” approach to frame design used varying tube sections (square, rectangular, and round), plus a round head tube with vertical webs. Depth of external butting varied according to stress forces.

Rhygin Custom 1994
- **Origin**: US
- **Frame**: Steel
- **Gears**: 21-speed
- **Wheels**: 26 in (65 cm)

Rhygin built durable, lightweight frames from Reynolds, Tange, and True Temper steel, depending on the rider’s weight and riding style. It made the first Columbus Metax stainless-steel frame.
Suspension Mountain Bikes

Initially met with skepticism, full suspension eventually changed the way mountain bikes were ridden. The 1988 "Nitro" concept from Kestrel featured early Rock Shox suspension forks with an air/oil rear shock. The 1990 Offroad Pro-Flex, the first production mountain bike with full suspension, had an elastomer rear shock, and hinged front "Flexstem" bumpers. Mountain Cycles' 1991 San Andreas had twin disc brakes and a radical, seam-welded, sheet-aluminum frame. From 1992, all manufacturers introduced full-suspension bicycles into their ranges, and it soon became a prerequisite for the growing sport of downhill racing.

Gary Fisher RS-1 1991
- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 21-speed
- **Wheels**: 26 in (65 cm)

This bicycle had a four-bar-linkage rear suspension with virtual pivot points and elastomer shocks behind the seat tube. It featured Mountain Cycle "Pro-Stop" mechanical disc brakes on moving mounting plates.

Boulder Defiant 1992
- **Origin**: US
- **Frame**: Steel
- **Gears**: 24-speed
- **Wheels**: 26 in (65 cm)

This bicycle's elegant design has a rear suspension unit concealed within the top tube for increased rigidity. The rear swing arm is joined to the main triangle using two links of motorcycle chain. The frame was available in steel, aluminum, or titanium.

Shimano's first XTR racing groupset, the M900
Answer Manitou FS 1993

| Origin: US |
| Frame: Aluminum |
| Gears: 24-speed |
| Wheels: 26 in (65 cm) |

Answer’s Manitou had full suspension with elastomer shocks, the rear of the bicycle featuring a shortened version of the front-suspension fork. The lightweight frame was constructed from large-diameter aluminum tubing and machined connections. The bike had minimal suspension travel of around 2 in (5 cm) both ends.

GT RTS-1 1995

| Origin: US |
| Frame: Aluminum |
| Gears: 24-speed |
| Wheels: 26 in (65 cm) |

This design had a shock that was activated by a “rocker” fixed to a subframe, which pivoted on the main frame. The design resisted lateral flex and was unaffected by chain tension. The bike was as good uphill as downhill, and riders won multiple cross-country and downhill World Championships on this model.

AMP Research B4 1995

| Origin: US |
| Frame: Aluminum |
| Gears: 24-speed |
| Wheels: 26 in (65 cm) |

The lightweight, all-aluminum AMP Research set new standards for full suspension efficiency. The disc brakes, a four-bar articulating fork, and a Horst link pivot on the chainstays—directly ahead of the rear axle—allowed the axle to be attached to the seat stay and isolated braking forces from suspension.

GT RTS-1 1995

| Origin: US |
| Frame: Aluminum |
| Gears: 24-speed |
| Wheels: 26 in (65 cm) |

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AFTER 2000

BICYCLES FOR ALL
STAGE 7
197 KILOMETERS

TOUR DE FRANCE 2012

ORCHIES
BOULOGNE-SUR-MER

TUESDAY 3 JULY
The 21st century has seen a consolidation in bicycle manufacture and use, with progress occurring in gradual refinements rather than sudden bursts. The sheer variety in types of cycling has led to a cross-fertilization of technology, with advances made in one field filtering gradually into others. Hydraulic disc brakes—first developed for mountain bikes—now appear on top-of-the-line road cycles. Carbon fiber has become the frame material of choice, wireless electronic gear-shifting is commonly seen, and carbon belt-drives and electronic motors threaten the monopoly of the humble metal-link chain.

While the bicycle has evolved into a machine of endless possibilities, it also offers empowerment around the world. Development charity World Bicycle Relief designs cycles for use in Africa, providing schoolchildren, healthcare workers, and entrepreneurs with the Buffalo Bike—a robust, low-cost, single-speed machine that can be locally built and maintained. A similar project enables craftsmen in developing countries to build the Bamboosero, a bicycle with a treated bamboo frame that can be sold locally or shipped to Western countries.

Gradually, and in spite of the dangers of sharing the same roads as motorized vehicles, the bicycle’s promise as a low-carbon, health-promoting transportation solution has begun to be realized. Bike-sharing programs—such as the Vélib bicycle stations of Paris—have spread to cities on five continents, while major businesses such as UPS and IKEA deliver goods via cargo bikes. As the reasons to cycle are more numerous, and with a growing variety of bikes and bicycling, the bicycle has the potential to be truly for all people and purposes.

**Key Events**

- **2000** Mountain bikes continue to be refined, with the “29er” wheel—a diameter used on road bikes—offering smoother rolling on off-road terrain than a standard 26-in (66-cm) wheel.
- **2005** Nonprofit organization World Bicycle Relief is founded in response to the 2004 Sri Lankan tsunami.
- **2007** The Gates Carbon Drive, the first production belt-drive, is released.
- **2008** BMX racing becomes an Olympic sport.
- **2008** Craftsmen in Ghana become the first local tradesmen to be trained in the construction of Bamboosero bamboo-framed bicycles.
- **2012** The Olympic Games include triathlon for the first time.
- **2012** Professional cycling is sullied by the revelation that the Tour de France’s most prolific champion, American Lance Armstrong, doped during each of his seven victories (1999–2005).
- **2014** The Union Cycliste Internationale revises the Hour Record rules, allowing up-to-date technology to be used.
- **2014** Dutch racer Marianne Vos—nicknamed “The Cannibal” after Eddy Merckx—becomes cyclo-cross world champion for the sixth successive year, taking her world championship titles across all disciplines to 12; she also has two Olympic gold medals.

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**Bicycles for All**

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“It may be the **simplest bike** I’ve ever ridden, but the humble **World Bicycle Relief** bike is also the most **important** ... It helps people **move out of poverty**.”

WARREN ROSSITER, CYCLING PLUS MAGAZINE, 2011

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△ **Bamboosero City Bike**

City frames, perfect for all-weather urban commutes, are agile in traffic, but also handle dirt roads well.

△ **VICTORY FOR MARIANNE VOS**

The Dutch racer becomes cyclo-cross world champion for the sixth time in 2014.
As interest in the Tour de France grew rapidly, led largely by the success of Lance Armstrong’s US-led teams, the bicycle industry responded in kind. Bicycle manufacturers began developing carbon-fiber frames, which soon became the standard for performance machines. Aluminum frames, although light, were also fragile and stiff. Carbon fiber had the high-tech allure of the aerospace industry and the glamour of Formula 1 racing. Componentry also advanced with the introduction of 10- and 11-speed cassettes, electronic gears, and hydraulic brakes.

