

The Progress of New York.

In 1771 the population of the city of New York was a little over 21,000; and in 1786, three years after the close of the revolutionary war, it had 23,614 inhabitants. The several censuses taken during the past 100 years exhibit the marvelously rapid strides which New York has made toward her present imperial position. In 1790, however, the population was little more than it was in 1771; but by 1800 it had risen to 60,515. The remaining censuses are thus given; 1810, 96,373; 1814, 95,518; 1820, 123,706; 1825, 166,086; 1830, 202,589; 1835, 270,089; 1840, 312,710; 1845, 371,223; 1850, 515,547; 1855, 629,906; 1860, 813,669; 1865, 726,384; 1870, 942,292; 1875, 1,041,886; and 1880, 1,206,299. On only two occasions has the enumeration shown a decrease from the figures of the preceding census. The first time was after the war of 1812, and the second after the civil war. The population of New York city has doubled six times within a century—doubling, on an average, once in every 17 years. In other words, the New York of to-day, is 64 times as large as the New York of 100 years ago. The rate of increase in the country at large is insignificant beside that of the metropolis. In 100 years the population of the United States has multiplied itself by 16; but the population of New York has increased at four times that rate. At the rate of increase shown by the last 25 years alone—a rate diminished by the decline of American commerce and the influence of the civil war—there are children now nursing who will behold a New York city containing no less than 10,000,000 inhabitants.

The California Redwoods.

A correspondent of the *Federal Australian* from San Francisco describes the cutting down of some of the great trees on the Pacific shore. He says:

"It is a magnificent yet a painful sight to witness the operations in one of these redwood forests. You stand in the midst of vast trees, so close together that there is a dim religious light around you like that of a cathedral. This delusion is furthered by the apparent regularity with which many of these trees grow. You can look down a long aisle as if it were a groined arch of cathedral roof, and the only thing which undeceives you is, on looking up, far above your head, to see rifts of blue sky between the branches. But you are suddenly startled by a long cry of warning, which follows the rhythmic chopping sound of the axe and the swish of the saw. It is the woodman, and his melancholy cry portends the fall of a mighty tree. There is a long and labored groaning sound; it is the tree breaking away from the friendly base which has held it, perhaps, for ages. Then there is a sharp "crack." The tree has snapped in twain. The mighty mass trembles slightly for a moment, then inclines in the direction toward which the practiced woodmen have designed it to fall. It topples—it falls. There is an awful crash—the falling tree is smiting the branches from a fellow tree which still stands upright, but not for long. There is a sound like a peal of thunder—the tree has struck the ground. The earth trembles for rods around, as if there were an earthquake; there is a cloud of dust, and all is over.

"The redwood is a most valuable kind of timber. It is very slow to burn, and if ignited is easily extinguished. It is very heavy and very dense in fiber, yet very easy to work, splitting with the most perfect accuracy, and yielding to the saw, the chisel, etc., with the utmost ease. When polished it makes a most handsome wood for interior fittings, and many of the finest houses in California are fitted with this wood in its polished state."

The Woodchuck.

A special committee of the New Hampshire Legislature has been amusing the members of the legislature and the readers of its reports by a semi-serious diatribe against the woodchuck; the occasion being a bill to authorize a bounty of fifteen cents on each woodchuck killed.

But really the "woodchuck," or "wood hog," is a terrible pest to farmers in New England and in the northern tiers of counties of our Middle States. It does immense havoc to growing crops, and its devastations seem to require as encouraging legislative enactments for its destruction in the way of bounties as in former years the legislatures offered for wolves' heads or foxes' skins.

The woodchuck is one of the most wary of animals. He is as bad a sneak as the weasel. He makes his ground burrow in a field planted to corn, or to other vegetables, or cultivated to clover. His hole may be found, but long before the beast can be reached he is far away. It is difficult to attempt to drown out a woodchuck by filling his hole with water. Long before the water can be brought the sly woodchuck has made a new home. Indeed, it is a fact that a chased wood-

chuck has made a new burrow almost in sight of his pursuers while they were searching for him.

