

HOW WHEELS ARE MADE

THE PROCESS IS AN ELABORATE AND COSTLY ONE.

Many bicycle factories have sprung into existence in the last few years. The plant a large one—why prices have not declined to any extent.

There are several hundreds of thousands of bicycle riders in this country, and a majority of them have each paid something close to \$100 for his or her wheel, but not one in a thousand of them knows anything about the making of the wheel or the why and wherefore of its costing so much.

Just how the bicycle is made is a mighty interesting question if the process can be seen in one of the large factories, where great care is taken to turn out only absolutely perfect machines.

There are 126 good-sized wheel manufacturers in this country today, and at all the small concerns are considered 300 would about cover the total number. The total number of wheels turned out during 1895 would amount to 500,000. At an average cost of \$76 to the buyer, this means \$37,500,000; figures which show that the bicycle craze is a very substantial thing viewed in a monetary light. Of course this does not cover the total expenditure of the nation in bicycling. There are many more little articles like lamps, repair tools, costumes and other accessories which would swell the total to \$50,000,000.

Besides making millions of the manufacturers, this sum supports an industry which gives employment to thousands of breadwinners. The manufacturers are inclined to claim, however, that there is no great money in the making of wheels, and a tour of their shops combined with their arguments will almost make the novice believe that they are telling the truth. Still the fact that the number of factories is constantly growing, and all seemingly prospering, for the failure of a bicycle concern is rarely heard of, is good proof that there is a mint of money in the business. Where there are 300 factories in the country today, there will probably be 450 at this time next year.

One of the reasons that the prices of wheels have not declined to any extent is the incessant race between the competing concerns to produce the strongest and at the same time the lightest machine. Here are some facts which will better explain the matter: All mechanical products have what is called the safety factor. Thus in the great high-pressure modern guns the safety factor is twenty, or, in other words, the gun is made twenty times stronger than the strain to be put upon it. Ordinarily guns have a safety factor of ten; boilers have six, bridges five and other mechanical products about four. This bicycle of the old style weighed sixty pounds; the high grade machine of today weighs eighteen pounds and the safety factor has been reduced to 1.25.

With the narrow margin, the various parts of the bicycle must be absolutely perfect and capable of standing exactly their proportion of the whole strain. There are 500 parts in the bicycle, counting each spoke separately, and the 150 and odd miniature steel balls in the bearings. The rivets of the chain, the links, nuts and bolts number 138 separate pieces. The old saying of a chain being only as strong as its weakest link holds good in the bicycle. Any little imperfection in any of its parts might cause an accident and do much to hurt the name of the maker.

In one of the factories visited there was a machine which had been made expressly for the purpose of testing the various parts of the bicycle. This machine was kept in constant operation, and was about the hardest-worked thing in the place. As rapidly as the other machines turned out spokes, rims, sprockets, frames, etc., they were brought into the testing room. Each of these parts had to sustain a strain that had been figured out to a nicety. This machine could make a tension or compression of from a few ounces up to 100,000 pounds. When the full power was turned on its great jaws could tear apart a solid bar of steel as easily as a child peels a banana.

Each spoke has to stand so many pounds, the frame must do the same, the rim, the chain, the sprockets, hub, the front fork, pedals, cranks, handle-bar and even the ball bearings must show that they are absolutely right. The coasting ability of a bicycle depends upon the "true" character of the bearings. To show how finely they are measured it will only be necessary to say that in one shop there is a machine which makes all the parts "true" down to one-thousandth of an inch. This is getting bicycling down to a fine point, but the race for precedence among the big makers is fierce, and seemingly out of keeping with the general hilarity of the sport.

The plant of a big concern represents an outlay of \$600,000. Bicycle machinery is a comparatively new thing and it costs a great deal of money. Improved machinery is constantly being invented, and, as soon as its utility is proved, it is introduced in the plant of the big concerns. The old dealers say that the new men have a certain advantage over them because they can begin with the new machinery without tying up a lot of money in machines which the march of improvement has made useless.

Six hundred men is the usual number employed in the large factories. Some of these are now running twenty-two hours out of the twenty-four with two shifts of men, and turning out the parts of 100 bicycles a day. This, of course, is an exceptional case, but it goes to show what a big thing, in a commercial way, the bicycle has grown to be.

