WHEELS OF CHANGE

A Study of the technical, social and political Evolution of the bicycle and cycling.

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A Study of the Technical, Social and Political Evolution of the Bicycle and Cycling

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INTRODUCTION

A special bond has always existed between man and the bicycle. Their unity creates not only a perfection in mobile efficiency but a unique cultural phenomenon with far ranging effects on the very fabric of society.

The story of the bicycle is not just a history of technical refinement in a machine of excellence but a complex tale of technological, social and political change. Wheels of Change tells this amazing story, examining and evaluating the technical, social and political evolution of this truly wondrous machine.

This thesis is divided into three main areas. The opening chapter is an overview of the bicycle and cycling development through the years, from the earliest bicycle-like machines of the Renaissance, to the futuristic human powered vehicles of today. The main emphasis is on the bicycle's technical evolution but the social and political environments in which technical changes occurred are also considered. The chapter is broken into sections coresponding to the important stages of technical improvement. It begins by examining the early origins of the bicycle. The chapter goes on to look at the hobby horses of the early 19th century, velocipedes, the ordinary bicycle, tricycles and the safety bicycle. The chapter concludes with a study of the bicycle in the 20th century.

Chapter 2 concerns the bicycle and society. In it, the concept of the bicycle as an instrument of social change is explored. The chapter consists of three sections. The first examines the link between cycling and social class structure. The next section on

cycling women and social emancipation, looks at the fascinating story of how women cyclists were instrumental in changing Victorian attitudes towards morality and the status of women. It also considers cycling as both a means of social liberation and integration. The third section looks at the bicycle's role as a utilitarian vehicle in past and present society. Two examples are given which demonstrate the bicycle's mixed fortunes as a war vehicle and its role as a transport vehicle in Third World society.

The third chapter entitled, "The Politics of Cycling" is broken into two main areas. The first section, "The Road to Change" looks at the early days of cycling and examines how political lobbying from early cycling groups brought about legislative changes which improved both the status of the cyclist and overall road conditions in the pre-motor age.

The concluding section traces the status evolution of cycling through the motor age and examines how governments have acted or failed to act to exploit the benefits of pedal power.

CHAPTER 1

EVOLUTION OF THE BICYCLE

The evolution of the bicycle is rich and varied, a fascinating tale of how technical innovation and mechanical ingenuity combined to create what is referred to as "man's most perfect machine".

This chapter examines the history of the bicycle from its early ancestors, the cumbersome, human-powered vehicles of the 1490's, to the highly refined cycling machines of today. Although the main emphasis is on the technical development of the bicycle, it is impossible to completely isolate technology from the social and political factors which were also important in its development. These two areas are therefore examined in this chapter but are dealt with in greater detail in the final two chapters.

Many people have been credited with the honour of having invented the bicycle. The machine's origins can be traced back a long time before industrialisation. While restoring the manuscripts of Leonardo Da Vinci in 1966, the Monks of Grottoferrata near Rome, uncovered a rough drawing of a bicycle-like machine. The sketch, hidden underneath some backing paper, is though to have come from da Vinci's studio in the 1490's. The drawing was probably the work of one of Leonardo's pupils, it may have been a copy of a da Vinci drawing or model. It is remarkable that the basic features of this early bicycle eventually became standard on bicycles over four centuries later.

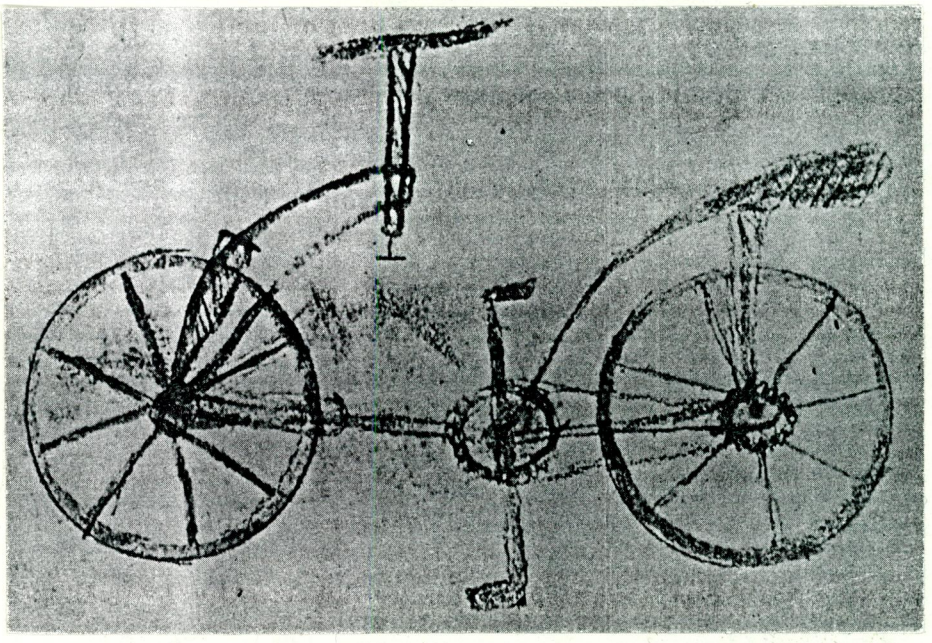

Fig. 1 This early bicycle sketch was found among Leonardo da Vinci's manuscripts dating from 1490.

This early design sketch shows a chain wheel drive mechanism. Da Vinci's notebooks contain many other significant drawings and descriptions of gearing systems, continuous drive chains, free-wheels and ball bearings. Da Vinci's quadricycle design from the late 15th century was probably intended as a chassis for a carnival theme float. It was propelled by two hand cranks, linked to the front wheels. There were a number of similar human-powered vehicles actually built before the 19th century in Italy and in Northern Europe. These vehicles, however, were totally inefficient as transport vehicles. They were typically built in the manner of horse carriages, driven by servants

who bounced on treadles or turned cranks. The master sat in front and steered the vehicle.

In the 1660's, one man did make significant progress. Stephen Farffler, a paraplegic clock or bell maker from Altdorf outside Nuremberg, designed and built a hand-cranked tricycle and quadricycle to transport himself around the village. The "fauteuil a roulette", (chair on wheels), was another invalid vehicle from the 1750's, consisting of a chair mounted on three wheels. It had sprung suspension and was propelled using hand levers. Towards the beginning of the 19th century there were more serious endeavours by inventors to find a more practical form of human-powered transport.

THE HOBBY HORSE

In 1791, a young man called Monsieur, (or Comte), de Sivrac, placed a padded saddle and second wheel on the hobby horse, (a one-wheeled children's toy from the Middle Ages). With this early machine, (which was basically a carved beam on wheels with no steering or pedalling mechanism), the rider could propel himself along in a straight line by pushing against the ground with his feet. Sivrac's early machine became known as the célerifère. In 1791, he showed it off in a Parisian park and started a fashion among the rich young men of Paris for striding these machines along the Champs Elysees. The vélocifère produced by Nicéphone Niepee in 1816 was an improved celerifere with a slimmer horizontal beam and larger wheels.

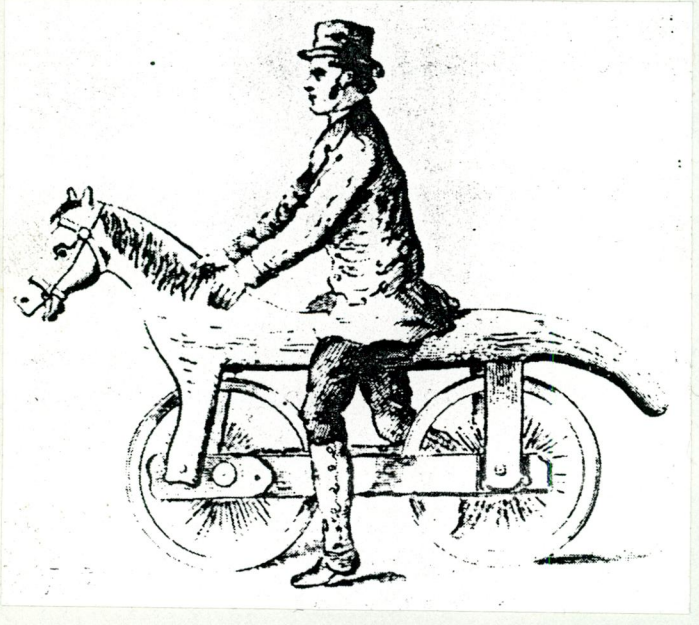

Fig. 2
The Célerifère, 1793

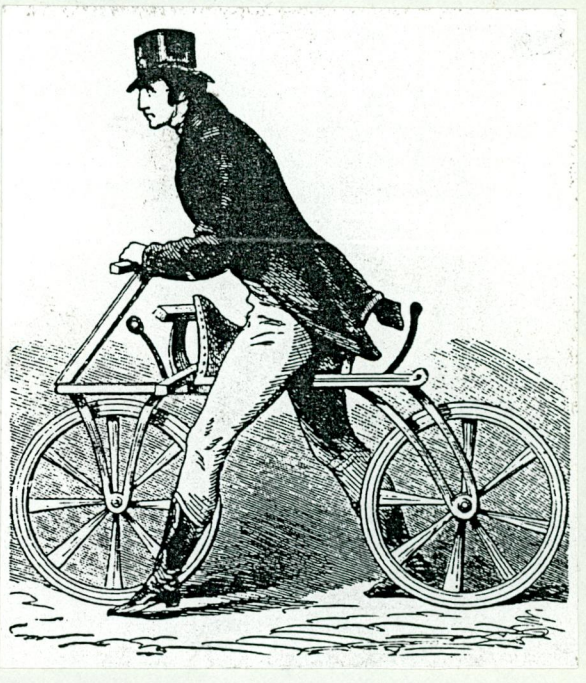

Fig. 3
The Vélocifère, 1818

In 1817, a German Baron, Karl Von Drais de Sauerbrun, from Mannheim, made an important improvement to the Velocifère by making the front wheel steerable. Von Drais, who had earlier invented an unsuccessful pedomotive, (foot driven), carriage initially referred to his new two-wheeled vehicle as a running machine.

He took his vehicle seriously and while employed as a Master of Forests by the Duke of Baden, used it to travel along forest paths to make inspections. Drais began limited manufacture of his vehicle. His machines were fitted with an upholstered seat, a luggage sack and a balancing board against which the rider pressed his elbows to assist the machine along. There was also a cord-operated brake, an adjustable seat height and a prop stand. Drais hoped to make a good business selling the machines and set about marketing his idea. On good roads the running machine was probably the fastest vehicle of the time, surprisingly quicker than the horse.

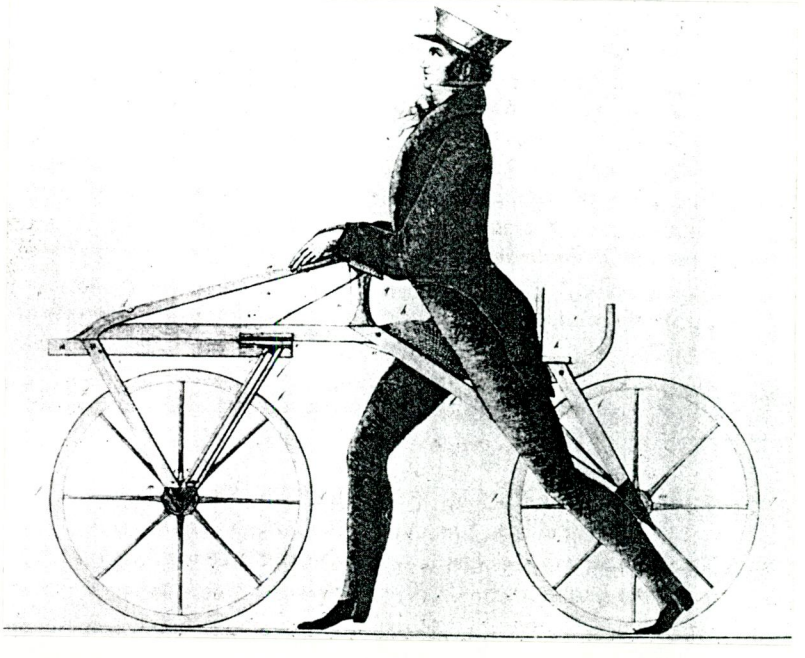

Fig. 5 Baron Von Drais Running Machine

In general however, road conditions were very bad and travelling by Drais machine was quite uncomfortable. It was difficult to keep up momentum and almost impossible to climb hills.

Baron Von Drais patented his machine in Baden on the 12th January 1818 and had a French patent taken out on the 17th of February. On the 5th of April 1818, the machine, (now called the "Draisienne"), went on its first public demonstration. Although this outing was not particularly successful, the people of Paris eventually took to the contraption and began to use the Draisienne. Drais left his position in Baden to set up a manufacturing works. He registered as many patents as he could but these gave him very little protection and soon imitations of his machine were being produced all over Europe. In England, a man called Denis Johnson, a shrewd entrepreneur, began to produce a machine based on the Drais principle. In December 1818, he applied for a patent for his machine neglecting to make any reference to Von Drais.

Johnson's early machines had a wooden frame. Later, he developed an iron frame which dipped in the middle allowing for larger wheels. The wheels used were similar in construction to early wagon wheels, with metal spokes and iron rims. Johnson offered two different rim widths for indoor and road use. These "dandy horses" or "hobby horses" used slender iron rods for the handlebars, forks and chest rests. Johnson manufactured his machines in quantity, developing advanced production techniques. He opened his own riding schools and had a successful business catering for the fashionable rich of London.

Hobby horse riders, however, began to use the foot pavements to escape the badly maintained roads and were subsequently banned from doing so. More and more legal restrictions curbed the freedom of the enthusiasts, riders were constantly subjected to ridicule from satirists and caricaturists. Fashions changed eventually and the hobby horse craze in London had eased by mid 1819.

Hobby horses found their way to America around this time and there were short-lived crazes in New York and Boston. Hobby horses, known simply as Velocipedes in America, were eventually banned from New York City, the reason again being sidewalk riding. As the main interest in the vehicles died down, unwanted machines were handed down to eager youths. In Germany, a final surge of interest in the Draisienne occurred in the 1820's. It did not, however, help the unfortunate Baron Von Drais, who turned from his unsuccessful business endeavours to alcohol and rode the running machine to his doom.

Such was the prejudice developed against the hobby horse by the 1820's, that for more than forty years after, very little interest was paid to any vehicle invention using two wheels. The last noteworthy development of the hobby horse era came in 1821, when a gentleman called Lewis Gompertz from Surrey, invented a velocipede which used a hand-operated rack and pinion mechanism to help propel the vehicle.

