BICYCLING: FROM SOCIAL, BUSINESS, AND HEALTHFUL STANDPOINTS.*

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That the bicycle is one of the greatest inventions of the age, is accepted by nearly every class of society. While bicycles have been known many years, it is only within the past ten years that wheeling has become so universal. The wheel has become an important element in modern life; and, although considerable has been written on the subject, much has not been written, much more will be written, and the subject will be discussed *pro* and *con* for years to come.

It might be well to mention that the object of this paper is not in any way to discourage the use of the wheel; but, on the other hand, to encourage its *judicious* use; and, by discussing certain features of the subject, to endeavor to suggest to cyclists ways in which they can guard against any possible dangers.

This paper will endeavor to deal with wheeling from three standpoints: Social, business and healthful, but with especial reference to its influence upon the healthfulness of the exercise.

From a Social Standpoint.

There can be no question of the utility of the bicycle in society. Never during the history of civilization has any invention been more of a boone to society. The enjoyable features of the wheel are so apparent that little need be said on that phase of the subject.

What can be more enjoyable than riding a wheel? There is no grander sight than to see the young lady, or the young man gliding down our streets, through the beautiful drives of our parks, or enjoying the grandeur of the country scenery; it is a healthful and pleasing exercise combined.

*This paper was not read at the Detroit Sanitary Convention; but, by vote of the State Board of Health, its publication here is authorized.

Bearing upon the influence the bicycle has had upon society, I take the liberty to copy from a recent issue of *Good Health* the following:

The Song of the Wheel.

THE OLD.

In and out of her golden hair
The sunbeams softly steal.
And her voice floats out on the summer air
As she sings to the hum of her wheel.
Little feet lightly the pedals press,
A white hand moves to and fro
As she sits in her quaint, old-fashioned dress
At the wheel of long ago.

THE NEW.

The wind has ruffled her careless hair,
She is dust from her head to her heel,
But she gaily whistles a rollicking air
As she springs to her seat on her wheel.
Stout little boots the pedals press;
In an instant she's off and away,—
The muscular maid in her bicycle dress
On the wheel of the present day.

Prevalence of the Wheel.

Just to whom we are indebted for the invention of the bicycle it is difficult to ascertain, and it would occupy too much time to go into the minute history of the evolution of the bicycle. It is enough to say that the bicycle probably came into use about the year 1808 when there appeared in Paris the original "dandy or hobby horse" wheel which had somewhat the same shape as the present safety, except that there was no gearing or motive power. The seat was placed near the center of the frame holding the two wheels intact, and was just high enough from the ground so that the operator could push himself along by touching his feet to the ground.

From that early date the bicycle has passed through a period of evolution of the most varied kind which forms one of the most interesting chapters in the history of mechanics. Some time about 1840 a clever mechanic in Scotland, KIRKPATRICK MACMILLAN by name, succeeded in attaching a motive power to the original "dandy or hobby horse" and by means of cranks and pedals, was able to show to the world a wheel which could be propelled without touching the toes to the ground and thus push the machine along. It was a great marvel and it is stated that MACMILLAN was at one time in Glasgow taken into custody for causing a crowd to collect and thus creating an obstruction in the street.

It was not until 1888 that the safety bicycle as we now undersand it was brought into use, and almost immediately the cushion and pneumatic tires were invented. It is an interesting bit of history to trace the evolution of the bicycle through its many improvements.

The introduction of the bicycle as we now understand it, has been so marvelous that it would be difficult to go to any civilized part of the world and not encounter one of the modern up-to-date pneumatic safety bicycles.

Cyclists in Germany are blessed with what is called "sand-papered" roads; and, together with beautiful scenery, it is indeed a great pleasure to ride. However, in some cities of that empire the police regulations are very exacting and troublesome. In some cities it is necessary to have what might be termed a license to ride a wheel. Before being permitted to ride a wheel upon the streets it is ucessary to appear before a police board of examiners who determine on your proficiency as a wheelman. If you are accepted and pass the examination, you are given a card bearing your full name and address and the full title and seal of the police commission. This card is to be carried at all times, in order that you may be inspected at any time a policeman may take it into his head to do so. The restrictions are rigidly enforced and it is hardly worth the while to undertake to become a licensed wheelman. The red-tape is ridiculous.

Under the laws of France every owner of a bicycle must have it registered. A recent census in that country showed 329,818 wheels in use, an increase of 73,734 over the previous year. These statistics are for only one out of many countries. It would be interesting to see a similar census taken in England, and America, as well as other civilized countries of the world. Considering the population of France, and the number of bicycles in that country, it will be seen that one in about every one hundred persons living rides a wheel. It is believed that the ratio of wheelmen to population in England and America would be even greater. In cities the ratio would be much greater; in some localities the proportion is extremely small. I have in mind one city of a number of thousand inhabitants where one out of every ten rides a wheel. It is believed that this same proportion would hold true in many cities in the United States. It is known that there are over a million wheels in use in the United States.

The time is not far distant when all classes of society will rely upon the wheel for a rapid, convenient, enjoyable and healthful method of transportation. In a recent issue of *Judge* is an ingenious bit of prophecy that glances into the future. The scene is laid in the year 1997. In the commodious museum our highly specialized and scientifically developed descendants are spinning along on their bicycles over the asphalt floors. Some are whirling along by themselves, looking at the strange sights; but most of the crowd is following the eloquent professor who rides around the hall on a wheel whose model has not yet been dreamed of and explains the marvels of the exhibition. Stopping before a wild-eyed and timid-looking man who is seated on an elevated platform the professor holds forth as follows:

"Here, ladies and gentlemen, you see the greatest marvel of the age, and see what will probably be known to your descendants merely as a tradition. This man, who was born and reared on the almost inaccessible slopes of the Rocky mountains and spent his life in wild fastnesses into which none but the most daring bicyclists could penetrate, was finally captured and at a great expense brought here for your entertainment. Ladies and gentlemen, you see before you the last and only living man who knows how to walk. I will now pause for a moment to allow

you to purchase photographs of him in the act of walking. Afterward we will proceed to the next platform, where I will explain to you all about the stuffed horse, and tell you some of the characteristics of this wonderful animal that flourished from the preglacial period to within fifty years of the present time."

Good Roads and Side Paths.

What goes to make up a beautiful city, or a beautiful farming country more than good roads? The use of the bicycle should be encouraged because it has come to stay, and because its permanence will in time insure good streets in our cities and good roads in the country. Improvement of the road means improvement of the property, and it is to the interest of every property holder to insist that good roads are made and maintained. The bicycle will injure no road; it is a road-maker itself, as will be observed where any number of wheels have used a certain road; the center of the road will be in poor condition, while the sides where the wheels have run, will be packed and even.

Before the Michigan legislature last session there was a bill to put a small tax upon each wheel for the purpose of constructing and maintaining side-paths. I do not believe there would be any objection to such a law by the wheelmen, and there certainly should not be by others. However, it was surprising to hear the objections made by farmers, that it would injure their property, et cetera. It would certainly have the opposite effect; it would increase the value of all farming districts. The legislature would not even pass a law to protect the side-paths constructed by those interested in country wheeling. The time will soon come, however, when there will be side-paths on every country road. And, before many years, there will be a general revolution in the road itself. Care will be taken in its construction, and pride taken in keeping it in good wheeling condition, not only for bicycles but for other vehicles.

Bicycle Ordinances and Laws.

Bicycling should be regulated and restricted by ordinance and State law, but it is to be hoped that prejudice will not enter into the formation of such regulations.