**Colnago CF7 2008**
- **Origin**: Italy
- **Frame**: Carbon fiber
- **Gears**: 22-speed
- **Wheels**: 28 in (70 cm)

Only 99 Ferrari special-edition versions of the CF7 were produced, and few people could afford the $17,500 price tag. The bikes came with Campagnolo’s ultralight Super Record groupset and deep-section carbon wheels. The bicycle had a high-modulus carbon frameset, which was based on Colnago’s expanded polystyrene (EPS) model.

**Trek OCLV Limited Edition 2005**
- **Origin**: US
- **Frame**: Carbon fiber
- **Gears**: 22-speed
- **Wheels**: 28 in (70 cm)

Trek used the process of Optimized Compaction Low Void (OCLV) to create ultralight carbon frames. Made famous by Lance Armstrong in the Tour de France, this Discovery Channel model was produced in the team colors used for the Texan’s seventh (now disallowed) Tour win.

**Specialized Roubaix 2009**
- **Origin**: US
- **Frame**: Carbon fiber
- **Gears**: 22-speed
- **Wheels**: 28 in (70 cm)

Inspired by the Paris-Roubaix race over a cobbled track in northern France, this bike came with a carbon frame that had bump-absorbing Zertz dampers in the seat stays and fork. A higher front end meant an upright riding position, which made long rides more comfortable.

**Rear derailleur**

After a break of 20 years, a new, ultralight version of Campagnolo’s Super Record was launched in 2008 and is featured on the CF7. It has an 11-speed cassette.
Tri handlebars
This style of handlebar is designed to allow riders to lower their position to create the most aerodynamic profile. The rider is effectively over the front wheel, as opposed to behind it, as on conventional bikes.

Carbon wheels
Fulcrum of Vicenza, a company founded in 2004 by three aerospace engineers, designed the wheels of this all-Italian bicycle. They are made of carbon fiber and have deep aerodynamic rims.

Integrated handlebar and stem
The robust, threadless headset on this bicycle has a handlebar stem that is clamped directly to the head tube, and is an extension of the handlebar itself. Patented in 1992, the design is a crossover from mountain biking.

Electronic gears
operated by buttons on handlebar

Campagnolo Ergopower combined brake and gear levers

3T Aduro aero handlebar

All-carbon frame and fork laid up by hand

Giant Trinity Advanced 2010
Origin: Taiwan
Frame: Carbon fiber
Gears: 20-speed
Wheels: 28 in (70 cm)

Introduced in 2009, this time-trial bicycle’s radical looks and wind tunnel-honed, aerfoil-shaped spars were Union Cycliste Internationale (UCI) legal. Its racing abilities were proven in prototype form by professional riders.

Cervélo P5 TT c. 2012
Origin: Canada
Frame: Carbon fiber
Gears: 22-speed
Wheels: 28 in (70 cm)

Time-trial bikes resembling stealth jet fighters were the norm in 2012, when the Canadian high-performance bike brand, Cervélo, introduced its P5 aero missile. It had brakes hidden behind cowlings on the front fork and under the bottom bracket.

Campagnolo Ergopower combined brake and gear levers

3T Aduro aero handlebar

Electronic gears operated by buttons on handlebar

Integrated handlebar and stem
The robust, threadless headset on this bicycle has a handlebar stem that is clamped directly to the head tube, and is an extension of the handlebar itself. Patented in 1992, the design is a crossover from mountain biking.

Carbon wheels
Fulcrum of Vicenza, a company founded in 2004 by three aerospace engineers, designed the wheels of this all-Italian bicycle. They are made of carbon fiber and have deep aerodynamic rims.
Racing Bikes For All

Carbon-fiber bicycles were used to win the Tour de France in 1986, but it would be another 15 years before carbon became the default choice for top-end racing bicycles. As the new century dawned, mass-produced carbon frames put high-performance cycling within the reach of many new cyclists inspired by the technology and growing popularity of the Tour de France. At the same time, interest grew in traditional materials such as steel, and advances in aluminum frames came close to the performance of carbon-fiber frames. Women’s bicycles, with adapted geometry and special-sized parts, also complemented a growth in women’s cycling.

Isaac Force c. 2006
- **Origin**: Netherlands
- **Frame**: Carbon and aluminum
- **Gears**: 20-speed
- **Wheels**: 28 in (70 cm)

The Isaac Force is a light, smooth riding bicycle that features a monocoque carbon main triangle, and chainstays with tubed aluminum seat stays. Isaac are proud of the care that goes into its frames, which are built by hand.

Colnago Master 55 2008
- **Origin**: Italy
- **Frame**: Steel
- **Gears**: 22-speed
- **Wheels**: 28 in (70 cm)

Produced to celebrate 55 years of hand-crafted frame-building, the Master 55 has fabulously polished lugs joining the distinctively fluted top and down tubes. The first straight-bladed fork, Colnago’s Precisa, was now universally adopted.

Trek Lexa Women’s 2012
- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 18-speed
- **Wheels**: 28 in (70 cm)

The growth in women’s cycling led Trek to produce a female-friendly range of bicycles with its Lexa models. Aluminum frames combine women-specific geometry with Bontrager and Shimano components to give fitness cyclists an affordable ride.

Specialized Dolce 2014
- **Origin**: US
- **Frame**: Aluminum and carbon
- **Gears**: 24-speed
- **Wheels**: 28 in (70 cm)

An elegant and versatile women’s sports bicycle, the Dolce has female-specific components, an aluminum frame, and a carbon fork with a Zertz damper to absorb vibration from the road. A wide-ratio, eight-speed cassette with triple crankset arms the rider with a gear for every occasion.
### Renovo R4-56 2012
- **Origin**: US
- **Frame**: Wood
- **Gears**: 20-speed
- **Wheels**: 28 in (70 cm)

Sustainable, strong, and capable of absorbing vibration, Renovo’s wooden frame weighs only marginally more than the best carbon-fiber frames, while riding just as well. Portland, OR-based Renovo has equipped the bike with internal cabling with Shimano gears and a radially spoked front wheel.

### Genesis Equilibrium 2015
- **Origin**: UK
- **Frame**: Steel
- **Gears**: 20-speed
- **Wheels**: 28 in (70 cm)

In order to appeal to the many new cyclists in the UK, Genesis designed the Equilibrium as an all-rounder. Reynolds double-butted tubes, with neat welds and a carbon fork, ensure a stable and comfortable ride suitable for sporting, touring, or commuting in style.
Giant

A success story of Asian manufacturing, Giant is an innovative, far-reaching global cycling brand offering a huge variety of bicycles and accessories. The largest bicycle company in the world by revenue, Giant achieved its enviable position not by going head-to-head with its rivals, but—in many cases—by building bikes for them.