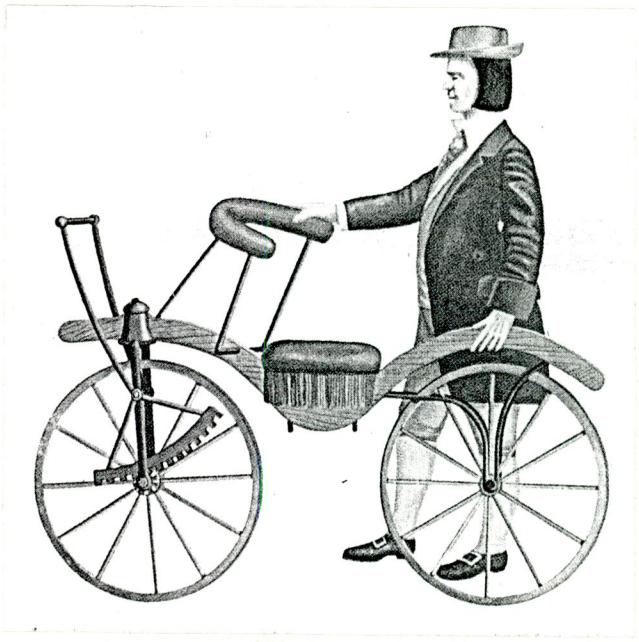

Fig. 6 The Gompertz Velocipede, 1821.

During the middle part of the 19th century, there was little interest shown by professional engineers in the development of human-powered vehicles. The considerations of transport engineers and the coal and capital of the Industrial Revolution went into the design and development of steam powered machines, bridges and tunnels. There was, however, a great deal of interest shown by individuals in the application of emerging technology and many new amateur mechanics began to invent and experiment. It was these men with practical engineering skills who carried out the most significant work on self-propelled vehicles during the mid 19th century.

Most of these new designs were for three and four-wheeled vehicles. In their quest for an efficient means of mobility, the amateur mechanics searched

for the most suitable application of mechanical principles. Their designs were very imaginative employing variations of rotary drives, treadle drives and rack and pinion mechanisms. Many contraptions created were, however, very heavy and difficult to steer. The "Mechanics" Magazine, founded in 1823 and joined by the "English Mechanics Magazine" in 1869, helped amateur mechanics towards a common sense of purpose . In these magazines, readers could describe their inventions, air their views and exchange information with each other. All sorts of inventions were discussed in the magazine.

The majority of amateur mechanics designed and built purely as a hobby. However, some more enterprising individuals found a market for their designs. One of the most successful mechanics was Williard Sawyer. Sawyer produced high quality finely engineered quadri-cycles. He produced a wide range of cycles for different purposes. His catalogues include quadricycles for invalids, lightweight racing machines, sociables which could carry up to six people and ladies carriages. All his vehicles used wooden frames, narrow wooden wheels and treadle drives directly attached to a cranked wrought iron axle. Sawyer had aristocratic and royal patronage. His prices were expensive, ranging from £10 to £40.

Sawyer, along with other velocipede manufacturers of the time, exhibited in the Great Exhibition of 1851. The mid 19th century resulted in a wide range of human powered quadricicyles and tricycles which, although quite interesting, were generally impractical as transport vehicles.

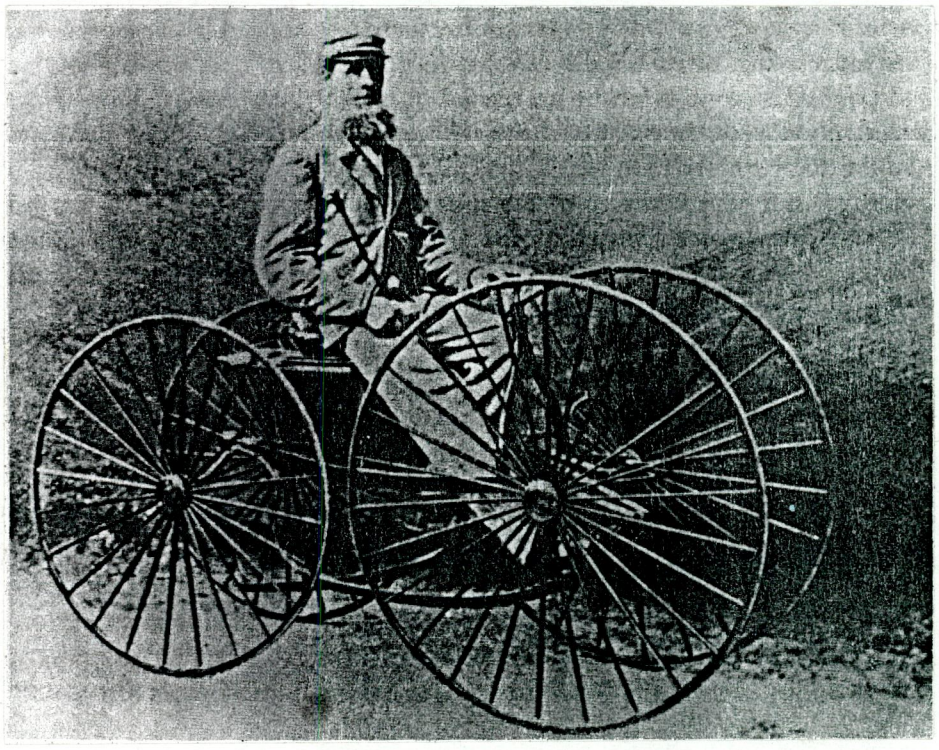

Fig. 7 Williard Sawyer on one of his vehicles.

VELOCIPEDES

In 1839, a Scottish blacksmith, Kirkpatrick Macmillan, from Courthill, a village near Dumfries in Scotland, completed a treadle-operated two-wheeler. Macmillan was a somewhat unambitious man and content to ride his machine around the village and even to let it be copied by other mechanics. He never tried to market or publicise his invention.

This velocipede was the first true bicycle that could be propelled with both feet off the ground. The wooden treadles were suspended from the steering head and linked by connecting rods to a cranked rear wheel. Macmillan could propel his vehicle along at 14 miles an hour over short distances. He often made the 14 mile trip to Dumfries and, in 1842, completed a 140 mile ride to Glasgow where he had the misfortune to knock down a child and was subsequently fined five shillings.

Although Macmillan's original machine has not survived, copies do exist. One was constructed in 1846 by a cooper called Gavin Dalzell. A number of similar machines were built commercially in 1860 by Thomas McCall, a joiner and wheelwright in Kilmarnock.

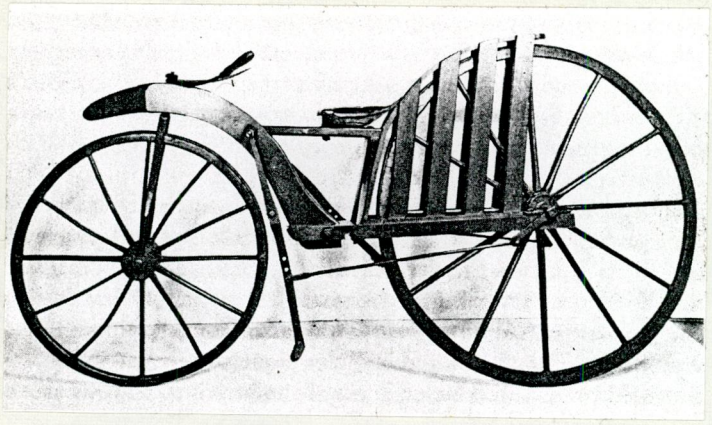

Fig. 8

Dalzell's Copy of
Macmillan's Velocipede

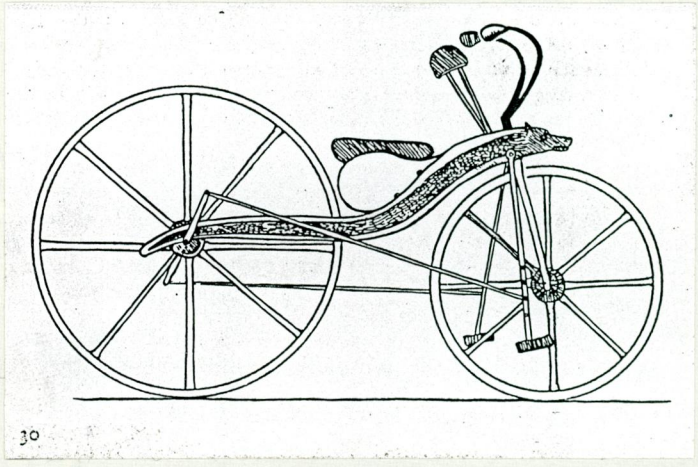

Fig. 9

Thomas McCall's 1860
Velocipede

Another machine similar in design to Macmillan's was constructed in 1842, by Alexandre Lefèbvre of St. Denis near Paris. Lefèbvre later emigrated to California taking his velocipede with him where it still survives as the oldest existing bicycle.

In 1863, the first machine with direct acting pedals was produced by Pierre Michaux, a Parisian coach repairer and cabinet maker. When a customer left an old hobby horse to be repaired, Michaux suggested that a cranked axle be fitted to the hub of the front wheel so the rider could turn the wheel with his feet. This suggestion was subsequently carried out and found to be a worthwhile improvement.

Soon Michaux's firm began to produce this new breed of velocipedes. These bicycles, known as "Michaulines" sold well in Paris and around 1867 to 1869 there was quite a passion for the machines.

Michaux's early velocipedes had wooden bodies and were similar to the Draisainne. New riding schools were set up and the first races between velocipedists took place. By 1865, the Michaux company was producing more than one machine a day. In 1866-67, a new model was developed featuring a larger front wheel for increased travel and a slimmer iron body. Michaux found many patrons among the aristocracy and royalty and velocipeding became a widespread activity around Paris. Michaux moved his factory to a larger premises and in 1870, sold his firm to the Oliver Brothers company. Under new management, improved production techniques were developed for the machines, and enhanced features were incorporated such as solid rubber wheels, pulley operated brakes and ball bearings (patented in 1867). More advanced machines had lever-operated,four-speed gears, free wheels and metal spoked wheels.

These metal spoked wheels, patented in 1802 were an important breakthrough. They consisted of lengths of wire, clamped to the hub with flanges and treaded through eyes in the rim. The new wheels were much more impact-resistant and lighter.

The velocipede found its way to England and America. In England, the enthusiasm was not as wild as in the early hobby horse craze. The Americans, on the other hand, delighted in the new machines and velocipede rinks, races and fashions evolved. As

with the hobby horse, however, the initial excitement in America soon mellowed and it was the English manufacturers who eventually maintained interest in the design and manufacture of the velocipede.

Fig. 10 Hanlon's Patent Improved Velocipede

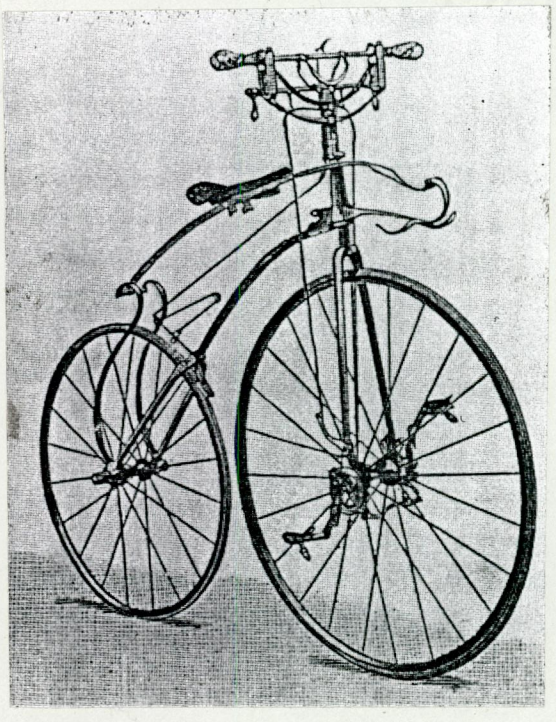

Fig. 11 Top of the range, Oliver Machine

THE ORDINARY

The extraordinary form of the Ordinary bicycle, (also known as the High or Penny Farthing) evolved in the early 1870's. In search for speed the front driving wheel of the machine grew larger so it would cover a greater distance with each turn of the pedal. The diameter of the rear wheel on the other hand, which acted basically as a stabiliser was reduced to keep the machine's weight to a minimum. On these machines, the rider sat high up over the driving wheel. The size of this wheel was dictated by the rider's leg measurements. The wheels themselves had tangentially arranged spokes. They had solid rubber tyres which were either stuck or sprung on to hollow section rims. Ordinaries had short straight handlebars with simple spoon type brakes.

To mount the ordinary, the rider scooted along beside the bicycle, placed his foot on a step on the frame and launched himself into the saddle. To pedal efficiently, the rider positioned himself over the hub of the driving wheel. However, sitting above the wheel in this manner with such a high centre of gravity, the ordinary would easily pitch the rider over the handlebars if the wheel hit an obstacle or if the brake was applied too severely. Ordinaries were therefore quite dangerous and falls extremely common.

The ordinary appealed mainly to adventurous and fit young men who had the power and skill to master these difficult machines. It was very uncommon to find women or older men riding the ordinary bicycle.

Fig. 12 The Popular Ordinary

As the popularity of the ordinary grew, touring clubs were established. These clubs catered exclusively for men. The members were predominately middle class from cities and towns. Clubs usually met on Saturdays and toured the countryside on their machines. Riding in these clubs offered companionship but also,

> "Some protection against the ridicule, insults and stones which were sometimes aimed at wheelmen".
> (McGurn, 1987, p.52).

Clubs usually did not venture out after October when the roads became unrideable. During these winter

months, non cycling activities were organised such as boxing or billiard tournaments, concerts and dinner parties. Newly established clubs with no clubhouse, met in inns and found different amusements.

Early bicycles cost as much as twenty pounds. As more and more were produced, however, cheaper new and second hand machines became available. The bicycle came into reach of other types of rider. Cycling sports evolved. The National Bicyclists' Touring Club and the Bicycle Union were both set up in 1878. They organised events in typical Victorian fashion, rife with class distinctions. The more refined upper middle class amateurs were distinguished from professionals. Amateurs, with a more 'physical' occupation, such as mechanics or labourers who would also be deemed to have an unfair advantage, were segregated.