A city ordinance regulating the use of wheels is just, and will be respected by most wheelers; of course there are a certain few who seem to delight in evading the laws of society, but there is a remedy for such offenders.

In making a city ordinance, fairness to all parties concerned should prevail, special privileges should be shown to none. An ordinance which requires a bell and lantern is applicable in certain instances. But, why should a wheel be required to carry a bell and a lantern any more than any other vehicle that runs in the road? When an ordinance requires all wheels to run in the highway, it is discrimination to say that such wheels shall carry a bell at all times of the day and night, and to carry a lantern after sundown.

The rate of speed in cities should be regulated. The thicker the population, the less the speed. In the heart of cities where people are most likely to be encountered, the speed should not exceed eight or ten miles

per hour; in other portions of the city outside the business limit the speed should not exceed twelve miles per hour. The regulation of the speed is just as much for the protection of the rider as the pedestrian.

In my mind the road is the place for the wheel where the roads are good, but in most cities the roads are not good and are not passable during a greater portion of the year. In such instances, it is well enough to permit bicyclists to ride on the sidewalk at such times and places where the road is not passable. While the bicycle in one sense is a vehicle, it does not stand to reason that it should be legislated off the sidewalk at all times, more than baby-cabs, children's carts, velocipedes, et cetera. But, where the wheel is given the use of the sidewalk, too much care cannot be taken to protect both the cyclist and pedestrian. The rate of speed should not be over six miles per hour, bells should be required at all times, and lanterns employed as signals after the dusk of evening has set in.

In cities of some size where the streets are nearly all paved, the cyclist does not care to use the sidewalk as the street is much better. As a matter of fact it is in many cities impracticable to use the sidewalk, because of the curb at the end of each block. The only time the streets are not passable is during or just after a heavy rain; and, then, it is not so bad, if the streets are properly drained.

The question of

What to do with the Scorcher,

is one which should receive special attention in regulating the use of wheels. The scorcher is a criminal of society and should be dealt with to the fullest extent of the law. It makes no difference what regulations are placed upon wheeling, there will be a *few* daring, reckless, and wilful wheelmen who can be rightfully termed "scorchers," and should be punished as would any other criminal of society. No one would think of prohibiting any pedestrian from appearing upon the streets or sidewalk, just because there are a certain *few* who violate the law and order of a community; it would be absurd. It would be just as absurd to deprive well-intending cyclists the use of the walks and streets just because of a few who persist in disturbing the peace of the public. I will again repeat that there is no law too severe for that criminal of society, the "scorcher;" he can be placed in the same category as the assaulter, the murderer, et cetera, and should be punished accordingly. A few severe examples will be sufficient to reduce scorching to a minimum.

Scorching may be Criminal.

Accidents to cyclists are comparatively few when wheeling is practiced as it should be in moderation; but, here it becomes necessary again to deal with the scorcher. The evil of careless cycling is of considerable import, and should receive legal attention whenever the case requires.

It has been claimed that before a scorcher could be prosecuted for feloniously wounding a pedestrian or other cyclist, the intent of the action would need to be established. CHIEF JUSTICE FOSTER, of England, likens it to the following case: "If a man were to ride a horse at a great rate of speed into a crowd of pedestrians, and the animal were to thus seriously injure one or more persons, the rider would be liable

to punishment for a felony, even though he had been possessed of no individual malice against any person. It is a social or general malice complained of."

If a few of these so-called scorchers were to be prosecuted in the manner above suggested, and the fact of such prosecution was widely published, it would deter most of the scorchers from such carelessness and disregard for human life and happiness.

FROM A BUSINESS STANDPOINT.

The utility of the wheel, has been proved, and can be classed with the rapid transit of today. One need but to watch the hundreds of working men, women and children going to and from their work, in order to be satisfied that its utility in a business life is indispensable. It makes the distance from home to work shorter and a pastime instead of the drudgery of the day's work.

In a large city the utility of the wheel is more apparent, it not only economizes time, but is economy from a financial standpoint; it saves street car tickets, saves expensive and unsatisfactory lunches down town, and gives the rider more time to rest during the noon hour.

For the Physician.

For the physician the wheel is invaluable, and every physician should be able to ride. It is often very important that there be no delay in the arrival of the physician; and, if he rides a wheel, he can give an urgent call almost immediate attention where, otherwise, it would be necessary for him to walk or wait for his carriage to be brought to the door.

Every convenience necessary has been made for the physician. Provision has been made whereby the medicine case, obstetrical case, et cetera, are attached to the wheel in a safe and convenient manner. These cases are well made, and can be used on the wheel or carried in the hand. In fact they are combination hand and wheel bags or cases.

Parcel Delivery Wagons.

In cities where it is the custom to delivér every little item purchased, it is essential to have some rapid and economical way by which these parcels may be delivered. In most cities will be seen a little box attached to a pneumatic tire tricycle; the operator sitting in front of the box on a regular bicycle seat; the one wheel in front with stearing apparatus the same as in any bicycle and the two wheels behind, to which the box is attached. This method of delivery is very rapid and satisfactory and much more economical than supporting a horse and large wagon.

The Carrycycle.

One of the latest uses to which the bicycle is put is illustrated in the carrycycle which is a combination of the push chair and the bicycle. There are many people who get the fresh outdoor air only by means of such vehicles; they could not stand the jar or jolt of a carriage or other such vehicle. But, here is a vehicle which is carefully made, ball-bearing, pneumatic tire, and suited in every particular for an invalid. It has

the advantage that the propulsion is a pleasure to the operator as well as the invalid. The machine is made with a low gear and takes but little power to propel it. It is made like a tricycle, the two wheels in front; the invalid's chair is in front over the two wheels, the operator sits on a regular bicycle seat over the rear wheel. This invention is certainly a great improvement over the old push-chair; having every advantage of the old chair but the advantage of being a pleasure to the operator with considerable less labor in its propulsion.

The Red Cross Corps.

The frequent accidents to wheelmen in racing and especially to those riding wheels on the crowded boulevard and streets of Chicago, has been the means of organizing a Red Cross Corps of Wheelmen. It is regularly and permanently organized and will be the means of saving some lives. The members of the corps are drilled in the service, and are expected to render intelligent aid to the sufferer until the arrival of a physician or an ambulance. It would be well to establish such a corps in every city of any size where accidents happen daily.

Bicycles in War.

Bicycles have been found by practical usage to be a very valuable military accessory. The aggressive Japanese was probably the first nation to use them in actual service, and found them exceedingly useful in reconnoitering and skirmishing. The movements on the enemy were rapid and disastrous; and, after the object had been accomplished, the attacking force was out of the way before the enemy could get into position to attack. A very small detachment of cyclists could do great damage to a large detachment, with little loss to their numbers.

It was found, however, that the regular bicycle was not applicable to military service and a folding wheel was invented; one the wheels of which could be folded together, in a few seconds, and strapped to the back of the soldier, in a neat package weighing about twenty-eight pounds. These folding wheels were a little heavier and built with special reference to durability, and could be taken by the soldier over fences, bridges, walls, in fact any place where the soldier could pass himself. In the march the wheels are especially valuable, because of the great distance the soldier is able to cover with no more effort than in walking.

The use of wheels in the European armies is becoming quite extensive. The demand for this specially military wheel has become so great that factories in Europe are devoting their entire time to the manufacture of them. One factory it is estimated will turn out 50,000 wheels annually, and are now behind on their orders.

