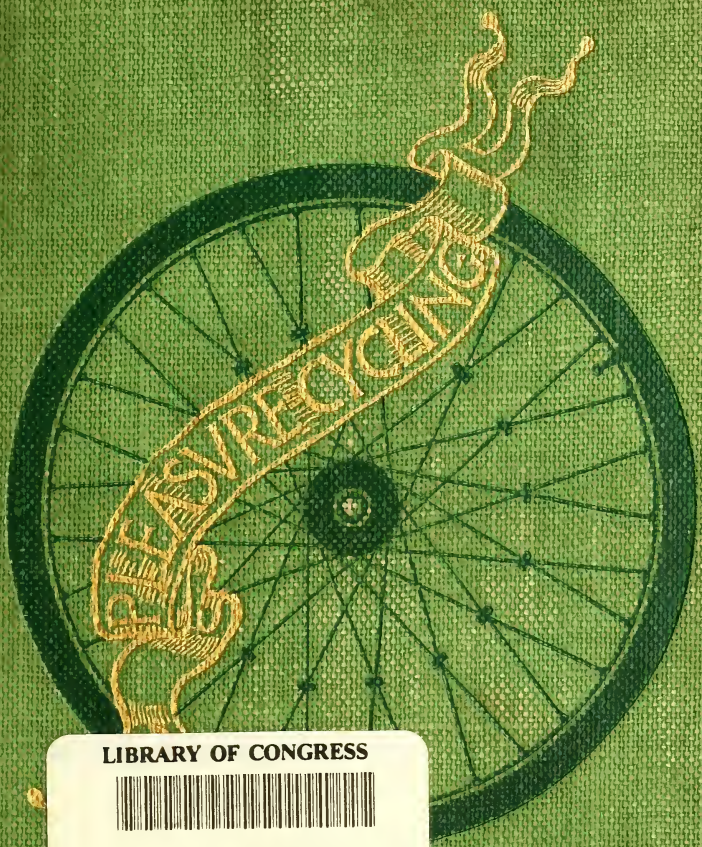

PLEASURE-CYCLING.

PLEASURE-CYCLING

BY

HENRY CLYDE

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PREFACE.

IN this little book, the writer, looking back to his own days of inexperience in cycling, has endeavored to furnish some useful information and advice to those who intend joining the army of wheelmen, or who, in their first season on the road, are beginning to appreciate the healthy pleasure which cycling brings. The book being especially intended to aid the amateur rider of the safety bicycle in the intelligent use of his wheel, the writer has kept that purpose closely in view, and has not included matters aside from it; such, for example, as the history of the development of the bicycle, and training for track and road racing.

Further, the writer has attempted, perhaps too emphatically as some may think, to

commend the merits of bicycling as a means towards innocent enjoyment and healthy living. But if, to persons as yet ignorant of the art and mystery of wheeling, he may seem to speak extravagantly, he is sure that his book will not be the subject of such reproach from those to whom, as to himself, the bicycle has brought a new and durable pleasure into life.

The book has been written solely for the instruction and benefit of cyclers in pursuit of health and pleasure; and, whatever criticism the opinions expressed in it may meet, they have at least the merits of honesty and independence.

The writer's acknowledgments are due to the Pope Manufacturing Company of Hartford, Connecticut, for permission to reproduce the illustrations contained in the book; and to friends for advice and suggestions generously given while it was in preparation.

H. C.

March, 1895.

THE WHEELMAN.

Murmurs of leaves and of brooks, the rhythmical beat
of the breakers
Pounding the curve of the shore, and the sea-birds rest-
lessly wheeling, —
Bells of the kine on the hills and the click of the scythes
in the meadow, —
Scents of the fern from the pasture, the wild roses' bloom
in the thicket, —
Resinous breathing of pines, cool cloud-shadows crossing
the mountains:
These his, as he rides, self-contained and exulting in
motion, —
Winds softly touching his face to whisper the secrets of
summer, —
Straight through the shadow and sunlight, swift as the
birds, and as silent!

H. C.

March, 1895.

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I.

THE POETRY OF MOTION.

"Never was the man of spirit the victim of ennui if his body was exposed to fatigue; never did the man healthy of body fail to find life light if he had something to engage his mind."

ALEXANDRE DUMAS.

I.

Of the million bicycles, or thereabouts, in use in the United States during the summer of 1894, some hundreds were ridden on the roads or race-tracks by amateur or professional racing-men. Many thousands were used, wholly or in part, in the business of their owners, that is in going to and from offices, shops, or factories at morning and evening, carrying messages, taking orders, visiting patients, and making pastoral visits. But probably three quarters of the million wheels were

devoted to pleasure-riding ; and if the use of the bicycle for this purpose increases as it seems bound to do, cycling is to become distinctively our national sport. It may not become, or may not long remain, popular with the class which seeks only those sports that are made impossible to others by reason of their expensiveness or the need of special surroundings for the practice of them, but the inherent delight of riding is too bewitching to be abandoned by most of those who have once experienced it.

It is about the wheel, as a means of amusement and exercise, that this little book is written. But not only as a sport is cycling destined to furnish innocent and exquisite pleasure to thousands of men and women whose enjoyments heretofore, through the stress of narrow circumstances or of absorbing avocations, have been very limited, — not only is it to bring better health and sounder constitutions to this generation of young and middle-aged Americans, — it is to be the saver of time and muscle to busy men, who will adapt the wheel to a hundred purposes in their daily work for which they

have been accustomed to use their own unassisted legs and lungs. When the bicycle has fairly taken its place as the popular vehicle of the day, the roads and highways must be adapted to it, and there will no longer be room for the reproach, now too true, that the common highways of the United States are vastly inferior to those of England and the continent of Europe.[1]

The safety bicycle is without doubt the safest road vehicle yet invented. It is fair to assume that nearly all the serious road accidents happening to cyclers have been

[1] The bicycle is now in use in nearly all the armies of Europe, and in that of Japan; and it is likely that, within a short time, a bicycle corps of couriers and scouts will become a part of the regular army of the United States, in spite of the difficulties which now attend movement by the wheel over the rough country in the West, and the bad roads which are the rule rather than the exception throughout the interior of the country. In his Annual Report for 1892, Major General Miles said: "The results obtained, under the most adverse and discouraging conditions, prove conclusively that the bicycle will in the future prove to be a most valuable auxiliary in military operations, not only for courier service, but also for rapidly moving organized bodies of men over the country."

recorded in the newspapers of the day; and it will be found that by far the greater number of these have occurred by reason of the unskilfulness of the rider or his gross carelessness, as by "coasting" in the night, or in failing to give warning of his approach in a frequented street. It is of course fair to exclude from the reckoning accidents occurring to professional or amateur racers competing with each other at close quarters, or to record-breakers on the road.

Bicycling adapts itself to all sorts and conditions of men. No other out-door sport, unless it be the gentle croquet, can be practised at all without a violent degree of physical exertion. This is especially true of base-ball, foot-ball, and tennis. But on a wheel you may jog along a country road at a five-mile gait, or you may emulate Zimmerman upon the race-track. You may spin without conscious effort along a suburban "boulevard," or you may, with the utmost exertion of wind and muscle, climb a long acclivity to dash breathlessly down on the other side. You may content yourself with a ten-mile ride each day, or you

may train for a succession of century runs. Whatever measure of time and speed you adopt for yourself, you will find the sport a delight which grows with time and experience. The wheelman and his wheel are one in a much closer degree than the equestrian and his horse; for, as between the horse and his rider, there is often, if not always, a conflict of wills, whereas your wheel is, to all intents and purposes, a part of yourself, and answers as if by instinct to your every whim and purpose. Its power is so much added to your own, and as you vault into the saddle and feel the pedals under your feet, you mount into a realm of new possibilities. The petty vexations of life may pursue you on the road, but they cannot overtake you, for the black care that is said to sit behind the horseman cannot find room on the bicycle. Dulness, lassitude, headache, fly away on the breeze which your own motion creates. On the wheel, at least, you will find your own thoughts welcome companions, and whether you ride alone or in company you will never be lonely.

You will find in this sport not only pleasure, but health. Every man possessed of two legs and a sound heart may take to the wheel with the assurance that his legs will grow stronger, his wind and digestion better, and his nerves less importunate. The tonic effect of the sport upon all the functions of the body is simply amazing. If a jaded business or professional man, overwrought and weary with his year's work and looking forward with apprehension to his work to come, will devote at the beginning of the season two hours each day to the wheel, he will find, in August, that his accustomed outing at seaside or mountains is no longer a necessity, and if he takes it, it will be with his wheel as a companion.

Among the many benefits which cycling is to confer on us Americans, not the least is this, that it will confute the absurd notion that athletic and manly sports are exclusively for very young men, — a notion which has never obtained in England, where men of seventy shoot all day over rough land, or ride to hounds, or like Gladstone, are woodchoppers or indefatigable pedestrians. "To

say that a man is too old to ride is to state an absurdity. Wheeling is easier than walking, and when a man is too old to walk he is ready to die. And he is never ready to do that."

Scarcely less notable than its physical benefits is the influence for moral good which cycling brings to every community where it is practised. The sport fosters wholesome thoughts and sane habits of living; and the purely healthy excitement which it brings in such large measure makes unattractive that gross artificial excitement which is the chief attraction to the use of stimulants. Says a prominent clergyman[1] in one of our cities: "Many a saloon, with its baneful adjuncts of betting and gambling, has been forced to loosen its hold upon young manhood since the advent of the wheel, and street corners, once foul and disgusting spots, have become clean and wholesome, just because a clean and wholesome exercise has been provided for many who idly drifted

[1] Rev. Dr. Heischmann.

into the company of the profane and degraded."

Except rainy days, all times are good times to the wheelman. Dusty roads will never stop him, and a degree of heat which would overpower him walking produces but the slightest discomfort as he spins along in the breeze that he creates for himself. And that is a very muddy road through which the experienced wheelman cannot pick his way. Even sandy roads, which are an abomination in very dry weather, afford the best of riding after a smart rain.

In early summer, you may rise with the lark, or rather with the robin, and ride through the cool sweetness of the early morning along country roads, where the wild roses and buttercups are freshened by the dew, and the scent of newly mown hay fills the air. Twenty miles you make out and home, before the work of the day has fairly begun for lazy people who know not

the pleasures of the road and the wheel. Or you may ride in the August twilights, when the sunset glows crimson in the west or the great thunder clouds warn you to hasten home, along roads where the air is heavy with the scents of the later wild flowers, and the whippoorwills are beginning to sing and the frogs to croak in the marshes.

In the cooler air of September, you will ride longer and farther under the rolling fair weather clouds, through miles of golden-rod and asters, or along high bluffs or sandy beaches in sight of the soft-sounding sea. But best of all, perhaps, are the October days. The wayside woods blaze with color; the maples are scarlet and the beeches gold. The sumac glows red by the roadside, and the russet of the oaks warms into a royal crimson under the bright sun. The pines fill the air with a stimulating fragrance, the wind just breathes through them as you run softly through a wood road over the brown needles which they have been patiently dropping for you through many tree generations. The tinkle of a cow-bell in a neigh-

boring pasture only accents the silence. You will not be lonely, although your only companion may be a red squirrel which essays to race with you along the stone wall, or an occasional rabbit sitting on his haunches in the undergrowth to see you pass.

On a clear November morning, when a white frost has ushered in an Indian summer day, and the roads are beaten hard by the heavy autumn rains, you may start for a fifty-mile run, knowing that your wheel will be all alive under you, and that fatigue will fly away on the cool breeze. The dead leaves rustle under your wheels; the late apple gatherers are at work in the roadside orchards; the blue smoke from burning leaves and rubbish rises here and there in the stripped cornfields; the distant woods are shadowed in soft grays and purples. In the early afternoon, you stop at a country tavern that keeps a good fire and a hot dinner ready for travellers. Then a rest and a smoke, — if you will smoke, — and home again in the cool early twilight. There, after you have changed and eaten, you may

lie back in your easy-chair, conscious of a day well spent as you bask in the light of the autumn wood fire, with just that delicious sense of fatigue that makes a luxury of repose, relating your day's adventures, if haply you find sympathetic ears to listen, or dreaming at intervals over the pages of some book of adventure, like Stevenson or Dumas, that fits into your mood. The morrow may bring its duties and cares, its bargains, or its briefs, or its sermon ; but for the night you are care-free, and you will permit nothing to disturb the serenity of your mind.

Perhaps, under the evening lamp, you will fall to planning new excursions to come. Fortunate for you, if you do not hear a northeaster rising in the night, and get up in the morning to find the ground white with the season's first snow. For it is sadly true that in the winter season, generally from the middle of November to the middle of April, if you spend it north of the Potomac, you must, practically, lay up your machine and forego the delights of cycling. Some enthusiastic riders, to be sure, will

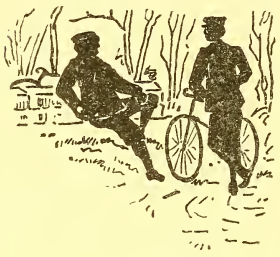
watch and wait for every favorable turn of winter weather, and ride even on the snow-covered roads, when these are in any way practicable. But the winter days, especially in the climate of New England, afford but few opportunities for comfortable riding; and most of us must let our wheels rest while we plan excursions for the far-away spring. If we are fortunately within reach of a riding-school or "rink," we may enjoy an occasional spin on its hard floor, — a poor substitute for the country road, but better than nothing.

But if the cycler has to endure a winter of discontent, the spring brings to him a brighter promise than to others. In the dawn of the murky March mornings, he hears the cawing of the early crows making their northward journey, and they become for him halcyon birds. Muddy roads do not annoy him, for the worse the ways the sooner they will become settled. He hears with satisfaction the remark, uttered oftener and oftener, "the bicycles will soon be out," and he resolves to devote his next holiday, not to say the next Sunday, to cleaning and

setting up his machine. Soon he sees complacent boys trundling single wheels along the pavement to or from the repair shop, and then an expressman's wagon crowned with a glittering new bicycle going out of town. At length comes the morning when he beholds the avenues leading to the city all dotted over with moving wheels, and he contemns business and engagements and makes haste for home and the road. That first ride of the season on a mild spring day is an event to be marked with a red letter in the cycler's calendar.

Wheeling levels all degrees, and disproves the adage that "crabbed age and youth cannot live together." Like other healthy and manly sports, this brings to the surface the boyishness latent in every man who is worth his salt. The wheelman is your modern Don Quixote, who finds his way beset with small marvellous adventures. His fellow wheelmen, met upon the road, are for him good comrades, or objects of mild, benevolent curiosity. One has a tire mysteriously deflated, and is in vain endeavoring to find the leak under the lee of the stone wall. How

ready are you to proffer him your advice and best assistance. A flock of hens, with a perversity peculiar to their breed and sex, scuttle under the wheel of that clean cut young stranger in the crimson jersey, and one is nearly decapitated. "O you monkey on a bicycle!" screams an old woman, the owner of the foolish fowl, as she observes the accident from her doorway, and this appears to you an exceeding funny incident in the human comedy as you ride up prepared to arbitrate differences between the virago and the bewildered youth. You meet a stout lady in navy blue ambling along at a five-mile gait. Her wheel-frame is festooned with parcels, apparently of groceries, and a small milk-can depends gracefully from her handle-bar. You are sure that you know her, as she wheels from the highway into a lane that leads to a region of abandoned farms. You stop in a convenient



shady fence-corner for a rest and a smoke. Soon comes another on a wheel numbered in the same series as your own, and you fall to discussing with its rider important questions of make and merit of machines, or the respective advantages of single and double tubes for tires, or the best means of inflicting punishment on the pestilent curs who, on the country roads, bark and snap about your pedals. All the loquacity that is in you becomes actively developed, and you chat unreservedly with the farmer hoeing his corn, or the keeper of the country grocery where you stop to buy a bad cigar. You feel a certain benevolent superiority to the pedestrians whom you meet upon the road, and as for horses you regard them as but poor creatures; knowing, as you do, that on your machine you may make your fifty or sixty miles a day for an indefinite period, — a thing utterly impossible to a horse, — and that your steed of steel will never tire, or stumble, or kick, or balk, or run away.