Racing changed the design of the ordinary. Wheels, tubes and joints were refined to reduce weight. The risk of falling from the ordinary bicycle prompted firms to search for safer bicycle designs that would not tip forward. One early machine called "The Star", had a small wheel at the front of the bicycle and the driving wheel at the rear. With the rider's weight at the front of the driving wheel in this manner they were not inclined to tip forward. The Star sold well in America but was difficult to steer and was rather heavy

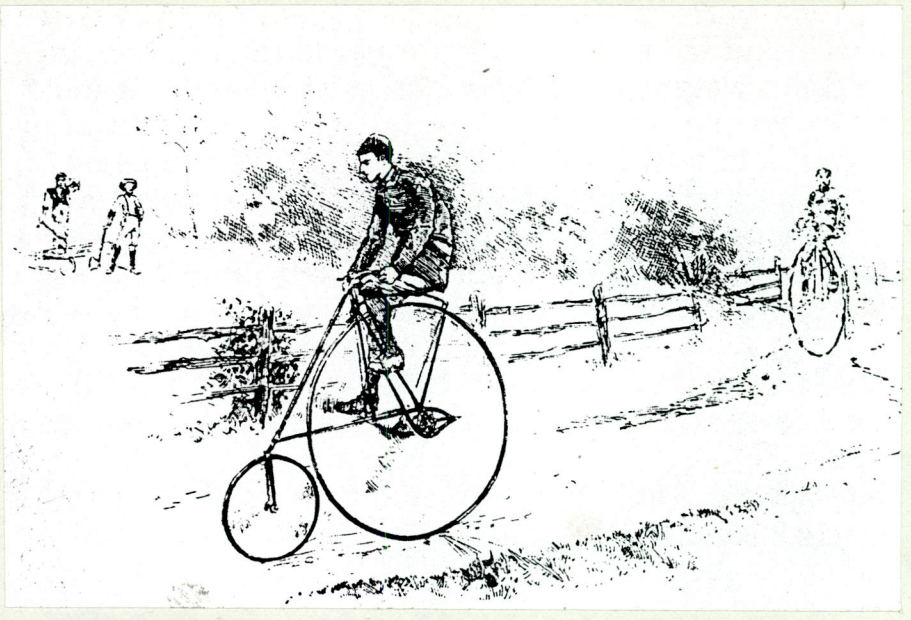

Fig. 13 The American Star, 1881

Manufacturers attempted to find safer ordinaries by moving the saddle further back on the frame. This, however, made the bicycle difficult to pedal and the rider more uncomfortable. The "Xtraordinary Bicycle" of 1878 attempted to solve this problem by using lever cranks. These cranks brought the pedals closer to the ground and made the bicycle somewhat safer.

The "Facile", another type of safer ordinary, used a similar up and down lever action to propel the machine. The "Kangaroo" bicycle, patented by E.C.F. Otto and J. Wallis, used a smaller front wheel of 36 inches in diameter. The wheel was geared up with a chain and sprocket arrangement so it would rotate efficiently with each turn of the pedal. The main trend in these safer ordinaries was a shrinking of the front wheel and an increase of the rear one.

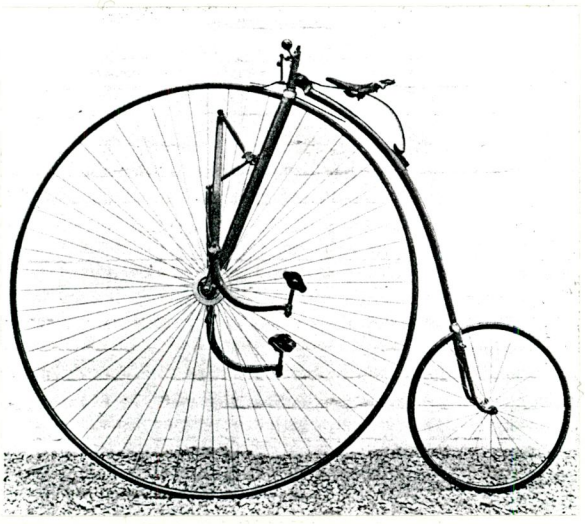

Fig. 14
The Singer Xtraordinary 1878

Fig.15
The Kangaroo, 1884

High bicycles were not very popular with horsemen and carters who felt they should have complete superiority on the road. High bicycles were somewhat faster than most horsedrawn vehicles. They often overtook carriages, frightened horses and teased drivers. There were no fixed rules of the road and cyclists often came to grief because of erratic driving styles. Coachmen were known to whip overtaking cyclists and in one famous case, a devious mail coach guard felled the Trafalgar Bicycle Club with a homemade type of bicycle bolas. The National Bicyclist Touring Club tried to make cycling more organised, providing information on roads, accommodation and cycling events.

The first British legislation to actually refer to the bicycle was the Highways and Locomotive (Amendment) Act. However, this Act gave power to county authorities to regulate the use of the bicycle. The result of this action was a wide

range of laws many of which discriminated against the cyclist.

In 1888, as a result of campaigning by the Cyclists Touring Club, a clause was added, (Section 85), to the Local Government Act which repealed all County Bye Laws. Bicycles, trycyles and velocipedes became legally recognised as carriages,

"within the meaning of the Highway Acts".
(Watson and Gray 1878, p.115).

TRICYCLES

Tricycles were first used to a limited extent in the 1860's. These early machines were mostly standard velocipedes that had been fitted with two wheel rear axles. The first three wheeler to be produced commercially was the Dublin Tricycle of 1876. This machine had a treadle driven rear driving wheel and two smaller steering wheels. In 1877, James Starley began large scale production of the Coventry Lever Tricycle. This three wheeler was adapted from an earlier version of the Ariel High Bicycle.

Starley designed this Ariel to be ridden by ladies with long skirts. He offset the backbone and rear wheel so the lady could sit with both feet one side of the front wheel. Both treadles were placed on this side. This design, however, proved unsuccessful. Later, Starled added an extra wheel for stability. He improved the steering and drive mechanisms and created the highly successful Coventry Lever Tricycle.

In 1878, Starley invented the differential gear.

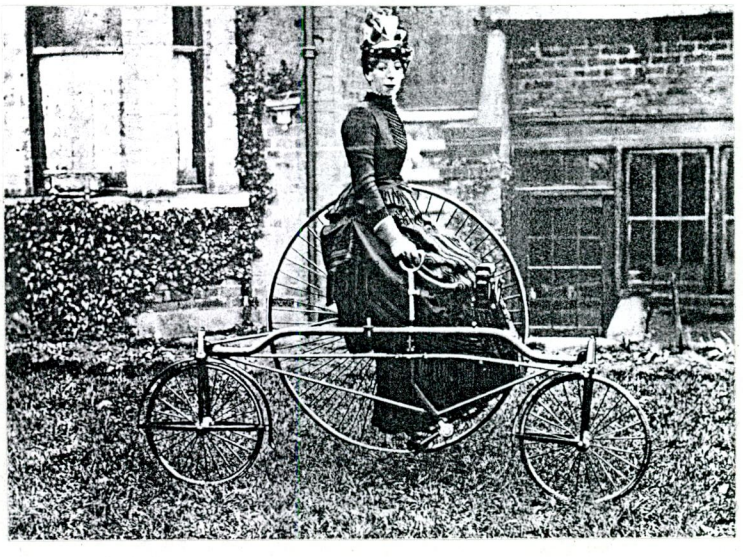

Fig. 15 The Coventry Rotary Tricycle

This very important mechanism is still used in almost every three and four wheeled vehicle today. At the time, it allowed tricycles to have two parallel driving wheels. Tricycles with this driving wheel arrangement had a smaller stabilising wheel at the front or rear of the machine. Starley's Salvo Quad from 1878, incorporated an even smaller fourth wheel for extra stability.

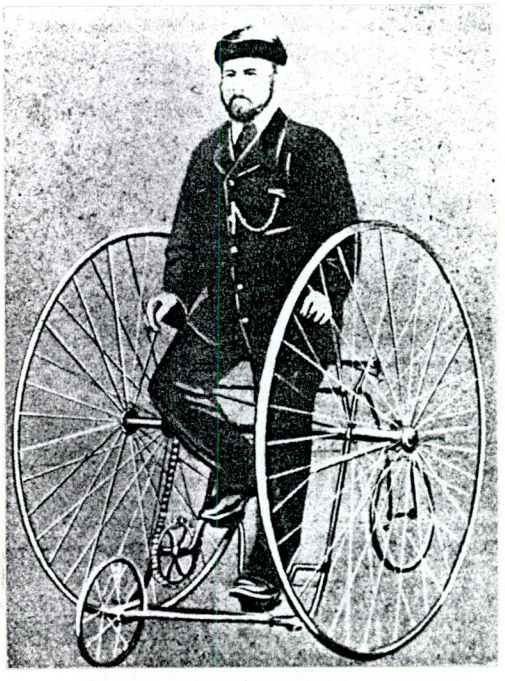

Fig. 16 James Starley on his Salvo Quad,1878.

Tricycles were generally considered to be safer than ordinaries. One important advantage was they would remain upright at slow speeds or when stationary. Many early tricycles were rear steered and lower geared models proved efficient hill climbers. Downhill, however, rear steerers were more dangerous since there was little of the rider's weight on the steering wheel. Any sudden application of the brake

would lift the rear wheel off the ground, thus throwing the machine and rider forward. Manoeuvering three wheels through potholed roads was understandably more difficult than on a bicycle. Tricycles could easily turn over if they encountered a rock or hole and unfortunate riders often became entangled in the large driving wheels.

At slower speeds, however, touring on a tricycle was a pleasent experience. Tricycling did not require the same athletic skill needed to master a high bicycle. Tricycling was considered a more refined activity and was taken up by respectable professional people such as doctors and judges. As time went on, a certain social status became associated with their use. Tricyclists considered themselves more dignified and mature than those who rode bicycles. One circular which was sent to tricycling members of the Bicyclists Touring Club stated,

> "It is desired by most tricyclists to separate themselves entirely from the bicyclists who are a disgrace to the pastime,while tricycling includes Princes, Princesses, Dukes, Earls etc. There are none of the upper circular who ride bicycles. This is easily seen and it is plain that the tricyclists are all together a better class than the bicyclists and require better accommodation on tours etc.".

One of the reasons for this class divide was the cost of the machinery. New tricycles were a lot more expensive than bicycles of similar quality. The main reason for this expense was the complexity of the tricycle's mechanical parts. Because design improvements were constantly being made, production runs tended to be short. Since status-conscious

tricyclists wanted to be seen riding the most up to date models, tricycles became obsolete quickly.

Tricycling touring clubs emerged in the late 1870's and even lady tricyclists were accepted. By the end of the 1880's, almost all big manufacturers were producing at least one type of tricycle. There were many types of tricycles on the roads with a variety of steering, gearing and driving mechanisms. Tandem tricycles had become popular. Early double tricycles had their saddles side by side and were called "Sociables". The Humber Tandem was one notable design with one saddle behind the other. It was fast and efficient with front direct steering and a single drive gear at the rear of the machine.

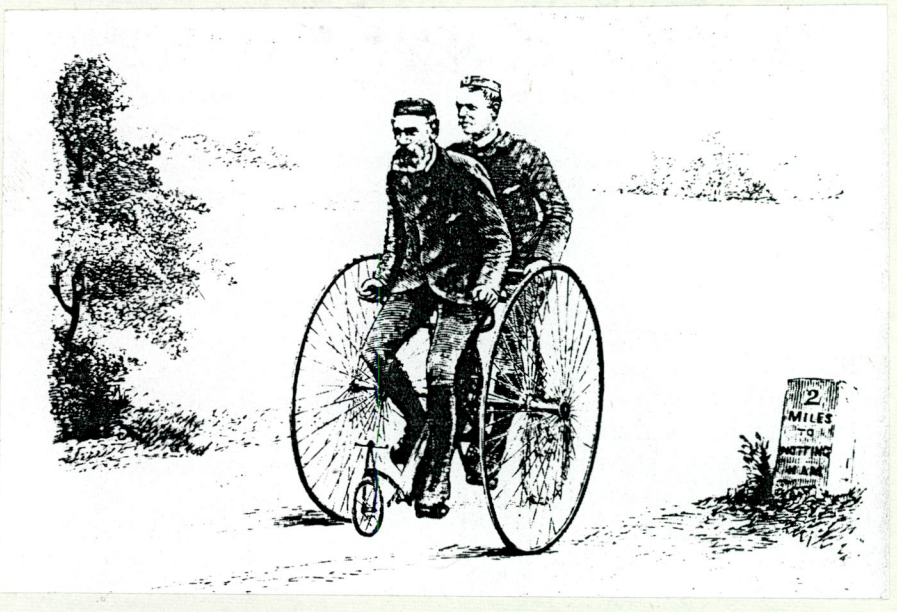

Fig. 17 Racing on a Humber TAndem Tricycle, 1885

Since much of the design and manufacture of tricycles was carried out in Britain, tricycling was principally a British activity. It did, however, become popular in France, Germany and America and indeed tricycles were exported to all parts of the world. Tricycles were used to carry and distribute goods from 1881 when the British Post Office supplied its staff with carrier tricycles to distribute mail.

In 1884, the "Evening Standard" newspaper ordered a fleet of Singer Carriers to make deliveries. Many shopkeepers and tradesmen subsequently took up this idea and a wide range of carrier tricycles evolved. Although the role of the tricycle as a goods carrier would become even more important later on, the development of the safety bicycle marked the decline of the tricycle as a popular vehicle

THE SAFETY BICYCLE

In 1879, H.J. Lawson designed the first bicycle with a chain driven rear wheel. Lawsons"bicyclette" featured a 40 inch front wheel and a 24 inch wheel at the rear. It resembled a cross between a high bicycle and a velocipede. The saddle on this odd machine was moved back behind the chain wheel which effectively removed the tendency for the machine to tip forward. The bicycle had a single, straight backbone frame with supports to accommodate the chain wheel, saddle and handlebars. The British bicycle company, Rudge, produced a small number of these machines but they were not a commercial success.

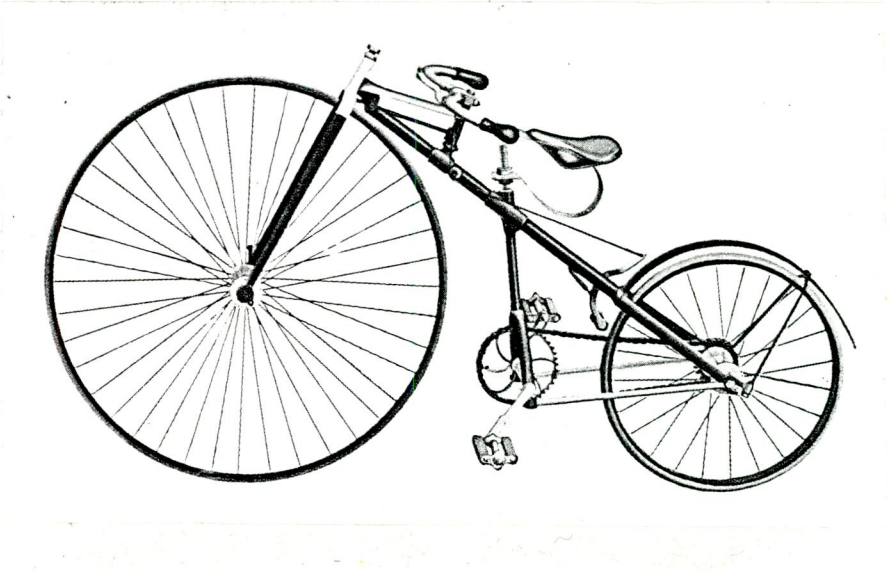

Fig. 18 H.J. Lawson's Bicyclette

In the course of the early 1880's, a variety of solid tyred safeties began to emerge on public roads. These new low safeties were frowned upon by high

bicycle riders who dismissed them as being 'ugly', slow and only fit for women, old men or those of a "timid disposition". (McGurn, 1987: 88). They compared the safeties to outdated boneshakers and predicted that safeties would never entirely replace the elegant high bicycle or indeed the tricycle. It was true that these early, solid tyred machines vibrated more and splashed the rider with mud and water. However, their superior safety, hill climbing ability and free steering qualities far outweighed any of the other disadvantages.

