WOMAN AND THE BICYCLE.

WHEN the social and economic history of the nineteenth century comes to be written, the historian cannot ignore the invention and development of the bicycle. The "wheel," as it is familiarly called, is now seen in all parts of the world; its production has given rise to a large and profitable industry; and in the United States alone there are a hundred manufactories for the construction of these machines. A large capital is invested in them, and they furnish occupation and a livelihood for thousands of wage-earners.

Bicycle-riding has changed the habits of hundreds of thousands who formerly took little or no exercise in the open air. It has widened the mental horizon for many by inducing them to undertake long rides far away from their homes, and has even become a link of international intercourse. Many an American now spends his vacation wheeling in England; and English bicyclists are often seen on the fine roads of France or on the picturesque and historical borders of the Rhine. A couple of young Americans have even successfully traversed the wilds of Asia, through countries that had never before received the imprint of a white man's foot. The bicycle has also called into new and flourishing life the old-fashioned, cosy, but unpretentious wayside inn, that had been almost driven out of existence by the railroad.

One of the striking and most charming characteristics of wheeling is that it is indulged in by persons of nearly every age. We meet the little five-year-old boy and his white-haired grandfather astride of their bicycles. Women have taken to the new sport with no less enthusiasm than men; and, finding their costume unpractical, have to a great extent changed it. Dress-reform, talked of for a generation or two, has suddenly become a reality.

In order to be an enjoyment and to reach the perfection of which it is capable, bicycling requires good, smooth roads. No wonder, therefore, that when so many thousands of people everywhere took up the new exercise, the demand for better roads became universal. In several places special roads have been constructed for the exclusive use of bicyclists, and others on a magnificent scale have been promised or are being built,—such as the forty-mile Aqueduct Road in the State of New York, and the twelve-mile road from Trenton to Asbury Park in New Jersey.

To trace the origin of the bicycle we must go back to the beginning of the century. In the year 1816 the "celeripede" was invented in France, and the "draisine" in Germany. Both these machines had two wheels of equal size, like the modern "Safety" bicycle, but no pedals; the rider propelling the machine by striking his feet against the ground. The driving-gear was invented by a Scotchman, McMillan, in 1840, and improved in 1845 by Dalzell, another Scotchman; but both of these used rods instead of a chain. Michaux, a French carriage-repairer, invented the crank and pedal in 1855, and may be regarded as the real inventor of the modern bicycle. The first bicycle ---or, as the machine was then called, "velocipede"---was exhibited at the International Exposition in Paris in the year 1865, and during the two following years velocipede-riding was fashionable in Paris, the Prince Imperial himself being an elegant rider. At that time elegance was more aimed at than speed, the rider sat upright on the machine, and there was no racing. Subsequent improvements of the velocipede were made chiefly in England, where the "high" or "ordinary" wheel took shape about the year 1876. Since 1869 the word "bicycle" supplanted "velocipede." The first foreign bicycles exhibited in America were seen at the International Exposition in Philadelphia in 1876; and the first manufactured here appeared in the following year, the first rider being Alfred D. Chandler, a distinguished lawyer of Boston.

This development of the high wheel may, however, be considered as a step in the wrong direction, as the machine was so difficult to mount and so dangerous to ride that its use was almost wholly limited to young men. This type is now nearly obsolete, but if it had been retained, bicycling would never have reached its present importance,—indeed it would perhaps soon have been superseded by other pastimes. But in 1885 the "Safety" bicycle was started in England, and soon became so popular all over the world that since 1890 practically no other machines have been sold. A "Safety" consists essentially of an iron frame, to which are attached two wheels of equal or nearly equal and modérate size, about twenty-eight inches in diameter, and placed one behind the other. At the lower end of the frame is a sprocket-wheel, which is driven round by two pedals fastened to cranks so disposed that one is at a distance of 180° from the other—that is to say, when one is all the way down toward the ground, the other is on the top above the sprocket-wheel. From this sprocket wheel an endless chain goes to a similar but smaller wheel placed at the hub of the posterior riding-The proportion between these two sprocket-wheels varies conwheel. siderably on different wheels, but is, on an average, such that for every revolution of the sprocket-wheel driven by the pedals, the hind wheel makes about two and a half revolutions. The saddle is fastened to the frame so as to be situate over the front part of the hind wheel. Over the front wheel is a horizontal and curved handle-bar, by which is turned a perpendicular pivot ending in a fork attached to the centre of the front wheel. The front and rear wheels have thick rubber tires, which counteract the vibration caused by the inequalities of the road,--so-called "cushion" or "pneumatic" tires, the former of which has a smaller hollow core than the latter.