After all, it is vain to attempt to explain to the uninitiated the delight which the gratification of what has aptly been called the "bicycle passion" brings to its votaries. It is a delight that grows with time and practice, and never wearies. To the healthy mind and body, it brings a fresh sense of power and the never failing joy of motion; to the lover of natural beauty, a closer fellowship with the trees and the flowers, and the glory of the hills and sea. Perhaps it has not been more exquisitely expressed than in these verses of Eben E. Rexford.

"It 's a joy to be up in the morning when the dew is still on the clover,
When the air is full of sweetness that seems like a draught divine,
To mount one's wheel and go flying away, away like a rover
In the wide, bright world of beauty, — and all the world is mine!

"I sing in my care-free gladness, I am kin to the wind that 's blowing,
I am thrilled with the bliss of motion like a bird that skims the down;

I feel the blood of a gypsy in my pulses coming
going, —
Give me my wheel for a comrade, and the king
may keep his crown ! "

II.

CHOOSING A BICYCLE.

"You may talk about your ships of state
And how they plough the main;
You may talk about your big balloons,
And eke your railroad train;
You may jolly up your trotting horse,
And speed him till he reel;
But when you 're after health and fun
There 's nothing like the wheel."

JOHN HENDERSON GARNSEY.

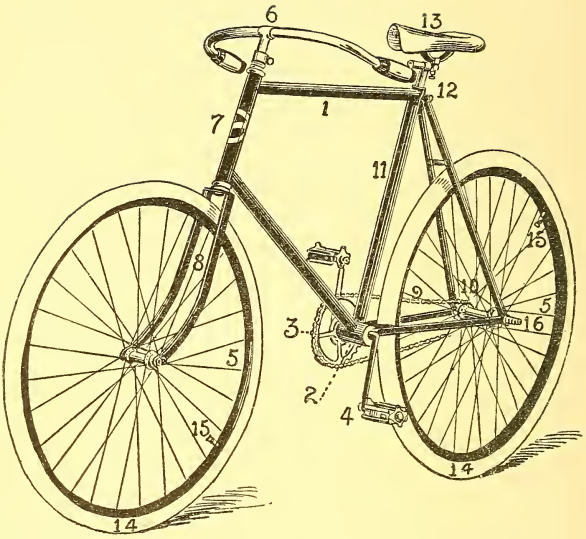
II.

It is not the purpose of this book to give a detailed history of the development of the Safety Bicycle of 1895 from the "Celeripede" and "Drasine" of 1816, and the machines called "hobby-horses," — in all of which the rider sat on a perch between the two wheels and propelled the machine by thrusting with his feet against the ground, — through the Lallemant Ve-

locipede of 1866, to which, it is believed, the pedal motion was first applied, and in which the essential elements of the modern "Safety" first appear. Nor is it worth the while to devote space to the "high wheels," or "ordinaries," so common ten years ago, but which have now nearly disappeared from the roads. An exhaustive and accurate "History of the Bicycle" may be found in Luther H. Porter's "Wheels and Wheeling,"[1] and to that book the reader who may be interested in the subject is referred.

Neither is it possible to attempt here a description in detail of the different bicycles now on sale in the English and American markets. The illustrated catalogues and circulars issued by their respective manufacturers sufficiently and fairly describe the details and peculiarities of the different wheels, so that an intending purchaser, studying and comparing the catalogues, can get a very good idea of the characteristics of the best known bicycles.

[1] Published by the Boston Wheelman Company, 1892.



SAFETY BICYCLE. 1895.

1. Frame
2. Sprocket-Bracket
3. Sprocket
4. Pedal-Cranks and Pedals
5. Wheels
6. The Head
7. Steering-Post
8. Fork
9. Chain
10. Rear-Sprocket
11. Saddle-Post
12. Saddle-Rod
13. Saddle
14. Pneumatic Tires
15. Valves
16. Step

The principal parts, common to most models of the safety bicycle,[1] are: —

THE FRAME (1), built from steel tubing, and answering to the body of an ordinary wheeled vehicle. Frames are built of different heights to suit the reach of different riders. At the base of the frame the

SPROCKET-BRACKET (2), or crank-bracket, carrying a shaft or axle which answers to the main shaft in any system of machinery, and on which is fixed a

SPROCKET (3), or toothed wheel, and the

PEDAL-CRANKS and PEDALS (4).

THE WHEELS (5), generally twenty-eight inches in diameter, the rear being the driving, and the front the steering wheel.

THE HEAD (6), consisting of the handle-bar and the vertically set tube which carries it. This vertical tube slides into and is clamped to a tube, which passes through the forward tube of the frame, called the

[1] See Illustration. There is a line of safety bicycles in which the power is transmitted from the crank-bracket to the rear axle by means of a rigid shaft and bevelled gearing.

STEERING-POST (7), and makes the top of the

FORK (8), which, being turned with the movement of the head, takes the steering-wheel with it.

THE CHAIN (9), which transmits the power from the sprocket to the

REAR SPROCKET (10), a smaller toothed wheel set on the rear axle of the machine.

THE SADDLE-POST (11), or the tube of the frame into which slides the

SADDLE-ROD (12), or tube, carrying the

SADDLE (13), which is adjustable to any convenient height.

THE PNEUMATIC TIRES (14).

THE VALVES (15), passing through the wheel felloes, by the application of an air-pump to which the tires are inflated.

THE STEP (16), usually a tubular prolongation of the left hand rear axle nut.

The double part of the Frame, carrying the rear axle bearings, is called the REAR FORK.

FOOT-RESTS, or "COASTERS," set upon the steering-fork, and BRAKE-WORK, may be added; also LANTERN-CLIP, BELL, and a CYCLOMETER to measure distances.

The principal devices upon which the utility of the modern safety depends are, first, the system of gear, and transmission of power by the endless chain; secondly, the application of the ball-bearing; and, thirdly, the pneumatic tire.

By the use of the gear and chain, a wheel of small diameter, say twenty-eight inches, is made the equivalent of a wheel of from two to three times its own diameter, such as was used in the "high wheels" of ten years ago; although this is effected with some comparative loss of power through friction and lost motion.

By suspending the wheel and sprocket axles, and the spindles of the loose pedals, within circles of steel balls, accurately turned and revolving on one another and suitably enclosed within cones and cases, the friction of the moving parts has been reduced, to the great advantage of the durability of the machine and ease in propulsion.

The vibration of the rigid frame of the bicycle when running upon ordinary roads, almost unendurable in the primitive machines, was greatly lessened by the appli-

cation of the cushion tire, and is made nearly inappreciable by the use of the "pneumatic." [1]

The best mechanical ingenuity and the most exquisite technical skill have been applied to devising and perfecting the parts of the modern bicycle; had not this been so, the practical difficulties in transmitting power through the complicated and wasteful mechanism of the machine could not have been overcome, and, like the old velocipedes, the cycle would have been but a toy, useless for practical road work.

The initial force which moves the bicycle is a foot pressure, or "push," applied to a loose pedal set at the end of a crank and moving a shaft or axle on which is set a toothed wheel called a "sprocket." This is a lever movement, in which the pedal-crank is the long arm, and the radius of the sprocket the shorter arm, the weight here being the

[1] Before the application of the pneumatic tire, various devices of spring forks, frames, and saddles were applied in conjunction with the cushion tire, to take up vibration; and many machines thus equipped are still to be seen upon the road.

force in pounds necessary to move the chain and attached gearing; in other words, the whole load, plus friction and lost motion. The power is then transferred by an endless chain (in itself one of the most wasteful methods of conveying power) to a smaller sprocket-wheel set on the rear axle of the machine. Here we have another lever action, in which the power is applied to the extremity of the short arm of the lever, this being the radius of the rear sprocket, while the long arm is the radius, or spoke, of the rear wheel; the weight being finally lifted at the end of the spoke where it meets the rim of the wheel. It is evident that this weight is equivalent to the force, measured in pounds, required to propel the machine, and that it is just so much less than the force exerted by the rider on the pedal-crank as is lost by friction or wasted motion suffered in the transmission of power through the whole train of mechanism.

The great strain borne by the long arm in the second lever system has been lessened by the tangential arrangement of the spokes, which is not the least useful of the various

devices which have been applied to the bicycle manufacture.

By the application of the ball-bearings at the tops respectively of the steering-post and fork, the actual work of steering the bicycle has been reduced to a minimun, and the durability of the working parts insured.

The frames of the best modern bicycles are built of steel or nickel steel tubing. The frame-joints, axles, sprocket-brackets, and balls for the bearings, with their cones and cases, are made from steel forgings, turned down to shape. For the joints, however, some manufacturers have adopted the "lap" method of joining, in which the ends of the tubes are lapped and reinforced, and the joint then brazed.

The problem of more equally dividing the load between the front and rear wheel-bearings of the machine has not yet been solved, for reasons which the reader will understand if he studies carefully the arrangement of parts, — the architectural plan, if it may be so called, of his bicycle. Even if it were possible to distribute the load equally between the two wheels, it is a question whether this

would result in any practical advantage, since it is evident that, as the burden thrown on the forward or steering wheel is increased, the friction at the steering-head becomes greater, and the machine less sensitive to steering.

Great ingenuity has been applied to the perfecting of the bicycle chain. The self-oiling or block chain is now used in the best machines, each block containing a felt pad, which, being properly filled with oil, will keep the chain sufficiently lubricated for a run of several hundred miles.

The accomplished wheelman must be a bit of a machinist as well. He will learn all he can from books, catalogues, and circulars, from bicycle agents and manufacturers and fellow cyclers; but most and best from carefully studying his own machine, and from trying to keep it always in perfect working order.

The writer, like most wheelmen, may have an opinion as to which is the best bicycle in the market, but, for obvious reasons, he does not intend to obtrude his opinion here.

Get that machine which you are convinced, upon careful inquiry, is the best of the high-grade wheels; and do not, if you can help it, let the matter of price influence your choice. Money is better invested in a good wheel in the first place, than in repairs or surgeon's bills afterwards. Many of what in the trade are called second class wheels do good work, but the test of these has apparently to be made upon the road at the risk of the rider, not in the manufactory. Thus of two bicycles of a certain manufacture, one has done excellent service for two seasons and appears still to be in fair condition; the other went to pieces running down a moderate declivity a week after it had been put upon the road. Another machine of a widely advertised make, running at an eight-mile rate on a smooth road, after a month's satisfactory service, broke suddenly at the head, throwing and severely injuring its rider.

Moreover, as between the high grade and second class wheels, there is generally in favor of the former a distinct advantage in greater ease of propulsion and more sensitive steering.

A bicycle of the best manufacture, properly cared for, is not likely to get out of order, unless as the result of accident or of long use. Others are always in the repair shop. Nothing, unless it be a lame horse, or a watch that refuses to run, is more vexatious to its owner than a wheel that is half the time unfit for road use by reason of some constitutional infirmity.

The notion that the "life" of a bicycle is ordinarily but one season is altogether wrong. A first class wheel, well taken care of, should be good for half a dozen seasons' work at least, with slight expense for repairs or renewal of parts.

Excellent second-hand machines are often to be had which practically will do as good service as new ones; especially wheels which their former owners have discarded, after a season's use, for the latest pattern. But, unless you are able to trust your own judgment as a mechanic in the choice of a bicycle, do not buy a second-hand wheel except of the manufacturer of the machine, whose interest it is not to send out a bicycle which has not been carefully overlooked, its worn

bearings replaced, and the machine properly set up and adjusted.

Weight of Wheel.

For road-riding, the machine should be adapted to the weight of the rider. If your weight is from one hundred and forty to one hundred and seventy-five pounds, you may be absolutely sure that a wheel weighing about thirty pounds will do good and permanent service. A lighter wheel may be trusted on asphalt roads or race-tracks. This rule assumes that you ride a wheel with steel rims. If you use the wood rim, or an all wood wheel, you of course get rid of more weight.

The safety bicycle, in the first years of its use, weighed from seventy to eighty pounds, which weight by the application of ingenious devices and improved methods of manufacture was gradually reduced, until in the season of 1893 we find the standard road wheels weighing from thirty to forty pounds. The notion has grown that, comparing wheel with wheel, the lighter is absolutely the better, and it is obvious that,

other things being equal, the lighter wheel can be propelled with less expenditure of force than the heavier one. The adoption of the wood rim and the paring down of the parts of the machine have at length produced the road wheel of 1895, which weighs from twenty to twenty-two pounds.

If you intend to follow the fashions in bicycles, as in clothing, that is, if you are to buy a new machine each season, you will of course test for yourself each new construction; and what follows is not intended so much for your benefit as for the information of those who intend to stick by their old wheels so long as these do satisfactory service.

As to the wearing qualities of the wood rim, it is at this writing, January, 1895, too soon to speak, and the writer leaves the question to the reader as one only to be answered by experience, merely remarking that, bulk for bulk, steel is stronger than any known wood, and that a steel rim, well lacquered, will always remain unaffected by dampness or weather conditions. But it may be considered as demonstrated that a

set of the best wood rims, carefully used, will stand two seasons' wear at least. The advantage in weight to be gained by the use of the wood rim is from two to three pounds.

Within certain limits, the importance of a greater or less weight in road riding exists rather in the imaginations of riders than in reality; as is illustrated in the story of the wheelman who stopped on a hard road to strip his machine of foot-rests and lantern-clip. These he stowed safely in his pocket, and, remounting, rode away with renewed spirit. After a mile or two, he observed complacently, with a sigh of satisfaction, that he would not have supposed that so small a reduction in weight would relieve him so much.

The rider for speed and the pleasure cycler, whether in neck and neck racing or to break records, work under wholly different conditions. Upon the racer, the slightest unfavorable conditions may have the most damaging results. His time may be materially reduced by a wet or rough track, by a head wind, or by half a dozen other circum-

stances. He is to exert himself to the limits of physicial endurance, and he naturally will reduce his *impedimenta* to the utmost, since with him every extra ounce of weight carried tells. All superfluous clothing he will cast aside, and he may even shave his head. He will of course choose the lightest wheel that can stand the strain of his work with a probability of not breaking down; and the number of wheels that do break down under the strain of track or road racing shows that sometimes he risks too much. The rider for pleasure seeks first in the sport safety, and then comfort. Unless upon some very long hills, he will not feel the difference between a twenty-five and a twenty pound wheel. He has to propel the weight of his own body plus the weight of his machine, say, generally, about one hundred and seventy-five pounds, and he will find that a few pounds more or less will not appreciably increase or diminish the work he has to do. The truth of this assertion may be tested by taking a twenty-mile run, first without any load, and then with a handicap of five pounds. You will find that the difference in load has

not made the second run appreciably slower or more fatiguing than the first.

It is obvious that the rider never really "carries" the weight of the bicycle and its load, since the greater part of the weight is supported on the ground, and the force exerted by the rider is only that necessary to propel it. When you walk, pushing your bicycle before you, this force is of the slightest, — only a few ounces measured in pounds. In the saddle, the propelling force, in other words the force necessary to overcome the resistance presented by the pedal to the foot, is measured by a very few pounds. The ratio of increase, as between two machines weighing respectively twenty and forty pounds, is probably not more than two pounds. It follows that, within reasonable limits, the ease of propulsion depends more in keeping the machine accurately adjusted and well cleaned and oiled, than in decreasing its weight.

The momentum of a heavy bicycle will help it to overcome obstacles which will stop or overthrow a lighter machine. Thus, where two wheels weighing respectively

thirty and twenty pounds were run at a slow gait against a curbstone at right angles, the heavier machine easily made the lift of four inches to the level of the sidewalk, while the lighter wheel was stopped short. So the heavier wheel will run more smoothly, and consequently with less jolting, over a rough road. Upon the whole, if you do not ride for speed, and if you have in good order a thirty or even a thirty-five pound wheel, which does your work with ease and satisfies your requirements, you may as well stick to it, at least until it wears out.

Gear.