The most interesting machine of these early safeties emerged in 1885, when John Kemp Starley, nephew of James Starley, produced his record "Rover Safety". This safety established the basic design form for the bicycle as we know it today. The Rover bicycle originated the diamond frame which has proved to be one of the most efficient tube configurations ever designed.

The 1889 version of the "Rover", (Fig. 19) had an indirect front steering mechanism. The following year a direct steering handlebar was incorporated, the forks became sloped to improve directional control and the frame was also modified. In the years to follow, the Rover went through eight different models to achieve its almost modern form, (shown overleaf at the bottom of Fig. 19).

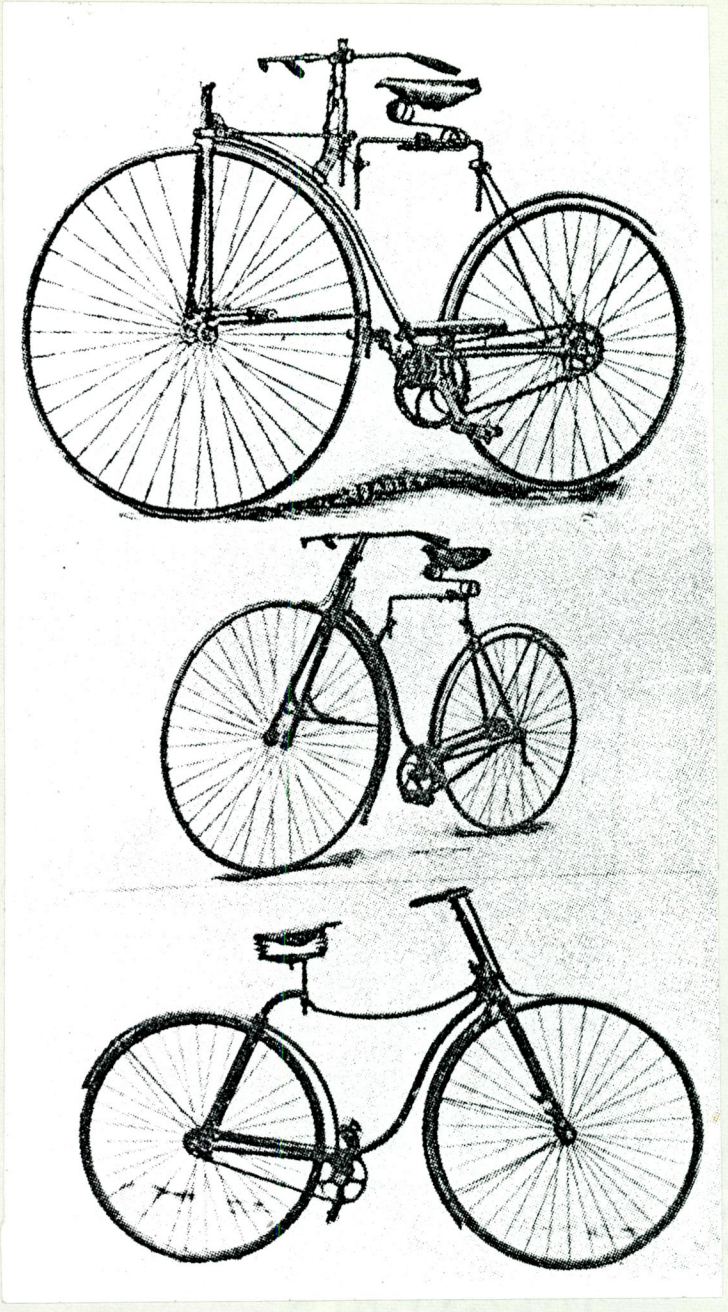

Fig. 19 The Evolution of the Rover Safety

Perhaps the most important achievement of the era which effectively completed the bicycle as we know it today, came in 1888, when John Boyd Dunlop first fitted air-filled tyres to a bicycle. Dunlop was a Scottish veterinary surgeon who was working in Belfast. When a doctor advised cycling for the health of his young son, Dunlop had the idea to fit an air filled tube around the wheel to reduce the vibrations when riding. The first type consisted of a rubber air tube contained in a canvas

pouch and stuck to the rim. Rubber strips were then glued around the running surface. Dunlop experimented with the tyre, found it to be successful and set about developing the product.

Dunlop joined with a Dublin businessman called Harvey du Cros to set up the Pneumatic Tyre Company in Dublin. The first tyres were fitted at the Dublin factory, they were not detachable, punctured easily and were quite expensive. These new sausage-like tyres immediately caught the interest of the public but were not readily accepted as an important development. Some people feared the tyres would explode if overheated, others believed they slowed the bicycle. Subsequent race and time trial victories proved the superiority of the air tyre and effectively advertised the new product.

Although Dunlop believed he had invented the air tyre, the idea had earlier been patented in 1845 by a 23 year old Scottish engineer called Robert W. Thomson. Thomson invented the tyre for horse drawn wagons and traction engines but failed to commercially exploit his idea. The news of this early patent was a setback to the Pneumatic Tyre Company and it invalidated Dunlop's patent. However, the company did prosper in the end as a result of the clever Du Cros acquiring the patent for wired on detachable tyres.

THE BICYCLE BOOM

The advent of the safety bicycle provided a convenient and comfortable mode of transport available to all classes of society. Tyre technology and manufacturing techniques continued to improve in the early 1890's. Whole new groups of people began to show an interest in the bicycle. People of every age and social class wanted to cycle and so great was the market for new bicycles that manufacturers were unable to satisfy orders.

With its large scale production and wholesale manufacture, the safety bicycle became an efficient means of transport as well as a vehicle for sport and recreation. The bicycle became an object desired and ridden by millions. Machines were cared for as if they were horses. They were not, however, left in a stable or outhouse but stored proudly in the hall.

Bicycles were commonly finished to the tastes of the owner, most men and women had their bicycles painted in their own particular colours. In London parks, cycling aristocracy mingled happily with middle classes. Lower middle classes who would find it quite a major investment to purchase a bicycle, secured loans or saved to buy bicycles in a search for adventure and liberation.

In Paris, the Bois de Boulogne was equally inundated with cyclists. Bicycle fashions became a popular topic. The writers of women's society pages discussed the suitability of cycling outfits, the splendour of the multi-coloured cycles and the trivialities of the riders. In these days it was important to be seen, to perform and to shine in public.

During the mid 1890's in America and England, manufacturers had been working fervently to keep up with the demand for cycles. However, in 1897, as a result of over-capitalisation and over-production, the bicycle business slumped. The flow of orders for bicycles dried up considerably and many manufacturers went bankrupt. In America, one of the largest firms, Albert A. Pope, began to buy up ailing companies, aiming for a monopoly. A price war developed and the cost of some models dropped from $100 to $30. The overall effect was a general drop in prices and subsequently the bicycle became accessible to even more types of people.

This period of intense cycling activity and manufacture during the mid 1890's was known as the "bicycle boom". Its social and political implications have been dealt with in the following two chapters.

By the turn of the 20th century, the great craze for bicycles had ended. The bicycle was no longer considered a novelty but had become an important part of everyday life and society.

THE BICYCLE IN THE 20TH CENTURY

As the cycling vogue among the wealthy ended and markets were flooded with cheaper American machines, British manufacturers were forced to reduce the prices of their bicycles. No longer was there an endless market for top quality machines in the more fashionable classes. American prices brought the bicycle within the reach of the working classes who eagerly bought them. British manufacturers were forced to readjust their marketing attutudes and aim at a more general, lower class market. More advanced production processes, using liquid brazing and sheet steel pressing allowed manufacturers to reduce manufacturing costs and by 1909, the average cost of a bicycle fell to four pounds as opposed to twenty at the height of the boom.

This did not mean that everyone could suddenly afford a bicycle. In 1901, the best paid manual workers earned around a pound a week and still needed to use hire purchase schemes or to join a club which would buy their machines cheaper in bulk. For the first time, bicycles were ,

> "coming into the hands of those who had the greatest need for cheap and independent mobility".
> (McGurn, 1987: 132)

We have seen earlier how campaigning by the C.T.C. brought about changed attitudes towards infrastructure and road usage in general. These efforts ironically served to pave the way for the automobile. In the late 1880's, Daimler first began to produce cars in his German factory. Although they began to emerge

on American and British roads as early as 1900, it was not until after the First World War that car numbers began to affect the overall pattern of cycling. IN America, development occurred so fast that cars could be purchased for less than$200 in 1915. In Britain, however, it was not until the early Twenties that cheap "Austin Rovers" and "Morris Crowleys" brought the car within reach of a large proportion of society. In the years to follow, cars improved technically, prices fell further and in general incomes increased. The number of vehicles grew steadily and by the Second World War there were over three million motorised vehicles in Britain.

The bicycle was bound to lose its prestige as a transport vehicle especially among the middle classes who were eager to become part of the motor age. (The C.T.C. lost 4,200 members between 1899 and 1910). In other sectors, however, the bicycle was still being utilised effectively. By the early Thirties, bicycles had become invaluable transport vehicles for policemen, postmen, all manner of businesses and tradesmen used carrier bicycles and tricycles to transport goods. Carrier cycles were cheap and easy to maintain, they made horses and carts unnecessary and could be ridden by all ages.

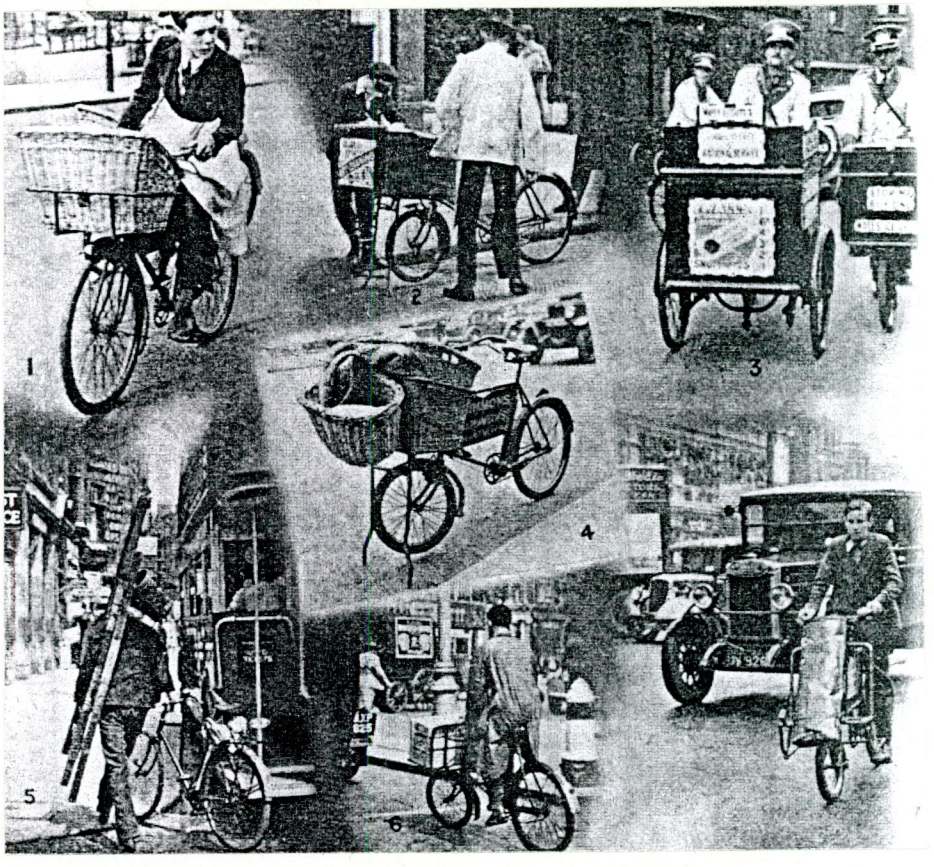

Fig. 20 Picture
"Hats off to the errand boy".
This collage of London carrier cyclists appeared in the "Cycling" Magazine in 1939.

The bicycle became the main vehicle of the manual working classes. Workers cycled to and from factories and at factory gates, bicycle racks were filled with many different makes and models. Housewives used the bicycle to do shopping and reach social engagements. Even young boys, (not so much girls), would be seen riding to school or making newspaper deliveries on bicycles. Cycling had become a predominately working class activity. It was still used as a recreational vehicle and cycling holidays, outings and clubs remained ever popular. The bicycle

played an important role in the development of mass leisure activities, providing the young with a convenient means of socialising and travelling to cinemas and dance halls.

In the 1930's, many new advances were made in frame and tube technology. Alloy components became increasingly available and the first derailleur gear systems evolved. These new developments did little, however, to imrpove the status of the bicycle, which suffered even more as lower priced cars came within the financial reach of the working classes. The motor industry went from strength to strength and sales of bicycles in Britain fell by half between 1950 and 1960. By 1965, there were nearly eleven million cars and motorcycles in Britain which was roughly one motor vehicle for every five of the population. Where once people looked to the bicycle as a medium of recreation, the car became the luxury product to bring magic to their lives. Where once the cyclist was the instigator of political change, the new generation of car owners had become the dominant voice of society. The bicycle industry seemed set on the road to decline.

In the late Fifties, an entirely new bicycle design was developed by Alex Moulton of Bradford-on-Avon, which returned the bicycle to fashion again and halted the trend towards steadily decreasing sales. Moulton, an independent engineer, designed an open framed bicycle with small sixteen inch wheels. The bicycle was sufficiently geared up so it would travel as fast a normal 27 inch wheel bicycle. It featured a rubber suspension system to absorb the vibrations from the small wheels. The bicycle was compact, novel and the concept of a mini bike fitted

in nicely with the mini cars and skirts of the era.

Moulton offered his design to Raleigh Industries in 1959 but they rejected it. Moulton began to produce the bicycle himself. The bike grew fashionable and sold remarkably well with sales reaching 70,000 in 1965. In the same year, Raleigh introduced their own small wheeled bicycle, the RSW 16, (Raleigh Smaller Wheels - 16 inch). As Moulton held the patent for the in-frame suspension system, Raleigh used fat low pressure tyres as shock absorbers. In 1967, Raleigh did a deal with Moulton, purchased his company and, at the same time, retained his services as a consultant. At the end of the 1960's, Raleigh reported that Moulton type bicycles accounted for up to 30% of their total British sales. The important point behind the Moulton RSW 16 and other small wheelers was their marketing as fashion vehicles. These new designs were triumphs of styling over quality although they performed surprisingly well. Raleigh executives realised that bicycles were consumer goods, not bits of light engineering as one executive pit it:

> "A fashion industry in which kids of all ages were the consumers was the ideal solution to Raleigh's product problems. It introduced the element of product obsolescence which the industry desperately needed".
>
> (McGurn: 1978: 166)

Fig. 21

Fig. 21 Alex Moulton on his Cycle.