GIANT STARTED OUT as a builder of low-cost bikes for major US brands and has since become a pioneering company that designs and makes its own high-quality machines. It was founded in Taiwan in 1972, at a time when the bicycle industry was dominated by a stable of established US and European names trading on their decades-long heritage. Steel was the only material for bicycle frames, and the finest bikes were handcrafted by artisan frame-builders in small workshops producing a few hundred bikes a year.

Giant’s founder, King Liu, was a 36-year-old Taiwanese engineer-turned-entrepreneur with a string of creative business ventures to his name. When a typhoon destroyed his eel farm in 1971, he and ten friends formed a bicycle company, naming it after the leading Taiwanese baseball team—the Giants. They wanted to capitalize on Taiwan’s status as a leading export base to take advantage of the boom in 10-speed racing cycles sweeping the US. Liu assembled the necessary machinery and skills to mass-produce bikes to order, adhering to the stringent Japanese Industry Standard of manufacturing. He urged Taiwan’s other bicycle companies to unify their component specifications, to enable greater cooperation.

The early years were a steep learning curve. Some companies accused them of being a mere testing lab that was short on output, while rivals in Taiwan and Japan shipped large orders—many of questionable quality—for overseas firms. But Liu’s attention to detail and hunger for quality eventually bore fruit. In 1976 chief executive Tony Lo won a major client: Schwinn cycles, founded in 1895 and still at the very heart of the US bicycle industry. After inspecting the quality and finish of one of King Liu’s steel frames, Schwinn signed a contract that made Giant an Original Equipment Manufacturer (OEM). Lo later revealed that without Schwinn’s patronage lent prestige to this as-yet small, unknown company. The relationship blossomed, and grew even closer in 1980, when a strike at Schwinn’s Chicago factory sent more business to Taiwan.

By the mid-1980s, Giant was producing more than two-thirds of Schwinn’s bicycles. But Schwinn floundered, its finances in disarray, as Giant went from strength to strength. The two companies parted when Schwinn moved production to the China Bicycle Company in 1985. Giant was left reeling by the sudden hole in its order book, but Liu and Lo took the unprecedented step of transforming their company into a self-standing bicycle brand.

Carbon-frame technology

Giant’s successful development and research program led to a market-leading position in carbon-fiber frame production. Carbon-frame technology enabled Giant to develop carbon-fiber technology. Within two years the company had its first carbon-fiber bicycle: the Giant Cadex 980C road bike, with carbon tubes bonded to aluminum lugs.

In 1986 Giant founded its first European headquarters, based in the Netherlands, and over the next five years, outposts were created in the US, Japan, Canada, Australia, and China. At first consumers were wary of the Giant name, associating its “Made in Taiwan” tag with inferior,
“Affordable carbon” arrives with the launch of Cadex 980C. Giant’s sponsorship of professional cyclists now includes road, mountain, and track cycling disciplines. US sales reach 300,000 bicycles, just over half as many as Schwinn, which files for bankruptcy the following year. US bank Goldman Sachs invests $12.5 million in Giant for a nine percent stake, lending international credibility to the company.

1997 Giant opens factory in the Netherlands. Giant launches the MCR1 carbon-composite road bike. Its single-piece molded “monocoque” frame is later deemed illegal for racing by the UCI.

1998 Giant’s sponsorship of professional cyclists now includes road, mountain, and track cycling disciplines.

1999 The Maestro full-suspension mountain bike is launched, designed to improve braking and pedaling efficiency.

2000 Giant’s production tops 5 million bicycles.

2004 Russian road cyclist Denis Menchov wins the Giro d’Italia on a Giant bike. Giant starts to use its global reach to champion cycling advocacy, and funds bicycle-friendly transportation routes. The company launches a new e-bike, the Twist Esprit, and continues to develop hybrid technology.

2007 Giant’s production tops 5 million bicycles.

2009 Giant sponsors the Rabo-Liv women’s team. Its leader, Marianne Vos, wins the cyclo-cross World Championships and Giro d’Italia Femminile.

2010 Giant opens its first women-only bike shop in Taiwan’s capital, and in 2011 the company introduces a female-only brand, Liv. With seven factories in China and one each in the Netherlands and Taiwan, together producing around six million bicycles per year, Giant employs around 15,000 people around the world. Giant continues to shape not just the cycling industry itself, but also the bicycles that the world rides.

Taking center stage
Giant’s TCR compact-frame road bike, ridden here by ONCE’s Laurent Jalabert in 2000, stood out from the crowd in the pro peloton.

Mass-produced goods. But they were soon won over by the high quality of Giant bicycles, not to mention the lower cost.

As an own-brand manufacturer, Giant put its energies into new forms of cycling. It acquired the technology and expertise to tap into mountain biking and BMX, and developed the machinery and processes to mass-produce aluminum frames. The company stepped up its sponsorship of professional cycling. From the Giant-Manitou mountain-bike team in 1995 to the Spanish road cycling team ONCE in 1998. While still overshadowed by more established bicycle brands in public, in private Giant’s expertise was highly sought after by its rivals.

In 1997 Giant released a landmark bike that challenged conventional thinking on what a road bicycle should look like. In keeping with the company’s approach to efficiency in materials and manufacturing, the Total Compact Road (TCR) frame was compact, with an angular, sloping profile when viewed from the side. The shorter frame tubes—the most dramatic of which was the diagonally sloped top tube—were the masterstroke of British designer Mike Burrows, and were already a feature on Giant’s mountain bikes.

While its innovative road- and mountain-bike designs caught the headlines, Giant’s steady push into the hybrid, women’s, children’s, and e-bike sectors made it a dominant force in the 2000s. In 2008 Giant opened its first women-only bike shop in Taiwan’s capital, and in 2011 the company introduced a female-only brand, Liv. With seven factories in China and one each in the Netherlands and Taiwan, together producing around six million bicycles per year, Giant employs around 15,000 people around the world. Giant continues to shape not just the cycling industry itself, but also the bicycles that the world rides.

Wind-tunnel tested
The carbon-fiber Trinity Advanced Pro TT was Giant’s most aerodynamic time-trial frame yet.
Hardtail Mountain Bikes

Suspension was first achieved in mountain bicycles (known as MTBs) simply by substituting a sprung front fork for a rigid one. As the sport developed, however, different types of fully suspended MTBs were created for specific purposes with varying configurations. But the simplicity of a hardtail—a rigid-frame MTB with a front-suspension fork—had much to recommend it, and these machines still have a big following. Hardtails are generally considered to be more efficient for climbing hills, since they are typically lighter, and there are no energy losses on the rear suspension. They are also good all-around machines for cross-country rides that have lower levels of technical difficulty.