By the "gear" of a bicycle is understood that application of chain and sprockets by which the speed of the rear or driving wheel is increased so as to make it the equivalent of a wheel of larger diameter. Thus, to say that a wheel has a "sixty" gear is to say that the rear wheel is the equivalent of a wheel of sixty inches in diameter, run without gear; that is, each revolution of the sprocket sends the bicycle a distance equal to the circumference of a sixty-inch wheel.

The gear of a bicycle may be determined as follows. Divide the number of teeth in the forward sprocket by the number in the rear sprocket,[1] and multiply the quotient by the diameter in inches of the rear wheel. Thus, supposing the number of teeth in the front sprocket to be seventeen, and in the rear sprocket eight, and the diameter of the rear wheel to be twenty-eight inches,

$$17 \div 8 = 2\tfrac{1}{8} \times 28 = 59\tfrac{1}{2},$$

which is the "gear" of the bicycle. Multiplying the gear by the ratio between the diameter and the circumference of the wheel,

$$59\tfrac{1}{2} \times 3.14 = 186.83 \text{ inches, or } 15.57 \text{ feet},$$

which is the distance which the bicycle will travel for each complete revolution of the sprocket. It is evident that, with the above gear, for each revolution of the sprocket the rear wheel makes $2\frac{1}{8}$ revolutions.

As the distance between the teeth of the sprockets is made invariable, so as to fit the

[1] This is of course equivalent to dividing the circumference of the larger by the circumference of the smaller wheel.

chain whatever the gear, it is evident that, the higher the gear, the larger the sprocket, the longer its radius, and the greater the force to be applied from the pedal to the sprocket-bracket. On the other hand, the higher the gear, the greater the distance which the bicycle will travel at each revolution of the sprocket-wheel.

With the twenty-eight inch rear wheel, and the number of teeth in the rear sprocket eight, the application of the above formula gives the following table of possible gears, and the distance which the machine will travel with each revolution of the front sprocket for each gear respectively:

15	teeth,	gear	52½,	distance,	164.85 in., or 13.75 ft.
16	"	"	56	"	175.84 in., or 14.64 ft.
17	"	"	59½	"	186.83 in., or 15.57 ft.
18	"	"	63	"	197.82 in., or 16.48 ft.
19	"	"	66½	"	208.81 in., or 17.40 ft.
20	"	"	70	"	219.80 in., or 18.32 ft.
21	"	"	73½	"	230.79 in., or 19.23 ft.
22	"	"	77	"	241.78 in., or 20.15 ft.

It will be observed that the ratio of increase in nominal gear for each additional tooth is 3½, and of increase in distance

travelled for each revolution 10.99 inches, or about 0.92 of a foot.

It is evident that by increasing the diameter of the rear sprocket the leverage applied to its rim, through the power transmitted by the chain (see page 41), will be increased; but with such increase of diameter, the front sprocket must be made correspondingly larger so as to attain the desired speed, thus requiring additional propulsive force to be applied at the pedal. As the weight of parts has been lessened, it has become possible to increase the size of both sprockets with a net gain of power in the rear sprocket, as also to build the machine with a higher absolute gear. With nine teeth instead of eight in the rear sprocket, the formulas given above will give a different table of gears, as thus:

With 18 teeth front, gear 56.
" 19 " " " $59\frac{1}{9}$.
" 20 " " " $62\frac{2}{9}$.
" 21 " " " $65\frac{3}{9}$.
" 22 " " " $68\frac{4}{9}$.
" 23 " " " $71\frac{5}{9}$.
" 24 " " " $74\frac{6}{9}$.
" 25 " " " $77\frac{7}{9}$.

In choosing a gear, much depends upon the individual taste and comfort of the rider. Use the gear which you find the easiest on the road. Judging from his own experience, the writer believes that for ordinary roading a gear of about 63 is best; and that with a thirty-pound wheel of that gear, without conscious speeding or extra effort, on a long run over ordinarily good and moderately hilly roads, an average speed of from ten to twelve miles an hour may be made. It is obvious, on consideration, that the higher the gear the greater the difficulty in hill climbing.

The "round" gears are now almost exclusively used. The experiments with an elliptical sprocket have not proved satisfactory.

A bicycle with a changeable gear has lately been invented; the device consisting of an arrangement of toothed wheels set in front of the rear axle, and which may be thrown into or out of the chain connection by means of a lever within the control of the rider.

Ladies' wheels are not ordinarily geared above 59, and the "throw," or length of

pedal crank, in these is generally not more than six inches. The longer the throw, the greater the leverage to be obtained at each pedal-stroke, and the higher the lift of the foot. Some wheels are fitted with slotted cranks, so as to be adjusted for a longer or shorter throw.

Tires.

As to the merits respectively of the double and single tube tires, each rider must form his own conclusions. For his own use, the writer prefers a single-tube tire of the best make, believing that it is the easiest to repair when repairs are needed, and that it needs repair or adjustment less frequently than the double tire. It cannot "creep" on the wheel if properly cemented, and it is almost impossible for it to leak about the valve, the valve nipple and tube being made in one piece. On a bicycle having the single tube tire, which was run nearly two thousand miles during the season of 1894, there was not once occasion to deflate a tire, and but some half-dozen times to pump up the air tension, this operation in each case not

consuming five minutes. Observation among friends using the same or similar makes of machines fitted with double tubes led to the conclusion that they experienced much more trouble than this, especially from "creeping" tires, or leaks about the valves. The writer has never met a wheelman using the single tire who would willingly abandon it, while he has listened to many bitter complaints from the owners of "double tubes."[1] It is to be observed that there is a great difference in the wearing qualities of different tires, some in the market being of material or workmanship so bad that they will not easily resist tearing and puncture.

Brakes.

The "spoon" brake, or, indeed, any brake which is applied directly to the circumference of the pneumatic tire, is destructive to

[1] It is a noteworthy fact that, in the prospectus for 1895 of a leading company manufacturing high-grade wheels, and which supplies either single or double tube tires to suit customers, it is stated that during the first part of the season of 1894 the demand for single tubes was in the proportion of 40 per cent of the whole number

the tire, and should be used only in emergencies. Many such brakes, if not all, are uncertain in their operation, and so not trustworthy. Many wheelmen prefer to ride without a brake, checking speed by the friction of the foot against the tire, in "coasting," and at other times trusting entirely to "back-pedalling" to stop or check speed. The "band-brake," first used during the season of 1893, is a leather-lined steel strap applied to a drum set on the rear axle of the bicycle, and connected with the brake-handle set on the handle-bar by a train of wires and springs. It is invariable in its operation, and cannot injure the tire. It will stop the wheel shortly on level ground, or on a moderate declivity; like the spoon-brake, it will slip on a fast run down a steep road, but it may always be relied on to check speed on any grade, and, with the help of back-pedalling, to stop the wheel in a few moments. With a little care in handling the machine, so as to avoid bending or

of orders received by the company; but that during the latter part of the season, this proportion was increased to 90 per cent.

otherwise injuring the brake connections, it is practically impossible for it to get out of order, and it has been found to do as good work at the end as at the beginning of the season, and this on a machine in constant use. Upon the whole, this brake is worth the extra weight which it adds to the machine, which is hardly to be said of any other bicycle brake yet invented. "Racers" are run without brakes, and it is understood that these will not appear in most of the models of road wheels for the season of 1895.

Saddle.

Use the lightest saddle in which you can ride comfortably, this being a matter which will be determined only by experience on the road. Some riders can endure sitting the lightest "scorcher" saddle for a whole day without the least discomfort, others will find it intolerable even for a short run. If you find that you must use a heavy saddle, choose one of good length, set on front and back springs, like the old standard "Columbia No. 10" (than which no easier saddle has ever been made), or, if you are

a very heavy weight, a "Garford," or one substantially like it. The "Columbia No. 10" weighs about four pounds, the "Garford" even more, while the lightest scorcher saddles (leather) now weigh from fifteen to twenty ounces. If your light saddle hurts you, discard it at once; if you persist in using it, you may lay the foundation of a serious disease. It is a good plan to have by you a light and a heavy saddle, either of which you may use on occasion.

Saddles have been invented to be made of woven wire, and perhaps of other materials, including a pneumatic saddle of rubber, which the rider may use if he wishes to run the risk of its exploding under him; but at present no material seems to be so satisfactory to most riders as good leather.

Handle-Bar and Handles.

As you will not ride with a stoop, you will not use the "dropped" handle-bar. (Some bicycles are fitted with an adjustable handle-bar, which may be adjusted to the upright position, or dropped, to suit the wishes of the rider.) Use cork handles;

these are easier and better than any others, and, if they are broken, are easily replaced. The height at which the handle-bar should be adjusted depends much on the length of reach of the rider, and it can only be said that the handles should be set at such a height that the rider, sitting erect in the saddle, can easily grasp them without stooping. Generally, it may be said that, with the upright handle-bar, the tip of the handle, on the head of the machine being turned, should pass about one and a half inches below the forward tip, or pommel, of the saddle, if this last is rightly adjusted. As to the length of the handle-bar, the writer prefers for his own use one which gives a distance in a straight line, measured from tip to tip of the handles, of from twenty-two to twenty-four inches.

Pedals.

Light rubber pedals are the most comfortable, — rat-traps the lightest. "Toe-Clips" may be servicable to the racer or time-maker, but it is not worth while to use them for ordinary roading.

Wheel-Guards.

The use of these on men's wheels is not now common. If you have them, keep them at home for use in a possible emergency. You will not, ordinarily, ride in muddy weather, and on a dry road they are a useless and weighty encumbrance. Ladies' wheels are equipped with both wheel and dress guards, the latter covering the chain and sprockets.

III.

HOW TO RIDE.

"Some love to roam
O'er the dark sea foam,
Where the wild winds whistle free;
But a bright cool day,
With a smooth highway,
And a spin on the wheel for me!"

F. M. Holland.

III.

THERE are two ways of learning to ride a bicycle. You may put yourself under the charge of an instructor, either in the open air or in a riding-school, or you may go out alone with your machine for a course of more or less rough and tumble practice on the road. (It is wholly or nearly impossible to learn riding on the lady's common "loop-frame" wheel without the assistance either of a professional instructor or of some practised amateur rider.)

In the riding-school, you will first be placed in the saddle, and, upheld by the

instructor, be made to ride around the track until you are able to balance, with an occasional tumble, and to propel your machine; and you will afterwards be taught, principally by practice, to mount and dismount.

If, on the other hand, you are your own teacher, you must learn first to mount your wheel, since reaching the saddle is a necessary preliminary to riding at all. Select a smooth bit of ground, slightly inclining, and, if you are a bashful person, as secluded as possible from public observation, and begin. Standing just astride the rear periphery of the rear wheel of your bicycle, grasp the handles firmly, holding the head of the machine at right angles with the frame; the wheel pointing down the hill. Now place the ball of your left foot on the step of the machine, set your teeth, rise on the left foot as nearly to a standing posture as you dare, and as your grasp on the handles will permit, and let the machine "go." It is well to have the handle-bar set rather high for this preliminary practice, and the saddle low, and the machine should carry a brake. You will get many a fall at first,

but will learn in a very few lessons to stand on the step and balance in that position while your wheel runs fifty or a hundred feet; and when you have learned this, you have got a long way.

When you find that you can mount the step and balance there with some confidence for a hundred feet run, try for the saddle from the step, and for the pedals from the saddle. You will fail ignominiously the first dozen times, and probably get several falls, but your first successful "mount" will be an era in your cycling career, for you will have gotten the knack, and your confidence in your own ability will rise by many degrees. After you are reasonably sure of making a successful start and mount, aided by the force of gravity, try the start on level ground, but you need not make a special business of this. You may go out upon the road, taking advantage of convenient declivities to get a start; and practise the level start as you find opportunity. This is of course made by placing the left foot on the step, "hopping" with the right foot so as to propel the bicycle forward, and then rising on the step.

As to balancing in the saddle, you will be told, and it is true in fact, that the equilibrium of the wheel is to be maintained by turning the steering-wheel in the direction towards which you are in danger of falling. This, at first, seems inexplicable to you, and you will persist in trying to save yourself by turning the wheel the wrong way. At length, in a happy moment the "knack" comes to you, and thereafter you balance unconsciously; that is, the movements by which you maintain your equilibrium are nearly automatic, although none the less actual and positive in their effect.

You will learn to dismount in the first place from the left pedal; but for some little time you will probably get off the machine "anyhow," without attracting more observation than you can help.

But there cannot be a useful manual of elementary instruction in cycling. A few hours' patient practice will teach you more than all the professors of the art can write. So, in what follows, the writer assumes that the beginner has learned already to balance

himself in his saddle, to propel his bicycle and in some fashion to mount and dismount. But to those readers who have never ridden and who contemplate learning to do so, a single suggestion may be useful. Do not, if you can avoid it, buy a new high-grade machine and take it out upon a country road for the purpose of learning to ride it. You will misuse, and perhaps ruin it. If you are within reach of a riding-school, learn there at least to balance and ride after you are in the saddle.

Do not be surprised if, on your first outdoor run, you get badly fatigued a mile out, and return home in a bath of perspiration, to get up the next morning with a pair of lame or stiff legs. You have for the first time in your life, perhaps, been really exercising the pushing muscles, and these need time to strengthen and develop. Ride at first on smooth and level roads, then take some easy ascent; make a good start for it and dismount as soon as you find that you cannot keep the wheel from wobbling. Turn the machine, run down the hill, stop for a good breath, and try it again. You will run

farther the second time than the first, and, if you are not tired out, farther the third time than the second. Attack the same hill the next day, and the chances are that you will conquer it — if it is not too long. Do not get impatient: you will not easily get discouraged, for you will find something in wheeling, even in the learning of it, which increases the neophyte's grit, and makes him persevere. The writer has never known a person attempting to learn riding who has failed, in a longer or shorter time, to succeed.

After you have learned to ride with some pleasure and confidence, you may find the suggestions that follow, as to the management of your machine, of use.

Most beginners are disposed to ride with a low saddle, and with this pushed back as far as the saddle-rod will permit. Thus, the push upon the pedal is too much in a diagonal direction forward and downward, with the result of a loss of power in propulsion, and of speedily producing fatigue in the muscles of the inside of the leg just above the knee, and at the ankle-joint. It is

obvious that the most powerful and easiest "push" is to be obtained by a motion of the leg and foot nearly vertical; and with the foot kept bent downward from the ankle, as in the swimming stroke, rather than at an upward bend, or horizontal with the ankle bone. The rider using the faulty tread described is like a swimmer who should keep his body bent at the hips at an angle of several degrees, and abridge each of his strokes by an inch or two. The saddle should be raised so high that, at the full stroke of the leg, with the foot bent downward as described, the forward part of the foot will just rest easily and firmly on the pedal. As a rough rule, it may be said that the saddle should be so adjusted that the point of the cantle will be in a horizontal line with the top of the rider's hip bone, as he stands beside it. At the same time, the saddle should be brought forward so far that the "push" of the foot will be nearly vertical, instead of diagonal; and, with the leg extended, the heel should just rest easily on the pedal at its lowest point of revolution. In those saddles which are set on a tilting-

bracket, some small advantage may be gained by tilting the saddle forward, but too much tilt will render the seat uncomfortable. Another advantage of setting the saddle well forward is that by so doing the weight of the load is more equally distributed between the two wheels of the bicycle, — an advantage in riding which is recognized by those wheelmen who ride with a stoop.

With the L rod, or tubular seat-rod now commonly used, (the "goose-neck," or curved spring-rod, seems to have had its day,) it is not possible to push the saddle so far forward as to secure an absolutely vertical push on the pedals. And if this were possible, it would not be desirable. It is evident that, if the push is directly vertical, there will be a total loss of pushing power whenever the pedal-cranks come to the direct vertical position; that is, there will be two "dead-points" for each complete revolution of the sprocket. On level ground, the momentum of the moving machine will carry it over these, and the momentary loss of power will not be noticed by the rider. But in hill-climbing momentum no longer aids the wheel, and in

fact it becomes a retarding force to drag the machine backwards, and then the "dead-points" become very much in evidence, and will be sure to stop the bicycle if the hill is long enough. On the other hand, with a push ever so little out of the vertical, there can never be an absolute loss of power.