The oil crisis of the early 1970's, caused another surge of interest in the bicycle. Some Americans took to their bicycles as a patriotic means of saving the country's oil reserves. Later in the 1970's, a popular interest in health and fitness created a recreational cycling boom. Manufacturers began to produce large numbers of lightweight cycles. Improved quality braking systems, touring panniers and crash helmets were developed. As cyclist numbers continued to grow, city planners began to take more notice of the cyclist. To encourage commuter cycling, transport planners advocated safe cycle parking at places of work and at suburban bus and train stops. new cycle lanes were built and existing networks updated with more adequate traffic signals. These developments give us an important insight into the way society has viewed and continues to view the role of the bicycle. This area will therefore be examined in more detail later on in the chapters on the bicycle and society and the politics of the bicycle.

California, where the cycling boom originated has generated a succession of new innovations in cycling. The International Human-Powered Vehicle Association was founded here by Dr. Chester Kyle in 1976. Human powered vehicles are mostly recumbant bicycles or tricycles where the rider sits back to pedal. In some versions, the rider pedals lying face down. Some designs are enclosed in plastic or fibreglass streamlined shells while others are left open. The H.P.V. Association has given designers a focus for their activities by organising annual races and record events in Europe and the United States. Human powered vehicles, (called phase three cycles) can out-perform

racing cycles and are an exciting form of transport. Although some enthusiasts believe that in the future, bicycles developed from human powered vehicles will eventually become as common as the ordinary bicycles of today, problems with hill climbing and poor visability will need to be solved.

The sport of BMX, (Bicycle Motor-cross), also evolved in California. The sport was first organised in the late 1970's. The competition consits of a race by young helmeted riders over a purpose built undulating dirt track. The bicycles themselves are designed specifically to be extremely shock resistant and highly manoueuverable over rough terrain. A complete range of clothes and accessories has been created for the sport.

The third important innovation to have come from the Californians is the "mountain bike" which also evolved in the late 1970's. Around this time, an amateur sport had developed which involved racing motorcycles and bicycles down rugged hillside and mountain paths. When the use of motorcycles for the activity was banned by the authorities, all attention focused on the bicycles. At first, the bicycles used were ordinary utility machines. These, however, proved rather ineffective; their back-pedalling brakes overheated quickly, frames broke frequently and the light tyres constantly punctured. Amateurs began to produce their own specially constructed machines with strengthened frames, wide heavy tyres and low gearing. The first commercially produced mountain bike prototype was exhibited at the 1981 New York Bike Show. The new features included wide handlebars, fat knobbled tyres and powerful cantilever brakes. Mountain bikes now account for about 50% of all bicycle sales.

The mountain bike has become a chic fashion accessory as well as proving an effective commuter vehicle. The most recent breed of bicycle to emerge in the 1990's, is the hybrid which combines the style of the mountain bike but is not as over-engineered and more suitable for use on the streets. Hybrids feature the latest innovations in gear, brake and frame technologies but all these changes are mere tinklings to a bicycle design that originates from the 19th century.

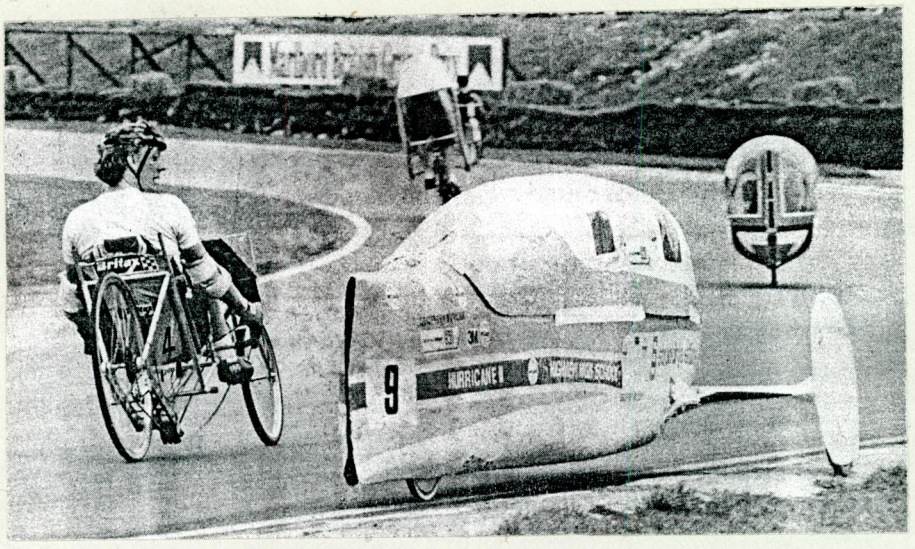

Fig.22 The Gifts of California: Human Powered Vehicles

the BMX and the Mountain Bike

CHAPTER 2

THE BICYCLE AND SOCIETY

> "Few articles used by Man have created so great a revolution in social conditions as the bicycle"
> (Bureau of Census, 1900)

In this chapter, the role of the bicycle as an instrument of social change will be examined. The writer will look at the concept of the bicycle as a social emancipator, the effect of cycling on social class structure and women on wheels. This chapter also examines other aspects of the bicycle as a transport vehicle in past and present day society.

For much of its history, the bicycle was a plaything of the wealthy simply because they were the only people who had the capital to purchase the machinery and the time to indulge in any cycling activity. The earliest human-powered vehicles were built solely for the amusement of the rich. These early machines were elaborately decorated and served more as status symbols than practical vehicles. In 1791, when Sivrac introduced the celerifere, it was the rich and fashionable young men of Paris who rode and raced the machines in the Champs Elysees and in the gardens of the Palais Royal.

With the emergence of the Draisienne and similar Johnson machines in England, hobby horse riding became equally in vogue with the fashionable rich of London. The caricaturists of the time made great money from the activity using the hobby horse to ridicule leading social or political figures. The first association between the middle classes and the bicycle came during the middle of the 19th century

when the amateur mechanics took up the quest to find an efficient means of personal transport. The most successful of these mechanics, William Sawyer, produced a wide range of high quality quadricycles but his prices were far too expensive for anyone but the upper classes. Sawyer had aristocratic and royal patrons including the Prince of Wales and the Emperor of Russia. In Paris, Pierre Michaux found equally prestigious patrons when be began to produce velocipedes in the mid 1860's. Velocipeding became an important social activity in Paris. Velocipedists could ride in new spacious and elegant riding schools or tour through the avenues of the Bois de Boulogne. Michaux supplied the Prince Imperial, Louis-Napoleon with a velocipede which he rode through the streets of Paris and encouraged velocipeding among the socially high-placed, the wealthy and the titled. House party guests at country chateaux often entertained themselves with velocipede races and the rich of Paris who holidayed at the coast found it quite enjoyable as well as fashionable to velocipede along seaside promenades.

As velocipeding became more popular and spread around Europe and to America, the prices of the machines dropped and they became somewhat more accessible to the lower classes. Some civil servants, who managed to purchase velocipedes were known to ride them daily to their offices from the suburbs. Velocipede races which had become common throughout Europe attracted a wide cross section of society. Although velocipeding lost some of its appeal to the fashionable wealthy as velocipedist numbers increased, manufacturers began to produce highly elaborate models to appeal to status conscious individuals.

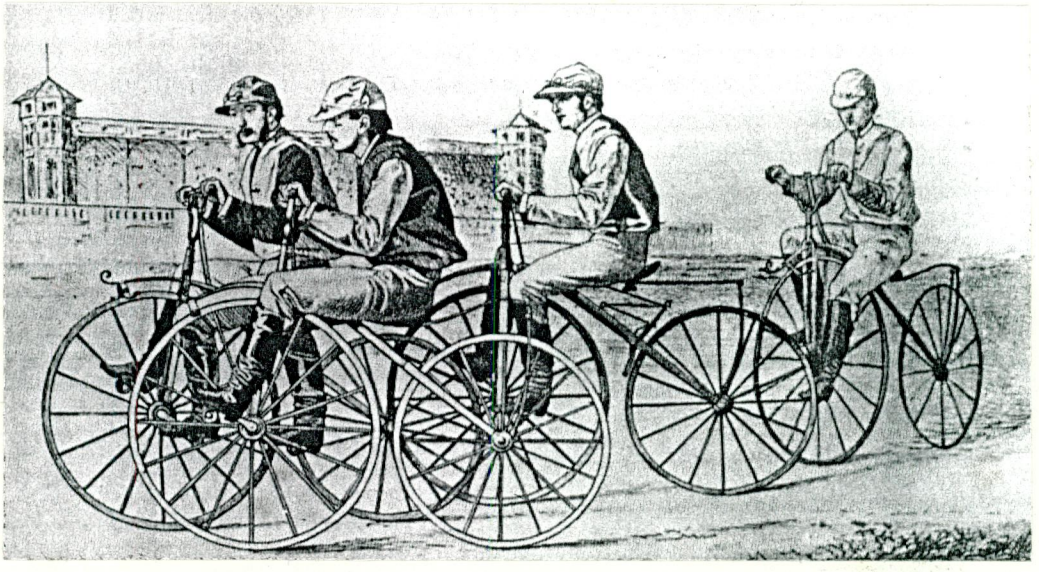

Fig. 22 French Racing Velocipedists on Michaulines, 1868

The high wheeler was predominantly the machine of the middle class young men from towns and cities. To begin with, these machines were as expensive as the velocipede, (at around £20), but gradually it became possible to find cheaper new machines. For most working class men, however, the price of a high bicycle, even with hire purchase, was beyond their reach. It was only after 1882 when new bicycle prices dropped to around £5 and second hand machines became available that working class men aspired to the high bicycle. High bicycle riders took themselves very seriously. Perched high above the commonalty on their elegant machines, riders had a great sense of social importance. The knowledge that they could master the fastest vehicle on the roads at the time, further fuelled this opinion.

Most riders belonged to a club. Clubs were typically organised in a military fashion with captains, sub captains and buglers. All clubs had their own uniforms, typically dark in colour, brass buttoned jackets, tight breeches and stout riding shoes. Riders also wore pillbox hats with the club badge attached. The captains could be identified by their gold braiding or gilt badge, sub captains wore the equivalent in silver. Bicycle clubs were primarily a British phenomenon of the 1870's and 1880's.

The majority of clubs were very respectable and there was a great sense of pride being part of the club. The membership fee usually dictated the social class of members accepted and, as most fees were in excess of 2/6d. and uniforms, £3 - £4, working class members were usually kept away. As second hand machines, however, became increasingly available, the number of working class enthusiasts began to grow, much to the dismay of the more distinguished wheelmen who felt that the status of cycling could suffer because of the unrefined riding activities of these lower classes.

As mentioned in the first chapter, tricycling was taken up by older members of respectable professions. The activity was considered to be a more dignified and refined pursuit compared to the hazardous and hectic activity of riding a high bicycle. As time went on, a growing rift developed between the high bicycle riders and the triccylists. Although on the roads the two groups co-existed satisfactorily, it was generally accepted that the tricyclists were of a higher social class and they would not associate with clubmen. Another contributory factor for this

class segregation was the price of the three wheeler which was substantially more than that of a bicycle.

The next stage of bicycle development, "The Safety" brought the bicycle within reach of even more social classes, namely the lower middle classes. This group included shop assistants and clerks. Many individual cycling clubs of the Safety Era tended to become less formal, keeping their membership fees down to appeal to more riders of a lower social level.

The safety bicycle brought about an important breakthrough in the fabric of social structure for it allowed aristocracy, middle classes and lower middle classes to indulge equally in a common social activity. Whilst cycling each person became no more than a common cyclist, one and all had to pedal regardless of their social status. The end of the bicycle boom saw the markets being flooded with cheaper safeties and the first motor cars came onto the roads. These lower bicycle prices brought safeties within the reach of the working class, offering them in turn the joys of personal mobility.

Where once the bicycle had been the vehicle to aspire to, the car now took over this role with the middle classes. Indeed, in time even lower car prices brought about this effect with the working classes. Although cycling was to some degree an equaliser of social class, it was not completely utopian in nature and within cycling ranks, there did exist a social structure based on the type of machine ridden. This phenomenon was clearly evident in the conflict between the high bicycle riders and those who first took to the safety. The bicycle's new role as a fashion object has brought about a similar effect in modern society where the mountain bike has become the luxury to which to aspire.

CYCLING WOMEN AND SOCIAL EMANCIPATION

Although Denis Johnson, the great English proprietor of the hobby horses, had developed a dropped frame model for women as early as 1819, the numbers of women riders were never extensive. The activities of women on the hobby horses were generally restricted to pillion riding on tandem machines. The important fact, however, was that as early as that time women had merited a special machine of their own.

Women first began to cycle in any significant numbers in France during the 1860's. Women first competed in an organised road race from Paris to Rouen in 1869. From then on, women competitors in road races became common. These early "velocipedeuses" were figures of emancipation. Although many women racers came from troupes of velocipede acrobats that toured France at the time, non competitive riding became popular with more "respectable ladies". Ladies riding clubs were established in Paris and women riders became a common sight on the main thoroughfares.

The instances of women high bicycle riders were few and far between. With the long clothes women were conditioned to wear, it was impossible to keep clear of the driving wheel spokes. James Starley's "Ariel" did attempt to accommodate longer skirts and allowed women to ride in a suitable Victorian side-saddle position. The Ariel, however, proved impractical to ride and few were even sold.

It was decided that the only suitable machine for women to ride was the tricycle. Even on early tricycles women were delicately seated in a posture that was thought to be more feminine. Such postures often caused

more problems with modesty than they solved. Seated low down, dresses were constantly riding up over the knees because of the pedalling action. To remedy this, some women sewed lead weights into their hems , however, the dresses then rubbed against their knees and tired the riders. Eventually, the common seating position was changed to allow the lady to sit in a more upright position with the dress draping comfortably down in front.

Even with the advent of the safety bicycle, the questions about whether women should ride, how and what they should ride and in what clothes, they should do so were still being debated. These matters of clothing became the main concern of the Rational Dress Society. Long dresses with multitudes of petticoats and highly corseted waists were not only difficult to ride in but they were also dangerous. Tight corsets restricted breathing and long skirts provided ample fodder for exposed wheel spokes. Although improved safety bicycles were fitted with chain and rear wheel guards which made it safer to ride with long dresses, the question of a more suitable cycling attire had yet to be properly addressed.