NON-SUSPENSION BIKES

Hardtail and fully rigid mountain bikes have several advantages over fully sprung models. The suspension fork of a hardtail is easily replaced, but the sprung frame required for rear suspension is a different matter. An unsprung frame will be lighter and mechanically simpler, which means less time spent on maintenance. And because the frame is cheaper to build, the maker has more budget to devote to components like gears, brakes, and wheels.

Surly Pugsley 2005 Surly was first established in Bloomington, MN in the late 1990s. The Pugsley model was introduced in 2005. It is described as a “fat bike” because it has extra-wide tires, which makes it suitable for use on soft surfaces such as snow and sand.

Maxxis Aspen tires front and rear

Maxxis Aspen tires front and rear

Shimano hydraulic disc brakes

Cannondale Trail 1 2016

Cannondale’s Trail bicycles are built to bring riders into the world of performance mountain biking. The Trail 1 is a sport hardtail rather than a true trail bike. For 2016, the Trail range has introduced 28-in (70-cm) wheels on all bicycles.

Cannondale Trail 1 2016

Cannondale Trail 1 2016

Shimano M506 hydraulic disc brakes

Trek 4300 2014

Based in Wisconsin, Trek was founded in 1975 and is one of the world’s biggest bike manufacturers. The 4300 first appeared in 2000 and, after a few years’ break, was reintroduced. It has an exceptionally good aluminum frame for a relatively modest price.

Trek 4300 2014

Origin: US
Frame: Aluminum
Gears: 27-speed
Wheels: 26 in (65 cm)

Charge Cooker 2014

Founded in 2005, Charge is a small specialty MTB-maker. Its Cooker range includes steel- and aluminum-frame bikes at different price levels. This model has 29-in (74-cm) wheels; later ones had wide-section 27.5-in (70-cm) rims, to accommodate fatter tires.

Charley Cooker 2014

Origin: UK
Frame: Aluminum
Gears: 18-speed
Wheels: 29 in (74 cm)
An Italian bicycle-maker, Scapin, started producing road bicycles in the mid-1950s. The Nope is a hand-built MTB designed to achieve high speeds. While this model has an all-steel frame, in later versions the seat tube and head-tube liner were made from carbon fiber.

Rocky Mountain Bicycles has been a specialty MTB manufacturer since the early 1980s. Its Vertex is a light, high-end hardtail MTB with a TIG-welded, Easton SC7000 scandium aluminum frame with air-sprung, front-suspension forks.
Full-Suspension Mountain Bikes

In recent decades, mountain bike manufacturers have become obsessed with offering both front and rear suspension, even if many of their customers rarely ride the sort of trails that require it. Cheap, full-suspension systems have trickled down to models at the bottom of the market, and many brands, such as the ones featured here, have sunk enormous amounts of money and research time into creating excellent forks and rear suspension systems. Technology has advanced exponentially, and today there is a multitude of full-suspension systems, ranging from single pivot, split pivot, or Horst link to soft tail or unified rear triangle.

Tektro alloy V-brakes
Despite the increasing use of disc brakes, direct-pull cantilever brakes, such as these Tektros, remain popular. They are often called V-brakes, which is a Shimano trademark.

Diamondback S20 2000s
Originally a BMX manufacturer from the 1970s, Diamondback built mountain bikes in the 1980s. The S20 was an entry-level bike in the full-suspension market but holds its own with its four-bar linkage suspension system.

Scott Reflex FX-25 2007
With its Reflex FX-25, Scott solved the problem of varying terrain by including a Genius LC-R shock-absorption system that can be switched from all-travel mode to lock-out mode at the flick of a lever.

Boardman Team FS 2012
This full-suspension bike, with its RockShox forks and rear suspension, is aimed at both cross-country and enduro riders. It is manufactured to the specifications of former British Olympic road cyclist, Chris Boardman.
**Front suspension**
Japan-based SR SunTour makes a huge range of suspension forks to suit every budget. The original equipment used on this bike was an inexpensive coil-sprung XCC fork.

**Wheels and tires**
The wheels of this entry-level bike have basic alloy rims and quick-release hubs. The tires are suitable for a mix of urban and off-road use.

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**Giant Glory O 2014**
- **Origin**: Taiwan
- **Frame**: Aluminum
- **Gears**: 10-speed
- **Wheels**: 26 in (65 cm)

This machine was designed specifically for downhill mountain-bike racing and has components that are built to take a beating. The Maestro suspension system features 8 in (20 cm) of travel.

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**Specialized S-Works Epic 2015**
- **Origin**: USA
- **Frame**: Carbon fibre
- **Gears**: 33-speed
- **Wheels**: 29 in (74 cm)

Specialized are very proud of what they call “Brain Technology” in the front and rear suspension on the S-Works Epic. In practice this means that the suspension adapts as the rider moves from flat to bumpy terrain.
Recumbent Bikes and Trikes

Although balance and maneuverability can be a problem in recumbent bicycles—especially for first-time riders—they are still more comfortable than upright bikes. Recumbents also offer more efficient braking because of their lower center of gravity. Additionally, these bicycles are faster on flat ground than their upright counterparts because of their aerodynamic riding position, and riders of recumbents regularly set new world speed cycling records. There are several variants available on the classic model, including low-racers (where the very low seat makes for better aerodynamics), high-racers (with larger wheels), tandem recumbents, recumbent tricycles (a delta with two rear wheels, and a tadpole with two front wheels), and recumbent mountain bikes.

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Hase Pino Allround 2008

- **Origin**: Germany
- **Frame**: Aluminum
- **Gears**: 27-speed
- **Wheels**: Front 20 in (50 cm), Rear 26 in (65 cm)

Unlike most bicycles for two, this part-recumbent, part-upright tandem places the captain upright at the rear and the stoker in the front. It can be dismantled in just 10 minutes and fitted into the back of an average hatchback car.
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Manufactured in Germany, the HP Velotechnik Gekko fx is a recumbent tricycle that incorporates many cutting-edge features, including advanced front and rear suspension. The most notable, however, is the optional electrical motor that can be built into the rear wheel, giving assistance up hills and over long distances.

Recumbents are larger than conventional bikes. However, this model can be folded up in a matter of seconds, for easy transportation and storage.