As to the way of using a bicycle, we may distinguish mounting, position, propulsion, direction, and equilibrium. Mounting is to most beginners a difficult task. As a rule, it is advisable to have assistance in doing so until one has learned to ride. There are many ways of mounting, but it is more or less difficult to obtain the necessary equilibrium to start with. Men commonly, at least in the beginning, mount from behind, push the machine forward, and place the left foot on a little step found at the hub of the hind wheel. A good way of mounting for a woman rider is to slant the machine a little toward the body, step on the farthest pedal, which should previously be placed (on the downward stroke) at an angle of about thirty-five degrees with the ground, raise herself with a downward pressure into the saddle, and place the other foot on the lower pedal while it is rising. In regard to attitude, three different positions are in use by bicyclists,-the upright, the curved, and the bent. In the upright posture the spinal column is kept straight, the shoulders are thrown back, and the weight of the body rests on the saddle. This posture is by far the best from a hygienic and medical standpoint. It is also safer in case of falls; it is the only one that can be called graceful; and it makes easier the direction of the front wheel and the maintenance of equilibrium. It should therefore be used by all except racers, and especially by beginners, old men, children, and women. However, it is seen quite exceptionally in the male rider, and even many women prefer the second posture.

In the second posture the back is curved, and the spine forms a somewhat acute angle with the saddle; the head hangs forward; the shoulders fall forward and inward; and a great part of the weight of the body is carried over on the handle-bar, and from it to the front wheel. By assuming this curved position the rider realizes some gain in swiftness, and in a better distribution of the jars caused by inequalities in the road; but he buys it at a high price. The lungs are compressed, and the circulation in the lower limbs---which ought to be particularly favored, since they do nearly all the work—is impeded by pressure on the large blood-vessels, arterial and venous, which are situated in the pelvic cavity and convey the blood to and from the lower extremities. The cartilages separating the vertebræ are compressed in their anterior part; and if much riding is done by children and young people before full bodily development has been reached, this may cause a permanent atrophy and the resulting incurable curvature of the spine. The pressure on the anterior wheel makes the movement necessary for directing the whole machine less delicate. the rider is thrown from his wheel, he is much more likely to fall on the head or hands, which may cost him his life, or lead to a fracture, not to speak of the loss of nearly all grace in attitude and movement.

The third position, which, to distinguish it from the second, we call "the bent," is an exaggeration of the preceding, the rider stooping so much forward that his back is almost parallel with the ground. This posture reduces the resistance of the air to a minimum,—an item of considerable importance when the wheel is driven at a great speed, and especially when against the wind. It becomes, therefore, a necessity for racers, whose only thought is of winning the race; but it should never be used by others, as from both hygienic and æsthetic standpoints it is the worst possible position. The rider goes at a speed that makes falls quite dangerous, and he submits his heart to an amount of work to which it may not be equal.

In order to understand how a bicycle is propelled, it is necessary to know that all bodily movements are accomplished by muscles, bones, and joints. The muscles are the real motors, the bones form levers, and the joints are the hinges between them, allowing them to work under constantly varying angles. A muscle is only capable of contraction and relaxation. It is only by contraction that it moves the levers, approximating the points of its origin and insertion. Relaxation is a mere passive process, which facilitates the work of another muscle or set of muscles. These two conditions of contraction and relaxation are under the control of the nervous system, a bundle of nerve fibrils entering each muscle and bringing it into connection with certain parts of the nerve centres,—the brain and the spinal marrow.

A bicycle is propelled by a pressure exercised by the lower extremities. The rider places the balls of his feet on the pedals, and presses the upper one down. This is the chief active movement, and is consummated by extension. The corresponding flexion is, however, not entirely passive, although it is greatly aided by the extension of the other extremity. Thus there is a continual and rapid alternation between extension and flexion. At the end of the downward movement the foot has to carry the lower pedal backward, or at least has to be stretched in order to be able to follow the pedal in its backward movement caused by the front movement of the other pedal. Otherwise the foot loses hold on the pedal,—an accident that usually compels the beginner to dismount. The foot is necessarily carried backward if—as expert riders often do for amusement—only one pedal is used. Only those muscles used for extension are vigorously worked, and by a law of nature are thereby much increased in size. We shall therefore find the muscles on the back of the pelvis, the front of the thigh, and the back or calf of the leg, largely developed in those who ride the wheel much.