Bloomers were an American invention of the 1850's. The garment was created by a Mrs. Miller but named after her friend, Angela Bloomer, who praised their usage in women's magazines. The bloomer was commonly worn in America and became highly fashionable at the peak of the cycling boom. In France, a similar knickerbocker costume evolved enabling women to ride crossbased bicycles long before the drop-barred models became commonly available. Drop-barred bicycles were subsequently introduced by manufacturers to accommodate long skirted riders, (an idea borrowed from Denis Johnson).

The Rational Dress Society continued to fight for the acceptance of more practical forms of cycling dress. They proposed an outfit consisting of knickerbockers, long leggings and a long coat in which the rider would look feminine but also have free movement. The society constantly met with opposition from public sectors. In 1894, the C.T.C. reluctantly got involved in the controversy when one of its members Lady Harberton, (the founder of the Rational Dress Society), took legal action against a public house landlady. The landlady had insultingly refused Lady Harberton admission to the coffee bar because of her cycling attire and suggested she go to the men's bar. In the ensuing legal case the court ruled in favour of the defendant and reserved the landlady's right to refuse to serve "rationally" dressed ladies. Although the action was a defeat at the time for the society, it was later celebrated as an important event in the road to the emancipation of women. As time went by women in general were becoming more emancipated and society's view towards morals and manners began to change.

> "By the end of Queen Victoria's reign the bicycle was totally accepted as personal transport for women of all classes".
> (Watson & Gray, 1978: 140).

Large numbers of women began to use the bicycle to get to and from their work in the towns and cities. Those who did not work and who had servants could ride socially in the parks or travel to social engagements. The bicycle was the perfect vehicle for trips to the shops and to visit friends. To the women cyclist, the bicycle became the instrument of liberation. The bicycle offered an enjoyable

and healthy escape from the normal activities of everyday life. No longer was the woman dependant on others for her mobility - the new cycling woman could come and go as she pleased.

As well as being a vehicle of social emancipation, the bicycle also became a means of social integration. Women began to cycle with their husbands, children and young men and indeed, if they had none of the afore-mentioned, cycling provided an excellent means of mingling with cyclists of the opposite sex. A study on "working class isolation and mobility" in rural Dorset by P.J. Perry found that intra-parochial working class marriages decreased from 77% before 1887 to 41% between 1907 and 1916. However, marriages to partners living six to twelve miles away increased from 3% to 9%. Perry attributed this new courtship mobility largely to the bicycle. Although this phenomenon was not so much due to the increased mobility of women as men, it does provide an interesting example of the bicycle's importance as a courtship vehicle.

This idea was very prevalent in the "sociable" and "tandem tricycle" riding of the earlier years. The sociable was particularly suitable, allowing the partners to ride arm in arm. The tandem bicycles of the 1890's were equally popular with couples.

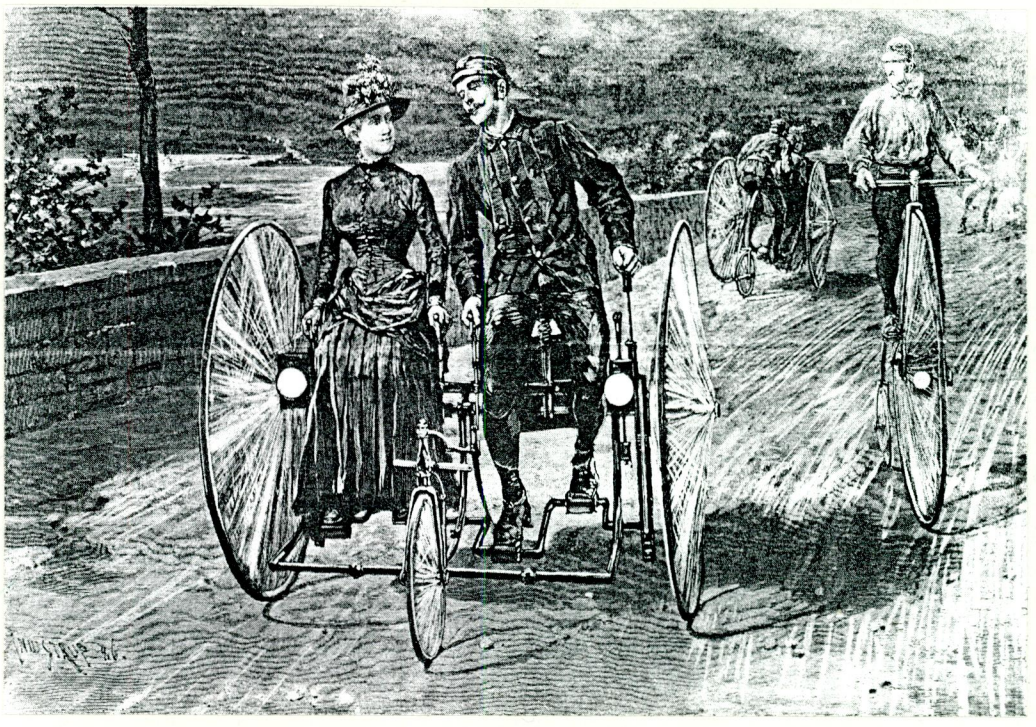

Fig. 23 "Sociable" riding in New York, 1886.

The new sense of freedom experienced by women safety cyclists had, of course, been sampled by the high wheeling clubmen many years before. With the appearance of the safety in the 1880's and its subsequent spread to the lower classes, more and more people began to enjoy this sense of emancipation. The bicycle became the essential vehicle of recreation and adventure. John Foster Fraser's 1896 travelogue "Round the World on a Wheel" tells of his amazing journey to different parts of the world where he encountered many interesting groups of wheelmen. Although it is easy to think that the bicycle's role as an instrument of liberation is unimportant in modern society, Moslem women, who are denied the freedom of the bicycle because of their lower social status and the walking millions of the Third World, would be quick to make you reconsider.

THE UTILITARIAN MACHINE

The opening chapter traces the development of the bicycle as a work vehicle from the early running machines Drais created to inspect the forests of Mannheim, to the many varied carrier cycles of the 1930's. There have been, and still are,many examples of how the bicycle has been specifically adapted to suit different utilitarian needs. In this section, I shall look at one of these examples, that of the bicycle as a war machine and examine its mixed fortunes as a military vehicle. The bicycle still remains the workhorse of many millions in the Third World and it is in this area, I will look in the concluding part of the chapter.

THE BICYCLE AS A WAR MACHINE

Almost from its introduction, people have considered the possible use of the bicycle as a war machine. In the course of the 1880's and 1890's, military tacticians debated the future role of the bicycle in warface. Many people had high expectations for the bicycle in the Boer War of 1899 to 1902 and when war broke out the Boers commandeered many machines from the inhabitants of Johannesburg. Although they did manage to construct a few rail bicycles from ulti-cycles arranged in parallel, the bicycle proved ineffective under fighting conditions.

The Americans had similar ideas in the war against Spain in Cuba but unridable terrain proved the downfall of their cycling troops. The Europeans also believed thebicycle could prove effective in a war and many cycling clubs, who already had uniforms and badges, converted into volunteer

forces. When the First World War broke out, there were fourteen reserve bicycle-mounted batallions. Books of military drill for cyclists were written. Army tacticians practiced manoeuvres such as the "Zariba" in which the cyclists formed a hollow square, upturned their machines and spun the wheels to frighten enemy horses.

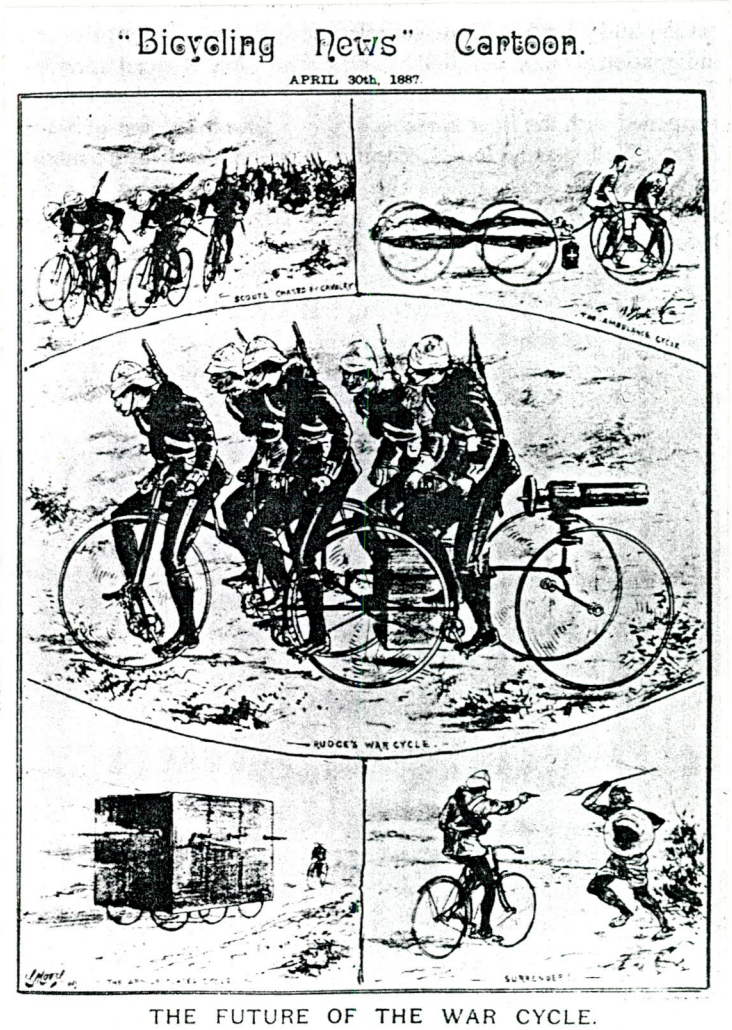

Fig. 24 Possible uses of the War Cycle, 1887.

The bicycle did prove itself useful in both world wars. In the First World War, the British army bought BSA folding bicycles which they maintained were useful for scouting with riders being less conspicious than horsemen. In the Second World

War, the bicycle was efficiently used by commandos to go behind enemy lines. Bicycles were a good means of transporting troops along roads when petrol was scarce. They were often used to speed up a landing or advances. Cyclist despatch riders were used occasionally during both wars but the motorcycle was far more suitable for this purpose. For the scores of refugees that moved across Europe, the bicycle was an invaluable means of carrying belongings. In Britain, with most cars off the roads during the war, the bicycle was used extensively.

When the conditions were right, however, the bicycle was an extremely efficient piece of military equipment. In 1942, when the Japanese attacked Singapore, their armies took thousands of bicycles with them. Guided only by basic school maps, the Japanese cycled along jungle roads to Singapore. Each company of soldiers had its own expert bicycle repairer and broken bicycles were either fixed along the way or replacements seized from local villagers. The British believed that the Malayan jungle was impassable because roads and bridges had been blown up. They did not figure on the bicycle which could be easily carried over obstacles. With the heat of the sun, the tyres of many bicycles burst and, not having time for repairs, the soldiers trundled along on the rims. The sound of hundreds of rims drumming in the distance made the British believe they were tanks approaching and the defences retreated. The Japanese advanced into Singapore and with relatively little effort captured the city.

THE BICYCLE IN THE THIRD WORLD

In the Western world, the predominant function of the bicycle has always been and still is as a vehicle of leisure. For many millions in the Third World, however, the bicycle exists as a tool for survival.

In China, there are about 180 million bicycles which is about seventy to every motorised vehicle. Private car ownership is restricted to public officials. A new bicycle in China costs the equivalent of three to four months' pay and is, therefore, a very serious investment. China produces about 32 million bicycles annually and production is rising at a rate of 45% per year although most of this expansion is exported. Cyclist numbers in China are rising at about 12% per year and even 20 foot cycle lanes either side of public traffic are not sufficient to accommodate their numbers. The use of the bicycle as a load carrying vehicle is very important throughout China. Specialised tricycles are manufactured to carry furniture, timber, even livestock. China differs from most other Third World countries in that women commonly ride bicycles.

In the Third World, the main transport activity is the carrying of small goods such as firewood, farm produce and water, goods easily accommodated on a bicycle. Yet only a few Third World governments attempt to make them more accessible to their people. The bicycle has proved invaluable for the continued existence of a decentralised Health Programme in Tanzania. The bicycle allows health workers to cycle to outlying rural communities. bringing essential vaccines a greater distance before the heat destroys them. Bicycle trailers provide the

only ambulance service available in these rural communities. They are also used in Nigeria, the Cameroons and elsewhere. Load carrying tricycles are an essential component of the goods distribution network in many Third World countries. In Bogotq, Colombia, a major bakery replaced the 90 troublesome vans that supplied its 20,000 sales outlets with 1,200 carrier tricycles. As well as creating over a thousand new jobs, the distribution costs dropped significantly and sales rose because the tricycles got through congested streets more quickly and delivered more reliably. In Mexico City, where traffic flow averages at about two miles an hour, cycle delivery is even more extensive.

In Penang, Malaysia, there are more than 1,700 registered tricycle rickshaw, (trishaw), pedallers. These pedallers cater for tourists, take children to school and carry foodstuffs and laundry. Trishaws are cheap, personal and pollution free vehicles. Although these trishaw pedallers need to work long, hard hours and get paid very little wages, to the pedallers and their families, the trishaw is an essential means of income and survival. The government, however, does not look favourably on trishaw pedallers and have tried to suppress the activity generally. The reasons they give are the trishaw pedallers' association with drug trafficking and theft, and the fact that they obstruct faster traffic. After years of restrictions by the Indonesian Government on Jakarta's initial 100,000 becaks, (tricycle riskshaw taxis on which the driver sits behind the passenger), the numbers fell to around 40,000. Not satisfied that this had reduced traffic congestion sufficiently, the authorities took the radical step of confiscating the remaining 40,000 and dumped them in the sea.

What are the redundant drivers to do? Train them as taxi drivers was the Indonesian Government's answer. Yes, and let them suffer even more exploitation at the hands of taxi companies. At least when they had their own trishaws, what little money they earned was theirs. As was the case with the emancipated women mentioned in an earlier section, the tricycle or bicycle gives the owner a personal identity and a freedom not shared by those whose only means of mobility is 'shank's mare'.

Why should a government try to suppress an activity that is vital to these lower social economies. Faster cars cannot be looked on as a solution to congestion problems. Cars take up far more space than tricycles and bicycles and cause extensive air and noise pollution. Trishaws are an integral component of the very tradition and culture of these societies and as such are not only important to the people themselves, but also to the tourists who visit. To remove the component is not only damaging to the economies of lower social orders but to the nation as a whole.

Fig. 26 Carrying Children to School in Delhi.
'The School Bus Trishaw'.