- **Rear brake**: Mechanical disc brakes offer greater stopping power and predictable braking, even in the wet. The steel disc at the wheel’s center is unaffected by water buildup, unlike a traditional rim brake.
- **Rear crank and pedal**: Made from aluminum, the crank is attached to a tapered bottom bracket. A Shimano clipless pedal is installed and the rider has to wear specific shoes with cleats to engage with the pedals.
- **Front seat**: The weather-resistant, bucket-style seat is constructed from synthetic fabrics and mesh. The fabrics are quick-drying to ensure that sweat does not build up and make the rider uncomfortable.
- **Front tire**: Made by German manufacturer Schwalbe, the partly-treaded front tire is suitable for any terrain. Inside the tire is a rubber belt that gave protection against sharp stones and glass.
**Bacchetta Corsa 650C 2004**

- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 27-speed
- **Wheels**: 26 in (65 cm)

The Corsa was designed by one of Bacchetta’s founders, Mark Colliton. This bicycle is built for speed, with a light aluminum frame and performance parts. The one concession to luxury is the inclusion of a soft EuroMesh seat.

**Bike Friday SatRDay 2006**

- **Origin**: US
- **Frame**: Steel
- **Gears**: 27-speed
- **Wheels**: 16 in (40 cm) or 20 in (50 cm)

This bike looks rather bulky with its high seat and handlebars, boom, and folding rear rack. However, it can be folded up small enough to fit into an accompanying travel bag or Samsonite suitcase.

**HP Velotechnik Scorpion fs 2007**

- **Origin**: Germany
- **Frame**: Aluminum
- **Gears**: 27-speed
- **Wheels**: 20 in (50 cm)

Designed for speed and long-distance touring, this recumbent tricycle has a lightweight aluminum frame and a long wheelbase. The front and rear suspension is fully adjustable and is designed so that it is not affected by the rider’s pedaling action.

**Challenge Hurricane 2009**

- **Origin**: Netherlands
- **Frame**: Aluminum
- **Gears**: 14-speed
- **Wheels**: 20 in (50 cm)

This mid-racer has an unusual rear-suspension design with the central shock absorber below the frame. The pass-through link to the seat spine and swing-arm pivot keeps power delivery high and the ride smooth.
Performance Tandems

No other bike turns heads like a tandem. First invented in the 1890s, like other types of bicycle, their design—and the materials used—have steadily evolved. While most current models are designed for touring, and are constructed from steel, carbon fiber racing tandems and off-road two-seaters are also available. One drawback of early tandems was their size. In order to retain strength and rigidity, the frames were short, giving an uncomfortable riding position. The use of modern materials means that the frames can be longer without reducing their integrity, so giving a more enjoyable riding experience. Being longer means that modern tandems are even trickier to store and transport than older machines. Recognizing this, some manufacturers, such as Orbit and Santana, produce cleverly engineered “demountable” frames that can be split in a matter of minutes.

Ventana El Conquistador de Montanas 2015

- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 27-speed
- **Wheels**: 26 in (66 cm), 27 in (68 cm), or 29 in (73 cm)

With suspension in the front and rear, fairly aggressive frame geometry, and a shorter wheelbase for tighter turning, this tandem is designed to soak up anything the trails might throw at it. Ventana’s owner, Sherwood Gibson, is a former BMX rider.

Orbit Summit 2015

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 30-speed
- **Wheels**: 26 in (66 cm) or 28 in (70 cm)

Orbit has manufactured tandems in Yorkshire since the 1950s, and in 2015 produced 18 different models. The Summit, its Reynolds 631 frame built to order by Bob Jackson of Leeds, comes in three models, all with Orbit full chromoly steel forks and S&S couplings.
### Cannondale Tandem 29er 2015
- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 10-speed
- **Wheels**: 29 in (73 cm)

The aluminum frame on this tandem, coupled with its 1.5-in (4-cm) steerer fork, makes for great handling, even on bumpy off-road trails. The wheel size also ensures that riders could take on roots and rocks without the fear of being thrown off.

### Santana Team Titanium 2015
- **Origin**: US
- **Frame**: Titanium
- **Gears**: 30-speed
- **Wheels**: 28 in (70 cm)

Tandems are rarely light because of the extra frame and components. Yet with this titanium model, Santana keeps the frame weight below 7 lb (3.17 kg). Santana claims it is the only bike-builder to use seamless, custom-drawn, tandem-specific tubing.

### Cyfac Le Duo Carbone 2015
- **Origin**: France
- **Frame**: Carbon fiber
- **Gears**: 30-speed
- **Wheels**: Variable

French manufacturer Cyfac produces this road tandem in a variety of build options and customized specifications. The T800H IM carbon frame with Kevlar reinforcement ensures that the bike remains incredibly light and fast.
Urban Bikes

After 2000, manufacturers rebranded hybrid bicycles as urban bikes, aiming to appeal to young, upwardly mobile adults and commuters. These bicycles, like the hybrids of the late 1990s, have elements of mountain and touring models but vary greatly in specification. Some have 28-in (70-cm) wheels and slick tires designed for road-only use, while others use 26-in (65-cm) wheels with some tread, making them ideal for light terrain. Frames have mounts for fenders and a rack or basket. Urban bikes are inexpensive, built from lightweight aluminum and their manufacturing outsourced.

- **Carrera Crossfire 2005**
  - Origin: UK
  - Frame: Aluminum
  - Gears: 8-speed
  - Wheels: 28 in (70 cm)

- **Mustang Aztekker Plus 2005**
  - Origin: Netherlands
  - Frame: Aluminum
  - Gears: 8-speed
  - Wheels: 28 in (70 cm)

- **Cannondale Bad Boy 2005**
  - Origin: US
  - Frame: Aluminum
  - Gears: 8-speed
  - Wheels: 26 in (65 cm)

- **Specialized CrossTrail 2005**
  - Origin: US
  - Frame: Aluminum
  - Gears: 8-speed
  - Wheels: 28 in (70 cm)

A manufacturer for the budget-conscious, Carrera generally makes heavy bikes produced in Asia and equipped with entry-level components. The front-suspension fork is intended to absorb shocks but in reality slows the handling.

Typical of the modern utility bikes commonly found across Europe, the Mustang Aztekker Plus is low-tech, affordable, and bombproof. A plastic chainguard keeps the rider's clothes away from the chain and kept maintenance to a minimum.

Relatively expensive compared to other urban bicycles, the Bad Boy was the first to harness all the qualities of a mountain bike and adapt them to urban commuting. Its lightweight aluminum frame and disc brakes make it popular.

This lightweight, fast-rolling bike features a carbon fork with Zerts rubber inserts that are designed to absorb frame vibration. With its upright position, the CrossTrail is popular with commuting cyclists.
**Trek Navigator 2012**

- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 22-speed
- **Wheels**: 26 in (65 cm)

The Trek Navigator, with its plush tires, suspension forks, and adjustable handlebar stem, is a ride designed for practicality and comfort. Its alloy frame and large tires mean the bike can go anywhere, and its low cost makes it popular with weekend fitness riders.

**Pashley Sonnet Bliss 2013**

- **Origin**: UK
- **Frame**: Steel
- **Gears**: 5-speed
- **Wheels**: 28 in (70 cm)

The Sonnet married traditional elegance with modern manufacturing techniques to bring together the best of both worlds. British company, Pashley, uses chromoly steel, and the vintage looks hide the fact that the bike is lighter than early-20th-century originals.