On the other hand, the movements needed for flexion being much less active,—in fact mostly passive,—the muscles needed in their execution are not much increased in bulk. An unfounded anxiety, therefore, has been caused by some writers who have predicted an aggravation of labor pains for the parturient woman, on account of the increased bulk of the muscles contiguous to the entrance of the parturient canal—the superior strait of the pelvis—namely, the psoas and iliacus internus. We shall later see that, by riding the wheel, woman, far from diminishing her fitness for this supreme act in her life, actually renders herself more capable of meeting the ordeal.

The direction in which a bicycle moves depends on the position of the front wheel, which is determined by the handle-bar. This wheel also serves another purpose in preventing the rider from falling. By turning the front wheel in the direction in which the machine tends to fall, and at the same time leaning the trunk of the body in the opposite direction, the vanishing equilibrium may be regained.

The body being so much wider than the rim of the wheels placed on a line one behind the other, the keeping of the equilibrium on the machine is an art to be learned. It is particularly difficult to obtain it in mounting, while once acquired it is comparatively easy to maintain, and the faster the machine is driven the easier it becomes. When once a person has become familiar with the machine, there are few

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limits to his successful defiance of the law of gravitation. Most riders of experience acquire such facility that they ride with the legs alone, without using the arms; *vice versa*, they coast down a hill without using the pedals; or they drive the machine by means of one pedal alone,—an accomplishment of great practical value in case of an accident at a distance from a place where repairs can be made.

Every beginner will fall frequently, and it is as necessary to learn to fall in the right way as to ride properly. Although it is easier to keep one's equilibrium in riding fast than when the machine is driven slowly or stands still, the inevitable falls become much more dangerous if they occur while the machine is in rapid motion. The first rule for a beginner is, therefore, to ride slowly until he has mastered the difficulties of equilibration. Next, in falling, he should never let go his hold on the handle-bar, but direct the wheel as best he can; and he should, if possible, give the machine time to slow up before he falls. He should throw the leg on which he is to fall well out, and follow the machine by hopping on this foot after it has reached the ground.

For comfortable and safe riding a suitable attire is necessary, the object being to avoid anything that is apt to be caught by the machine. Men are obliged to tie a string around the lower ends of their trousers above the ankles, or to use the convenient steel bands made for the purpose. But it is certainly more convenient, and presents a better appearance, to wear breeches that only descend to the knee, and to cover the leg with tight-fitting stockings or leggings. The upper part of the body should be covered with a garment exposing as small **a** surface as possible, be it a buttoned coat or a so-called "sweater." The shoes should preferably be low-cut and have transverse furrows in the soles for a better adaptation to the pedals.

But how should women be dressed for bicycling? The usual long skirt is objectionable in every respect. It impedes the free movement of the legs, pumps air up against the abdomen, and is in great danger of being caught by projecting parts of their own machines or those of other riders, as well as by other obstructions found on the road. To avoid these inconveniences many women have shortened their skirts, and some have done away with them altogether, wearing so-called "bloomers," a wide, bifurcated garment extending from the waist to the knee. This garment, combined with a waist and leggings, forms a neat, practical dress for a woman rider. True, it is at present ridiculed and even condemned by some as immodest. However, before men say anything against the decency of bloomers, they had better reform their own trousers, which are not much more decent than becoming; and since a bathing costume—allowing the lower limbs from the knees to the tips of the toes to be exposed in tight-fitting stockings—is admitted by every one as a proper costume for a woman to appear in on a beach frequented by hundreds of lookers-on of both sexes, it is hard to understand what objection there is in the name of modesty against a piece of wearing-apparel that by its wide proportions entirely hides the outlines of the body.

From a medical standpoint bicycling is valuable both as a prophylactic and as a curative agent. Like other outdoor exercises it takes its votaries away from the vitiated air of closed rooms; but it has several advantages peculiarly its own. It is less expensive and safer than horseback-riding. For the female sex it is also healthier, since horseback-riding, if indulged in too much or at too early an age, is apt to produce a funnel-shaped pelvis, which abnormality may prove a serious obstacle to childbirth. It has much more variety and interest than walking, except in localities that offer such steep ascents and descents that the bicycle cannot be used. It also allows the rider to see much more and to cover a much greater distance in the same time. It has the advantage over games that it can be indulged in for a longer time without causing fatigue or becoming tedious.