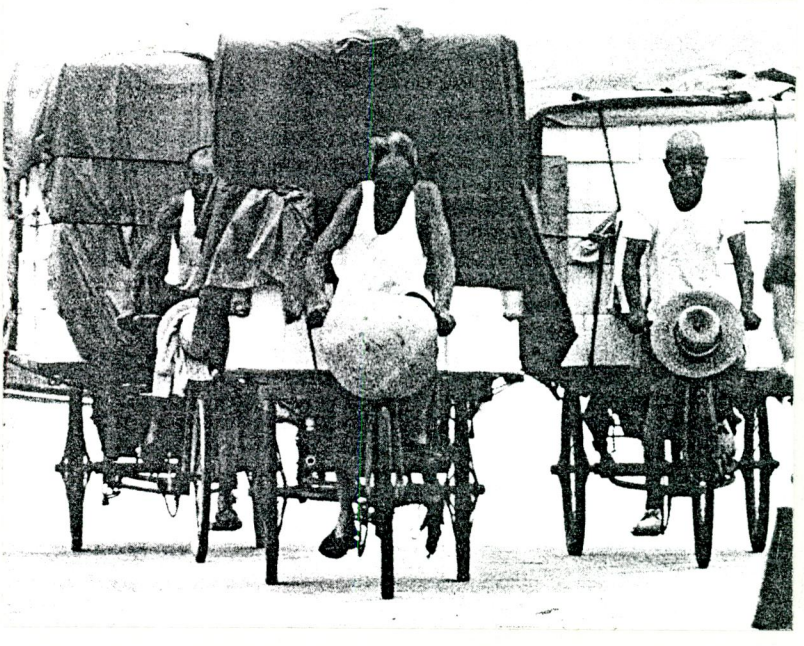

Fig. 27 Three Bicycle Trucks in Peking.

CHAPTER 3

THE POLITICS OF CYCLING

From the early age of hobby borses to the present day, the rights of the cyclist on the road have been the subject of political debate. Early pedestrians felt that cyclists had no right to be on the "roads where the horses went", whilst in the modern world, many motorists hold a similar disdainful view of the cyclist. The first section of this chapter will examine how active political lobbying from early cycling groups brought about legislative changes which improved the status of the cyclist. The chapter will also examine how, as a direct result of determined cycling campaigners, important improvements came about in the suffering infrastructure of the time. The concluding part of the chapter traces the volatile political history of cycling through the motor age and examines its status as a 'green' machine in what is supposed to be a more environmentally aware, modern world.

THE ROAD TO CHANGE

When the first hobby horse riders of the early 19th century took to the roads, the long distance coach systems were still in existence. The Turnpike Trust System and the work of the engineers, McAdam and Telford, maintained most British roads in an acceptable condition for the coaches. In Europe, however, the roads had been deteriorating since Roman times and most were deeply rutted from ox cart carriage traffic. The roads in America were even worse and so many cyclists took to the pavements to

avoid these holes and ruts that the authorities found it necessary to ban them from footpaths and suppress the activity generally . As time went on, one municipal authority after another forbade riding on 'sidewalks'. When the hobby horse craze had more or less died away by the 1830's, the railway networks were being developed and to many at the time, it seemed that future transport would not use the roads at all. By the 1850's, the great coaching days were almost over and for the next thirty years or more, the main roads were empty of public transport vehicles and received less and less maintenance.

The coming of the great velocipede craze in the 1860's, did little to improve the conditions of the roads. Although any slight rise in the ground might halt the progress of a velocipede, the soft mud did not necessarily impede the heavy machines. With their tyres of iron, it was the wet, paved surfaces that posed the greatest threat because wheels could easily slip sideways and cause a fall. Even when those who had some power to improve road conditions began to velocipede, little change came about for they had the newly constructed, elegant and spacious riding schools to practise in. Anyway, no one was quite sure if cycling was only a passing craze.

When the great age of the high wheel came about in the 1870's, the need for better road conditions became a prime concern. These precariously balanced machines would easily pitch a rider over the handle-bars if the driving wheel hit a stone, pothole or any other serious impediment. As more and more clubmen took to the roads, high bicycle falls became so common that they nicknamed them 'headers' or

'imperial crowners'. With increased numbers on the roads, there were inevitable conflicts with professional horsemen who had long been accustomed to empty highways and as ratepayers, (which cyclists were not), they felt they were entitled to do anything they wished. Cyclists were also at the mercy of the police who constantly summonsed riders for 'furious riding'. The cyclists did not take too lightly to these over-zealous lawmen and warned,

> "Bicyclists are mostly young men with their position yet to gain, but they will someday be ratepayers and acts of injustice are apt to rankle in the mind longer than any other feeling"
> (McGurn, 1978: 57).

The implication in this statement from "The Cyclists" 1882, being that, as ratepayers they could have influence over the rate-funded Police Force. Many magistrates were equally unsympathetic to the cyclist. With no legislation referring specifically to the bicycle, many held the opinion that bicycles had no right to be on the roads and were a danger to pedestrians.

The passing of the HIghways and Locomotives, (Amendment) Act in 1878, which was to refer specifically to the cyclist, did little to improve the rights of cyclists. This Act simply handed power to county authorities to regulate cycling and resulted in a wide variety of bye laws which was confusing to all and often unfair to the cyclist. This Act also conveniently neglected to include tricyclists in its legislative net, who were normally of a more influential upper class.

In 1878, the Bicyclists' Touring Club was formed to protect cyclists rights and improve conditions for the activity. By 1886, there were 20,000 members and many of them were campaigning very strongly for changes to the law and the roads. The EArl of Albemarle, who later became President of the National Union of Cyclists, wrote in the 1887 edition of the Badminton Library:

> "The only obstacle that I know of to the use of the cycle becoming universal in this country, is that year by year, the roads seem in many parts of England to be getting worse and worse..... A revolt against the present system of road repairs and surveying is being organised and is likely to have considerable success". (Woodforde, 1970: 3)

The cyclist did have many successes, one of the first being a protest meeting of bicyclists from Birmingham which led to eight road surveyors being fined for not keeping their roads in a suitable state of repair.

After campaigning by the C.T.C., a clause was added (Section 85), to the Local Government Act,which removed county authorities' powers, repealed all laws concerning cycling and declared bicycles, tricycles and velocipedes to be carriages and therefore entitled to use the roads.

In America, a similar organisation was founded in 1880. Under the guidance of Colonel Albert A. Pope, the great cycling entrepreneur, the association campaigned vigorously for better roads. Pope himself subsidised a course in Road Construction at the Massachusetts Institute of Technology in the 1890's. At his own expense he had a piece of

macadam built on Columbus Avenue, Boston, to show what good roads could be like. The CTC continued to campaign, it persevered in erecting danger notices and signposts until the Motor Car Act of 1903 designated the task of putting up road signs to the county councils. The cyclists of the CTC formed a powerful lobby for cycling, breaking the ground for the motoring organizations which began to emerge at the turn of the century. When the great cycling boom was under way in the 1890's, many county roads were still in a very dilapidated condition, strewn with stones and potholes. In many cases where repairs had been carried out, large angular flints were used to fill in the holes, which only served to exacerbate the situation. The cyclists' campaign was strengthened by the increasing numbers of magistrates, policemen and county council chairmen in their ranks and the highway authorities were put under increased pressure.

However, it took until the first cars came on the roads after 1910 for widespread tarring over to occur. The irony lies in the fact that as the road conditions improved, largely because of the CTC's compaigning, the cyclists' position, as road users, got worse.

THE BICYCLE IN THE AGE OF THE MOTOR CAR

During the years of economic slump in Britain in the early 1930's, cycling along with other outdoor activities such as walking, climbing, and camping enjoyed a marked increase in popularity. The attraction of the motorcar had reduced CTC membership to 8,000 in 1914, compared to 60,449 in 1899. After the First World War, however, the bicycle was rediscovered not only as a means of travelling to work but also as a means of recreation. The reduction in the standard number of working hours from 53 hours per week in 1910, to 48 hours in the 1930's, was the main reason for this increase in popularity. In France, a similar effect occurred when the 40-hour week with paid holidays was introduced in 1936. There were an estimated 7 million cyclists in France by 1926 but this figure rose sharply to 9 million in 1937 and 1938. In France, these new working conditions allowed millions of Parisiens to take to the countryside for weekend breaks and they provided a vital means of escape from depressing mill towns, factories and mining villages for English workers.

Cycling was not the safest of activities at the time. Figures for deaths and injuries among cyclists rose to a peak between 1934 and 1941, at which time there were about $2\frac{1}{2}$ million regular drivers and 9 million regular cyclists. There were more cyclists killed on the roads in 1934 than in 1963. In April of 1934, Parliament discussed the Road Traffic Bill to try and reduce these frightening numbers. Car owners who saw themselves as a persecuted minority about to lose their freedom, protested strongly. Some maintained that driving was a relatively recent phenomenon and drivers needed time to get used to the

roads, others suggested that systems should be introduced to prohibit cycling in very crowded areas.

In its editorial of the 10 March 1934, "Cycling" addressed the politics of the situation. It stated that,

> "The Minister of Transport must choose between the 'lesser important' emnity of the cyclists and the formidable opposition of the whole motoring community, which financially and industrially, is now bound up with the life of the nation.... He is an anti-cyclist because he caters primarily for an age in which none of the leaders of public thought in transport matters are cyclists.
> (McGurn, 1978: 155).

In the end, the Act was passed in 1935 and there were the first reductions in accidents for several years. In this legislation, the speed limit in urban areas, (roads with street lighting), was restricted to 30 m.p.h. This legislation also introduced the first driving tests and pedestrian crossings. The Government, in an effort to reduce the conflict between cyclists and motorists moved to take more cyclists off the roads by creating segregated cycle paths. This action, however, was not undertaken in earnest by the authorities. Building started in 1935 but by 1937, only 137 miles of cyclepaths had been laid. These cycle paths were not readily accepted by cyclists either who saw them as an attack on their rights to use the road. The CTC argued that the cycle ways would be a low priority as far as maintenance was concerned

and would fall into disrepair, proving just as hazardous as the roads. These cycle paths also used the main traffic junctions, pushing the cyclist onto the road just at the most dangerous points. In many cases, the fears of the CTC were justified for many paths were and are badly maintained and therefore avoided by cyclists.

The CTC further involved themselves in what now seems questionable political lobbying for the cyclist in 1939. In that year, because of wartime blackout regulations, car headlights were forbidden. In the course of a month, road deaths rose by 100%. The Government introduced masked lights with minimal illumination and proposed that cyclists carry rear lamps. The CTC were strongly opposed to this proposal, stating that the onus for avoiding an accident lay with the overtaker and not the overtaken. They maintained that if a car expected to see a cyclist's light at night, they would drive faster and kill more cyclists whose lights were out. The CTC's political influence with a rather unsympathetic parliament was not enough, however, and the legislation was introduced, initially as a war time measure, and then permanently.

Post War Britain of the 1950's, gave a high priority to recreation. Huge numbers made their way to the seaside,holiday camps and to local leisure activities such as the cinema and dance halls. People sought new pleasures in which to indulge. Although the bicycle still gave the freedom of the countryside to many thousands of cycle-tourists, in general, there was an increase in the standard of living and the attention of the mass population turned to the motor car. In the ten years after the war's end, the

number of motor vehicles increased by 300%. For many years, the motor car had been a pleasure shared only by the wealthy so when these pleasures became available to the population at large, the new motorists fought tooth and nail for their rights on the road. Although the numbers of private car owners were only a small number of total transport users, they campaigned with a noise and power equal to that of their early engines. Motorists in general paid little heed to safety regulations and accidents were rife. Where cyclists were concerned, the motoring organisations suggested training them to cope in traffic rather than attempting to restrict their members. In 1954, CTC resigned from R.O.S.P.A., (the Royal Society for the Pevention of Accidents), claiming that it was controlled unjustly by those with motoring interests. The new President of R.O.S.P.A. was the Chairman of Vauxhall Motors, its Chairman of the Road Safety Committee was a leading figure in the legal department of the Society of Motor Manufacturers and Traders. The CTC felt that R.O.S.P.A's public campaign assumed that the onus of avoiding accidents lay with the cyclists. The numbers of CTC members dropped from 40,000 before the war to 20,000 in 1969. The number of kilometres travelled by cyclists fell from 23,000 million km in the early 1950's to around 4,000 million km in 1974.

In 1974, however, there was a marked turnaround and member numbers began to increase substantially. The main reason for this rise was the Oil Crisis of the 1970's. Throughout Europe and America, the numbers of cyclists and the sales of bikes rose dramatically. InBritain, cyclist numbers rose threefold in the

years from 1974 to 1979. The peaksales times coincided with the worst of the petrol shortages although not all of these increases were a direct result of a desire to save the nation's oil reserves. In the 1970's there arose a strong general interest in health and fitness. Possibly initially prompted by others who had patriotically left their cars behind, many more people began to cycle again for recreational purposes.

Manufacturers reacted quickly to this new cycling boom and supplied the growing market with a wide range of up-to-date models and new technology. Cyclists were equally well supplied with cycling literature and many new clubs and associations evolved. The CTC, during the 1970's, had somewhat relaxed their customary radical campaigns for cyclists' rights and seemed content to engage themselves in the organisation of club runs, rallies and other sedate social activities.

In 1977, a study by J.R. Waldman, a statistician with the Department of Transport revealed that if cycling was made safer, the level of cycling journeys in hilly - traffic dangerous towns would rise would rise from 2% to 20%. In flat dangerous towns, the level of cycling would rise from 6% to 43%. The obvious environmental effects of such a proposed change evoked little interest from the Government who, quietly buried the report. Other countries, however, took note of the overall increase in cyclist numbers and the obvious advantages improved cycling systems would have on society as a whole. In 1975, the Dutch Government began a substantial programme to build and improve cycle paths, both in towns and

across the country. 155 miles of cycle lanes were built in Amsterdam alone. Helsinki also constructed a network of cycle paths and in the German cities of Hamburg and Munich, extensive pedestrian and cycling path networks were introduced, both in city centres and linking the cities with outlying green areas.

As the 1980's approached, many cycling reform groups began to emerge and campaign for transport planners to take note of the bicycle and the many advantages of pedal power as opposed to the internal combustion engine. In Dublin, the voluntary cyclist groups, "Bring back the Bike" and "Pedal Power" called on the Government in 1977 to follow the example of other European cities and plan for cycleways and cycle parks. Their efforts proved in vain, however, for even today, the extent of Irish cycleways consists of a few isolated stretches of badly maintained pathway.

In the 1980's, the CTC, prompted by other cyclying reform groups began a renewed commitment to furthering cyclists' rights. It showed a new vigour in dealing with Government agencies and began to work more closely with younger transport campaign groups. The London Cycling Campaign was the largest of many local cycling pressure groups to emerge in the early 1980's. Linked with each other by the environmental group, "Friends of the Earth", these groups drafted research reports, organised media campaigns and supplied technical advice to the local authorities who were not provided with such advice from the Department of Transport. Indeed, the Department has proved largely ineffective in carrying out any widespread development to promote cycling. It did set aside funds for some

experimental schemes in 1978. But only one grant was handed out to Middlesborough for its seven kilometre, £250,000 cycle way, which opened in November 1979. The Government did issue a brief cycling policy statement in 1982, which many believed was its first attempt at an overall cycling policy change but it looked at the issue of accident reduction rather than the ecouragement of cycling.