It takes thirty skilled mechanics, each

skilled in a different way, to turn out the complete bicycle, aided by the most improved machinery. The big machine shop is divided into a dozen different departments. In one of them spokes are cut out of the bars of steel. In another the steel tubing used in the frame is cut. The making of the rims is still another department in an interesting process. Sheets of steel four feet wide and twenty feet long are run into the cutter, which slices them up with nice accuracy into the required widths and lengths. Another machine curves each strip, and a third bends them into the required shape for attaching the rubber tire. The ends are then grazed together. Castings have gone out of date for the fastening of joints, brazing being the method largely used now. When this has been done, holes are made for the spokes and then the rim passes on to the department where the spokes are adjusted.

The sprocket wheels are first cut in circular form out of sheets of steel, and then piled up in heaps of a dozen each. Another machine handles one of these heaps at a time, and it only takes a few seconds for its sharp teeth to make the notches on which the propelling chain works.

When each part of a machine has been finished it usually passes into the polishing and nickel departments, and from there to the general assembly room. Here they are put together by experienced men, and from this room the completed machine appears. Everything is done with such mathematical accuracy that any of the parts will fit any machine turned out of the same grade and style. The woman's machine is a difficult thing for the maker to produce and keep up to date, for the reason that the improvements are being made at a rapid rate, as the needs of the woman bicyclist are better understood.

Saddles are turned out by the new machines at a terrific pace. One machine cuts the leather into assorted sizes, and these are passed into another machine, and when they come again into sight they are complete. The hub, washers, spoke nipples and all the other small parts are handled separately by skilled men. Outside rubber concerns usually make the rubber tires, but the mechanical parts are fitted in the bicycle shops. There are four mechanical contrivances in each tire, and these are put through the same careful test as the others.

After a visit to a few of these shops it is an easy matter to understand why bicycles are not cheaper than they are. There is a rare chance, however, that they may be cheaper, as a concern has just started with the intention of using seasoned bickory in place of the steel tubes now used in the frame work. This will make a light machine and will bring the price of a first-class bicycle down to \$10, providing, of course, that the scheme is feasible.

POWER IN FLIGHTS OF BIRDS.

Is Exemplified in the Case of Swallows, Humming Birds and Others.

How wonderful and beautiful is the power of flight, and yet from the smallest insect, that is tossed about by the gentle summer breeze to the great golden eagle that is capable of carrying a young lamb to his eyrie all are masters of the art. A large portion of the living animal world has wings and can use them. When watching a swallow's infinite power upon the wing one feels like rephrasing the cry of Richard III., "My kingdom for a horse," to "My kingdom for a pair of wings." Perhaps among our most common birds the swallows are the most graceful and skilful of flight. Before a rain along our country roads the barns and white-bellied swallows are always to be seen cutting the air in graceful curves, now skimming the roads, now rising abruptly to sail over the stone wall, and float out across some neighboring meadow. They love the sea also and wing their way over its surface with marvellous skill.

The chimney-swift surpasses in the power of endurance even the swallows. Uncanny birds they are, far more like bats. Their flight is not graceful as the swallows', but in a way more erratic. They rest only in the chimneys or hollow trees, even gathering the twigs for the construction of their nests while on the wing. Their food also is taken when on flight—in fact the chimney-swift's life is spent in the heavens. "Perpetual motion" must be their motto, for but a few moments out of each twenty-four hours are spent at rest in the chimney's sooty depths. The opposite of the swallow's and the swift's flight, one might say, is that of the kingbird. Jerky, spasmodic, ungraceful, as it is in the extreme, and yet powerful; for the kingbird among crows certainly deserves his name. As all true Tyrannidae he is an expert fly-catcher, and is very dexterous and often absurd in pursuit, tumbling over himself in his hurly to catch some dainty insect.

The monotonous undulations of the goldfinch, each rise and fall in the flight accompanied by the notes which resemble "considerable," give the bird an original if not a pleasing flight, and to me he brings to mind the two extremes of the season—in summer undulating over the sunny meadows and in winter over the snowbound fields. When a robin crosses the sky so one can really see his flight, he is one of the few birds that look as if they really were going somewhere. Direct, even, and steady as the characteristics of the flight when really on the wing with some distant point in view. The erratic and wonderfully rapid flight of the humming birds is marvellous and the human eye can only vaguely follow their winding course; such strength of wing for so tiny a body seems almost incredible. Their migration southward from New England, extends to South America. The phoebe's flight is very like that of the kingbird's, and his tumblings when in pursuit of insects are almost identical, but his long flights do not denote such power, nor, I think, such rapidity. The wonderful feats of the carrier pigeons have become famous and the distance that they cover in a given time is hardly to be believed. Each downbeat of their wings looks as if they were flying in a denser atmosphere than air, so much power is shown. The bit's crazy movements in the evening twilight are absurd, full of plunges, turnings, twistings, rapid flappings and tumbles, and yet they seem

to know where they are going, and most certainly do.