With the advent of the bicycle in military affairs, comes the perplexing question of dealing with them. Here again the faithful dog is suggested. It is understood that in Germany dogs are being trained to dismount soldiers riding wheels. Wheelmen all know what damage a very small dog can do, and it is easily understood how a large ugly Danish dog could play havoc with soldier cyclists. The dogs are taught to attack only the soldiers wearing the enemy's uniform. There will be other ways thought of to cripple, dismount or in other ways unequip the soldier cyclist.

FROM A HEALTHFUL STANDPOINT.

What is more to be desired than health? Health is the road to wealth, and it goes without saying that no condition moral, social or financial, of the human being should be sought for more than a healthful condition; for, if he has health, he will have wealth, and consequently a moral and social condition satisfactory to himself and to others.

A healthful condition is attained in various ways. Those who are employed out of doors secure their exercise without conscious effort, but there are the classes who are employed indoors, who do not get the requisite amount of fresh air, and require outdoor, invigorating exercise to attain that healthful condition. What the office man requires is moderate exercise, in the fresh air, and not the athletics of the gymnasium which are generally of violent nature and leave the individual weak for several hours after indulging, and may produce functional derangement or organic change in the body, especially of the heart and lungs. For this class bicycling is especially beneficial.

That bicycling is a healthful exercise when properly and moderately indulged in, there can be no question. It is the same as any other kind of exercise properly indulged in; there are certain ones who will abuse it and thus injure themselves. However, it is gratifying to say that those who do abuse it are in the minority; and that minority will decrease as time increases and education along this line becomes more general. But as the wheel has come to stay, people will in time be educated and will know when they are abusing the use of the wheel, and will learn to use it with more moderation.

In this portion of my paper I will endeavor to point out some of the ways in which the abuses *may* occur. There are certain features of wheeling which may become detrimental to the health of the individual; but, in general there is no form of exercise, to my knowledge, that is so beneficial and at the same time so enjoyable to the participant.

As a General Exercise.

The value of a moderate form of exercise cannot be over-estimated. It is to be regretted, but it is nevertheless true, that up to within the last score of years a regular systematic physical exercise was practiced but slightly by our men and women. To many, exercise is hard work and sometimes even drudgery; but if judiciously prescribed it is worth much as a curative agent, and especially is it valuable in nervous disorders. Health of the body and health of the mind go hand in hand; without a healthy constitution it is difficult to obtain the best intellectual results. Regular and systematic exercise promotes a healthy development of all parts of the human body and therefore mentally better men and women; but, if indulged in to excess must and will eventually lead to a breaking down of the physical system.

No method, device or mechanical contrivance has been nor will be so conducive to physical development as our "silent steed" the bicycle. One of America's prominent physicians speaks of the bicycle as the "great calisthenic of the world." An eminent physician has gone so far as to say that "not in two hundred years has there been any one thing that has so

benefited the human race." It has been said that the wheel develops only the muscles of the arms and legs, but this is not true; the whole muscular system improves under its influence. If properly indulged in, there is no exercise that causes such a general invigoration and development of the different muscles and parts of the body. If used in moderation, better respiration, better heart action, better physical development in every way results. It banishes aches and pains, brightens the intellect and makes better men and women physically and mentally; and, upon these conditions of our citizens, depends the success of the nation. It builds up a vigorous constitution, a condition which tends to keep the individual free from pains and disease.

Wrong Uses of the Wheel.

The abuse of the wheel will be discussed under following heads, in order to give the cyclists some idea in what that abuse consists, but in no way to discourage its judicious use.

To just what extent a person can use the wheel without abusing it, will depend largely upon the individual. Individuals differ; some are naturally weak and delicate; others are strong and healthy. No rule can be laid down that will govern all cases. Providing there is no organic trouble with the heart and lungs, any exercise short of fatigue will probably be healthful. If there be any question concerning the amount of exercise that a person can indulge in without deleterious effect, it would be money well spent to consult some able physician who can make a thorough physical examination of the heart, lungs, etc., and thus be able to give intelligent advice.

The Influence of Age.

Bicycling is an exercise which should be indulged in by persons of nearly every age, and by nearly every class. Of course there are two extremes, the very young and the very old. It is ridiculous and absurd to think of placing a very young child on a wheel, and especially a "safety" bicycle. It has recently been stated that Alabama claimed the youngest bicyclist, a little girl three years old who rides a safety 14 inches high. Such toleration by the parents needs no comment.

It is believed that girls at ten and boys at eight are about the earliest ages that they should be permitted to ride the bicycle, and then under restriction, because of the occasional unmatured condition of bones, organs, heart, etc. The tricycle will do, up to that age. The great trouble is that it is difficult to regulate the use of the wheel in such young children; in fact it is difficult to regulate the wheel in some children at any age.

It has been claimed that the wheel for young men about the age of puberty and for girls just budding into womanhood creates abnormal excitement of the sexual organs and thus causes injurious results, but there is no reason why this should occur if proper saddles are selected, and it should be the duty of every mother and father to see that their boys and girls do not ride on saddles that in any way interfere with the natural condition of the human organism. It would be well for the parents to keep close watch and if necessary from time to time to question their boys

and girls concerning the saddles they use. It ought not to be difficult to ascertain whether or not the saddle is a proper one, without creating any feeling or suspicion of immodesty in the child.

The Bicycle and the Mortality from Consumption.

It has been shown by statistical evidence that consumption, that great destroyer of mankind, is decreasing. Just what relation this diminution has to the use of bicycles cannot be definitely ascertained. Doctor Samuel W. Abbott, secretary of the Mass. State Board of Health, and a prominent sanitarian, speaking of the decline of tuberculosis in Mass. says "The rate in 1851 was 1,451 females to 1,000 males; in 1890 1,055 females to 1,000 males; and in 1895, only 974 females to 1,000 males. In 1895 was the first year in the history of the State in which the number of deaths from phthisis in females was smaller than in males."

The fact that there are usually more deaths from phthisis in females than in males, and the fact that of recent years this condition is reversed, leads one to think that there is some relation between this changed condition and the use of the wheel. Of course it would be impossible at this time to show any direct relation. It is well known that bicycling causes a vigorous constitution, and vigorous constitutions are less susceptible to contract tuberculosis than are weakly delicate ones. The lungs are put through a gymnastic exercise which could not fail to do good. The deep breathing tends to clear up slight lung lesions and insipient pulmonary tuberculosis has been supposed to disappear under its influences. In my mind there is some relation between the reduction in consumption and the advent of the bicycle. However, considerable credit should be given to the faithful work of the sanitarian. Just previous to 1895, initial steps for the restriction of consumption were taken. The Michigan State Board of Health was the first State authority to declare consumption a dangerous disease; New York city having taken the initiative steps. This action was taken in 1893 and immediately similar work was taken up in various parts of the country. Great effort was made to educate the people just how the disease was spread and just how it could be prevented. If the facts were known, consumption has probably diminished in many states.

In a recent report to the Mayor, the New York City Board of Health declares that as the result of three years' restrictive work in that city the mortality from pulmonary tuberculosis is now 30 per cent. less than it was twelve years ago.

In Michigan the mortality from consumption has decreased considerably. This decline seems to have been more apparent since 1888, about the time the Michigan State Board of Health undertook to educate the people how the disease was spread and how it could easily be prevented.

Rheumatism and Gout.

The writer has frequently observed that cases of rheumatism, are markedly benefited by riding a wheel. Just what reason there is for the improvement, cannot be definitely stated, because of the various theories concerning the etiology of rheumatic trouble; but that there is improvement, and in many cases entire relief, there is no question.