In 1989, the Department began a £1,000,000 Accident Reduction publicity campaign to urge motorists and cyclists to become aware of each other. The campaign, however, had no great effect on casualty levels. The cyclists felt that the blame for road deaths lay totally with the motorists and what was needed to reduce accident levels, was a major road development campaign to cater more for the needs of the cyclist. Despite the Department's lack of involvement, Peterborough and the new towns, Milton Keynes and Stevenage, used their special planning powers to build bicycle routes into their road systems during the late 1970's. However, compared to America, where Denver had already introduced 250 miles of cycleways, California had its own bike police, San Francisco and Los Angeles provided bicycle parking spaces and, in San Diego, the buses carried bike racks, the effort in Britain had been minimal.

In the mid 1980's, the Dutch Government began to research the Woonerf concept. This idea concerned housing communities in which motor traffic was either physically prohibited or else slowed down to cycling pace by special road design. All facilities and services were positioned within cycling or walking distance. This period also saw the German Ministry

of the Interior begin an intensive programme of cycle paths construction. As a further experiment, it designated "Rosenheim" and "Delmold" as cycle-friendly towns and provided both with a wide range of cycling facilities.

The extent of the British Government's cycle safety effort of the same year was an ineffective road safety campaign which encouraged road users to be nice to each other. The British Government's unsympathetic attitude has changed little since then. In 1988, a European Commission-sponsored report concluded that British cyclists suffered the lowest official esteem and the poorest environment in eleven countries. The Government only had one-and-a-half staff working on cycle matters and even its small cycle research unit had wound up. Last year, it issued an environment White Paper which moaned about the crowded city centres, the pollution, and fuel economy but its reference to the bicycle, which could clearly have offered them a real solution, was minimal. In fact, the ground research work for a 1,000 mile network of strategic cycle routes in London, which could efficiently reduce congestion and pollution, had already been painstakingly carried out by the volunteer members of the London Cycling Campaign.

Disgusted with the response of the British Government, the London Cycling Campaign has looked to local level to try and improve the situation for the cyclist. It produced a campaign manual explaining how the local government works and what cyclists can ask for. Already, local campaign groups have been set up in most urban areas linked together by a cycling campaign network. Whilst the British Government recently

introduced an extreme programme of environmental education in the schools, it makes little positive steps towards genuine green reform in terms of widespread cycling.

As the Single European Act comes nearer to existence, the British and Irish Transport Departments should take some notes from their European neighbours. In Switzerland, for example, the pharmaceutical giant, Ciba Geigy, recently offered staff a free bicycle if they gave up their parking space. Over 350 new bicycles were handed out. In Zurich, where motorists are subject to strict emission controls, theauthorities have introduced town planning on the same lines of the Woonerf concept. They have also substantially increased the time given to pedestrians and cyclists to cross at junctions.

Man on the bicycle has long been known to have the highest efficiency rate among all moving animals and machines. To ride a typical commuter journey of 10 miles by bicycle requires only 350 calories of energy, equivalent to one bowl of rice. The same trip in the average American car uses 18,600 calories, the equivalent to 52 bowls of rice. The car releases harmful nitrogen oxides and organic compounds into the atmosphere which contributes to global warming. An estimated quarter of a million people worldwide die in automobile accidents each year.

A recent report found that 70% of all car trips are under 5 minutes and most with only one occupant, trips that a bicycle would perfectly cater for. The fashionable mountain bike boom has made millions of people look to the bicycle as a means of transport and recreation. If riding conditions were made

safer, how many millions more could be enticed to use pedal power?

In 1978, Charles Haughey, who was then Minister for Health wrote,

> "The internal combustion engine has dominated our modern world. Bicycles are looked on as something to leave to children and remote areas. Only a few would look at the motor car so firmly and deeply entrenched as an integral part of the modern world and see it as expensive and wasteful of our finite natural resources, a major course of pollution, of death and disablement and of tension and stress.... More and more people must be persuaded to use bicycles for leisure, for sport, for recreation and for getting from one place to another more cleanly, efficiently and expeditiously. The impact on the health of the people would be enormous; the more they could be prised out of their comfortable, well upholstered cars or their soft sedentary evening chairs".
>
> (Morten, 1978).

Like so many politicians, however, who preach their false concern, Haughey has got into power and so far has failed to react. We see little improvements being made to facilitate the Irish cyclist. In the modern world where environmental awareness is preached from all angles, the Government who should be at the core of environmental reform seem disinterested in implementing change.

Cycling is cheap, healthy and enjoyable. The bicycle is efficient, environmentally friendly and in a modern world, well on its way to destruction, pedal power could well prove the salvation of mankind.

CONCLUSION

Few other articles used by man have created so great a revolution in social conditions as the bicycle. Referred to as man's greatest machine, the bicycle is not just a highly refined piece of technical excellence but a complete social phenomenon that has had far ranging effects on the very fabric of society. This thesis has attempted to examine and evaluate the bicycle's technical, social and political evolution.

The opening chapter traced the machine's technical development from the earliest Renaissance human powered vehicles to the technically specialised models of the modern world. The late 18th century saw the advent of the celerifere, a machine with no steering or propulsion mechanism. The machine was propelled by pushing one's feet against the ground. The very concept of a vehicle comprised of two wheels in a line, on which one could balance while moving, was an incredible phenomenon at the time, and indeed, many doubted its potential. The celerifere was further rined to the velocifere and a steering mechanism was added to create the hobby horse. For more than thirty years following, people were content to stride laboriously along on these crude machines. In 1839, Kirkpatrick Macmillan made a new breakthrough, adding treadles to a hobby horse so it could be propelled with both feet off the ground. 1863, saw Michaux tackle the problem of propulsion in a different manner by adding a cranked axle to the front wheel so the rider could turn the wheel with his feet. This propulsion mechanism formed the basis for subsequent bicycle design until the emergence of the Safety in 1879. With the Safety came a convenient and comfortable mode of transport available to all classes of society. The Rover Safety established the basic

design form of the bicycle as we know it today and the achievements of Dunlop in providing air filled tyres in 1885, effectively concluded the main story of bicycle evolution. Although the modern world has seen a barrage of new innovation in brake, frame and gear technology, they are all mere 'tinklings' on a bicycle design that originated in the last century.

Chapter 2 evaluated the bicycle's effect on society and explored the concept of the bicycle as an instrument of social change. Three main areas were considered; the first, looked at the bicycle's effect on social class structure. For much of its history, the bicycle remained a plaything of the wealthy. The elaborate MAN powered vehicles of the Renaissance were built solely for the amusement of the affluent. Toyed with by royalty, they served more as elegant status symbols than functional transport vehicles. When Drais created the relatively more practical running machine in 1817, it too was a novelty to amuse the rich, ridden extensively by the regency of London, Paris and New York.

Velocipeding came equally into vogue fifty years later. Again it was the fashionable rich who initially took up the activity. As production techniques improved, however, and manufacturers produced cheaper machines, the velocipede spread to the less affluent classes. A similar phenomenon occured with the High bicycle, which on its introduction was taken up by the middle classes and for much of its history remained primarily a middle class machine. Reduced prices, however, and the availability of second hand models eventually allowed even working class enthusiasts to partake in the activity. Where once cycling had been exclusive to royalty, the safety bicycle allowed

the aristocracy, middle classes and working classes, to cycle as equals. Each person regardless of social standing had to pedal just as hard to exist as a cyclist. The bicycle was in a sense a leveller of classes. It could be equally argued, however, that the bicycle also acted as a class divider for within cycling ranks a certain class structure did exist based on the type of machine ridden. The tricyclists, who tended to be more respectable a breed because of the refined nature of the activity, tried to disassociate themselves from the haphazard bicyclists. High bicycle riders themselves assumed a social superiority on their elegant machines and looked down on safety cyclists. They dismissed the new low safeties as only being fit for women or older people. In the modern world, a similar phenomenon has occurred where the mountain bike, or the new hybrid machine, has become the bicycle to aspire to and other varieties tend to be regarded as inferior.

The second area considered in Chapter 2, explored the link between women and the bicycle, looking at the bicycle's instrumental role in changing severe Victorian attitudes to women and morality. The bicycle's role as both a means of social emancipation and integration was also evaluated. Although in France in the 1860's, cycling had been widely accepted as a suitably respectable pursuit for women. In Britain, however, even with the advent of the safety cycle, the question of whether women should cycle, what they should cycle on and what they should wear while doing so, was still being debated. Very few women rode high bicycles for physical as well as social reasons, thus it was decided that the only

suitable machine for women to ride was the tricycle. Even on a tricycle women were deliberately seated in a posture thought to be more decorous. As the Safety Bicycle Era prgressed, however, the question of whether a woman should cycle was soon outdated by the problem of what she should wear to do so!

In France and America, knickerbockers and bloomers had evolved and quickly became accepted dress for women cyclists. Staunch Victorian moral attitudes in Britain, however, were against such 'rational' attire and stressed that cycling women should only wear suitable long dresses, with standard petticoats and corsets. The dresses were not only uncomfortable to ride in but also dangerous, restricting breathing and skirts constantly catching in the spokes. By the end of Victoria's reign, however, as a result of prolonged campaigning by the Rational Dress Society, moral attitudes relaxed somewhat and rational cycling dress became accepted, marking an important milestone on the road to female emancipation.

The bicycle itself became an instrument of women's liberation, giving lady cyclists a new freedom. No longer dependant on others for mobility, cycling women could come and go as they pleased.

The bicycle also served as a means of social 'integration' allowing women to cycle with their children and husbands or young men. The bicycle provided an excellent means of mingling with the opposite sex and indeed sociable tricycles and tandems became noted for their suitability for courting. In the modern world, the bicycle still exists for some as an instrument of social emancipation, nowhere more evident than in Third World countries.

The third area of the chapter evaluated the importance of the bicycle as a utilitarian vehicle in Third World societies.

For millions of people in the Third World, the bicycle exists not as a vehicle of recreation but as a tool for survival. In developing countries where the main transport activity is the carrying of small goods such as firewood, farm produce and water, the bicycle serves as an important transport vehicle. The bicycle has proved invaluable for the existence of a decentralised health programme in Tanzania and here and in other developing countries, cycle trailers provide the only rural ambulance service available. Load carrying bicycles are an essential component of the goods distribution network in many Third World countries. In Bogota Colombia, Mexico City, and all over China, specialised carrier tricycles transport food, furniture, timber and even livestock. Despite the importance of the bicycle in these countries, most Third World governments do little to promote cycling. Indeed, in Penang, Malaysia, the government has tried to suppress trishaw pedallers because they obstruct faster traffic and are allegedly involved in drug trafficking and theft. In Jakarta, the Indonesian Government has taken the radical step of confiscating the cities' 40,000 becaks and dumping them in the sea in an effort to reduce congestion.

It is difficult to see the reason behind both governments' unconcerned attitudes to the trishaw pedallers. The trishaw is vital to the lower social economies of these countries. Pedalling is an activity woven into the cultural fabric of society and as such is not only important to the people themselves but to the

tourists who come to see the country and its traditions. To remove this activity is not only damaging to the lower classes but to society as a whole. Removing the trishaw from the pedaller, not only takes away his livelihood but his personal identity and his means of liberation.

Chapter 3 examined two eras of politics in cycling. Section 1 looks at cycling in the pre-motor age and examines how political lobbying by early cycle groups brought about important legislative changes which enhanced the status of cycling. It also examined how determined cycle campaigning helped improve road conditions of the time.

With increasing numbers of wheelmen on the roads in the 1870's, conflicts between horsemen and cyclists became frequent. Coach drivers had long been accustomed to empty roads and as ratepayers, (which cyclists were not), felt they should retain sole rights on the roads. Encounters with the law were even more common, police constantly summonsed riders for "furious riding" and as the cyclist was not referred to specifically in any road legislation, magistrates were equally unsympathetic. The Highway and Locomotives Act, passed in 1870, did refer specifically to the cyclist but the act did little to improve cyclist rights. It was not until a clause, (Section 85), added to the Local Government Act, declared bicycles, tricycles and velocipedes to be legal carriages, that the cyclist was conferred with a legal status and accompanying rights.

In England, the passing of the great coaching days with the advent of the railways marked the end of the Turnpike Trust System and the start of the demise of the roads. In Europe, road conditions had been deteriorating since Roman times and American roads were even worse. The velocipede craze of the 1870's

failed to make any significant improvement to conditions and it was not until the days of the High bicycle that the state of the roads became a prime concern. The campaign for better roads was taken up by the Earl of Albemarle, who in 1887 declared a revolt against road repairs and surveying systems and indeed, was successful in bringing lax road surveyers to justice for failing to maintain roads in their care. America had its own road champion in Colonel A.A. Pope who vigorously lobbied for better roads and even privately funded road maintenance schemes.

In England, the C.T.C. campaigned with equal vigour prevailing in erecting signposts and danger signs until the Motor Car Act of 1903 designated this task to the County Councils. It is ironic that as cycle campaigning served to improve road conditions, paving the way for the motor car, it ultimately worsened road conditions for the cyclist.

The second section looks at cycling's political environment in the motor age, evaluating how governments have acted or failed to act to exploit the benefits of pedal power. The bicycle is the most energy efficient of all moving animals and machines. It is an environmentally friendly, cheap and an effective mode of transport. It is a healthy and enjoyable means of recreation. The bicycle has long proved itself an excellent urban commuting vehicle. Many governments worldwide have been quick to see these advantages of cycling over the internal combustion engine and have acted to reap the benefits of the bicycle.

Many European countries have constructed and maintained

extensive cycle transport networks. The most important development occurring in the Netherlands, Germany and Switzerland. All three countries have implemented modern town planning systems based predominantly around bicycle transportation.

In other countries, however, the effort to cater adequately for the cyclist can only be described as minimal. The British Government initially seemed to favour cycling by introducing the Road Traffic Bill in the 1930's and starting some cycle lane construction. Since then however, the Government has been generally deaf to the voice of the cyclist. As the motoring lobby grew stronger in the 1950's, the Government did little to restrict the activity of the motorists who showed an increasing disregard for safety regulations. Instead, it suggested ways for the cyclist to cope better in traffic. Indeed, up to the present day, where other governments are implementing substantial road development to improve conditions for cycling, the extent of the British Government's cycling effort has been half-hearted road safety campaigns urging cyclists and motorists to be more aware of each other The Irish Government has proved equally unconcerned with introducing any transport policy to encourage cycling.

As 1992 approaches, the call is on both governments to look to the example of their European neighbours and to introduce effective transport reform to provide for and encourage cycling throughout their nations. In a modern world, increasingly ravaged by pollution, it is not only their duty to provide the cyclist with a suitable environment but their responsibility to the world as a whole.

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