The movements of a hawk or eagle in the upper air are graceful and magnificent. What must the sensation be of sailing about so easily in the heavens? Rising and falling, sailing and gliding—diving down with frightful speed, and yet the whole body is in perfect command. The osprey plunges into the sea and rises with a fish; how keen the eye that directs such swoops!—Boston Transcript.

A Lady Who Was Badly Deceived.

Unfortunately She is Unable to Obtain Redress.

A Warning to Thousands of Others.

When troubles gather thick and fast; when anxiety and alarm prevail in the home; when the faces of friends look sad; when death is even staring the victim in the face, it is cruel and heartless to deceive the helpless one.

Mrs. Charlotte M. Neary, of Port Williams, N. S., will ever remember her trials and tribulations with the vilest class of deceivers; and, had death claimed her, they would have been morally responsible. 'Tis indeed a pity that the law does not reach such cases of deception.

Mrs. Neary, however, has good cause to rejoice, notwithstanding the fact that her life was in peril. While lying helpless in the midst of danger, she found what she had been looking for—a medicine that would bring relief and cure. After her many failures with deceptive pills, preparations and prescriptions, she heard of Paine's Celery Compound; she used it, and is to-day a new woman.

Surely Mrs. Neary's experience is a strong and forcible warning to thousands who are now vainly trying to obtain health and new life from the various common medicines of our day.

Mrs. Neary's testimony regarding the powers and virtues of Paine's Celery Compound is strong and extremely encouraging for all sick and suffering men and women. Mrs. Neary writes as follows:—"I have much pleasure in testifying to the beneficial effects of Paine's Celery Compound. I suffered for about five years with chronic dyspepsia and weakness of the heart. I had tried several different medicines, but all to no purpose. No relief came until I used Paine's Celery Compound, which helped me at once, in fact it saved my life."

"I cannot recommend Paine's Celery Compound too highly, for I believe it to be the very best medicine ever prepared."

WHITE LIES IN SOCIETY.

Worn and Meaningless Phrases Can be so Vitalized as to Charm.

Indulgence in social fibs grows apace into a habit. The conscience of the average person acquiesces these little subtleties of immorality, but the use of them renders social intercourse even more incinerate than it need be. Let a woman pause to think and she will be astonished when she takes to noting how many of these little fiblets she resorts to and without which she would do very well, says the New York Commercial Advertiser. There is that phrase "oh, dear, I'm sure"—could anything be more foolish? Way miss the chance to make a hit by substituting for this idiosyncrasy an apparently sincere and grave "It will give me much pleasure." The phrase has at least the air of meaning something and of being originated for the occasion. There is "Quite well, I thank you," gabbled off in unending responses to an unneeded question. Try saying it as though it meant "Thank you for caring."

Sometimes the unexpected vitalizing of a worn and meaningless phrase on the lips of the one just introduced is what arrests the attention and gives an expression of individuality and sincerity before three sentences have been spoken. Often a serious and sincere reply to a gabbled catch remark will at once set the talk running along lines of interest. Try it! When he says to you, "Pleasant weather we are having," perhaps when it raining, in proof that he wasn't thinking a bit of what he said, you can return gravely, "I like the rain, too," with this air of unflinching and quiet unaffected sincerity. And, behold! the topic of the weather, so threadbare, will be an interesting one inasmuch as it starts you to some sort of argument and exchange of opinions, instead of empty phrases.

The not-at-home fib is one that is difficult to avoid at times. It is often the gentle way of denying one's audience, for the disappointed visitor is left the option of believing circumstances and not your un-