When you have once determined the best adjustment for your saddle, it is a good plan to indicate it on the saddle rod by making some light scratches with a file, so that you need not lose time in getting the correct adjustment after you have removed the saddle for any purpose.

Push hard on the downward moving pedal, and let your foot yield to the upward movement; otherwise, you are making one foot undo the work of the other. The reverse of this motion, that is, the push on the upward moving pedal, with a release of force on the downward movement, constitutes "back-pedalling"; an important, and, if you ride without a brake, the only means of stopping the machine quickly.

Let your foot always cling to, or "hug,"

the treadle, keeping the foot bent downward as described both on the downward push and on the return, unless when "back-pedalling."

As to the handle-bar, it should be so adjusted that, sitting in the manner described, you can just easily grasp it.

I assume that you ride for pleasure, not to make records, nor to see what measure of muscular effort you are capable of. If you ride for pleasure, you will stop when you are fatigued, walk when walking is easier than riding, ride slowly or fast as you feel disposed, coast or not when opportunity offers. If your ambition is merely to make a certain number of miles in a certain number of minutes, believe me you are losing the best of a noble exercise.

If you would ride easily, gracefully, and with the best results as regards your health and comfort, avoid the "stoop" in ordinary road riding.

Says a well known gymnasium instructor: "Why will so many of you sit on your seats like monkeys on a stick, and try to grind your noses off on your front wheel? All

this is wrong, and will only bring discredit on the sport that we love so much. There could no occasion arise that would necessitate your sitting on your seat with your back humped up like a camel. If the wind is blowing strong and you must ride faster for a time, you should bend your body forward at the waist, carry your head well forward and down, yet keep your back straight and chest out. In this way you will not cut such a ridiculous figure, and deep breathing will not be interfered with."[1] It is pleasant to know that the "stoop fad," which apparently reached its height in the season of 1893, seems to be rapidly dying out.

Keep an erect position, like that which a graceful equestrian maintains in his saddle. Sit easily, letting the line of centre of gravity of your body fall a hair's breadth to the front of the saddle centre. Grasp the handles very lightly; you will soon learn that a slight pressure of the hands, just at the

[1] Robert J. Roberts, Young Men's Christian Association, Boston.

base of the fingers, on the handles of the machine, is sufficient. After you have ridden for a month or two, and so have acquired some confidence, learn to steer with either hand, leaving the other at liberty.

On nothing so much does the pleasure of riding depend as on your keeping all the muscles of your body relaxed, except, of course, the propelling muscles of the legs. You will understand this, if, when riding with a rigid grasp of the handle-bar, with your teeth grimly set and your back stiffened, you happen to remember that you are riding wrongly, and let your muscles relax. The relief will be instantaneous and marvellous.

Learn to keep the handle-bar steady; thus you will describe a straight track, and not a zigzag. If you watch the tracks made by other machines on the road, you will observe that many of them run a more or less crooked course; that is, the riders of them are unable to steer straight. The knack of straight steering is wholly in the proper management of the hands and arms. If

you will let your hands rest half open on the handles, never grasping these hard, and so permit the whole weight of the arms to depend from the wrists, you will avoid all involuntary motions of the shoulders or elbow-joints; and it is these involuntary movements that produce wild steering. Sitting in this way, a slight movement of the body to right or left will take the corresponding handle with it, and thus you will steer by the body motion, and not from the wrists.

Learn to dismount by either pedal; then, by reversing the motion of mounting; that is, by a slight bound backward from the step, keeping a good grip on the handle-bar.

It is one thing to scramble, more or less awkwardly, into one's saddle, after an exhibition of ungraceful "hopping" along the ground, and another to vault quietly and surely to one's place, and easily catch the pedals. Ease and skill in mounting and dismounting show the accomplished rider, and

it is worth while to practise these assiduously in private. Do not be in too much haste to catch the pedals. If the wheel has impetus enough for a good start, you will have plenty of time to adjust your feet to the pedals gracefully, without fidgeting and paddling about in search of them.

The following rules for mounting and dismounting, as given substantially in General Ordway's "Cycle-Infantry Drill Regulations," are worth keeping in mind: —

"To mount. Grasp the left steering-handle with the left hand; raise the rear wheel slightly from the ground with the right hand; adjust the pedals to a horizontal position with the left foot; lower the rear wheel, and, grasping both handles, step to the rear of the bicycle; place the right foot on the ground and the left foot on the step. Take three short steps forward with the right foot and rise on the left foot; let the body come gently into the saddle, and place the feet on the pedals.

"Or, after having adjusted the pedal cranks, step to the left side of the machine, facing front, and place the left foot on the step, the left leg crossing the right. Push forward on the steer-

ing-handle; rise on the left foot; pass the right leg with knee bent, over the rear wheel; let the body come gently into the saddle, and find the pedals.

"To dismount, rise from the saddle on the pedals, throwing the weight of the body on the left foot; pass the right leg, knee bent, over the rear wheel; descend lightly to the ground, removing the left foot from the pedal."

"To dismount by the step, carry the left foot to the step, rise from the saddle on the left foot, and seek the ground with the right foot, at the same time checking the machine." [1]

For a lady's mount and dismount the following directions may be studied.

Standing at the left of the machine, advance it until the right pedal begins to descend. Then step into the space before the saddle, place the right foot on the right pedal, give a slight push on the ground with the left foot, and rising on the right foot take the saddle, and without haste find the left pedal. The weight of the body pushes the right pedal down, as you rise

[1] From Lieutenant May's Cyclists' Drill Regulations, U. S. Army.

upon it, and gives the bicycle an impulse, and the left pedal rises to the place for its push.

To dismount, slacken speed with the brake or by back-pedalling, and when the left pedal reaches its lowest position rise on it, and, keeping a steady hold on the handles, swing the body out and step off the pedal; or, passing the right foot over the left, take a slight hop to the ground.

In any form of dismount from the pedal, be careful to take it at its lowest point, or just as it begins to rise. If you rise on the back downward movement, you will add a sudden impulse to the machine and may have to jump quickly to save yourself.

General Ordway thus describes the position of the mounted cycler: —

"Head erect and square to the front.

"Chin slightly drawn in.

"Shoulders square to the front.

"Back straight, with body slightly inclined forward.

"Arms straight, but not rigid.

"Legs straight, but stretched by their weight alone.

"Feet parallel to the axis of the cycle, the ball of the foot resting lightly on the pedal."

You will, where the ground permits, wheel to the left, for a full turn; but you should learn to wheel either way with confidence. When wheeling for a turn, choose level ground if possible, as the bicycle is more apt to slip when turning on a declivity, than in forward riding. On the turn, always push hard, particularly on the inward pedal, and let a strong push accompany each inward shift of the handle-bar when making a short turn. If in making a short turn you lose your confidence in your ability to make it, you will probably go down.

Some teachers of cycling will tell you that the machine is to be steered only by the manipulation of the forward wheel; others, that it is to be done by the motion of the body. In a sense, both statements are correct. The first seems obviously true, since without the turn of the forward wheel you cannot deviate from the straight line. But if you will steer, not by a motion from the

wrist, but by slightly swaying the body in the saddle, you will find that the wheel answers almost automatically to your movements, the arm and wrist following the movement of the body. And a certain, although unconscious, motion of the body is as necessary to the cycler, in order to keep an easy balance in the saddle, as to the equestrian. You will discover this if you attempt to make a short wheel keeping the body in an absolutely erect position. In good riding, first comes the "knack" of balancing, then, with more or less practice, confidence, until at length you ride, steer, and wheel almost automatically, and will find it the hardest thing in the world to tell another how you do it.

At this point in your experience, your confidence in your bicycle will have become perfect. You will as soon expect the arm-chair by your fireside to rise up in revolt and cast you from its embrace, as your wheel to play you a trick, or to refuse to answer as if by intuition to your slightest half-formed wish. And the bicycle will answer your

confidence so long as you keep it going. "Hear now," says Rev. Charles F. Dole, "the parable of the bicycle. The thing goes as long as you keep up the motion. It goes by going. Once stop working, once begin to let it wobble, and ruin faces you. A certain degree of momentum is needful. So everywhere, if you want to succeed, or even to live, you must keep up your momentum."

But there is more in steering than is acquired by the proper management of hands, body, and arms. You will have noticed, as has been said, that, in short wheels, you are aided by pushing strongly on the inner pedal. The reason for this it will puzzle the beginner to discover, but it is really an application of "foot-steering." If you lash or clamp the steering-fork of your bicycle so that it cannot turn, having the wheels in a right line, mount and start as usual, and then, letting go of the handles, fold your hands and push, you will, if the

machine is in right balance, move on a straight line forward just so long, and no longer, as you exert an equal pedal pressure with each foot. The stronger push, usually that with the left foot, will drag the machine towards the left, just as an oarsman drags the bow of his boat about with his stronger arm, and you will probably overturn in that direction. But you will have learned that the machine may be guided by the foot movement, and you will unlash your steering-head and go out on the road with that notion in mind. Now bend your energies, say during the first fifteen minutes of each run, towards acquiring equal pushing power with each foot. If you find the right foot the weaker, practise wheeling to the right, pushing as hard as you can with the weaker foot. From time to time let go the handles, on a straight level course, and await results, trying to push as evenly as possible. After many failures, the time will come when you will move straight on without a flinch, and you will have begun to acquire the art of riding "hands off." You will perfect yourself in this by occasional practice on good ground,

and at length, by increasing pressure on one pedal or the other, you will deflect the course of your wheel to that side, — and this is "foot-steering." It, of course, can never be as reliable as body-steering, and it can be safely practised only on fairly good ground; but there are emergencies in which it is convenient to have the hands at liberty; and you will not rest until you have mastered all the qualifications which go to make up a good rider.

While the stoop is to be avoided upon reasonably level ground, a leaning position has obviously its place in hill-climbing. This will be evident when it is considered that in mounting a hill the centre of gravity of the load is necessarily thrown back towards the axle of the rear wheel, thus increasing the difficulty of propulsion. To counteract this, it is as natural for the rider to lean forward as it is for the pedestrian walking up a steep hill. At the same time, you will as naturally keep a somewhat firmer grasp than usual of your handle-bar, both to support yourself and to prevent the

forward wheel from wobbling, which it will have a tendency to do if relieved from part of its ordinary load. At times, you will brace yourself by a strong upward pull on the handle-bar. As you will naturally lean forward in ascending a hill, so you will lean backward in running down a steep declivity.

The elements of success in hill-climbing are, first, good legs and lungs, secondly, knack, and, thirdly, confidence. Each rider must be a law to himself as to the way in which he will attack his hills. Some take a strong spurt at the foot of the hill and depend on it to carry them up; others work themselves up at a slow pace by sheer strength of leg muscle. You will find that mounting the same hill grows easier and easier the oftener it is done, and that a "new" hill will often get the better of you, although in fact you have again and again ridden easily up harder hills. You will of course gain something by "zigzagging" a very steep ascent.

The actual muscular effort necessary to

ascend an acclivity on a bicycle is certainly not greater than that required in walking up the same hill, and the expenditure of breath is less. The difference is (and this makes the difficulty in hill-climbing) that, when walking, you may stop for rest when you choose, whereas on your wheel, working up a steep hill, if you stop you may be unable to get a new start, and so may be forced to walk to the top of the hill.

If a hill distresses you, do not be ashamed to dismount and walk. You are riding for pleasure, not to make a record. With each week of riding, you will find the work easier, and will smile to think how many a "Hill Difficulty" which appalled you in the beginning has seemed to level itself before your flying wheel. But there are many steep and stony or sandy hills up which you should never attempt to force either yourself or your machine. A high-grade bicycle is a wonderfully strong and trusty machine for its weight, but it was built to be used only by reasonable beings; and if you are a good and well practised rider, you may be sure that you should never drive your machine

across ground to get over which distresses yourself. (I do not refer to very long hills, on good roads, where of course the endurance of the machine will outlast that of its rider.)

A twenty-eight inch wheel, running at a ten-mile gait, makes 7,240 revolutions per hour, $120\frac{2}{3}$ revolutions per minute, or 2.01 revolutions each second. Supposing the weight sustained by the two axle bearings to be 165 pounds, this is distributed between the two bearings in about the ratio of one third and two thirds,[1] the rear axle carrying the greater weight, that is, 110 pounds, and the front axle 55 pounds. The proportion of weight sustained by the rear axle is of course increased in hill-climbing. The strain which the rear bearing and spokes have to stand is obviously very great, even in level roading. Not only do the bearings carry weight in the proportion stated, but the motive power is applied to the machine, not by a front traction, as in a vehicle drawn by a horse, but directly to

[1] This assumes that the saddle is carried well forward. As it is pushed backward, the proportionate weight imposed on the rear bearing is of course increased.

the axle of the wheel; so that each spoke becomes the long arm of a lever of which the radius of the rear sprocket is the short arm, at the end of which the power is applied to raise the weight, that is, the load made up of the machine and its rider. It is to throw the strain of the lift as much as possible into a straight pull lengthwise through the spoke, that the admirable tangential arrangement of the spokes has been devised, and applied to all the high-grade machines. On a level road the momentum of the moving machine helps the wheel; but on an acclivity the wheel has both to carry its load and to overcome the force of gravity which drags it backward. It is no wonder that spokes in sound wheels have been known to snap like twigs at the felloes under the weight of a heavy rider driving his machine up a hard hill, and that such accidents are not more common shows the perfection to which the bicycle manufacture has attained.

You will be told at the riding-schools to look always straight ahead in riding, and

never at the road in front of your wheel. This advice is sound, theoretically, but it is not always possible to follow it on ordinary country roads. Sharp stones, little ruts, sand or water holes, bits of broken glass, lie everywhere in wait for you, and you will learn with practice to avoid them almost instinctively, by a turn of the hand. While in the beginning, if you fixed your eyes on a pebble ahead of you, you would be sure, by the force of some mysterious attraction, to run your wheel over it, soon you will be able to graze it by a hair's breadth on either hand without touching it. Keep then an easy outlook upon the road about thirty feet in front of you; and still farther ahead if you are riding a bad road, over which you have to pick a path for your wheel. Avoid watching your front wheel. It will take care of itself, and watching it will tend to make you giddy or confused.

If you do not carry a brake, do not attempt coasting until you have acquired the fullest confidence in yourself and thorough control over your machine. Without the

brake, the only means of checking speed is by braking with the foot, which is an ineffectual resource, besides being injurious to the tires; or back-pedalling, to make which effective on a steep grade requires great muscular effort. In coasting, not only have you to look out for possible collisions, but the frame of a light weight machine cannot be put to a severer test than it suffers in a run, say at a twenty-mile gait, down a long hill. The best place for the feet of the ordinary rider, in his first season, is on his pedals; and the worst cycling accidents recorded have occurred to riders coasting without brakes, or in the night.

To check speed in coasting, do not apply the brake too suddenly, if you would avoid a bad "header." If you have a band-brake, apply it gradually, let go of it, and in a second apply it again. You may use the same method with the spoon-brake, if it works well and freely.

The night rider takes the risk of accidents from bad roads, or obstructions which may cut his tires or otherwise injure his machine

or himself. But there is no denying the strange fascination of night-riding. As you swoop through the darkness like a hawk, unable to see the slight possible dangers that lie in wait for your wheel, and so perforce relieved of all responsibility for your own safety, you experience an eerie sensation which must be akin to that which the old New England witch enjoyed, as she sped on her broomstick through the cloudy night to a symposium of the "black man's" disciples.

On dark nights, always carry a lantern.

Observe carefully the "law of the road"; that is, on meeting a carriage or another wheelman keep to the right; in passing, to the left. If you will do this, even although it may not be absolutely necessary, you will avoid the responsibility of accidents. If you ride in the dark, ring the bell freely.