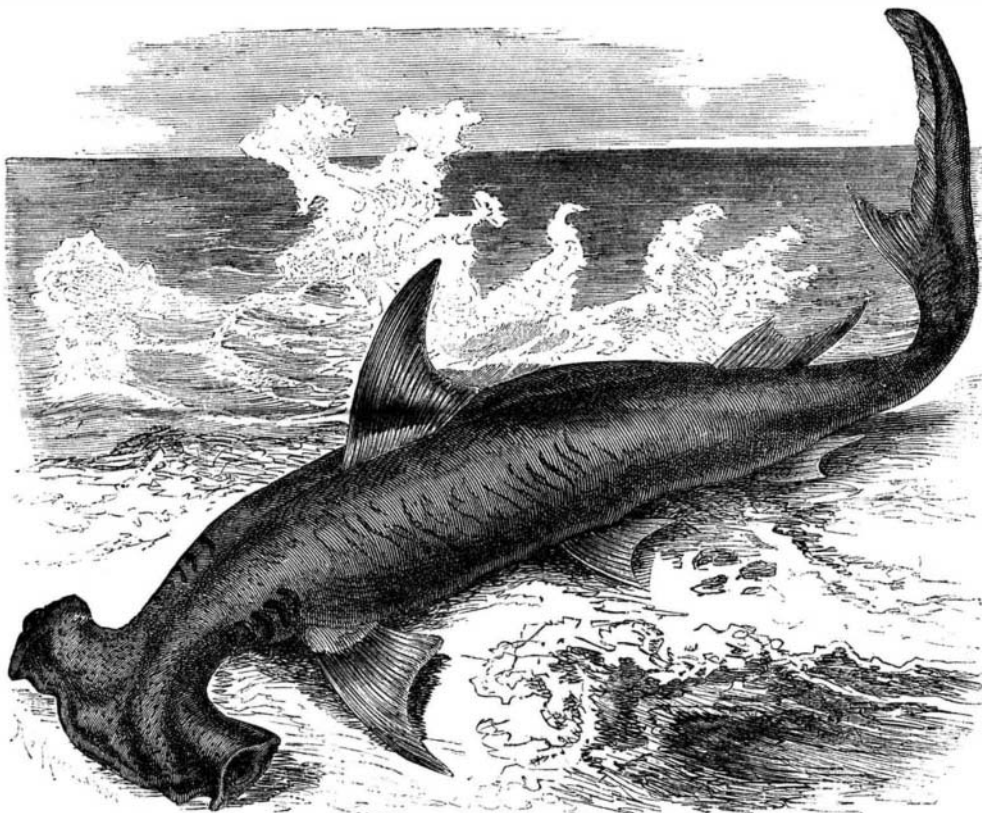
There is nothing succulent and of a salad quality that the woodchuck does not relish; growing beans, lettuce, peas, springing corn, new potatoes, anything that is good for humans is good enough for him. He will make a meal off of clover, or will subsist on ordinary grass.

But all his life he knows that he is a sneak thief. He does not come out and rob like his betters of the *ferox* tribe, but is very careful about exposing himself. Just after the sun has sunk in the west, in the interlooming between daylight and dark, he sneaks out of his hole and goes to feeding, but he never feeds without watching. His down nibblings and uprisings are so frequent as almost to be instantaneous. It is considered in New England localities where the woodchuck abounds a fair trial of skill to send a rifle bullet through one as he shows himself above the grass or stubble. This extraordinary quickness of movement makes the hunting of the woodchuck a sport. Usually the woodchuck is caught with dogs and "drowning out" by pouring water in his subterranean habitation, after driving him in and being sure that he is there.

The woodchuck, to those whose prejudices do not extend beyond reason, makes a palatable dish. He is a cleanly fed animal, taking only vegetable food. He is a hibernating animal, sleeping like the bear from frost to spring, and grows fat on the growing vegetation of the field and garden, until in the fall he is "fat as a hog," which he is, and deserves to die to give food to those whom he has robbed a whole season through.

HAMMER-HEADED SHARK.

The hammer-headed shark (*Zygæna malleus*) is a very remarkable fish, and has from ancient times excited general attention. It resembles others of the shark family in the

**HAMMER-HEADED SHARK.**

number and position of its fins, but is distinguished from them and all other vertebrate animals by the lateral expansion of the head, especially of the bones and cartilage around the eyes, so that the head resembles a hammer, the eyes being placed at the projecting extremities.