Although we have seen that certain groups of muscles come chiefly into play, all the muscles of the body are used more or less, and are thereby strengthened. Good fresh air is plentifully drawn into the lungs, and the capacity of these organs is increased, especially by maintaining the straight position in riding. A person who only works and walks hardly ever fills his lungs; but the bicyclist needs all the air he can inspire, and good respiration causes a more perfect oxidation of the blood, and good blood means healthy tissues, strong nerves, and normal secretions. Normal peptic juices digest all food. The elimination of waste material through the skin and lungs is increased; which also purifies the blood. The whole nervous system is highly benefited by bicycling. The rider must constantly use the senses of hearing, seeing, and feeling in order to avoid collisions, direct his machine, and keep his equilibrium. This exercise, therefore, is in a high degree apt to draw the mind away from its usual pursuits and the cares of daily life. It is highly exhilarating and promotes sociability, since it is both pleasanter and safer to ride in company than alone. In women it is apt to overcome the impulsiveness and whimsicality which render so many of them unhappy. It has also a beneficent effect on a purely

PRODUCED BY UNZ.ORG ELECTRONIC REPRODUCTION PROHIBITED physical condition peculiar to their sex. From the upper corners of the womb extends a string that goes through a canal in the lower part of the abdominal wall, and is fastened to the bones and skin between the thighs. This string is called a ligament, but microscopical examination shows that it is composed of both voluntary and involuntary muscle-bundles. This organ is of the greatest importance in maintaining the uterus in its proper position, and in preventing its displacement backward and downward, a fruitful source of suffering. This same organ is much enlarged during pregnancy, and in childbirth has the important function of directing the child under a favorable angle against the entrance of the canal it has to pass in order to begin its separate and individual existence. And this organ, being of muscular construction, is, like all other muscles, strengthened by bicycling.

If bicycling is an excellent preventive of disease and a promoter of good health, it is of no less value as a remedy for certain pathological conditions. It is not compatible with the limits and nature of a magazine article intended for general readers to enter into details about I shall therefore limit myself to a few the treatment of diseases. remarks. By its effect on respiration and digestion, bicycling becomes a potent remedy for anæmia, that condition of the blood which consists in a diminution of the red blood-corpuscles, and shows itself in pallor of the skin and the mucous membranes. Numerous nervous troubles are relieved or cured by this exercise: such as neurasthenia, or nervous prostration,-a condition usually due to overwork or worry, and in which the normal strength is lost, and the slightest exertion causes fatigue and physical and mental exhaustion. The same holds good in regard to headache, insomnia, and neuralgia. The writer once treated a little girl for a wound received by falling astride of a sharp edge. The wound soon healed, but the patient continued for years to have a neuralgic pain in the scar, which pain entirely disappeared when the sufferer took to bicycling. Among the nervous affections benefited by bicycle-riding may also be included that troublesome disease, asthma, a cramp-like contraction of the muscles of the bronchial tubes, which causes a painful sensation of choking. In the beginning of phthisis, where parts of the lung tissue become condensed and less pervious, moderate bicycle-riding is helpful. Many diseases of the intestinal canal—such as dyspepsia, constipation, and hæmorrhoids—yield to the effects of wheeling. A case has recently come to the writer's knowledge in which the stiffness remaining after a fracture of the leg was successfully treated by riding a bicycle.

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But if bicycling is a valuable resource in certain diseased conditions, there are numerous others in which it is harmful or should only be indulged in very cautiously. Most acute diseases demand rest, and bid the bicyclist abstain from his favorite pursuit; and many chronic diseases are made worse by riding. Since wheeling considerably increases the rate of the respiratory movements it would be folly for a person with advanced pulmonary consumption to attempt to ride. The heart being whipped unmercifully to work in driving the machine, bicycling should be strictly forbidden in serious diseases of this organ; and persons affected with minor cardiac troubles ought at least never to race or otherwise expose the heart to a fatigue which it is not prepared to stand.

Women should abstain from riding during those periods in which undue exercise is apt to exert a deleterious influence on their general health. They ought also to abstain during pregnancy, since the riding might cause a miscarriage, and a fall from the machine might endanger two lives. Pelvic inflammation, which is so common in their sex, is also a barrier to wheeling so long as any pain or soreness is felt.

Even for people enjoying perfect health, bicycling is not free from dangers and drawbacks which cannot be ignored, and which cannot always be guarded against. Collisions with other riders, with vehicles, or with pedestrians, are of constant and sometimes fatal occurrence, and such accidents are frequently entirely independent of the riders' skill, especially on the streets of populous cities and on crowded suburban roads. But in order to prevent an exaggerated estimate of those dangers we ought to keep in mind the enormous number of the devotees of the exercise. It is calculated that a hundred thousand machines are in use in the city of New York alone, and a proportionately large number is used in other cities and in the country. Taking this widespread use of bicycles into consideration, the percentage of accidents is certainly a very small one, and the "wheel" in this respect compares favorably with horseback-riding, driving, swimming, sailing, and skating.