**CYCLING IN CITIES**

In many countries before World War II, commuting by bicycle was the norm. As the automobile took over, traffic discouraged cyclists. To tempt cyclists back to the inner cities, town planners created more bike lanes and paths, and manufacturers now promote bikes suitable for city use.

**Safer urban cycling** The increase in urban cycling has been such that many cities around the world are now creating segregated routes for cyclists.
The bicycle is the only reliable, cheap form of transportation for families and workers in many poor and less accessible parts of the world, especially in war-torn places such as Kabul, Afghanistan. This Afghan man is riding his bicycle—heavily laden with watering cans for his market stand—past the ruins of the Darul Aman Palace, west of Kabul. This area was the scene of some of the heaviest fighting between opposing warlords and the Taliban in the 1990s.
Cargo and Passenger Bikes

First invented for tradesmen to use on deliveries, these solid workhorses were extremely popular during the early part of the 20th century. After World War II, however, they became less common as vans and trucks were used for deliveries. Cargo bicycles enjoyed something of a revival in the 1980s when businesses became more ecologically-minded. They later developed into high-tech machines capable of transporting heavy loads, camping gear, or even children, as families sought alternative, greener ways to travel. The front wheels are normally smaller than the rear wheels to make room for the load containers and improve stability by reducing the center of gravity at the same time. Some models feature two wheels at the front for extra stability.

\[\text{Nihola 4.0}\]

- **Origin**: Denmark
- **Frame**: Aluminum
- **Gears**: 8-speed
- **Wheels**: Front 17 in (44 cm), Rear 22 in (55 cm)

This sturdy machine, with a load capacity of 265 lb (120 kg), has room for four small children in its enormous cabin at the front. Safety is never compromised thanks to the cabin’s double-tube frame welded together with steel sections.

\[\text{Xtracycle Edgerunner 2015}\]

- **Origin**: US
- **Frame**: Chromoly steel
- **Gears**: 24-speed Shimano Acera
- **Wheels**: Front 26 in (65 cm), Rear 20 in (50 cm)

The rugged-looking Edgerunner is a dedicated and adaptable load-lugger. The smaller rear wheel lowers the center of gravity, while the extended wheelbase makes the bike more stable, even when carrying a heavy load. A child seat, carry bags, or a sidecar can also be added.
**Omnium Mini-Variant 2015**

**Origin**: Denmark  
**Frame**: Chromoly steel  
**Gears**: 3-speed  
**Wheels**: Front 16 in (40 cm), Rear 28 in (70 cm)

The load-bearing capacity of this bike was not huge, but what it lacked in strength it more than made up for in maneuverability. Extra-fat tires, a step-through frame, and an upright riding position added to all-around rider comfort.

**Babboe Curve 2015**

**Origin**: Netherlands  
**Frame**: Steel  
**Gears**: 7-speed Shimano Nexus  
**Wheels**: Front 20 in (50 cm), Rear 26 in (65 cm)

Ideal for carrying young children, these bikes are a common sight in many Dutch cities during the school run. They have a load capacity of 220 lb (100 kg), and passengers and cargo can be kept dry by fitting an optional cover.

**Pedalpower 2015**

**Origin**: Germany  
**Frame**: Aluminum  
**Gears**: 24-speed  
**Wheels**: Front 20 in (50 cm), Rear 26 in (65 cm)

At 104 in (266 cm) in total length, this cargo bike from Pedalpower can transport almost anything. Low to the ground, it is also surprisingly stable. Its NuVinci N360 drivetrain is the first continuously variable bike transmission commercially available.

**Christiania Classic 2015**

**Origin**: Denmark  
**Frame**: Steel  
**Gears**: 8-speed  
**Wheels**: 20 in (50 cm)

Christiania’s galvanized steel tricycle bike features disc brakes on the front wheels, which greatly shortens the stopping distance. The hand brake has a parking function, which adds to safety.
Commuter Bikes

After the first mountain bike was introduced in 1981, it became a popular option for commuters: with its sturdy frame and load-carrying ability, it could be used as both a utility bike and a sports bike. In 1988, a new type of bike, the hybrid, was introduced to address the growing needs of the urban cyclist. Hybrid bicycles combine features of the mountain bike, road bike, and touring bike. Hybrids designed for commuting have flat bars and wide tires designed for comfort, load-carrying capacity, and versatility over a wide range of road surfaces. Small-wheeled, folding cycles are another popular option for commuters, and are most frequently used for traveling to work via mass transit.

Hybrid Bikes

The hybrid bike is a derivative of the mountain bike. Raleigh pioneered the style in 1988, closely followed by Bianchi. The aim was to keep the good braking, wide-ratio gearing, and upright riding position of the mountain bike, but with the lighter frame and slimmer tires seen on road bikes. There are different types of hybrids, and most can be used for both urban and recreational riding.
**Indigo Folding Bike 2013**

- **Origin**: UK
- **Frame**: Aluminum
- **Gears**: 3-speed
- **Wheels**: 16 in (40 cm)

The Indigo’s stepover frame design was based on a large-section, aluminum, down-tube frame that offered rigidity and lightness. The height-adjustable handlebars and seat stems made the bicycle easy to fold.

**Dahon Vigor P9 2014**

- **Origin**: China
- **Frame**: Aluminum
- **Gears**: 9-speed
- **Wheels**: 20 in (50 cm)

The Dahon’s thick wheels gave this bicycle stability and excellent handling. Its aluminum frame, forks, and wheels reduced weight and the bicycle could be easily folded into a small package.

**Marin Fairfax 2014**

- **Origin**: US
- **Frame**: Aluminum
- **Gears**: 27-speed
- **Wheels**: 28 in (70 cm)

Built for multipurpose urban use, the Marin Fairfax had a wide range of gears, powerful disc brakes, handlebars and an aluminum frame. It also had rack and fender mounts so it could double as a touring bike.
Cutting-Edge Designs

After more than a century and a half of near-continuous evolution, bicycle design and technology are increasingly characterized by a single trait—specialization. From speed-hungry race bikes with a set of components “integrated” with the frame to optimize aerodynamics, to bombproof, go-anywhere “fat bikes” with oversized tires for traveling on snow or sand, bicycles are available in any shape, size, and specification to suit any taste. While advanced technologists, from Formula One specialists to world-beating bicycle brands, redefine the capabilities of cutting-edge materials, such as carbon fiber, there is still space for artisans to hand-build esoteric creations from the purist’s favorite—steel.