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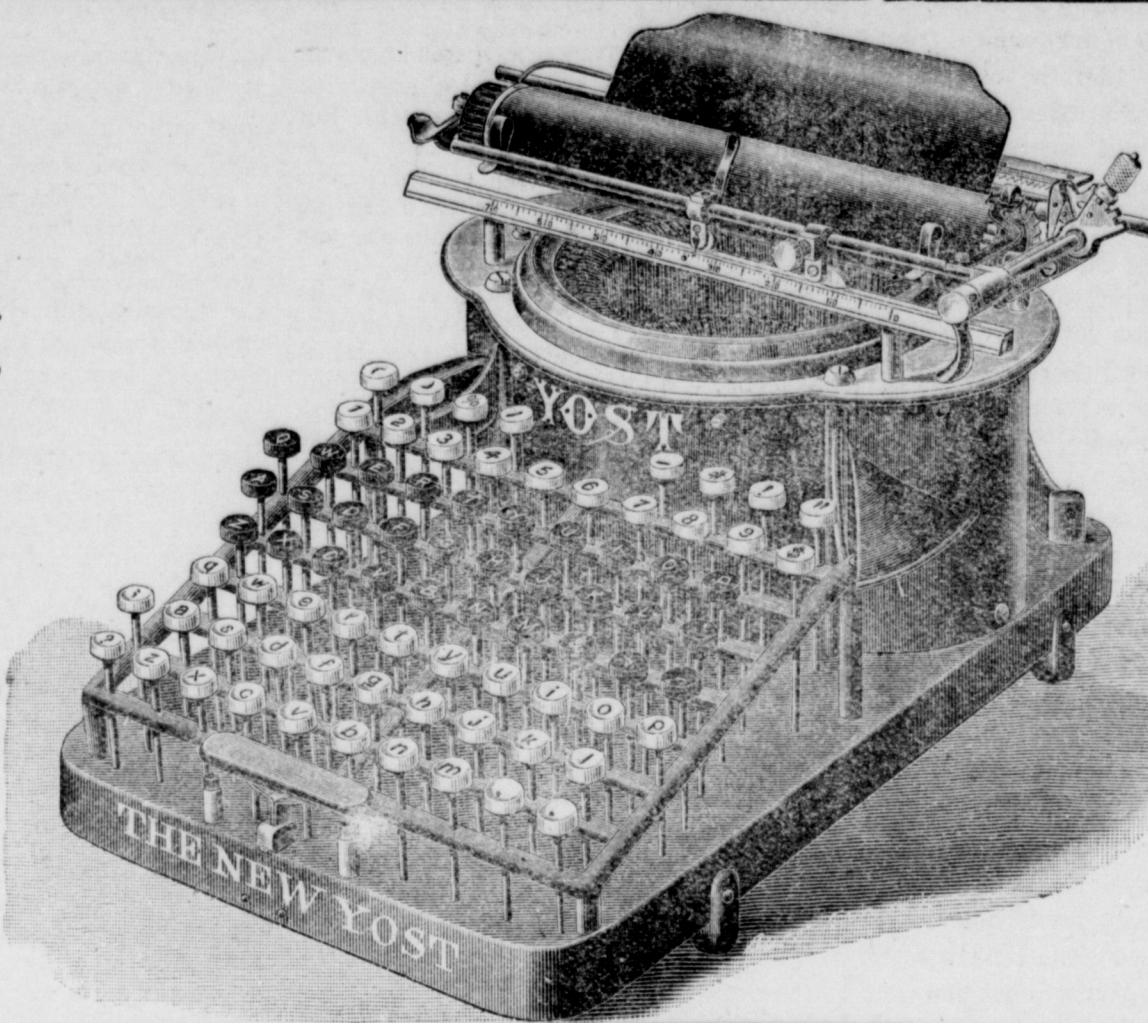
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willingness prevents an interview; but many times a candid excuse sent to a friend would meet the case much better. Let the maid say, "Mrs. S.—is so sorry, but she is ill to see any one to-day, and hopes you will call again soon," or something like that.

"I beg your pardon," is another phrase too really pretty to be spoiled by careless use. Don't fire it off on every occasion, and when you are really sorry about something say so. "I beg your pardon," said with moving sincerity, is absolutely startling, just because of its hackneyed use. She is a wise girl who takes to studying phrases and sets herself to give new life to them in her usage. She will find her social career advanced wonderfully without extraordinary wit or beauty to help.

Wedded in American Style.

The first wedding of Celestials after the American fashion that ever occurred in Chinatown, San Francisco, was celebrated a few days ago. The bride-groom was Fong You, a wealthy merchant, and his bride was Soon Fong. The only oriental feature of the wedding was the costumes of the principals and many of the guests. The bride was gorgeous in broad silk and gold embroidery. The wedding was in the groom's house, and every detail of the ceremony was after the most ultra-fashionable American style.

The Reason why.

Bagley—There goes a man whose hair turned perfectly white in a single month. Tagley—Some great sorrow? Bagley—Nop. He stopped dyeing.

She was too Precious.

She—Have you ever loved another? He—Yes, of course. Did you think I'd practice on a nice girl like you?

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How Foolish You are

to make up costumes with perishable interlining

Fibre Chamois

will not only give the stylish stiffness you desire, but will keep your skirts and sleeves in their original graceful outline the garment is threadbare. It is essential to a bathing gown as the dampness will not injure its stiffness. But don't expect these good qualities in imitations. Find the red label with the name and number on every yard of Genuine Fibre Chamois. No. 10 is the light weight, No. 20 the medium, No. 30 the heavy.

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