This fish is found in the Mediterranean Sea, and sometimes strays as far as the northern coast of Europe. It is about seven or eight feet long, but specimens have been found eleven and twelve feet in length. Its body is covered with a granulated skin, the upper side being of a grayish brown, and the under side a grayish white; the large eyes are golden yellow. The teeth are long, sharp, almost triangular, and serrated on the edges.

They search for prey around ships. Gessner says: "They are large, hideous, terrible animals, and destroy men who are swimming, and it is considered a sign of ill luck to see them."

They produce living young. In a hammer-headed shark captured on the English coast were found thirty-nine fully developed young, averaging nineteen inches in length.

Oil is procured from the liver, but the flesh is not good, being hard and ill-flavored.—*From Brehm's Animal Life.*

The Indications of the Clouds.

Some of the oldest text books, or the reading books, of the present mature generation show by text and illustration the shape and the proportional construction of clouds, giving them names; as, the *cirrus*, *stratus*, *cumulus*, *nimbus*, and their names compounded. A recent contributor to our cloud knowledge is an English meteorologist, Rev. W. C. Ley, who has initiated the appearance of the clouds as a study by means of photography. He claims that by observing cloud forms he can predicate rain from the surface

of a cloud whose *nimbus* portion may be forty miles away. His plan comprehends the material as well as the forms of clouds. The *cirrus* is an ice cloud sailing at an altitude of from three and a half to seven or eight miles above the general surface of the earth, with a very high velocity, at times exceeding that of the locomotive. The icy structure of the upper clouds is evidenced, not only by the fact that at the levels on which they move the temperature must be extremely low, but by the fact that halos and mock suns, formed by *cirri*, cannot be explained in accordance with optical laws, except on the hypothesis that the light is refracted through minute prisms of ice. "Outlying streaks of this cloud, often from 20 to 100 miles in advance of the main pack," he shows, serve as "the pioneers of the coming army"—these attenuated threads of ice crystal, between 25,000 and 40,000 feet above the earth, arranged in parallel lines, gradually overspreading the sky with a milky looking film of whitish cloud matter. This stage occurs at a place lying in the storm's track before the barometer gives any warning, and sometimes while the mercury in the weather glass is rising. Thus the trained observer may consider these clouds as storm signals, advertising, by their peculiar movements, not only the coming of the storm, but also the bearings of its center.

Uses of Slag.

Among the utilizations of furnace slag, those by Mr. Charles Wood, of Middlesbrough-on-Tees, promise to be of considerable commercial value. From the slag he has formed building bricks by reducing the slag to a sand and mixing it with lime, the mixture being pressed, dried, and air hardened, without baking. It is claimed that bricks thus made were not only so tough as to resist splitting when a nail was driven into their substance, but that they had a crushing resistance fully equal to the ordinary bricks.

A finer sand was used also to form a cement, the composition being two and a half parts each, by measure, of slag sand and ground brick to one part Portland cement. The slag sand was obtained by running the molten slag into water kept in agitation.

Paving blocks and tile, and even railway sleepers, have been made direct from the molten slag, but it is doubtful if the economy of this method of utilization would permit the transportation of these weighty materials, substitutes for which could generally be found on or near the place of using.

Glass of the coarser sorts has been produced from molten slag mixed with sand and alkalies in the proportion generally of one-half slag. The heat of the fused slag was an advantage in its use over the use of other materials, although a remelting was necessary after the addition of the other materials. The production of "mineral wool" for non-conducting and similar purposes is only another treatment of the slag as a vitreous substance, it being torn into filaments by the force of steam. Even this use of slag is so slight in amount that it seems to have no appreciable effect on the growing masses of residuum from blast furnaces in our iron producing localities.

Two years ago Mr. A. D. Elbers, of Hoboken, N. J., patented a process for rapidly cooling the flowing slag in successive layers, or rather in a welded mass, so as to form coherent blocks or slabs of any required form and dimensions. But none of these attempts can keep pace with the continuous waste of slag material at the ore reducing furnaces, even when these furnaces are the centers of increasing populations and parts of busy cities.

New Statue of Washington.