**Pegoretti Marcelo 2012**
- **Origin**: Italy
- **Frame**: Steel
- **Gears**: To order
- **Wheels**: 28 in (70 cm)

Every frame built by Dario Pegoretti is unique, whether in its paint finish, geometry, or the signature detailing added at will by the enigmatic Italian craftsman. The Marcello features Pegoretti’s TIG-welded steel tubes, which are larger in diameter than most steel frames for improved ride quality.

**Ritchey Commando 2015**
- **Origin**: US
- **Frame**: Steel
- **Gears**: To order
- **Wheels**: 26 in (65 cm)

Built by mountain-bike pioneer Tom Ritchey, the Commando is available as a frameset-only. It is a classically styled take on “Fat Bikes”—off-road bicycles with ultra-wide tires for riding on loose surfaces, from sand and mud to ice and deep snow.

**Caterham Duo Cali Limited EPS 2015**
- **Origin**: UK/Germany
- **Frame**: Carbon fiber
- **Gears**: 22-speed
- **Wheels**: 28 in (70 cm)

Designed by Caterham Cars, this model was released in a limited run of 73, marking the inaugural year of the British sports car brand. Priced at approximately $25,000, the exclusive machine features a unique “Duo Blade” frame that channels air flow around the bicycle.

Electronic Campagnolo Super Record EPS gears
**Santa Cruz V10 CC 2016**

- **Origin**: US
- **Frame**: Carbon fiber
- **Gears**: 7-speed
- **Wheels**: 27.5 in (70 cm)

With more elite-level Downhill race wins to its name than any other mountain bike, the V10 is one of the most sophisticated, full-suspension bikes around. Its carbon-fiber frame is strong enough for downhill racing.

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**Trek Madone 9 Series RSL 2016**

- **Origin**: US
- **Frame**: Carbon fiber
- **Gears**: 22-speed
- **Wheels**: 28 in (70 cm)

The Race Shop Limited (RSL) is a replica of the bike used by the Trek Factory Racing top-tier professional team. Every component has been selected or customized to produce a fully integrated, aerodynamic racing bike built for pure speed.
Great Races

Women’s Olympic Road Race 2012

This women’s road race, one of the cycling events at London’s 2012 Olympic Games, took place on July 29. The course started and ended in front of Buckingham Palace, running through central London and then out into the English countryside.

The riders set off in pouring rain, with Nicole Cooke of Great Britain, who won gold at the Beijing Olympics (also in the rain), the defending champion. The women’s road race followed the same route as the men’s, although they rode fewer laps of the Surrey Hills section (see opposite). Their ride was a total distance of 87.2 miles (140.3 km).

In usual road-race style, there were several early breakaway moves, but all the favorites remained in the peloton, keeping an eye on each other. Later, teams at the front of the peloton started sending riders off in attacks to try to draw the strength from their rivals. While this was going on, there was almost as much action at the back of the peloton. The heavy rain had washed sharp grit onto the roads, causing several riders to have flat tires. The difficult riding conditions also led to a number of crashes. All of these incidents meant that some riders lost valuable time in the race.

The first serious attacks came before the first ascent of Box Hill, with Great Britain’s Emma Pooley, the USA’s Kristin Armstrong, and a Dutch rider, Ellen Van Dijk, being the most active. The attacks continued throughout the famous climb, and increased in intensity afterward. Pooley mounted a tremendous attack that another Dutch rider—Marianne Vos—had to chase. This meant that Pooley’s teammate Lizzie Armitstead could follow her wheels and save a bit of energy. Eventually, with 31 miles (50 km) still to race, the attacks saw a select group of 30 riders go ahead. These riders stayed together until Vos, Armitstead, Russia’s Olga Zabelinskaya, and the USA’s Shelley Olds...
“What does it mean? It means four years of hard work has paid off.”

LIZZIE ARMITSTEAD IN A POST-MEDAL CEREMONY INTERVIEW
Competitive or professional road cycling demands incredible fitness levels in cyclists, who pedal their way through amazing scenery, encouraged by hundreds of spectators. The prestigious Grand Tour events—the Tour de France, the Giro d’Italia, and the Vuelta a España—cover several thousand miles over the course of three weeks. Here, the UK’s Chris Froome (bottom left, leading the field) is riding for Team Sky on one of the arduous mountain stages of the 2013 Tour de France.
BICYCLE COMPONENTS
Anatomy of a Bicycle

When running smoothly and efficiently, the array of components that makes up a bicycle is barely perceptible. It is only when the rider stops to inspect a skipping gear or rubbing brake pad that the sophistication of the interrelated parts becomes apparent. The frame is the skeleton of the bicycle, while the key contact points—saddle, pedals, and handlebars—form a tactile interface between rider and bike. Brake and gear systems allow control of acceleration and deceleration, the two main forces of cycling, while the wheels transmit those efforts to the ground.

FRAME DESIGN
The frame is the core of the bicycle, since everything else—potential use, ride quality, and component options—is dependent on it. Bike frames can be built from a variety of materials, ranging from the commonly used steel, aluminum, and carbon fiber to the less widespread titanium, wood, and bamboo. Regardless of the chosen material, a frame must be stiff enough to support the rider and any extra equipment, and to allow efficient power transfer from the cranks to the rear wheel, while being “compliant” or forgiving enough to offer some comfort to the rider. Consisting of the main “triangle”—formed by the seat tube, top tube, and down tube, plus the head tube—and rear triangle, which comprises the chainstays and seat stays, most bicycle frames are still built to the basic diamond-frame pattern first seen in the 1890s.
FRAME MATERIALS

Each material has its own characteristics. Steel is known for its forgiving ride and ease of working and repair, while aluminium delivers a stiff ride but has been supplanted by carbon fiber as the material of choice. Titanium does not rust or corrode and is strong and light, but is expensive.

Steel frames are usually built with lugs—preformed sleeves into which the tubes are brazed—or TIG-welded, a process by which tubes are joined with an electrical charge. Fillet-brazing is another method, in which tubes are mitered and butted against each other before being brazed with brass or bronze solder.

Titanium frames require meticulous welding to join the tubes together, making them very expensive compared to steel and aluminum. Tubes can be bonded—a rarer method that is useful for joining to another material, such as carbon-fiber seat stays—using an adhesive.

Carbon-fiber frames can be built as a monocoque (a continuous molded piece) or formed from ready-made tubes glued together with internal or external lugs. Carbon fiber offers myriad customization options.
Brakes and Gears

Braking and shifting gears are two of the key skills that every bicycle rider learns once the fundamentals of balance and pedaling have been achieved. But the simplicity of stopping and of changing gears belies the complexity of the mechanical parts that perform these functions, not to mention the huge variety of different braking and gear-shifting technologies—from cable-activated rim brakes to hydraulic disc brakes and electronic gears—that have evolved over the years.