It seems to be conceded by those who have given the subject most attention that there is really no great difference between gout and rheumatism, the two conditions being produced by the same cause, namely, a sub-normal elimination of uric acid, the rheumatic or gouty pains coming from a deposit of the urates in certain portions of the body.

To these urate deposits Mordhorst* gives the name "needle urates." In appearance they are something like a chestnut burr, but of course microscopical in size. When these are deposited in a muscle or joint, it can be easily conjectured how they may cause pain, irritation, and inflammation. Mordhorst further remarks "sodium urate is only deposited in those organs and tissues which are sparingly or not at all supplied with blood-vessels, and the nutrition of which accordingly takes place only or principally by means of lymphatic vessels or lymph spaces. The connective tissue of muscles, fascia, tendons, tendon sheaths, nerve sheaths, ligaments, cartilage, perichondrium or periosteum are almost exclusively the seat of gouty affections."

Haig and others have found that there is a constant relation between the amount of urea and uric acid that is eliminated. There is a slight difference of opinion as to the exact relation, but it is believed that one part of uric acid is excreted to every 33 parts of urea. Any condition which will increase the excretion of urea will tend to increase the amount of uric acid excreted, and thus prevent deposition in the body. The diet seems to have a direct bearing upon the amount of urea eliminated. Lehman† concludes "that the amount of urea which is excreted is extremely dependent on the nature of the food which has been previously taken. On a purely animal diet, or on food very rich in nitrogen, there were often two-fifths more urea excreted than on a mixed diet; while, on a mixed diet, there was almost two-thirds more than on a purely vegetable diet; while, finally, on a non-nitrogenous diet, the amount of urea was less than half the quantity excreted during an ordinary mixed diet." Flint† states that alcohol and tea and coffee also have a tendency to retard the elimination of urea.

Uric acid contains more nitrogen than does urea. Many observers have proved that the amount of nitrogen eliminated during work or exercise was in direct relation to the amount of work. Probably this fact accounts for there being less urates deposited in persons having healthful exercise.

Another more likely explanation of the beneficial influence of exercise, is the fact that muscular fluids after moderate exercise become alkaline, thus causing a condition more favorable to a dissolution of uric acid. It has been shown by Haig that exercise keeps down the acidity of the urine and at the same time increases the excretion of uric acid.

Haig‡ found that in the cold months of the year, the acidity of the blood tends to be high, because of little loss of acid in the perspiration and through the urine, each being excreted to a less amount during colder months. Haig has also pointed out a constant relation between acidity of the urine and the retention of the uric acid, both tending to rise and fall together. Any condition which tends to diminish the solubility of uric acid, tends to retain and accumulate it in the body. As the uric acid

*London Lancet, July 17, 1897, pp. 132-136.
†Flint's Physiology, Fourth Edition, p. 378.
‡Haig "Uric Acid in the Causation of Disease," Second Edition, and British Medical Journal 1896.

tends to remain in the body when the urine is highly acid, and the perspiration of summer tends to reduce the acidity of the urine, then the summer tends to reduce the retention of uric acid. It is well known that gouty and rheumatic patients have less trouble in the summer than in the winter. And it is also undoubtedly true that if sufficient exercise were to be had in the winter, the cold months would not be attended with so much rheumatic trouble. While according to Haig exercise keeps down acidity of the urine, and increases the excretion of uric acid, it must be borne in mind that the reason of less acidity in the summer is due to the excretory function of the skin and kidneys during that season of the year.

Here again it is shown the necessity of out-door exercise, where oxygen can and is more freely taken into the system through the lungs. The action of the lungs and heart increase under muscular exercise, and the blood receives more oxygen which is sent rushing through the arteries to every tissue of the human system. Oxygen stimulates the blood, and in connection with muscular exercise increases the quantity of blood. If rheumatism is caused by a germ as is claimed by some authorities, the beneficial results experienced after moderate exercise has probably a direct relation to Metschnikoff's theory of phagocytosis. A stimulation of the blood's activity may render such a condition favorable to throwing off the poisons that may be excreted by the germs. This same argument may also hold true as regards the ability of the blood to throw off or dissolve the urates deposited in the various tissues. Exercise certainly stimulates every fibre and tissue in the body by a stimulation of its blood supply.

It is important that exercise be regular and even in order to produce the most beneficial results in rheumatic trouble. Make the exercise regular, increasing the amount slowly in order not to cause exhaustion; especial attention should be given the regularity of exercise in persons past the prime of life, because as age advances the muscular activity tends to decrease and requires greater effort to keep the muscles in active working condition. Over exercise might be the cause of a rheumatic attack especially if an abnormal condition like chill, etc., were encountered after violent exercise. Then again it is equally as important that during a long ride sufficient water shall be taken into the system at the proper time, in order that perspiration may go freely on, and that the human body may receive the amount of water required to carry on the combustion and extra work devolved upon it during exercise, and cause a thorough flushing of the system thus aiding in eliminating waste material.

The fatigue after violent exercise, Haig attributes to the excess of uric acid formed that would have been carried off by a preceding continued exercise. Hence the importance of being in training and taking regular, not excessive, exercise.

The "Bicycle Face."

Some ingenious opponent to the wheel, has coined this term, and many have been terrified therefrom, not knowing what it all meant. I don't doubt that there is such a condition that might be designated by that term. But that there is such a permanent condition, I would be indisposed to accept.

The bicycle face is seen only in beginners, and comes from the anxiety or uncertainty of the individual. Until the beginner has learned to ride, and until balancing becomes a second nature, there is liable to be an anxious expression on the face. The same expression would probably be seen in beginners in other arts that carry with them a certain amount of danger, as the person learning to ride a horse, to swim, etc.

Care of the Eyes.

There are many times during the year, and it may be common especially during the dry summer months, when riding a wheel might have some temporary bad effect on the eyes. The glare of the sun, dust, flies, etc., might cause a weak condition of the eyes, and would be quite likely to make naturally weak eyes weaker. If a rider has trouble with his or her eyes he or she should consult an occulist, and ascertain if there is cause for glasses that would correct any difficulty there may be. The occurrence of headaches, pain over the eyes, etc. might indicate there was some eye trouble. In such cases glasses should be put on without regard to the wheel. If there is no eye trouble except that which may come from the dust, flies, etc., it would be well to have a pair of blue glasses or glasses without strength to protect the eyes from the introduction of foreign matter during wheeling.

Inflammation of the Kidneys (Nephritis.)

There seems to be more or less possibility that inflammation of the kidneys may accrue from *over-riding* on the bicycle. Mueller has carefully investigated the urine of twelve persons after severe muscular strain in bicycle riding: In the urine of eleven examined, or 92 per cent, he found albumin, and in eight out of twelve, or 67 per cent, a considerable number of all, casts, in six of which the casts were as numerous as seen in acute and chronic forms of parenchymatous nephritis. In two (16 per cent) he found a few true hyaline casts, with albumin, and in another there were casts of every variety, and kidney epithelium, but no albumin. The urine of two persons, or 16 per cent, was constantly normal. The investigations confirm those of Stablewski and Leube, that excessive muscular exertion can cause albuminuria. It is therefore a physiological or functional albuminuria of short duration. It differs from other forms of physiological albuminuria, in which few or no casts are found. The casts here, however, were only found with the centrifuge, after forced riding, racing, and excessive muscular exertion. That frequently repeated over-exertion in bicycling might, by constant irritation, produce true chronic nephritis appears quite possible.