After much conflict, it may now be considered as settled law throughout the United States that the bicycle is a "vehicle," and that its rider is possessed of the same rights and charged with the same duties, so far as these

are applicable to him, as the driver of any other vehicle. In the summer of 1894, the Legislature of Massachusetts passed, and the Governor of the State approved, June 14, an "Act to regulate the use of Bicycles and other similar vehicles," it being understood that the act had the approval of the League of American Wheelmen. By the terms of the fifth section of the act, it was taken out of the power of local boards, such as the street commissioners of towns and cities, to prohibit the use of the wheel in the public thoroughfares, — a power which had at times been harshly, not to say unjustly used. As the Massachusetts act may probably be made the foundation of similar acts in other States, it is printed below in full, for the information of cyclers in Massachusetts and elsewhere.[1]

[1] Chapter 479 of the Acts of 1894 : —

"SECTION 1. Whoever, without the permit provided for in section three of this act, rides in a public highway or town way, street, square, or park a bicycle or tricycle at a rate of speed exceeding ten miles an hour, or rides such machine on a sidewalk, or rides such machine in the streets, squares, or parks of any city when the same is not provided with a suitable alarm bell adapted for use

It is a pretty custom, on meeting another wheelman, to ring him a salute on your bell.

by the rider, or after sunset rides the same in any public way, square, or park, whether within or without the limits of a city, when such machine is not provided with such suitable alarm bell, shall be punished by fine not exceeding twenty dollars for each offence, and shall be further liable for all damages occasioned to any person by such unlawful act.

"SECTION 2. The term 'sidewalk,' as used in this act, shall mean any sidewalk laid out as such by a city, town, or fire district, and any walk in a city or village which is reserved by custom for the use of pedestrians, or which has been specially prepared for their use. It shall not include cross-walks, nor shall it include foot-paths on portions of public ways lying outside of the thickly settled parts of cities and towns which are worn only by travel and are not improved by such cities or towns or by abutters. The terms 'bicycle,' and 'tricycle,' as used in this act, shall be deemed to include all vehicles propelled by the person riding the same by foot or hand power. The terms 'park,' and 'square,' as used in this act, shall not include any spaces under the control of park commissioners, or of a park board or a special park department of a town or city having power to make regulations relative to such spaces, and this act shall not in any way abridge the powers of such commissioners, board, or department.

"SECTION 3. The mayor of a city or selectmen of a town may in their discretion, upon any special occasion, grant permits to any person or persons to ride such

If in rapid roading you are confronted by a sudden danger, you must decide on the instant how you will meet it, — if you hesi-

machines, during a specified time, upon specified portions of the public ways of such city or town, at any rate of speed; and may annex such other reasonable conditions to such permits as they shall deem proper. The city council of a city and the selectmen of a town may also, under such conditions as they deem proper, permit the use of velocipedes or other similar machines by children on any sidewalk in any public way, square, or park in such city or town.

"SECTION 4. Proceedings for the enforcement of the penalties imposed by this act shall be instituted within sixty days from the time the offence is committed.

"SECTION 5. No city or town shall have any power to make any ordinance, by-law, or regulation respecting the use of bicycles or tricycles, except as provided in section three of this act; and, except as provided in said section three, no ordinance, by-law, or regulation heretofore or hereafter made by a city or town in respect to bicycles or tricycles shall have any force or effect."

The "Liberty Bill," so called, enacted by the Legislature of New York in June, 1887, and which has been substantially re-enacted in several other States, provided that "commissioners, trustees, or other authorities having charge or control of the highways or park driveways" of Central Park, "shall have no power or authority to pass, enforce, or maintain any ordinance, rule, or regulation by which any person using a bicycle or tri-

tate, you are lost. If you believe you can stop in season to avoid it, you will of course do so; but if you cannot stop, do not slacken speed except in the case that you have to avoid an impact with some solid obstacle. A fast wheel will skim through, sometimes almost on a plank's edge, where a slow one will go down. If you have a narrow passage which you must make, do not think how narrow it is, but rather how much room it affords. Sight for the middle line of it, keep cool and steer straight and push hard, and ten chances to one you will be all right. If you hesitate and let the bicycle lose speed and wobble, you will certainly come to grief.

In setting out for a ride, see always that the nuts about the saddle connections and at the axle-hubs are tight, and that the head is firmly clamped to the fork. If, on the road, the saddle begins to slip under you, check speed, and, if necessary, rise on the pedals,

cycle shall be excluded or prohibited from the free use of any of the park highways or driveways at any time when the same is open to the free use of persons using other pleasure carriages."

keeping a firm grip on the handles. If the head turns in the tube while you are riding at a good pace, you will get a fall so quickly that you will not know what throws you. Bicycle falls seldom result seriously, but if you find that you must fall, say to the right, throw the right foot off the pedal, keep a good grip on the handles, and the chances are that you and your machine will come up standing. If you run nearly at right angles against some solid obstacle, check speed as much as you can, and dismount by the step just as you strike. If you keep the saddle, you may be thrown forward.

If you have ruts or street-car tracks to cross, take them as nearly at right angles as possible. If you swerve so as to let your wheels fall into the rut or track, you probably will get a bad fall. So if you are riding on a badly rutted road, you may have to save yourself by zigzagging from one side of it to the other.

A very short experience upon the road will teach you that a strong wind, if against you, makes hard work of wheeling, while if it is at your back it equally lessens

the labor of propulsion. Your dress should afford as little vantage for the wind as possible, if you would ride easily. So you will wear a cap instead of a hat, and, in a windy day, keep your coat closely buttoned. Among the other disadvantages of the long skirt for ladies is that it catches the wind so readily.

The greatest annoyance which besets the cycler on the road is from the attacks of ill bred dogs, who snap about his pedals and may dart under his wheel and so throw him. This is most likely to happen on back country roads where the inhabitant curs are unused to the sight of the wheel. If you are attacked by a dog on a road commonly frequented by wheelmen, you may be sure that the animal is vicious and deserves to be put out of the way. If you are attacked running down hill, throw your feet on to the coasters. There will be a happy chance that the pedal will strike the cur on the head, and perhaps, as has once happened within the knowledge of the writer, fracture his skull. If you can make a fly-

ing shot, and are attacked while on the wheel by a vicious dog, intent on biting, shoot him, — the law will justify you.

Not so dangerous as the dogs, but nearly as annoying, are the flocks of hens or turkeys which, when frightened by your approach, invariably run in front of your wheel uttering discordant cries and gobbles. But these neither bark nor bite, and generally manage just to escape being run down.

As regards the form and rate of riding, the temperament of the rider counts as a most important factor. A graceful walker will be a graceful rider, and a rider who has undergone the military drill will show it upon the wheel almost as much as in walking. A nervous man, as he is sure to be a fast walker, will make a rapid rider, and will find it hard to keep a pace of less than twelve miles an hour in ordinary roading. Indeed, in cycling, nerve counts as much as muscle, or even more. Most of the riders who have made great records on the race-track have combined to an unusual degree the qualities of alertness, daring, and quick-

ness of perception to see and take advantage of an instant's opportunity. Study a group of their photographs, and you see a set of clean-cut alert faces, firm-set mouths, and keen eyes. The figures do not show excessive muscular development, rather litheness and grace. For example, you will not find a more beautiful figure in its way than that of Zimmerman on his wheel, but it has the beauty not so much of a Hercules as of the Flying Mercury.

Thus it is impossible to prescribe for any one a "rate" for road-riding. You will find your wheel answer to your feeling almost as if it were a part of your own nervous system, and your temperament will govern your pace. When you are sluggish and weary, your wheel will drag under you; as the fresh air and rapid motion enliven you, your wheel will seem to feel a new impulse. Experience will soon teach you your pace, and you will find that, taking one run with another, you make an average hour rate which will not much vary from day to day.

You will find it hard, particularly if you are of a nervous disposition, to conform your

own pace to the different pace of another. It is like trying to row behind an oar whose style and stroke are different from your own. Your tastes and feelings may be perfectly congenial, and you may be the best of chums off the wheel, but if your companion on the road for a long run customarily rides at eight miles while you ride at twelve, you both will soon grow as restive as a pair of ill-matched horses. The result may be to develop a certain petulance of temper, rather than indulge which you had better "agree to differ," and each either take his own pace or separate at the first cross-roads.

At the end of the season, if you have ridden prudently, and otherwise taken good care of yourself, you should be in the best possible condition of health and strength; able to take a fifty-mile run without appreciable fatigue, as your once unaccustomed muscles have developed and hardened by the season's practice. In the Northern climate, you will perforce abandon roading during the winter, and when you mount the

wheel for the first ride the next season, you will probably be appalled and discouraged to find how much strength you have lost. But in a comparatively short time the muscles for a time out of use will regain their former elasticity and power; and with a couple of weeks' steady riding you will regain all you have lost. If you are within reach of a riding-school, be assured that a regular practice there during the off season, say two or three rides each week of half an hour each, will not only bring you pleasure in the taking of them, but will count greatly to your advantage when you take to the road in the spring.

IV.

TAKING CARE OF A BICYCLE.

"When Aurora paints the dawn
And the fields are bright with dew,
When the fleecy mists of morn
Rise and thin and melt from view,
O what ecstasy to feel,
With the wind against your face,
Miles slip by beneath your wheel,
Cares outdistanced in the race!"

L. G. C.

IV.

What his piano, his violin, his flute, is to the accomplished musician, what his locomotive is to the railway engineer, his wheel is to the enthusiastic cycler. "His wheel and he are one. It seems to obey his thought and to share his emotions. It lives with his life, it reflects his idiosyncrasies." It seems to him not a lifeless congeries of steel and nickel parts, but a thing of intelligence answering to his own; and, if it comes to grief, he mourns for it as for a favorite horse

or dog. So, if you are really fond of cycling, you will take the same pride in a well-kept and well-running machine that a horseman feels in a well-groomed horse.

A bicycle frame, with its straight lines and sharp angles, is not perhaps a thing of beauty, although some of the models of 1893 and 1894 have a rakishness of design which is very nearly graceful; but it may at least have the beauty of cleanliness and brightness, and then when it flashes by in the sunlight, a glitter of black and silver, it will not want admirers.

Many bicycles, even of the best make, become practically worthless by the end of their first season of use; but except in cases where the machine has been exposed to some severe accident, this is because the rider has been too lazy or too ignorant to take care of his wheel. If you will spend from five to ten minutes at the end of each run in caring properly for your bicycle, you will find it always ready for use, and, barring accidents, as good for road use at the end of the season as it was at the beginning.

The writer lately rode a wheel which for

ease of propulsion and straight steering seemed perfect, and which he found had been ridden three thousand miles during the season of 1894. It was equipped with single tube tires which were inflated but three times during the season, and the bicycle, having been carefully and intelligently cared for, was to all intents and purposes as good as new.

I assume that you are riding about one hundred miles a week in fair weather, and over ordinary roads.

After each run, look over your machine carefully. If it shows mud-splashes, wash them off with a damp, not dripping sponge. If it is dusty, dust lightly with a soft cloth, preferably woollen, or with cotton waste.

Some of the manufacturers advise cleaning the bicycle with a hose, saying that water will never injure their machine. But no one would willingly expose his machine to a heavy shower if he could find an opportunity to house it, and there is a chance that a smart stream of water from a hose will strike some bearing which is not fully pro-

tected by oil, and so perhaps cause rust. It is a safe rule, never, if you can help it, to allow water to touch the bearings of your machine.

Wipe all oil and dirt from the outsides of the bearings.

Be sure that the nickel parts are dry, and rub them well with a chamois skin. This, with a little fine whiting, will remove incipient rust.

If you have to keep your machine in a place accessible to dust, it is well to keep it covered with a cotton cloth. An old sheet will answer the purpose. It goes without saying that a bicycle should never be kept in a damp "stable," especially if it has any wooden parts.

See that the axles, joints of tubing, and outsides of the bearings are always clean and bright. If the spokes are nickelled, rub them occasionally with a woollen cloth moistened in kerosene. Keep the chain as clean and dry as possible.

Keep the bearings of your machine snug, not tight. If too tight or too loose, they will soon wear out. When you shake the

wheel, there should appear only just enough lateral motion on the axle to be perceptible.

If the bearings are in good order, each of them, in running, should give a soft continuous click. If your machine makes a sharp or irregular noise on the road, ascertain at once what the matter is. The noise may be caused by a dry chain or axle, or by lost motion in the brake connections. Listen carefully to the working of each bearing, and if the noise proceeds from it you will conclude that a ball has become broken or badly worn. In that case "take down" the machine to the bearing, or have this done, and have the worn or broken part replaced.

Some wheelmen are always taking their machines to pieces; but this is not often necessary unless a part is broken, or the machine has got badly filled up with mud or water. In any case, unless you are an excellent mechanic, it is better to send your wheel to a repair shop when it needs taking down. It is a nice job to "set up" a bicycle, and if there is anything wrong in the adjustment, the machine will run badly and wear out at the bearings.

The chain necessarily takes more wear than any other part of a bicycle, and should always be most carefully looked after. It should be kept free from grit and dust, and it is well to brush it well with a stiff brush after each run. Every two or three months, reverse it on the spockets, so as to distribute the wear between the two sides.

Oil your bicycle, generally, once a week, using rather a heavy oil and never enough of it to run out at the bearings. The rear-axle bearing, the bearing at the sprocket-bracket, and the lower steering-head bearing take the most wear, and are most carefully to be looked after. Work each bearing well after oiling.

You will find it very convenient to sling up your bicycle to a hook in a ceiling, or to the limb of a tree, before oiling or cleaning, so that you can get easily at all parts of the machine and work the bearings freely.

Do not let the lubricating oil touch the tires of your bicycle, as it is destructive to rubber. If kerosene gets on to the tires, wipe it off quickly. The coal oil products are, more or less, solvents of rubber; kerosene

however being a much less powerful solvent than benzine, and therefore a safer and nearly as effective an agent for cleaning the bicycle.

Clean the machine about once a month. First, sling it up, as directed above. Loosen the bearings slightly, and fill each bearing with kerosene from a squirt-can and work the bearing rapidly. Do this until the kerosene runs out clean from the bearing. Take off the chain and let it soak for fifteen minutes in a liberal bath of kerosene. Shake it out, rub the whole surface of each block clean with a woollen cloth, and hang the chain up to dry out. Rub the sprocket-teeth clean with a woollen cloth moistened in kerosene.

Take advantage of the chain being off the machine, while the wheel is suspended in the air, to test the bearings and their adjustment. Work the pedals, and listen carefully at the bearing on each side of the sprocket-bracket. If it gives out a soft, regular musical "click," it is probably all right. Revolve each wheel and listen at its bearing. The wheel, if the bearings are rightly adjusted, should, under a smart impulse, revolve for several minutes,

and, in stopping, should oscillate backwards and forwards, until the weight of the valve-nipple brings it to a rest with the nipple about at the bottom of the circumference. On revolving the sprocket, it should, if the bearings are right, come to rest with the pedal-cranks standing about in the vertical line.

Place the chain — I assume that you use an "Elliott" or other self-oiling block chain — on its side on a board or table. Put not more than one good drop of oil in each block, being careful not to omit a block. If oil appears on the outside of the chain, wipe it off as cleanly as possible with a woollen cloth.

If you use dry plumbago for lubricating the outside of the chain, apply it on the working side of the chain only, with a very little kerosene oil, which should not be allowed to work into the insides of the blocks, before replacing the chain. Preparations of plumbago, or graphite, are now sold in the form of lubricating sticks, using which you will apply the lubricant more evenly and easily than by the use of dry graphite. Beware, however, of compounds of grease and

graphite, sold for lubricants, which leave the chain sticky, so that it will gather grit and wear the sprockets.

Now replace the chain on the sprockets. To do this place the joint ends of the chain, respectively, over the upper teeth of the sprockets and revolve the sprockets towards each other until the ends of the chain meet, or nearly so. If you have difficulty in making the joint, as may be the case if the wheel is suspended and you are working alone, draw the ends of the chain together by means of a cord inserted between the block-joints until the joint is made; fasten the cord, and then put in the screw and nut to fasten the chain.

Now oil each bearing, using a little more oil than common.

At the end of the season clean the machine carefully, oil it well, and sling it up or hang it on the "rests" made for the purpose, and cover it with a cotton cloth. Put it in the dryest and cleanest place you can find for the winter. At the beginning of the next season, if the machine is not to be taken down, clean out the old oil with the

kerosene, and give it a fresh oiling. It will be well to work the bearings occasionally during the off season.