This statue, of bronze, to be thirteen feet high and to weigh more than one and a half tons, is expected to be ready to be unveiled November 26, on a pedestal at the center of the flight of steps on Wall Street, New York, leading to the doors of the Sub-Treasury building. The statue is by J. Q. A. Ward, and is to be of bronze cast in Philadelphia, and will cost at least \$35,000, which has been raised by a committee of the New York Chamber of Commerce. The statue is intended to represent Washington just after he has taken the oath of office as the first President, as he stood on the 30th day of April, in the year 1789, on the balcony of the old Federal Building, which occupied the site of the present Sub-Treasury building. He stands in an easy, natural, yet very dignified pose, looking out to the right, with his right arm extended, and his left hand placed on the hilt of his sword. The moment chosen is that when, after taking the oath, he said, "I will, so help me God!" The expression of his face, modeled from the Houdon bust and the Stuart portrait, is calm, earnest, and resolute. Its completion and erection will add another to the attractions of the metropolis, and to the mementos of the early history of the country as a Union of States.

The Invention of the Telephone

We have heretofore noticed the decisions of the Patent Office, by which the prior claims of James W. McDonough, of Chicago, as the inventor of the principal telephone instruments have, after several years of delay, been recognized by the allowance of patents to him. His inventions, together with various others by other parties, relating to the working of telephones, exchanges, etc., have been acquired by the United States Telephone Manufacturing Company, of New York. This corporation issued a statement of its rights and position in respect to the telephone, in which it asserts that the American Bell Telephone Company, with its aggregate capital valuation of one hundred millions of dollars, has really no right or title to any of the numberless instruments which it now has in use; but every one of them are infringements upon the United States Company's patents, and sooner or later will be so declared by the courts. According to the statement the only basis which the gigantic Bell Corporation now flourishes is the wit and ability of its lawyers in devising technical objections and obstructions that postpone the trial of the telephone issues before the courts.

It is claimed by the United States Corporation that McDonough was the original and first inventor of the art of transmitting speech by electricity, just as it has heretofore been claimed, and in fact decided by the courts, that Bell was the original Jacobs. The Patent Office, the United States Court, Bell, and McDonough, all appear to be unanimous that Phillip Reis, who made the first instrument for conveying speech and sounds by electricity, who in fact invented the word telephone and christened the instrument with that euphonious name—all, appear to be unanimous that Reis must be ignored and his marvelous discovery buried in oblivion. The United States Company says in its statement:

"On the 10th day of November, 1879, a contract was entered into between the Bell Telephone Company and the Western Union Telegraph Company and others, which has very seriously restricted the public use of the telephone, preventing the telephone company from extending to its patrons the advantages of the telephone, for communicating between cities, greatly to the disadvantage of individual and business interests, and only serving to materially aid in building up the monopoly of the Western Union Telegraph Company. As the United States Telephone Manufacturing Company has not entered into any such complicated alliances, the use of the telephone between cities and towns for all purposes now opens up an additional and very extensive field; one which threatens eventually to supersede the telegraph itself for prompt and cheap communication between distant points.

"This company owns the only long line telephone systems especially adapted for this purpose, and which have been tested and proved to be eminently practicable.

"The Records of the Patent Office show that Mr. James W. McDonough, of Chicago, Ill., before the 31st day of December, 1867, invented and constructed a telephone receiver, consisting of a combination in an electric circuit of an electro magnet and a diaphragm, supported and arranged in close proximity thereto, whereby sounds thrown upon the line were reproduced accurately as to pitch and quality.

"On the 26th day of August, 1871, Mr. McDonough made a drawing of a telephonic transmitter and receiver, also of the circuit with battery included, showing how to use them, 'for the transmission of speech through wires by means of electricity,' substantially as used by him experimentally in the year 1867, as above stated.

"Early in May, 1875, Mr. McDonough constructed and practically operated a telephone by means of the human voice, and an electric current through wires connecting a diaphragm contact electrode transmitter with a diaphragm receiver, with an electro magnet in close proximity thereto.

"During the summer and fall of 1875, Mr. McDonough made a number of modifications of his apparatus, and on the 10th day of April, 1876, filed his application in the United States Patent Office, boldly claiming the reproduction of articulate speech by means of electricity. Moreover, he devised a title to typify his invention, calling it a telelog— which signifies 'far speaker.' In reality a more significant and appropriate title than 'telephone,' the latter signifying far sounder.