The Bicycle and Appendicitis.

It is alleged that there is some connection between bicycling and appendicitis. "The condition is caused, it is thought, by the contractions, too frequent or too violent, of the psoas-illacus, which bicycling involves.

Hence results contusion of the appendix, followed by desquamation of its mucous membrane; this makes a breach through which infective agents find their way into the walls of the appendix and set up inflammation. The straining caused by going up hill makes the danger all the greater. In persons who have already suffered from appendicitis, bicycling may easily lead to rupture of adhesions, and to the development of acute conditions."* Some physician has been so impressed with the dangers from appendicitis that he has recommended a systematic removal of the appendix in children, as a prophylactic measure. In these days when bicycling is so fashionable, effort is made by some to prove the bicycle the cause of all kinds of ailments; it is not at all surprising to hear of its being a causative factor in that "popular" trouble with the appendix vermiformis. Doctor G. A. Armstrong of Toronto, who is a recognized authority on appendicitis, expresses his belief that there is no relation between wheeling and this disease.

Bicycling and Hernia.

Dr. George W. Miel, of Denver, Colo., points out the fact that bicycle riding is a cause of inguinal hernia. He says "in considering the causes—picture to yourself the usual bicycler astride his wheel; with thigh more or less flexed, his body bends forward, the abdominal contents resting and pressing upon and against the inguinal abdominal wall. It is manifest that he needs only abduction of the thigh to favor, and then sufficient strain to induce inguinal hernia.

"About a city, or on a road the wheel may slip sidewise in sand, gravel, mud or on wet pavement; especially in turning, or in crowding a car track, or the side of a wide wagon track through hardening mud; to escape a fall the rider may have occasion to make what might be termed a grand effort, with straining pressure on one pedal to maintain his equilibrium; in which he balances to the opposite side, but turns his wheel sharply in the direction toward which he is falling, at the same time throwing his knee wide to clear the handle bar; the pedal exertion falling on the same side. If the pedal be high at the instant he must strongly abduct and flex this thigh. Those acts are instinctive and not wholly under his control or of his choosing; they are therefore not easily followed."

Then again hill-climbing and riding against wind may also carry with them considerable risk. There would probably need to be a weakness; if the inguinal ring were naturally inclined to be open, hernia might result from some of the above-mentioned causes, but it is quite improbable. It might result from coughing, sneezing, blowing wind instruments, etc. or other similar straining effort.

Paralysis of the Third and Fourth Fingers.

The writer's attention was first called to this subject by personal experience. It was first noticed in the spring after a ride of fifty miles there was complete loss of feeling in the third and fourth fingers especially of the left hand, the numbness continued according to the length of the ride,

*British Medical Journal, April, 1897.

varying from two days to a week. The numbness was noticed even after a ride of fifteen or twenty miles without resting. The trouble seemed to have come from undue pressure or gripping of the handles, and the elevation of the handle bars had a direct bearing. The condition probably came from pressure upon the branches of the ulnar nerve. No doubt the vibration of the handle bars had some influence. Wearing gloves seemed to prevent, to some degree, the numbness, as would also guiding the wheel by grasping the bars near the head, or by grasping the handles between the thumb and forefinger, thus avoiding any pressure upon that portion of the hand where the branches of the ulnar nerve are distributed.

It was also found by the writer that as the season advanced there was not so much trouble of this kind, unless after a very long ride and the above-mentioned precautions were neglected.

A pneumatic or cushion handle for the bicyclist to grasp might be an accessory worthy of consideration.

Since the first of the writer's experience, he has searched for similar cases and finds that the medical literature has reported a number. In some cases atrophy of the fingers affected followed the paralysis. Precautions against this trouble, are worthy of adoption especially in office clerks or others whose hands are soft and susceptible to such trouble.

Other Affections of the Nervous System.

Space is too limited to go into details concerning the various conditions of the nervous system which may result from the use or rather the abuse of the wheel. Such conditions as temporary or permanent paralysis of the lower extremities, loss of sensation in the penis, perineum, complete permanent paralysis of the bladder and anus, etc. Drs. Semple and Taylor of England have given this phase of cycling considerable attention, and have recorded cases that have come under their observation.* Many such cases have been recorded and many more yet remain to be made a matter of record.

Doctor Furnivall, Assistant Demonstrator of Anatomy, in a London College, publishes his personal experience prior to the time of acquiring his profession.† His experience relates not only to conditions experienced by himself while he posed as a professional racer, but the experience of other professionals. What Doctor Furnivall relates is right in line with the experience of others, and confirms the observations of Doctors Semple and Taylor above referred to.

The writer has in mind a case of so-called "Multiple neuritis" in a young man who was in the habit of taking "Century runs", and who was stricken down after such a ride, the cause of which undoubtedly had a direct connection to the use of the wheel. That numbness in the perineum and contiguous organs after long rides on bad saddles, is apparent, one has but to enquire amongst wheelmen to establish this point. There are probably many serious cases that could be placed on record as having been traced to the use of the wheel.

*London Lancet, April 7, 1897, p. 1084.
†London Lancet, May 29, 1897, p. 1502.

This phase of wheeling is of immense importance, and should receive the attention of every cyclist. Whenever there is numbness of parts of the body, or other abnormal condition produced, it would be well to investigate, and if necessary consult some competent physician, in order to prevent any disaster which might occur if the conditions causing the trouble were not changed.

The attitude the rider assumes on the wheel has an important bearing on all of the above-mentioned troubles, but the size, shape, and tilt of the saddle has equally as much influence. The "wedge-shaped" thing designated as the "saddle" is undoubtedly responsible for most all the trouble. Just what kinds of saddles are best, and the use of such saddles, will be dealt with under another head in this paper.

Heart Strain.

One, if not the most serious, condition which may accrue from the abuse of the wheel is heart strain, due to over taxation during long, rapid, or quick short rides.

Dr. Albu gives the results of his investigations in twelve professional cyclists whom he had examined both before and after races lasting from five to thirty minutes. The strain on the heart was shown by well marked dyspnœa (difficult breathing), and by strong pulsation of the heart and arteries, but the most remarkable fact was an acute dilation of the heart, especially of the left ventricle. This dilation was temporary, disappearing after rest, and returning after another race. When over-exertion is frequent this dilation may become permanent, and in a heart that was previously weak an irreparable injury may occur.*

A symptom of heart strain is mouth breathing, and when this occurs the rider should give the warning attention. Another symptom may be the appearance of albumen and casts in the urine, caused probably by the kidneys being irritated by this unusual effort of cycling; perhaps no more so than any exercise of equal violence, increasing the circulation and increasing the excretory action of the kidneys.

Petit† records three cases of sudden deaths from use of the wheel. In each case there was history of heart trouble which, by the over-exertion, caused the death. While few sudden deaths may occur, the entailments which result from this violent exercise, may be many, severe and lasting. The over-exertion might have come some other way, and caused the same result; but the wheel is a likely way for such over-exertion. A hard ride, or a sudden quick spurt may mean sudden death. There are numerous cases of this kind on record. Such cases of heart failure seem to more frequently occur in fleshy persons; because of their flesh, the respiration and heart action are somewhat restricted, causing a congestion, and possibly heart failure.

Doctor G. M. Hammond, professor of Mental and Nervous Diseases, New York, has made an extensive study of the condition of the heart in amateur and in professional riders. Some of his findings are tabulated in the following tables, which I take the liberty to quote:

*London Lancet, June 5, 1897, p. 1578.
†Medical News, Oct. 13, 1894, p. 412.