Keep by you the black lacquer sold for the purpose of repairing the scratches or worn places which are sure to show themselves on the enamelled parts of your machine. This is not nearly so durable as the enamel, but if applied whenever needed it will keep rust from the frame and prevent the outfit from getting shabby.

Inflating Tires.

In inflating a tire, it is of advantage, if you have opportunity, to turn the machine on its side on supports, or to sling it up, so that the wheels can revolve easily. See that the air-pump and connecting hose are clean and free from dust, and that the closest possible connection is kept between the valve and pump during inflation. At each stroke of the piston, force it as nearly as possible to its full length.

As the greater weight falls upon the rear wheel of the bicycle, its tire should be kept the most tensely inflated. The degree of

inflation desirable for the pneumatic tire varies with the weight of the rider. A tire which is hard enough for a rider weighing one hundred and fifty pounds will flatten badly under one who weighs two hundred. If your tires flatten very slightly under your weight, no harm is done, — your wheel will run with the less jolting, and you will incur less risk of injuring the tire on stony ground. On the other hand, if the tire flattens too much, it may "cut" at the rim of the wheel; and it is probably true that "hard" tires propel more easily than "soft" ones.

If you run a double-tube tire with a too soft inflation, you will probably very soon destroy the inner tube, which is exceedingly fragile and easily injured.

The larger the tire, the less the degree of inflation necessary to keep it safe, and the easier the motion of the machine. But with the decrease in diameter of the tire, the lighter the machine becomes.

Never meddle unnecessarily with the valves. The less often these are touched, the less likely they are to leak. If, when you remove the valve-cap, the valve "whis-

tles," this shows that some foreign substance has got into the piston, or plunger, of the valve, — probably from the air-pump. If the leak is so slight that you can inflate the tire so as to overcome it, do so, and replace the valve-cap; and the obstacle in the valve will probably work out of itself. So long as the cap holds the air, you need not trouble yourself about the interior leak. A little oil applied to the washer of the valve-cap, or to the threads of the screw-stopper, in the valves made without washers, and wiped off carefully, will help to keep the valve tight.

Mending Tires.

If your tire leaks, first see — if you are not aware of having punctured the tire — whether the leak is in the valve. Turn the wheel so that the valve will come uppermost, and hold a glass of water so that the valve-nipple will be submerged in the water, and watch for air bubbles, which will appear if the valve leaks. If no bubbles appear, sponge the surface of the tire liberally with water, and watch closely for bubbles. If none are detected, probe carefully the surface of

the tire, wherever any scratch or abrasion appears, with the blunt head of a large needle or with the instrument provided for the purpose in the repair outfit. If the leak is not detected, remove the wheel from the machine and immerse it in a tub of water. Then, if the tire does not show bubbles to indicate the leak, you have no resource left but to send the wheel to the repair shop.

After a long run, you may find a tire wholly or partly deflated without any apparent cause. In such case, on examination, you will find that the valve-cap has worked loose, not having been screwed to a firm "set" before you started, and that the constant pressure on the tire on the road has forced out the air through the valve-nipple.

In mending the double-tube tire, the tire must be deflated and removed from the wheel at the place of the puncture. Then the inner tube is to be taken out, or so much of it as is necessary, and patched with the pure rubber ribbon which makes a part of the bicycle outfit and rubber cement (a solution of pure rubber and other ingredients in benzine), after which the tube and tire are to

be replaced, and the tires inflated. Ordinary punctures in the single-tube tire are easily and quickly repaired by inserting in the puncture rubber threads in the ordinary form of "snappers," or rubbber plugs made for the purpose, either of these being well covered with the rubber solution and forced into the puncture, when the benzine evaporates and leaves the rubber a solid mass, adhering firmly to the tire and making it air-tight.

Temporary repairs on the road may be made by patching the punctured place on the outside with the rubber ribbon and solution, and binding the tire and felloe tightly with hemp twine. All the parts to which the solution is to be applied must be perfectly clean and dry. A piece of sand-paper for cleaning the rubber may be a useful part of the equipment.

General Repairs.

If your bicycle has a buckled frame, or a warped wheel or broken spokes, you had better send it to the repair shop, and so if the tire wants cementing. But it is well to

understand that spokes may be loosened or tightened by turning to right or left the nipple set on the spoke at the junction with the felloe. This may be done with a spanner or monkey-wrench, or with a special tool furnished for the purpose in some outfits. The set or "true" of the wheel depends largely on the tension of the spokes, and you will not meddle with them unnecessarily.

Try your spokes from time to time, taking each in turn around the circumference of the wheel, to see that none of them have worked loose.

It is said that a buckled or sprung wheel may often be restored to shape by laying it down and placing the foot on the higher part of the bend in the rim, lifting with the hands on the lower part, and so springing it back; but this would seem to be an heroic remedy, and best let alone. There is little danger of a wheel on a high-grade machine buckling or springing, unless as the result of a severe collision or other accident.

If you are obliged to cement a tire for yourself, place the tire on the wheel, with the side to be cemented outward. Sear it

slightly all around with a hot iron, so that the cement may stick to the rubber; remove the tire; pour heated cement into the felloe and distribute it evenly; then replace the tire on the felloe, seared side in, and, if the wheel-rim is steel, heat the felloe from underneath with a spirit lamp, (which will not injure the enamel finish,) and let the cement "set" for several hours. Melt your cement over a slow fire, stirring it constantly so as not to burn it.

You will find on your machine appliances by which the tension of the chain may be increased or diminished. As the chain wears, it will grow slack on the sprockets, but a chain well taken care of should run well for two seasons without readjusting. Too tight a chain causes the wheel to run hard, and wears the sprockets; if too loose, there is a loss of power, and a likelihood of stretching or breaking the chain on any sudden application of power, as in ascending a hill. If your chain shows a slack between the tops of the sprockets of not more than a quarter of an inch, the tension is probably right.

Bending a pedal-crank is the accident likeliest to happen to a wheel in the hands of an inexperienced rider, and many an old rider has had, at one time or another, to work home on one pedal. Bent cranks are repaired at the shops by putting them under strong pressure in a vice. But you may generally straighten the crank at home in the following manner. Place the bent crank, with the convex upward, upon an ordinary chopping-block, slightly hollowed, as such blocks generally are, by use, so that the ends of the crank will rest firmly, leaving the bent place free of the block. Set a billet of oak wood endwise on the part of the crank where the bend appears, and strike one smart blow accurately upon the upper end of the billet with a rather heavy hammer. If the first blow only partially corrects the fault, you may try a second; but if the blows appear to make no impression on the crank desist from further attempts, lest you break the crank, and send it to the repair shop.

Never let a hammer touch directly any part of the machine. If you have a pin to drive out, interpose a copper wedge or a

bit of oak wood between the hammer and the point of the pin. In using the monkey-wrench, try to move it directly in the arc of which it makes the radius, and so avoid bruising the nut or damaging the screw-thread. If a nut is set hard, a little kerosene allowed to work into the screw bearing may relieve it. The little wrenches furnished with the bicycle equipment are useful, but an ordinary machinist's wrench is best for loosening the nuts about the saddle and saddle-rod, and the pedals.

The parts of the leading bicycles are interchangeable, as between wheels of the same model, so that any new part wanted can be supplied. It was by carrying such duplicate parts as would most likely be needed, or by sending these ahead on the route, that the trans-continental riders, notably Messrs. Allen and Sachtleben in their trip across Asia, were able to complete their arduous journeys.

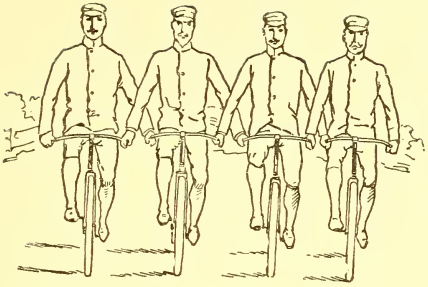
V.

DRESS AND EQUIPMENT.

" She met me on the river road
Beyond the pasture bars,
With wind blown hair, with cheeks aglow,
With eyes that beamed like stars.

O what a flash of youth and health,
And all things good and leal!
I'd give my all to spin beside
That girl upon the wheel!"

L. G. C.



V.

THERE is no disputing about tastes, and the matter of bicycling costume must be settled largely by the individual taste of each rider. But there are one or two axioms that may safely be applied to the subject.

First, long trousers are an abomination in riding.

Secondly, so are braces or "suspenders."

Thirdly, the looser the leg gear above the stockings, the greater the comfort in riding.

The rider who has once worn short trousers will not again, unless in case of necessity, mount his wheel in long ones; nor, if

he has once substituted a belt for his suspenders, will he willingly put these on again. The knickerbocker trousers are much more comfortable than the tight knee-breeches. The latter, if buttoned at the knee, impede the free action of the leg, and, if worn open at the knee, catch the dust, besides presenting a very slovenly appearance.

Cycling suits in great variety are to be obtained of the dealers in sporting goods, or the clothing dealers, in any large city, or you may have a suit made to order to suit yourself.

Knickerbockers may easily be made by adapting a cast-off pair of loose summer trousers. Cut these off at about three inches below the knee, hem them, and run a strong elastic cord into the hem, and the work is done. Of the cast-off part of the trousers, you may have a cap made, and waist-straps to keep the belt in place.

One of the best cycling suits the writer has seen was thus made out of a last year's summer suit of a light texture of gray cloth. The knickerbockers, sack-coat, and cap were worn with gray woollen stockings and a light

weight flannel shirt of the same color, with russet leather belt and shoes.

A sack-coat is preferable to a blouse, or Norfolk jacket, as being more easily removed to be strapped to the handle-bar in warm weather.

The stockings should be long enough to reach at least three inches above the knee; and the knickerbockers should be turned under so that the elastic will clasp the leg well above the knee joint, thus leaving the action of the knee absolutely free.

As the unimpeded action of the knee joint is an essential aid to comfortable wheeling, nothing can be more absurd than the English "cycling costume" figured in the fashion plates for the season of 1894, with its trousers buttoned tight just below the knee, and its stockings laid fold on fold over the calf of the leg. The costume would seem to have been designed, not to promote the comfort of the wearer, but to conceal the physical deficiences of some lean and slippered pantaloon. Jerseys, or "sweaters," so called, are very comfortable, but off the wheel are not desirable wear.

Fine woollen stockings are much preferable to cotton. The best stockings the writer has seen were hand-knitted, of soft Scotch gray wool.

Keep two or three sets of gossamer underwear for summer riding.

A cap with a visor to match the costume is the best head-wear. On a hot day, the white duck caps are very comfortable. These, however, will very soon become soiled. If it is desired to wear them, it is well to buy several of the cheapest sort, and throw them away as they become defaced. If you are obliged to ride under an intensely hot sun, and do not mind tan or sunburn, you will find the best head-gear to be a large white handkerchief wrapped turban-wise around the head, and kept wet. A black silk cap with a visor is very comfortable in hot weather.

You may wear bicycle or tennis shoes, with rubber soles, if you will; but you will find, after a little practice, that a leather sole holds the pedal as well as a rubber one, and that an ordinary low-cut russet shoe answers every purpose. A low-cut shoe is

much better than a laced boot, unless you have weak ankles.

In warm weather you will soon find the backs of your hands tanning to a deep and healthy brown, like a well colored meerschaum pipe. This color you probably will regard as ornamental; if not, and you wish to ride in gloves, choose those woven of Lisle thread or silk, rather than kid or dogskin.

A pair of light leather straps, each about fourteen inches long and fitted with buckles and eyes, which can easily be carried in the pocket or around the handle-bar, form a very useful article of bicycle equipment. With these, your belongings necessary for a two days' run, or any articles which you may pick up on the road and wish to carry home, may be conveniently strapped to the handle-bar.

Many devices for carrying a larger equipment are sold which answer their purpose well.

Canes or umbrellas, if you have occasion to carry them, or a fishing-rod or light rifle, or a small camera, may be strapped to the top bar of the machine.

In fact, if you have strong muscles and ride fearlessly, you may carry almost anything on your wheel which you could carry walking. The writer knows a professional paper-hanger, who for a whole season customarily carried with him to and from his daily work a large pail of paste, adroitly strapped to the head of his machine, while his paper-hanger's board was balanced across the bicycle frame, and the accompanying paste-brush, scissors, etc. tied to the handle-bars.

Extra weight should be adjusted as far as possible to the front of the machine, as the centre of gravity of the whole load is thus thrown forward, and the work is more equally distributed between the two wheels. For a like reason, the tool-bag is better carried on the top bar close to the "head" than in the rear saddle-spring.

Suppose you are starting on an autumn morning for a hundred-mile run out and home, intending to stop for the night at an inn half-way out. What shall be your "kit,"

and how will you bestow it? You will wear a medium weight all-wool flannel shirt, or a jersey sweater, — preferably for such a trip the shirt, over light underwear, — with sack-coat, knickerbockers, leather belt, russet shoes, and cap. Take with you a large silk neck muffler. Leave at home all superfluities in the way of things carried in the trousers pocket, which are always a nuisance on the bicycle. Discard your pocket-book. If you carry a cigar-case, wrap bank-notes in tissue paper, and put them in the case as the safest place, since, whatever else the smoker leaves or loses, he will look out for his cigars. Put your silver, loose, in your pocket. Your keys, except perhaps a watch-key, you will not want. The best way to carry your watch is in the fob pocket of your knickerbockers in a rubber or chamois case, and without the chain, which, however worn, will persist in catching on the saddle in mounting. A match-box and a folding drinking-cup in a leather case may be carried in your coat pocket. Your sack-coat and shirt should keep you sufficiently warm on the wheel; if you are too warm, you may relegate the coat

to the handle-bar. Make into the closest possible roll a light weight night-gown, a change of underwear, an extra handkerchief, and a comb and tooth-brush. You may make the roll into a brown paper parcel, closely tied, or enclose it in a leather or rubber cover. Strap this to the front of your handle-bar with the leather straps described above, or with an ordinary shawl-strap.

If the weather is not too cold for pleasure-riding, that is if there is not snow on the ground, it is warm enough to dispense with an overcoat, which is the most troublesome of encumbrances on the wheel. If you must dress warmly, put on extra underclothing, button your coat snugly, and wear a silk muffler to keep the wind from the throat, and woollen gloves, or, better, mittens. A man riding a bicycle in an overcoat is not only an absurd figure, but, which is more important, he carries unnecessary weight and a sail to catch the wind.

You will find it interesting to keep a record of trips for the season. You may carry a note-book for the purpose, setting down

the distances travelled as accurately as possible, or, if you want an absolutely correct record of miles run, use a cyclometer, — getting none, however, but the best.

Do not leave your wheel alone where it will be exposed to the depredations of thieves, small boys looking to steal a ride, or malicious tire-puncturers. The use of a chain and padlock will at least compel a bicycle thief to carry the machine away bodily, if at all.

Ladies' Cycling Dress.

In the matter of a suitable dress for ladies upon the bicycle, there will always be a gentle conflict between the subjects of conventionality, on the one hand, and the advocates of positive comfort, on the other. Fashion, not the absolute beauty or fitness of things, prescribes the gowns of the day; and it has so thoroughly taught us its lesson that what is not in fashion seems positively ugly, and we believe that whatever is, is right.

But, with all masculine diffidence, the writer ventures to sketch the outline of a

costume for the wheel, which he believes would answer all purposes of neatness, utility, and comfort. Very full "Zouave" trousers, made with an elastic band to be turned under just above the knee; (the trousers when worn to fall just below the knee;) long leggins to meet the trousers; loose fitting blouse waist with wide collar, to be worn under a Zouave jacket, which may on occasion be removed and strapped to the handle-bar; round cap with deep visor; — all these from a soft texture of woollen cloth of uniform color; — and a russet leather belt and shoes. In warm weather, duck leggins and a white duck cap might be worn.