Apart from injuries, the rider's health and harmonious development may suffer; but, as a rule, he can obviate this in different ways. In order not to draw cold air and dust into the lungs, he should invariably keep his mouth closed and breathe through his nose, the many narrow passages and profound anfractuosities of which are well fitted to warm and, as it were, filter the air. This kind of breathing is the best for every one, but it is of particular importance to the bicyclist, who often rides on dusty roads, and by the exertion is compelled to breathe much more frequently and more deeply than a person who sits still or who walks at a moderate pace. Since the rapid motion and muscular exertion make the rider perspire freely, he is apt to catch cold while he rests. He should therefore use woollen or silk underwear, be careful to avoid draughts while resting, and change all his clothes at the end of a trip that has made him perspire. Those who ride much at a very early age are apt to become deformed by a disproportionate development of the lower limbs. Persons who spend much time in the curved or bent posture are likely to become round-shouldered and hollow-chested. If a person uses a wheel that is too heavy in proportion to his strength, he is obliged to move from side to side in order to utilize his weight as a propelling force,—a motion which is fatiguing and looks bad, and in women is decidedly objectionable.

From a sanitary standpoint athletics ought to be used for a harmonious development of the *whole* body,—the doctrine and practice of the old Greeks. Bicycling gives more general development than most other sports, but on account of the preponderating use of the lower extremities, and the drawbacks of the stooping position so commonly affected by bicyclists, it ought to be combined with other exercises; as rowing, which develops the muscles of the back and the arm; and the use of dumb-bells, which develops all muscles of the body and more especially those of the arms and trunk.

I have spoken of bicycling only as a pastime and a sport, but it has already proved itself capable of being utilized for many purposes in practical life. In some cities and in some parts of the country physicians have adopted the wheel as a means of inexpensive, pleasant, healthful, and rapid locomotion. In a city like New York, with its poor cobble-stone pavements, this would hardly be feasible. The policemen have to some extent adopted the wheel, if for nothing else than for the power of overtaking erring bicyclists. Many stores have small delivery-wagons built as tricycles. The Street-Cleaning Department is mounting its inspectors on bicycles. Even for warfare the peaceable bicycle has been pressed into service, wheelmen being used to carry messages from one part of the territory occupied by a military force to another. Bicycling is therefore no longer a mere fashion that may fall into disuse and give way to a new one. It is a wholesome and inspiring exercise, and has proved of practical value as a means of rapid locomotion.

HENRY J. GARRIGUES.

THE "GERMAN VOTE" AND THE REPUBLICAN PARTY.

ONE of the most characteristic features of the history of American party politics during the year 1895 is the peculiar prominence given to the political attitude of the great class of Americans of German birth or extraction, more especially in the State and city of New York. As was the case in Wisconsin in 1890, and in Illinois in 1891 and 1892. local questions of quite subordinate importance to national issues created an apparent solidarity of what was called the "German vote"; and a serious divergence of views-not to say antagonism-was observed between the aims and aspirations of many patriotic native Americans and the great mass of their countrymen of German origin. Should this solidarity and this antagonism continue, it would be a serious and disturbing factor in our political and social development. Α new force would in that case confront politicians of all parties, the true character and importance of which they have as yet shown few signs of comprehending. Such a result would be deplorable from every nobler point of view, and with wisdom, patriotism, and a better understanding it can easily be avoided.

Political antagonisms based, however remotely, upon race prejudice, afford the most dangerous opportunities to demagogues and small minds of every description. Accordingly, German-Americans are constantly warned against "nativistic" conspiracies against their welfare, and on the other hand a tendency to underestimate their services in the upbuilding of this nation, and to sneer at "beery and ignorant foreigners," is also noticeable. Not that any American politician would so far forget himself as to underestimate the numerical strength of his German-American fellow citizens: on the contrary, the magnitude of this vote is always spoken of most respectfully; and among the most valued bait in the average candidate's outfit there will invariably be found an affable recognition of the deliciousness and invigorating qualities of beer; a eulogy of German family life; and a cordial praise of gymnastics (for a *Turn-fest*), of target shooting (for a *Schuetzen-fest*), and of the deep, rich harmonies of a male chorus (for a Saengerbund or *Liedertafel*). Occasionally, too, an ambitious citizen with a German-