Cases.	Age.	Ridden a wheel. Years.	Miles Ridden.	Chest Expansion. Inches.	Heart.	Muscular System.
1	37	5	22,000	1¾	Slight hypertrophy..	Well developed.
2	25	10	27,000	1¼	" " ..	Legs well developed, arms and trunk fair.
3	36	5	8,000	2	" " ..	General development greatly beyond normal.
4	42	12	24,000	1½	" " .	Well developed.
5	46	13	25,000	1	Normal	Average.
6	24	13	14,000	1⅜	Slight hypertrophy..	Well developed.
7	25	10	20,000	1¾	" " ..	" "
8	34	7	18,000	1⅝	" " ..	" "
9	30	8	9,000	1⅜	Normal	" "
10	29	7	8,000	1⅜	Slight hypertrophy .	" "
11	28	7	17,000	2	" " ..	Generally very muscular.
12	24	6	7,000	1¼	Normal	Average.
13	39	5	6,000	1⅛	"	"
14	24	5	5,000	1½	Slight hypertrophy..	Well developed.

"Average chest expansion, 1 4-7. Heart usually hypertrophied without dilatation. Average age, 31 years. Chest expansion, 13 riders above normal; 1 normal"

The above table exhibits Doctor Hammond's experience with 14 amateur riders whom he has had under his observation, and of whom he had definite information.

In explanation of the table he says "This table demonstrates two important facts very clearly. *First*, that men who have ridden a great deal for a number of years have acquired simple cardiac hypertrophy without dilatation; and *second*, that their breathing capacity is greatly in excess of that of the average man. The cardiac hypertrophy that I refer to is due to a simple increase of muscular tissue, and is in the nature of a healthy growth or development induced by exercise. It is precisely similar to the hypertrophy which occurs in any other muscle which has been used a great deal." A condition that carries with it no idea of organic trouble, but of a healthful condition.

Dr. Hammond has found by actual measurement that the normal chest expansion after a full breath is one inch,* but varies somewhat in different individuals. It will be seen by the foregoing table that the chest expansion in the 14 riders was either normal or above the normal. Also that the condition of the heart and of the muscular system was above the normal.

However, if this exercise were excessive and the hypertrophy of the heart tissues was considerable as in the case of professional racers the muscular elasticity would be impaired and sooner or later the heart would give out, resulting in heart failure and sudden death.

Fainting, and possibly heart failure, may be due to an auto-intoxication by carbon dioxide (CO_2). During great physical exertion, combustion of the bodily fats is very rapid, giving off CO_2 and water. CO_2 in the blood causes the short breath and mouth breathing, and an excess of it causes fainting and possibly death by poisoning of the heart muscle.

*Diameter.

Prostatic Enlargement.

Long before the modern safety bicycle became so universally used, the possibility of enlargement of the prostate gland was discussed. The subject has been traversed pro and con; some authors claiming that there is no relation between bicycle riding and enlargement, and others affirming that there was a direct relation. In my opinion there is a relation; and, although there may be no immediate positive proof, there are many cases on record and in private practice that tend to point toward a relation. One will need but to enquire of different physicians to find that already there are now cases of prostatic enlargement which can be attributed to no other cause. I have no doubt if statistics were available that prostatic trouble would be shown amongst cavalry soldiers of the war, or other horsemen who ride bare back. It is believed that if statistics were available that prostatic trouble could be shown as prevalent among the tribes of Indians.

It is believed that the possibility of prostatic enlargement depends directly upon the kind of saddle used by bicyclists, and the kind of saddle that ought to be used will be discussed in another portion of this paper.

Those who disclaim any relation take it for granted that saddles are used as they should be, but neglect to consider that they are not. The tipping of the horn of the saddle up would seem to me to have not so much bearing, it is the opposite that does the harm; it is the tipping of the horn of the saddle down; and when leaning forward the cyclist rests the weight of his body on the narrow horn not on the perineum but directly on the rectum. If prostatic enlargement comes from wheeling, it comes under this condition.

Urethritis, and Other Trouble Along the Urethral Tract.

Medical literature records many cases of urethritis of a non-specific nature. This trouble would come from a pressure of a bad saddle along the urethra most likely to occur at about the point where the urethra passes under the pubic prominence, but frequently occurs posterior to that part even back as far as the bulb. The post-urethritis is believed to be due to tipping the horn of the saddle down so that the rider will slide forward and thus rest the most of his weight upon the horn of the saddle in the region of the perineum. Where there is numbness in this region, the warning should be given attention, and the saddle should be exchanged for one that causes no such abnormal condition.

In the opinion of the writer the unnatural pressure of a bad saddle is capable of producing prostatic urethritis, stricture of the urethra, sterility, impotency, incontinence of urine, etc.

How to Breathe.

An important item to consider in wheeling, is how you breathe. You can breathe through your nose, you can breathe through your mouth; but if you breathe through your nose, you can be satisfied that you are making no mistake. But, if you breathe through your mouth, it would be well to

give the point due consideration and if necessary consult your physician. For healthful wheeling, breathing through the nose should be practiced. In the nose are little hairs, cilia, which have been placed there by nature to strain out impurities that may be in the air, and the moist mucous membranes of the nasal cavity have a similar function. Nature has made no such provision for mouth breathing, and there is great danger of taking impurities into the lungs which may cause disease and consequent death. The tubercule bacillus (consumption germ) is one of these impurities, and when you stop to think that about one-seventh of all who die are killed by this little germ it is important that every precaution be taken that is possible to avoid infection, not only by this germ, but by other disease-producing germs.

There is another important reason why mouth breathing demands attention and that is it indicates that the vital portion of the organism—the heart—is not performing its functions properly. Difficulty in breathing so that one is obliged to breath through the mouth, indicates a lack of blood supply to the lungs and also a weakened condition of the heart.

Abdominal breathing has direct bearing upon a healthful condition of the human economy, and is particularly sought for in professional vocalists. Not only this, but it tends to a better form, and better digestion. Exercise of the abdominal muscles has a tendency to keep the internal viscera in their normal position, particularly so if not forced out of place by undue pressure caused from tight corsets. Doctor Kellogg has said that displacement of the internal organs by the lax condition of the abdominal muscles is the most prolific cause of dyspepsia. Exercise these muscles and they will perform the work nature intended they should; you replace the displaced viscera and replace the health of the individual. Wheeling exercises this portion of the muscular system. Singers have sought this mode of exercise and have been benefited. They indulge in a moderate exercise. One of New York's prima donnas says "When I took my spin regularly in the mornings I felt bright for the entire day. The regular exertion if we may call it that, seemed to start circulation and deeper and more evenness in breathing. So when I began to practice I found my voice much clearer than on mornings when I did not ride."

The Dress.

In the female the dress should be simple and as nearly as possible made in "combination," the weight of the garment coming upon the shoulders. The corsets, waist bands, should be abandoned entirely, in order to give the waist full liberty and in no way to restrict the action of the abdominal muscles which have their function to perform. The corset is injurious enough at any time, but it is especially injurious when the lady is exercising and should not in any way interfere with her breathing. Such exercise as wheeling requires more liberty of breathing than does ordinary pastime. But it is hoped the time is coming when the corset will be discarded and will not be worn by our women. However, as the intelligence of woman increases the corset will decrease. The corset should not be used while riding unless the breasts demand a support, then only a loose corset which comes to the waist, or a breast support that comes from the shoulders. A substitute for corsets is suggested in a Ferris or Equipoise

waist. The shirt waist, the jacket, the lady riding boots that come to the knee, all go to make up not only an attractive but a healthful dress. There are some who are opposed to the short skirt because of some æsthetical misunderstanding, but the time is coming when there will be no objection, the short skirt will be universally worn not only by wheel women but by all classes of women. Of course the skirt should be no shorter than necessary. It is universally conceded by those ladies who have worn the above-mentioned dress, that there is nothing that compares with it for convenience and ease. It is gratifying to notice that many women are adopting the short storm skirt; it is a step in the right direction. The writer has in mind a lady newspaper reporter whose work brings her out doors in all kinds of weather. Recently she adopted the short storm skirt and rubber boots which she wears during rainy and wet weather.