It will be said that this is a sketch of an Amazonian rider; but the answer is that only as an Amazon will the wheelwoman get the most of health and pleasure out of cycling. To ride at all, she must sit the saddle "like a man." Why should she not mount her wheel like a man, and, like a man, enjoy all possible freedom of movement? Then she might discard the heavy "loop-frame" bicycle, with its wheel-guards and dress-guards; and it is pleasant to know

that one manufacturer, at least, for the season of 1895, will build a light wheel for ladies on the exact lines of the men's model. When such a wheel comes into general use, these lines by a cycling poet will become present truth, and not merely melodious prophecy: —

"In older times the woman rode
As fitted one of subject mind:
Her lord and master sat before,
She on a pillion sat behind.

"But now upon her flying wheel
She holds her independent way,
And when she rides a race with man,
'T is even chance she wins the day."[1]

It is certain that women on the wheel will generally wear either absolute trousers or absolute skirts, for the "divided skirt" appears already to be relegated to the limbo of ugly absurdities; and it is not easy to believe that the hybrid monstrosity in costume figured in certain fashion-plates, that is, the combination of loose trousers and a tightly corseted waist and balloon sleeves, will find favor.

[1] A. L. Anderson.

In spite of the reasons of utility and comfort that make against it, the majority of wheelwomen will probably, for the present, continue to wear the ordinary skirt, making it as little obtrusive and troublesome as possible.

By so much as you will abbreviate the length of your skirt will you increase your own comfort and safety on the wheel. An experienced teacher of cycling, replying to inquiries by the writer, says: —

"In my experience, I have found that it is much easier for a woman to learn to mount a bicycle when arrayed in 'unconventional' costume. . . . The fewer under-skirts the better, especially when one is learning to mount the wheel, and the outer skirt should be of light weight material, made perfectly plain and without facing. The skirt should be made to reach a little above the ankles." [1]

As to the details of the ordinary dress, a lady writes: —

[1] Mr. L. B. Smith, of the Columbia Riding School, Boston, the value of whose criticisms and suggestions, kindly given while this book was in press, the writer gratefully acknowledges.

"The rider's comfort depends on what she wears under the skirt, if the latter be properly lined and shaped, more than on the skirt itself. The skirt should be cut so there is no unnecessary fulness about the hips, and yet unpleasant scantiness should be positively avoided. To begin with, a union under-garment should be worn next the skin, varied in fabric and texture according to the weather. Over this suit should be worn equestrian tights in lieu of underskirts. Corsets should never be worn on the wheel. Well fitting waists should be substituted. 'Equestrian' stockings should be black, and under a smoothly lined skirt, allowing perfect freedom of motion with nothing to entangle in pedals or spokes. Shoes should be low and broad-toed. . . . For the head, a light weight felt tourist's hat is almost universally becoming, but whatever style of hat is worn it should be entirely devoid of flowers or feathers. . . . Jewelry should be left at home. . . . Lisle thread gloves are better than kid or silk. . . . Every garment worn for riding should be kept exclusively for that purpose." [1]

[1] Mary Sargent Hopkins.

Tools and Repair-Kit.

The regular outfit supplied with the wheel usually consists of an air-pump, a small monkey-wrench, a screw-driver, an oiler, and, when the machine requires it, an instrument for adjusting bearings. There are also included, when a separate repair outfit is not furnished, a tube of rubber solution and rubber tape for making temporary road repairs. In addition to these things, you will do well to keep at hand a larger screw-driver and a machinist's monkey-wrench, a tin or, better, sticks of graphite, a can of lubricating oil, which is best bought of a responsible dealer in bicycle supplies, and enamel lacquer. Suitable brushes with which to apply lacquer and dry graphite are necessary. Spanners which fit the principal nuts on the machine, and especially the spoke-nipples, are useful; some outfits include a special instrument for turning the spoke-nipples. You will want an abundance of kerosene oil for cleaning; also two or three chamois skins, sponges, soft dusters, preferably of old woollen or silk, and plenty of

woollen rags. Clean cotton waste is useful. Add to your equipment some whiting with which to remove rust. Keep a tin vessel in which to soak out your chain, and two small squirt-cans, one for kerosene and the other for lubricating oil. If your machine has a wood rim, some shellac finish may be useful. A sling, with hooks, with which you may hang up your wheel, is indispensable, and you will want a ball of strong fine hemp twine, and a wooden pail or bucket for water.

Keep your outfit together, and always in order, so that you can get at anything you need in an emergency, and save yourself delay and vexation.

Experience will teach you what tools you are likely to want on the road. With a single-tube tire, on a short run, the necessary things would seem to be the small wrench and screw-driver, the air-pump, the rubber tape and solution, and twine; but you may wheel for weeks without having occasion to open your tool-bag. For a long run, particularly if it is to be over country roads, take with you the small oiler. Pack the tool-bag carefully,

using a woollen wrapper for the tools, if necessary, so that these may not rattle, nor the tube of solution break and make a mess. Turn out and examine the contents of the tool-bag occasionally, as the steel tools, if left lying in the bag, are apt to rust.

VI.

CYCLING AND HEALTH.

"*Though near the top of life's long hill,*
And ready for its slow decline,
I feel again my pulses thrill,
And drink again youth's nerving wine."

"Beth Day."

"*I care not for riches or greatness,*
I bid dull care depart,
And laugh at dyspeptic sedateness,
As I spin through the air like a dart."

Lenox B. Smith.

VI.

It has been wisely said by President Eliot that "the athletic sports and exercises which commend themselves . . . are those which can be used moderately and steadily, and which remain available . . . in mature life. Such are gymnasium exercises, walking, running, rowing, sailing, riding, cycling, tennis, gunning, bowling, and fencing. The youthful expert in any of these sports . . . will carry into his strenuous professional life a great source of enjoyment and a real safeguard of health and of the invaluable capacity to endure without injury mental

and moral stress. On the other hand, the games which demand so much practice and such severe training that the brain is temporarily dulled for all other use, or which require a combination of many individuals of like powers and tastes, or which contain as essential elements violent personal encounters, can have no direct application to the after life of professional or business men. Moreover, all games which require intense training for short periods present a serious physical and moral danger for the players, — the familiar danger of reaction when training stops."

The writer believes that of the list of sports which President Eliot mentions, considering these as aids to health and clear-thinking, cycling easily leads, and is likely to lead, until some sport shall be invented which shall bring with it an equal pleasure for the same modicum of exertion in its practice. The sport is to be differentiated from the others named, in that, first, it is the most independent of sports except walking or running, and, secondly, that the amount of exertion applied to its exer-

cise may always be regulated by the strength or taste of the individual, and this without making the sport irksome. Gymnasium exercises are available to comparatively few persons, and to most soon grow insufferably tedious when undertaken as a duty. Tennis and bowling both require a special equipment for the practice of them, and companions to join the sport, and the minimum of physical exertion which each calls for is beyond the strength of many fairly healthy, but delicate constitutions. Running is for most men past their youth an absolutely dangerous sport, and one which few women at any time of life can safely practise. Most persons find walking for a length of time, especially solitary walking, extremely wearisome. Gunning, in the absence of game, is merely walking with the handicap of a gun. To fence, you must find an adversary of about your own degree of skill to make the sport enjoyable. Rowing requires water and a boat, and sailing a wind as well, which may treacherously abandon you or set its face against your plans. But the cycler, with his wheel under him and

mother earth under his wheel, is absolutely independent of circumstances, and may set out alone or in company, with the world before him where to choose.

Speaking of cycling as a supplement, in later years, to the athletic sports practised in the colleges, Surgeon Culp of the United States Army says: "Twenty times as many men as formerly devote more or less time to athletics while at college. These, after developing cardiac, pulmonary, and muscular systems to the highest point, but too often, on the completion of their college life, settle down to a sedentary existence absolutely without any form of active athletic exercise. As a result of years of experience among this class, I am perfectly convinced that sooner or later they lose not only their physical strength, but health and vigor as well. To such persons the modern bicycle becomes much more than a delightful mode of recreation, and the lawyer, doctor, merchant, or preacher finds that his short daily ride enables him to do better mental work, both as regards quality and quantity, than before. Perhaps of even more impor-

tance is the fact that consumption, Bright's disease, and gout are almost unknown among wheelmen, and it has seemed to me that college athletes are particularly prone to the two former as they approach middle age."

Cycling, like rowing, sailing, foot-ball, base-ball, riding, and tennis, is not now, in the Northern climate, available to any extent as a winter sport; but it is altogether likely that, with the organization of cycling clubs in the larger cities, and perhaps in the principal colleges, covered tracks will be provided for winter riding, so that the sport as a means of exercise may be practised in the winter to a much greater extent than at present. The writer looks forward hopefully to a time when the gymnastic training in the principal colleges shall include a course of bicycle instruction, and when the apparatus of the gymnasium shall not be considered complete unless it include a sufficient store of bicycles which may be loaned or rented to all undergraduate comers.

Dr. C. B. Mëding, a New York physician, says: "Ride a bicycle for one half-mile,

notice the refreshed feeling, the quiver of gentle tension, the enthusiasm of vigor; now try to recall your thoughts during the half-mile. Am I not right when I say that every care and weight has been lifted?" It has already been said that the positive tonic effect of this exercise upon mind and body both is marvellous. Just before these lines were written, a lady said to the writer: "The bicycle has been the greatest of blessings to my husband. He has always seemed fairly well, but always nervous, and at times afflicted with the worst attacks of 'the blues.' These never visit him now in the wheeling season, and I shall welcome for his sake the opening spring and settled roads." Perhaps the exhilarating effect of wheeling may be a little like that produced temporarily upon a well-balanced organization, unaccustomed to the use of wines, by taking a glass of champagne, with the difference that the effects of the wheel exercise are natural and those of the wine artificial, and that the stimulus produced by the wine must be followed by an intenser reaction. As regards cycling, "the cause of

this effect," the writer believes, is not far to seek. If one inhales a whiff of "laughing gas," that is atmospheric air a little overcharged with oxygen, he experiences a momentary exhilaration, not unlike, while it lasts, the exhilaration produced by riding. On the wheel, riding in the pure air, if the rider sits his saddle as he should, and breathes deeply, as he should, the lungs are constantly well filled and emptied; and at the same time a rapid circulation of the blood is induced by the steady muscular motion. The body and brain-cells respond at once to this quickened and perfected oxygenization of the blood, with the result of a renewed tone and vigor, both of mind and body.

It may be said, and it is true, that a similar effect is produced, for instance, by rowing; but there is this difference, that rowing is of necessity a violent exercise, which cannot without special training be kept up for any great length of time, whereas on your wheel you may ride from the sunrise to the sunset of a summer's day, with very moderate periods of rest, taking draughts

of renewed health and happiness with each push of your pedals.

Says Dr. Mëding: "Look at that man or woman applying to your immense knowledge for health. Born healthy! Bred healthfully, yet pale, dispirited, headachy, constipated, without appetite, sound sleep, and ambition. Try your iron, oxygen, arsenic, and quinine, your bolus or your fiftieth dilution of a milligram. Bah! As well give them to the struggling rose-bush in your parched back garden. Air is what they need, — air in the lungs, — enough to oxygenate, to store up, and then still more to increase the residual capacity. . . . Prescribe walking? Such men and women don't walk, they meander. . . . Is it generally known that flabby muscles are the enemy of beauty? Is it generally accepted that fresh air will sweeten temper? . . . These are gospel truths. Hippocrates cried centuries ago for less medicine and more nature. We want less of the bark, resin, and extract of the tree, more of its rich beauty. The bright flowers and living green of meadow plants I sometimes think would do more good than

the teas made of their remains. Do I exaggerate? If I tell you many aches, real ones, many pains, sharp ones, many unnamed, unclassified, but real complaints are to be cured by riding a bicycle, will you deride? Not yet, I fancy, have extolling exclamations for some recent coal-tar derivatives died out; you did not know even their formula; you used them. I suggest a sure adjunct to rapid cure, based on daily experience which you can obtain for yourself, and I give you the formula, — a good bicycle and common sense. Can you ignore it?"

Cycling, then, is not only the most available of sports, but, as regards its effects upon the physical well-being, the best and safest, because even a very moderate practice of it brings, to most temperaments at least, a pleasure equal to that which the most violent exertion gives. Thus you will find that many strong and accomplished riders prefer for pleasure riding a gait of from six to eight miles per hour. As has already been said, one's riding rate will, other things being equal, depend very much on his temperament, and it will be always the nervous,

enthusiastic rider who will be in danger of overdoing.

For cycling, like every other athletic exercise, may be rankly abused. For instance, a rider has set for himself a forty-mile run over hilly roads, a trip which he is easily able to make under favorable conditions. Two or three miles out the wind shifts and blows lustily in his face from the northeast, bringing with it cold and heavy rain. He determines not to be stopped by a "little thing like that," and pushes on over roads growing heavier with every mile. He gets wet through and chilled to the bone, he and his machine are covered with mud-splashes, and the wheel begins to run hard as the bearings fill with dirt and water. He has to dismount and drag his bicycle up hills that have never troubled him before. At length, he reaches his journey's end, ravenously hungry, perhaps, but not in condition to eat heartily. He will be pretty sure to catch a bad cold, or a rheumatism, or an indigestion; and will be lucky if he has not laid the foundation of some grave functional disorder.

Again, there is not anywhere a more foolish person than the amateur racer, who without any real chance of making a distinguished record, and without either the strength, skill, or training of the kings of the track, exhausts himself in inglorious contests never to be heard of out of a little circle of equally foolish boys. Remember too, that, as soon as you begin to make cycling a business, you make a toil of a pleasure and the best of the sport is gone, and, which is worse, you may make that an absolute harm which in its judicious practice is the best and safest of outdoor amusements.

Speaking of the possible abuses of cycling, it is said: —

"There are objections. What are they? The same that are justly urged against extravagance. The same objections that can be brought against every article of food or drink, . . . namely, against the abuser, not the thing abused. Drunkards, gluttons, and inveterates, are they legitimate arguments against anything but themselves?

"To see a rider bent into a tipsy W, flying

and panting on a wheel, to hear of some clogged heart that for twenty years has objected to curbstones, having stopped after a bicycle ride, to hear of the broken heads of rash coasters, the hoarse voices of relay riders, these are not objections. As well does the victim of the morphine habit prove opium a curse."

The writer has spoken of a road rate of from ten to twelve miles per hour as one easily to be attained by the average wheelman on good roads, such as for instance are to be found in the radius of twenty miles from Boston. But the capacity of making this rate with comfort and safety depends upon the condition of the rider, or rather upon his constitution. If his lungs are sound and strong, he may make and keep such a rate, feeling pretty sure that he can maintain it until his legs get tired, which they will not do for several hours if the rider takes five minutes every hour for rest. If you have weak lungs, you should not ride at such a pace as to get winded or attempt hard hills. If you ride perseveringly, stopping whenever you get out of breath, and not

taking the saddle again until you are fully recovered, you will find at the end of each week that your endurance and lung capacity have sensibly increased.

If moderate exercise on the wheel develops a palpitation or pain about the heart, stop at once, and do not mount your wheel except under the advice and direction of your physician. It may be that the exercise in a moderate degree will cure you, or it may be that you must abandon it altogether, but you should not be your own judge in the matter.

If you have no functional disorder, you may from the beginning safely put into your work on the bicycle all the merely muscular exertion of which you are capable. The fatigue, or slight lameness, which hard work may at first induce, will do you no harm, and will be amply compensated by the tonic effect of the sport on all the bodily functions. If you sit your saddle rightly, that is, in an erect position, you cannot help breathing freely and deeply, and at the same time the rapid action of the leg muscles will induce a quick and full circulation of the blood

throughout the system. You are getting pure air and exercise as active as you choose to make it, and the result will be a clear head, a sound digestion, and an absolute quietude of your obtrusive "nerves."

As compared with walking, cycling requires an increased action of the knee and ankle joints, and, in addition to the exercise of the muscles used in walking or running, it employs another set of muscles for the "push" movement which ordinarily have been but slightly developed. It is therefore in the knee, the ankle, and in the pushing muscles, that the beginner is most likely to feel fatigue, and it may require several weeks of practice to bring him into such condition that he can endure a fifty-mile run without some slight lameness of these parts following. So, during the off season, you will lose something of what you have gained in strength in the muscles which are resting, unless you are within reach of a riding-school and practise there for an hour or two each week.