Brakes are essential for safe riding on any bicycle, and must be well adjusted and regularly inspected to make sure they function effectively. Brake-pad wear can be an issue on rim brakes because of the erosive effect of water and grit on the wheel rim, while hub and disc brakes tend to be more effective in wet and dirty conditions. As for gears, the drivetrain can consist of a single fixed gear or up to 30 derailleur gears, but at either extreme, accurate adjustment and chain lubrication are important.

Types of Brakes

Braking is the most essential feature of the bicycle—without the means to stop, the earliest boneshakers would never have caught on. Modern bicycle brakes come in three main varieties according to their location on the wheel: rim brakes, hub brakes, and disc brakes. Activated by a lever located on the handlebar, rim brakes and disc brakes can be operated with either a metal cable or a hydraulic line, while hub brakes are almost always operated with a cable.

Rim Brakes

Dual-pivot calliper brake
Side-pull caliper brakes have two arms that squeeze two rubber brake blocks onto the wheel rim, creating resistance. The dual-pivot variety is widely used on road bikes.

Center-pull caliper brake
A popular 1960s and 1970s design, center-pull brakes feature two symmetrical arms connected to the brake cable via a “yoke,” distributing the pull evenly across both arms.

Cantilever brake
Popular on cyclo-cross bikes because of good mud clearance, cantilever brakes consist of two arms (cantilevers) that pivot around bosses attached to the frame or fork.

V-Brake
A type of cantilever brake, V-brakes have longer arms for greater leverage and more powerful braking. They are popular on hybrid, children’s, and low-range mountain bikes.

Drum Brakes

Drum brake
A drum brake has a brake shoe and a drum built into the hub shell. When the lever is pulled, the shoe moves outward against the drum to create friction, which in turn slows the wheel. Drum brakes are reliable and are often used on utility and commuter bikes.

Disc Brakes

Hydraulic disc brake
A disc brake comprises a “rotor” bolted to the hub and a caliper bolted to the frame or fork. Within each caliper are two brake pads that are forced against the rotor to slow the wheel. These powerful brakes are common on mountain bikes, but also used on road and cyclo-cross bikes.
DRIVETRAIN CONFIGURATIONS

The drivetrain is the collection of components that transfers the up-and-down movement of the rider's pedal strokes into the forward motion of the rear wheel. The chain connects the chainset with the cassette, two components that together determine the gear ratios of the drivetrain, and therefore how fast the bicycle will go in relation to the terrain and the power of the rider. Light and comparatively cheap, front and rear derailleurs are used on most bicycles, while internal hub gears are more durable but heavier and more expensive.

Crankset and cassette
The crankset comprises two arms—to which the pedals are attached—and the chainrings, on which the chain runs. The cassette consists of different-sized sprockets that take the drive from the chain and transfer it to the rear wheel.

Internal hub gear
With a complex gear-shifting mechanism encased inside the hub, internal hub gears are reliable, long-lasting, and virtually impervious to rain and dirt. An external sprocket driven by the chain is connected to a system of internal cogs and rings that interact to determine the selected gear.

Combined control lever
Most modern bicycles feature combined control levers that house both the brake and gear levers in a single unit, enabling the rider to brake and change gears at the same time.

ANATOMY OF A CHAIN
The fundamental component of any drivetrain, the chain links the chainset—and hence the rider's power output—with the cassette and rear wheel. It must be strong and flexible enough to wrap around the chainrings and sprockets, and to withstand being pushed from one cog to the next by the derailleurs.
Contact Points

While the frame is key in defining the handling and ride characteristics of a bicycle, the points of contact with both the rider and the ground are equally important to the overall “feel” of the bike. The chosen types of handlebars, saddle, and pedals affect how the rider interacts with the bicycle, while wheel construction and tire choice also have a part to play in determining the bike’s responsiveness and level of comfort while pedaling, braking, descending, climbing, or cornering.

Suspension can have a dramatic effect on the rider’s experience in the saddle. The most sophisticated suspension systems are found on mountain bikes, where shock absorbers can deliver 8 in (20 cm) or more of wheel “travel” for riding over rough terrain. Some utility and hybrid bikes have suspension to improve comfort, while carbon frames can be tuned through their layup to provide vertical flex for comfort.

**SADDLE DESIGNS**

Perhaps the most important link between rider and bike, the saddle supports the majority of the rider’s weight. Most saddles feature parallel rails that are fixed to the seat post, allowing a certain amount of front and rear adjustment in order to achieve the optimum riding position.

*Leather saddle*

Traditionally, saddles were made from one piece of leather stretched over a coil-sprung steel frame. Over time, the leather would deform and mold to the unique shape of the rider to provide the ultimate in comfort.

*Leisure saddle*

Modern saddles consist of a layer of padding, such as silicone gel or foam, sandwiched between a preformed base—typically semiflexible plastic—and a plastic or leather cover. Leisure saddles usually feature extra padding.

*Performance saddle*

Saddles for performance use tend to be narrow and sparsely padded to optimize support for the rider. Light weight and strength may be achieved with a carbon-fiber base and titanium rails.

**PEDALS**

Most bikes have flat pedals, sometimes equipped with toe clips and straps to hold the shoe on the pedal. Performance bikes use clipless pedals with a mechanism that attaches to a dedicated shoe. For road-bike use, clipless pedals tend to be lighter and wider for improved power transfer, while mountain-bike versions are more robust and have the ability to shed mud.
TYPES OF HANDLEBARS
Handlebars are the rider's primary means of holding on to the bicycle, and must offer sufficient hand positions for the chosen type of riding. Commonly used on road bikes, dropped handlebars provide multiple hand positions to alleviate the stresses and strains of long days in the saddle. The flat or riser bar, used on mountain bikes, allows fewer hand positions but gives a firm and secure platform for the rider to hold onto on rough trails. Covering the bar with a rubber grip or padded tape is essential to cushion the hands from vibration, bumps, and trail shock.

SUSPENSION TECHNOLOGY
Many types of front- and rear-wheel suspension have been developed over time, but the main thrust came in the 1990s as mountain-bike designers borrowed from motorcycle technology. While off-road riding is the main application for suspension, some city bikes also feature shock absorbers.

Rear suspension
Some bicycles with front suspension also have rear suspension to further cushion the rider from shocks and impacts. Rear suspension requires a bicycle frame with a pivoting rear triangle and a shock unit with a spring and a damper to control the up-and-down movement.

WHEEL CONSTRUCTION
A bicycle wheel is composed of a hub and rim connected by a set of spokes or another support system, such as a carbon-fiber disc. Wheels must be strong yet light to keep the effort required to turn them to a minimum.

Hub
The hub is usually clamped into the frame with a quick-release mechanism. Loose or sealed bearings inside the hub allow the wheel to rotate smoothly.

Rim
The rim supports the tire and, on bikes with rim brakes, also offers a braking surface. Tubeless rims allow low-pressure tires; clinchers are the standard type; and tubulars are used in competitive racing.
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