There is only one dress for the man, and that is the regular golf suit, some have indulged in knickerbockers, fitting the leg tightly in such a way as to be inconvenient. No garb for the man looks so well as the complete golf suit, with bicycle shoes, adorned with pretty golf stockings. The time is not far distant when the city population, doctors, bankers, lawyers, students, clerks, and I might say the clergy will wear this garb during their every day work; long trousers will be a thing for "dress" only.

For Women and Girls.

One of the most important questions that can be considered, is the use of the wheel by our girls and women; if it is a healthful exercise, it should be preached from every pulpit, taught in every school and praised and commended by every physician. If it is not a healthful exercise, it should be universally condemned. It is my belief that nothing in the form of exercise has ever come to the gentler sex that is so beneficial; it gives them *natural* color in the face, gives them better circulation, better breathing, takes them into the fresh wholesome air, and above all things makes them companions of their husbands, if married, or, if not married, supplies not only a pleasing but a healthful entertainment, for their best young men.

It has been claimed that it tends to lead our women and girls astray. There is no reason why it should; it certainly would have a tendency to prevent it, with married women, because their husbands are with them more hours in the day than when the wheel was unknown. Women and girls who ride wheels should exercise the same good judgment in their selection of gentleman company, as they would were they in the drawing room at home or any other place. Roof-gardens and other such enticing places should be avoided. It is well known that weak, indolent women are more liable to have their sexual feelings excited than are strong healthy women, and it seems to me that it ought to be a powerful argument for any exercise which shall place our women on the same footing as our men, so far as strength of mind and body is concerned. With the young lady, there should be no more privileges given her with a wheel than she had before; all young ladies should be under the surveillance of their parents until they have the discretion to properly care for themselves. There is only one possible bearing the claim may have, and

that is the erotic influence of a bad saddle. Just how much there is, is not known; if a saddle causes any abnormal feelings, it should be exchanged for one that does not.

Another argument which has been used against the use of the wheel by girls not having reached the age of puberty, is that it may deform or interfere with the proper development of the pelvic cavity. An improper saddle might result in an abnormal development of the pelvic bones; that is, a saddle that presses on the perineum might cause the ischial tuberosities to be brought closer together, and thus produce what is called a contracted pelvis, a condition not at all desirable. It is also said that the constant pressure of a hard saddle upon the perineum causes the muscular tissue to toughen and thus interfere with child birth. These claims may have considerable foundation when thought of in connection with a bad saddle. There is no doubt that a bad saddle can cause many abnormal conditions, but that is no argument against a good saddle where the weight of the body rests upon the ischial tuberosities.

Prof. Robert L. Dickinson, M. D., of Brooklyn, and a prominent gynecologist in this country, has given the subject of "bicycling for women" a considerable amount of scientific study. His views are contained in the following summary: "Under proper conditions of costume and posture, with care that the exercise be gradually increased and properly graded for the individual case, and where there is no acute inflammation to contraindicate it, bicycling will probably show itself capable of large results as an agent in curing pelvic disorders, since it is one of the few exercises which attract women. In view of woman's disabilities, and the disadvantages under which she has suffered in attempts to obtain interesting and beneficial muscular exercise, it seems hardly too much to say that the promise from the bicycle is far-reaching. Through it and the habits it will engender we look for better dress, freer dress, shorter dress in bad weather; for better exercise, for out-of-door activity, for steadier nerves, stronger muscles, painless periods, easy labors."

At a meeting of American Gynecologists recently the subject of bicycling for women was thoroughly discussed, and it seemed to be the unanimous verdict that bicycling in moderation would produce wonderfully beneficial results in the coming woman. It was especially commended for patients suffering from nerve weakness or exhaustion, indigestion, constipation, and general debility caused by sedentary and indoor life.

Gynecologists seem to be more or less united in the belief that wheeling has curative effects on various female disorders, misplacements, etc. There is no question but that wheeling properly done has a wonderful influence upon weak women. It is common belief among women having misplacements, weaknesses, etc., that they generally feel better and have less trouble during the season for wheeling. Women that can walk but little, can ride a wheel with perfect impunity.

Of course during the period of menstruation women should refrain from the use of the wheel or any other excessive exercise. However, some physicians, claim that women can ride wheels even during this time. Nevertheless it is undoubtedly true that during this time of general weakness, when it is a question of walking or riding a wheel, the wheel should be chosen. The same amount of work is accomplished with much less effort.

Wheeling has been likened to the sedentary life of the operator of the sewing machine, but there would seem to be no resemblance. The stooped position, the restricted action of the lungs, digestive organs and pelvic organs, and the indoor environments, cannot be compared with the upright position and the out-door exhilerating influences attending the use of the wheel.

Exercise for women and especially invalid women has occupied the best minds, and is a subject of constant controversy. Gymnasiums, physical culture, and many other methods of exercise have been recommended, but those who know most about the subject are recommending the wheel to take the place of such exercise. Doctor John H. Kellogg,* Superintendent of the Battle Creek Sanitarium, has given the subject of woman's ailments much attention, and is an authority on any subject relating to this branch of medicine, or relating to the disease or health of woman. He is unqualified in his praise of wheeling for women. Concerning a case of complete nervous exhaustion which came to his sanitarium for treatment,—the young woman was so weak she could scarcely stand alone for any length of time. He attributes her improvement to moderate use of the wheel. He says "At the end of a few weeks her total strength had increased from 1,450 lbs. to 2,500 lbs., a gain of half a ton. One of the most noticeable gains was in the muscles of the arms and legs, particularly the latter. The leg muscles had gained in strength from 900 lbs. to 1,450 lbs. The arm muscles gained nearly 50 per cent, and the strength of the chest muscles had doubled. The total strength of the muscles of the thighs, which are especially used in this exercise, was increased from 394 lbs. to 728 lbs. The young woman had been completely transformed from a feeble, nervous discouraged individual, to a bright, rosy-cheeked, vigorous young woman." He cites similar cases, giving the results of a scientific investigation, by means of his unique and original physical measurements and charts.

Concerning the use of the wheel Doctor Kellogg* further says "There is no better form of exercise for increasing the strength of the muscles of the trunk than bicycle riding. The trunk is a weak portion with the great majority of women. Weakness of the muscles of the trunk is the principle cause of backache and of the great share of the peculiar ailments from which women suffer."

The writer has in mind a case of an anemic woman with nervous exhaustion. After a few weeks of medical care she was able to walk about but was unsteady. Although she could not mount her wheel alone, with help, she could ride a hundred yards the first day, and every day increasing the distance, using great care not to overdo. Within a short time she was able to ride a mile or so, without the least exhaustion, but during this same time she was able to walk but a few yards. With tonics and the wheel she soon regained her health, and within three months was able to take rides of 20 miles in one day without fatigue.