The beneficial effect of cycling to cure incipient rheumatism, or weakness of the knees

or ankles, is positive and wonderful. If you are afflicted with these ills, or either of them, and are able to ride without actual discomfort, even for the shortest period of time, try the wheel, and ride perseveringly. If you can keep the saddle at first but five minutes, you may be sure that in a week or two your endurance will be doubled, and that probably in a month your strong new legs will laugh at the weak members which they have displaced.

In a newspaper anecdote, the lean lady is made to say to the stout one, "How delightful that you have a bicycle too! I go every morning because doctor says I shall certainly grow stouter." To which the stout lady replies, "Perfectly lovely! We 'll go together. I go because the doctor tells me that it will decrease my weight." The contradiction is not so absurd as it seems, for the lean dyspeptic, for example, as the exercise gradually strengthens his digestion, will find his flesh and weight increasing, while the fat and hitherto lazy man will certainly reduce himself to a comfortable leanness in the course of a season's persistent riding.

Cyclers in their first season, who are just beginning to take long rides, may find the following suggestions of use.

When at work on the wheel, keep your lungs always well inflated, breathing through the nostrils and keeping the mouth closed. Keep the chin up, the shoulders well braced back, and, although you may have sometimes to lean forward in the saddle, never stoop at the shoulders. Do not acquire the bad habit of riding with the hands close to the steering-post of the machine; this position contracts the shoulders and so lessens the lung capacity, as does also the use of a very short handle-bar. For a man of ordinary size, a bar measuring twenty-four inches in a straight line from tip to tip is not too long.

Do not ride with a saddle that persistently hurts you. The difficulty may disappear after a short rest; if not, a slight change in the saddle adjustment may relieve it. If your saddle constantly troubles you, discard it and try another pattern; if you find nothing but the old-fashioned hammock saddle comfortable, use that in spite of its weight.

Do not ride fasting. If you go out for an early morning run, take a glass of milk, or a cup of black coffee, and a roll, before starting. You may ride ten or fifteen miles upon this, and return with a marvellous appetite for a more substantial breakfast.

If you can take but a short rest at dinner time on a long run, do not eat a heavy meal. A lunch of eggs or raw oysters, or both, with milk or black coffee, will keep you in good shape for road work, and you will avoid the danger of the indigestion which a heavy dinner without a rest after it may induce.

It is much better to rest for an hour after dinner than to resume riding at once, especially if you have eaten heartily, but a longer rest than this is not necessary. If you are obliged to ride immediately after a meal, ride moderately at first.

As to drinking water on the road, the same rule is to be observed as in mountain climbing, horseback riding, or any other athletic exercise; that is, if you perspire freely, you may drink as freely as you choose, so long

as you do not drink ice-water, or other extremely cold drink. But if you do not perspire, you must drink with the greatest moderation. The use of alcoholic liquors while actually engaged in riding, or any other active exercise, is to be strictly avoided. It not only utterly upsets the balance, so to speak, of the physical system, but it has the immediate effect of inducing a shortness of breath, and so disabling the rider. Ginger ale is an excellent and most refreshing drink for a long run on a hot day; and this may be taken rather freely by persons who are obliged to drink very sparingly of water.

An excellent thing to carry in the pocket on a hard ride is a stick or two of chocolate, sweet or not as you prefer, done up in tinfoil, as it is sold in the shops. This, with a hard biscuit or two, will make on a pinch a very satisfactory lunch.

You may smoke, if you will, on easy ground, and will not find that it intereferes with your riding, that is, if your lungs are strong, and the exercise does not "wind" you. But if you have a hard hill to climb,

throw away your cigar. Your lungs are to be taxed, and in cycling, as in mountain climbing or rowing, good sound breathing and smoking are incompatible.

Avoid, so far as you can, getting heated on the road in cool weather. To this end, wear the minimum of clothing while actually in the saddle. Down to the end of October, you will find that, generally, the best place for your coat is the handle-bar. If you are warm on dismounting, lose no time in unstrapping your coat and putting it on. No matter how cool the weather, you run little risk of catching cold while actually riding, the only real danger being in the exposure of the throat to the wind, which will strike keenly if you ride even at a moderate gait. So you should never leave home without a silk or wool muffler for the throat. Wearing this, you may be sure that the rest of your body will take care of itself, that is, if you are in good condition.

If you are warm on getting in from a run, lose no time in making a complete change of clothing, taking, if possible, a rapid sponge

bath and a hard rub with a coarse bath towel. Thus you will avoid a possible cold. If you are to take a long run, carry with you, no matter what else you leave behind, a change of underclothing, and do not neglect to change at once when you come to a long halt.

The stiffness of the muscles and knee joints which sometimes follows a long run will generally yield to a warm bath and a vigorous rubbing with a coarse towel, which may be wet with a dilution of bay rum. Some professional riders use freely a liniment made up of equal parts of alcohol and hamamelis.

In conclusion. Give all your leisure, for one summer, to the wheel. Ride wisely and moderately; and you will understand, perhaps for the first time in your mature life, the significance of the expression, "a sound mind in a sound body." Dreamless sleep, unobtrusive digestion, clear mental action, wholesome thoughts, and the relish for healthy pleasures, — all these will be yours in full measure, and you will see that "a

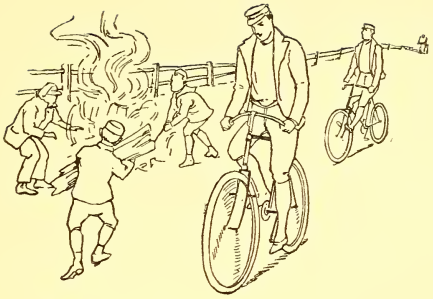
new era, not merely of physical vigor, but also of mental and moral health, has been inaugurated by this light, swift, joy-giving, marvellous means of locomotion."

VII.

ON THE ROAD.

" When all the world was free,
And naught of care had we,
Each grassy blade, each forest shade,
Each winding stream, we thought was made
For our long jubilee."

J. Andrews Cone.



VII.

CYCLING gratifies the love of adventure which is latent in everybody. You may make a little journey into the world on your wheel, and, although you travel but a hundred miles from your home, you will be surprised to find how much of interest and amusement you meet along new roads, and among fresh faces and unfamiliar landscapes.

Get a good road-map of the country for forty miles around your home; study routes and distances with its help; learn where

the comfortable country inns are; plan for each long ride a route in advance, and do the whole region thoroughly. After a month's or two months' practice, you will be able easily to take a twenty or twenty-five mile route out before dinner, dine and rest, and run home easily in the afternoon; or you may plan a hundred-mile trip out and home, resting over night at your fifty-mile objective point.

You may be happy enough to have secured a week's or a fortnight's outing, and wise enough to devote it to the companionship of your wheel. In this case, you will make deliberate preparations for a long trip. You will arrange an itinerary, or select one from the League "Road-Book," showing routes and stopping places for each day's run, and make your map a part of your equipment.

The wheelman, at least in the east, will find many road-maps in the market, some good and some nearly worthless. For all-round use in the country regions of Massachusetts, the writer prefers the plates of the standard Massachusetts Atlas, published by

George H. Walker & Co., of Boston. These twenty-seven in number, and covering the entire State, are sold separately folded in stiff covers, and can easily be carried in the pocket. The scale is an inch to the mile: the roads are very accurately laid down, and the character of them as being good or bad, fairly well indicated. Contour lines in color indicate heights above the sea level. Railway crossings at grade, or over or under grade, and churches, school-houses, and cemeteries (which often serve as landmarks in a strange country), are also indicated. By the study of these maps, the rider may form a reasonably good notion, in advance, of the character of a proposed new route.

If you wish to keep in touch with the bicycling world, besides enjoying the substantial advantages which attach to a membership in the way of special rates at many hotels, and the use of its excellent Road-Books, you will probably join the League of American Wheelmen.

The League was formed at Newport, Rhode Island, May 31, 1880. It grew out

of suggestions made by Charles E. Pratt, of Boston, who was its first President. The objects of it, as set forth in its original constitution, and which have been substantially adhered to since, were "to promote the general interests of bicycling, to ascertain, defend, and protect the rights of wheelmen, and to encourage and facilitate touring." It is largely owing to the efforts of the League and its officers that the legal rights of cyclers upon the road have been ascertained, and clearly defined; and its efforts directed to the improvement of the public highways of the country deserve grateful recognition by all good citizens, whether cyclers or not. The official organ of the association is the "L. A. W. Bulletin," and in January, 1892, it commenced the publication of the well known magazine, "Good Roads." [1]

The Road-Books published by the League, and not easily to be obtained except by its members, are the result of infinite patient disinterested effort on the part of wheelmen and the officers of the League in charge of

[1] The "Bulletin" and "Good Roads" are now, April, 1895, consolidated.

the work. The books give in detail distances, character and grades of roads, landmarks and stopping places along a great number of the principal highways in the different States in which they are severally issued, and include maps giving the general course and direction of the roads. The seventh and latest edition of the Massachusetts Road-Book was issued in 1894.

Your outfit, if small, you may take with you in a "luggage carrier," or in a valise made to fit within the frame of your bicycle, or you may reduce your *impedimenta* to what may be strapped to the handle-bar, sending on other baggage from point to point by express.

If you start for a long trip, make up your mind not to be annoyed by trivial things, nor to fret if your plans are deranged by bad weather or unforeseen happenings. A rainy day in a country inn may indeed be dull, but this like everything else will pass, and you will only add to your own discomfort and that of others, by taking it hardly. Above all, do not get obstinately bent on

pushing on through wet and wind. If you are a good wheelman, you should be also an every-day philosopher, and, as such, superior to all petty vexations. If you will take things as they come, and refrain from fidgeting and worrying, you will find your week on a bicycle a bright spot in your remembrance as long as you live, and when your faithful wheel brings you back to your own door, you will dismount from it feeling yourself a giant refreshed.

The diligent cycler becomes, perforce, a keen student of topography. In the course of a season on the wheel, you will become intimately acquainted with every road within a reach of twenty miles from your home. You will know the hard hills and the easy ones; the troublesome ruts in one road, the smooth hard-beaten footpaths that border another for miles; the sandy roads that are impassable in dry weather, but which a summer thunder-shower beats hard for you; and the wet woodland byways that only weeks of sunshine will make tolerable. You note the changes which the hurrying

season brings, — the maple sapling, prematurely scarlet, in the marsh, the ripening of the hops upon the farmer's vine, and the purpling of the wild grapes in some thicket of which in July you discovered the secret. In the season you scent the laden hay-rigging by the fragrant wisps that it drops behind it along the road, long before you hear the creaking of its laboring wheels. The Indian corn you watch from its youth of silky greenness to the day of its solid golden maturity; and you anticipate the coming time when the surly green apples overhanging the road shall soften to a mellow crimson.

But the pleasures of cycling are not to be obtained only from long runs and country rides. You may choose for your riding the suburban parks and "boulevards," which, on a summer afternoon, you will find dotted all over with the swift-gliding wheels of others, like yourself on health and pleasure bent. For the beauty of wild landscapes, — the hill pastures, the thick woods, and the tangle of golden-rod and asters by the road-

sides, — you enjoy now the more conventional charm of well kept lawns and flower gardens; and instead of farmhouses and country school-houses, you spin by Queen Anne cottages and shingle-sided villas; — all these scattered along roads over which your machine almost moves itself, so that nothing diverts your attention from the beauty in nature and art which surrounds you, or from the living beauty which meets you on the way.

The city wheelman has offered him for exploration miles of park and suburban beauty. The wonderful zone of gardens, hills, and villages that surrounds Boston; the noble asphalted streets and avenues of Washington; Riverside, and Central Park, Druid Hill and Fairmount; and the magnificent chain of boulevards and parks that girdles Chicago; — any of these furnish room for a season's cycling.

On a bright June Saturday, as you sit at your desk, despatching with unwonted celerity the business of the day, you will bless the beneficent and growing custom which is making a half-holiday on the

seventh day of the week, until at length you are ready to close safe-door and "roll-top," with a clang and a slam, and hasten to where your patient wheel, shining and well oiled over night, is waiting for you. You grudge the accustomed delay of the steam or electric line that takes you home, and, once there, you lose no time in discarding the starched garments of conventionality and slipping into your loose-fitting knickerbockers and flannels. You vault into the saddle and give your first push to the pedals, and the cares that have infested the week are forgotten and for an afternoon you are a boy again, as you join the crowd on the suburban roads, or in the driveways of the neighboring park, or run a half-score of miles to some unexplored village, or perhaps spin over the long stretch of a hard sea-beach within easy reach of the city.

Not all the enjoyments of a healthy sport are to be found in its present exercise, but

the pleasures of it are also in memory and anticipation. To the wheelman who loves Nature, — who keeps his eyes open to the pictures that she paints for him, his ears alive to the symphonies of the winds and the brooks, the songs of the birds, and the whisperings of the sea, — who appreciates the humors and whimsicalities of every-day life and makes even a superficial study of them as they pass before him in the panorama which he watches from the saddle, — the adventures and happenings of a season on the wheel may, in the retrospect, enliven many a dull day or winter evening.

You may, if you crave the satisfaction of benefiting others while you are amusing yourself, select some good route not yet described in your Road-Books, and set yourself the task of thoroughly exploring and noting it, at the end of the season making up your notes into the form of the League routes, and sending the result to the proper quarter.

If you are a photographer, you may make your camera a part of your bicycle outfit, and it will preserve for your future enjoy-

ment hundreds of souvenirs of men and things.

If, better still, you are an artist, even if your capacity is limited to making a tolerable sketch in water color or black and white, you may carry along your sketching materials, sure of abundant opportunity for using them. If you can make clever sketches, truthful or whimsical, of the persons you meet, so much the better.

If you can do none of these things, you can at least write, and you will find a book of notes of your season's runs, not only interesting as recalling the memories of pleasant days, but full of bits of useful knowledge for the wheelman and local topographer.

Note each run of any consequence that you make; the distance of it by the cyclometer, if you use one, — if not as nearly as you can by the map and scale; and the time made from point to point. Note the weather, the character and condition of the roads over which you travel. Mention the odd things

and queer people whom you meet, the acquaintances you make, the inns at which you stop and what they serve you for dinner. Do not say, "This or that is trivial, it would be childish to note it." You are not at work, but at play, and to the child at play nothing is childish. It is the best of this noble sport that, to the busy man, it brings back, while his wheels whirl, his lost youth; and if you are to be young, you may as well begin as near the beginning as possible.

You may come home with your pockets ballasted with geological specimens, or with your machine loaded with bunches of golden-rod and swamp pink; if you have any special interest that connects you with the world of outward nature, you will find something to interest you. You may if you like take out with you a book to read; but you probably will not read it. If you can be content to lie under a tree and take the world at second hand from the pages of a book, while your wheel waits impatiently at your feet begging you to ride it, and all

the world of reality lies before you to explore, you are at least an oddity.

Some good friend will tell you that wheeling is a selfish solitary sport; another, that it can only be practised with pleasure in good company. You will bear these slanders with equanimity, well knowing that neither is true. Cycling is certainly the most independent of sports. There are times when you want no companion but your silent wheel, and then it will not fail you. A solitude in which you cannot brood or fret may be just what appeals to you after a week of wrangling in the courts, or chaffering in the market, or with the prospect before you of facing a sea of faces, dull or attentive, in a pulpit on the morrow. At such a time you will turn from the haunts of men to wheel over miles of country road, through the woods perhaps, or along the autumn sea-shore, with the wheel and cheerful thoughts for your only companions. Again you will want company, considering that a pleasure shared with another is a pleasure doubled; and then your cycle runs

alongside that of some friend of like disposition, and you both talk faster than you ever talked before. Or you may be disposed to join a merry company of cyclers, and, contented to set your pace to that of the weakest wheel, go out for a day's prescribed run. Thus it is the prime advantage of the sport that it suits almost any mood of mind in which you can approach it.

But the twilight draws on, and it is time to turn the cycle and to push soberly towards home. And so to the fellow wheelmen and wheelwomen who have made the afternoon's run in his company, and who he hopes have enjoyed it half as well as he has, the writer, wishing to each and every one of them "more power to his wheel," rings a farewell salute upon his bell and says good-by.

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