As an exercise machine, the bicycle holds first rank, because of its ability to use every muscle of the body. That every muscle is used will be affirmed by every beginner; for, after the first ride, he will aver that he never knew he had so many muscles in his body, every one of the muscles (about 400) of the human anatomy seems to take particular delight in being prominent.

*Good Health, Vol. 28, pp. 174-75.

No better testimony for the benefits of the wheel, is needed than to feast your eyes upon lady bicyclists. Full of life, sturdy and well-developed, no grander sight can mortal eyes gaze upon. Always ready for a ride, never tired, she forgets all woman's ailments, headaches, backaches, etc. It gives them just what they need, out-door active exercise, gets them out of the illy-ventilated house, and gives them the fresh pure air of nature.

Every woman should have a certain time of each day which she should devote to out-door exercise. Get out into the open air, take a short spin on your wheel, dress loosely that all the organs of your body may perform their functions naturally, make a study of your breathing so that the oxygen of the air will reach the most remote portions of your lungs, you will feel like a new woman and will forget that you have any pains or miseries. Try it and you will be convinced, you will wish that every day in the year was a bicycle day.

How to Sit Upon a Wheel.

It is to be regretted that a large percentage of the riders do not assume the proper posture or position. It is needless to say that bending over as in the act of scorching, is not the proper position. The body should be erect, and not dissimilar to the erect position assumed during walking. Every effort possible should be made to educate the wheeling public. Prof. Robert L. Dickinson, of Brooklyn, has given this subject a great amount of study. He has written at least one paper in which he had illustrated the various postures by means of photographs from living models and skeletons, upon the wheel.

The correct posture is when the trunk is held erect, the seat directly over the pedals, the elbow is a little flexed, and the wrists extended. When one of the pedals is at the lowest point, the leg on that side should be only slightly flexed and the foot should be at right-angles with the portion of the leg below the knee joint; the leg on the higher side will take care of itself. Only the ball of the foot should press the pedal. When the saddle is too low the rider cannot assume the position just described; and, when the saddle is too high, there will be a rocking action of the body caused by an effort to reach the pedal at the lowest point. A posture other than the "correct" one should be avoided. Be careful not to have the saddle too high, or too low, and see that it is directly over the pedals, in order not to have a waste of energy or an unhealthful posture.

The Saddle or Seat.

Upon the seat depends largely the comfort of the rider, but determines more largely the all-important question of whether cycling is a healthful or a harmful exercise.

It is to be regretted that that portion of the wheel upon which the rider sits, has been termed "saddle", it is a misnomer and is responsible for the many mistakes made in the manufacture of that portion of the bicycle which should be called "the seat". Sitting upon a wheel should

not be dissimilar to sitting on a chair, etc. Of course it is necessary that the seat be as narrow as practicable, in order that the legs may not be spread apart more than is absolutely necessary.

The term saddle has probably originated from the saddle used in horse-back riding, but there is no resemblance. The equestrian saddle is broad and flat and there is little difference between sitting on it and sitting upon a properly constructed chair.

The bicycle seat should have the same relation to the rider as does the properly constructed chair; it should be flat, rigid and fixed in its shape; and at no time should any part of the seat cause undue pressure upon parts in one of the most delicate regions of the human economy. In order to better place this portion of the subject, before the reader, I have in connection herewith three illustrations—Plates 1, 2 and 3.

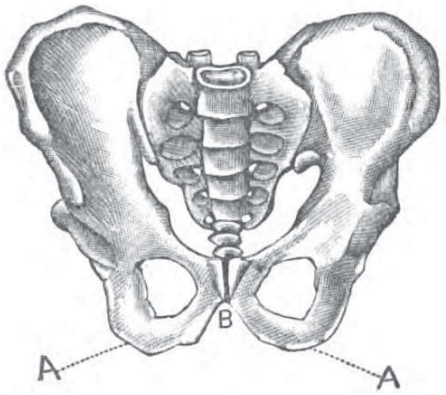

PLATE 1.

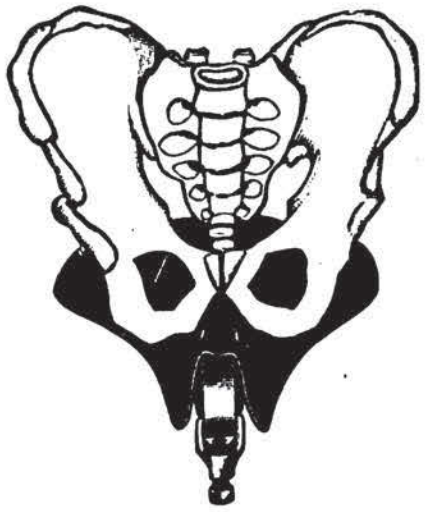

PLATE 2.

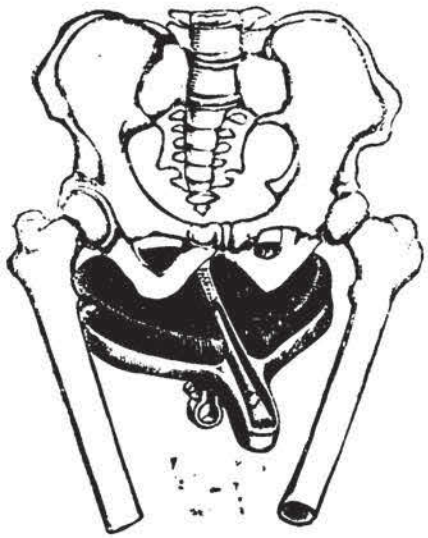

PLATE 3.

Plate 1, represents the bony pelvis of the human being. The two prominences marked "A" are the ischial tuberosities upon which the weight of the body when riding a wheel should rest. "B" exhibits the

pubic arch, which protects a portion of the body upon which the weight of the body should never rest, for any considerable time. The pubic arch is nature's protection for some of the more delicate and sensitive parts of the body, among which are the prostate gland, the bulb, urethra, etc. Any condition which shall interfere with nature's arrangement, will throw down the bars of protection, and sooner or later result in permanent and serious injury. The insidious way in which these injuries gain a foot-hold, misleads the one being injured; and, while there may be premonitory symptoms or warnings, they are not such as would be observed until too late, when the injury has occurred.

Plate 2, represents the bony pelvis seated upon the common hammock saddle, the saddle which should be guarded against. It will be seen that the weight of the body ceases to be supported by the ischial tuberosities but is supported by that portion of the body called the perineum.

Plate 3, exhibits the bony pelvis resting upon a flat rigid seat, the weight of the body falling upon the two bony prominences of the pelvis. The seat represented in this plate will be seen to consist of two separate pads or cushions, between which is a groove or depression (about one inch across) for the better protection of the perineum from pressure. Any bicycle seat made upon the plan exhibited in this plate will be less likely to cause injury to the delicate portions of the human anatomy situated in the region of the perineum. The horn should be free from sharp corners and padded or cushioned when practicable.

The pelvic bones vary in some, and especially in females, the tuberosities are closer together than in others. The seat should be wide enough so that these bony prominences of the pelvis shall rest comfortably upon the pads. It is equally important that the seat be not too wide, in order that pedaling can be accomplished without unnecessary friction or chafing by the edges of the seat.

In this paper the writer has endeavored to point out to the reader the injurious effects that may result from the use of an improper saddle and the injudicious use of the wheel; and, at the same time, he has endeavored to show not only the essentials of an anatomical and hygienic seat or saddle, but what great and lasting benefits may result from the judicious use of our "silent steed"—our bicycle.