"No one before that time had made the claim of having even constructed an apparatus which could be made to reproduce speech by means of electricity, and James W. McDonough stands as the first person before the word and the Patent Office as the enunciator of the fact that he had discovered the art of transmitting articulate speech by electricity, and made a successful working apparatus.

"In the same year (1876) Mr. Bell filed an application for a method of transmitting two or more telegraphic signals simultaneously over a single wire, to enable several telegraphic dispatches to be transmitted at the same time, but no disclosure was made that would lead any person, even the most skilled in electrical matters, to know that the invention described was for a speaking telephone, much less to enable persons so skilled to have made a speaking telephone from the drawings and descriptions given. In fact, in a critical suit recently concluded in England, the high court of that country decided positively that this (1876) patent of Bell's did not disclose the invention of a speaking telephone.

"The first application filed by Mr. Bell for the transmission of articulate speech, or for any instrument capable of such transmission, was on January 15, 1877, more than nine months after McDonough had filed his application, accompanied by working models capable of illustrating his claim.

"Mr. Bell's patent was issued to him on January 30, 1877, fifteen days only after his application was filed, without being first put into interference with McDonough, but after such issue to Bell an interference between Bell and McDonough was declared.

"When Mr. Donough filed his case there was no one else in the office showing such an invention, yet while he was patiently waiting for the issue of his patent, Mr. Bell steps in with an application, and within the brief space of 15 days had his case issued to him, and he has paraded before the world ever since as the original inventor. It only remained after this to get Mr. McDonough put into interference with an issued patent to hold him in the office for years, which was done.

"Thus, the man to whom belonged the credit of this important invention, as well as the revenue therefrom, has been unjustly kept out of his right for many years.

"Recently the Patent Office has allowed Mr. McDonough to divide his case, and has issued to him four controlling patents: One for the receiving telephone, as now in general use; one for and controlling the transmitter, as now used; one for a combination of the transmitter and receiving telephone, and one for the removable diaphragm of the receiving telephone, as now in use.

"As the original inventor, these patents will be sustained by the courts in their broadest scope; and while he will yet undoubtedly obtain through the same courts the broadest claims to the art covering any possible way of transmitting speech by electricity, these issued patents control the field, and will prevent others from using any of the now known methods of such transmission.

"The United States Telephone Manufacturing Company, organized under the laws of the State of New York, who are the owners of the McDonough patents, also owns the patents of George W. Coy and Charles E. Buell, of New Haven. It is a well known fact and beyond dispute that Mr. Coy was the inventor of the exchange plan or system now in use for utilizing the telephone, and which completely overcame the then existing difficulty of bring the telephone into universal use. He devised and put into operation at New Haven, Conn., the first telephone exchange, inventing and combining the necessary circuits and apparatus that has made the system so effective and popular throughout the entire world.

"Upon these new and necessary combinations he applied for letters patent, which have been granted to him; these patents cover and control, to the fullest degree, the system now employed to operate any and all of the telephonic exchanges in the United States.

"Every exchange from the smallest to the greatest are infringing these patents in a score or more of different points, and are all liable at law for damages for such infringements from the date of the patents."

The Care of Tricycles and Bicycles.

The *Wheelman*, an illustrated monthly journal published in Boston, and devoted to the interests of bicycling and tricycling, has in its September number an article on the care of the machines, which will be read with benefit to themselves by a large number of the younger members of the bicycling fraternity, and some of the older bicyclists may derive some pleasure if not profit from the writer's suggestions.

In caring for your machine, says the writer, roads, climate, and personal surroundings must, of course, be considered. Hilly, rough roads, cold weather, and a poor place of storage are all against your wheel. Your first care begins when you learn to ride—learn on "some other fellow's" wheel (provided you can find so accommodating a fellow); and when once you know how to ride, falls should not be indulged in—let the wear be simply friction. Accidents, of course, will now and then happen, the same as to a railway train or any moving object; but make it your constant thought that what damage does happen shall be accident, and not your carelessness.

Know your wheel. I find many who have ridden for months, even years, and who "swore by" the special make they were using, and yet knew nothing of taking it apart or putting together; they "had found holes for oiling, and, when anything got loose, screwed it up." When you get your mount, don't be afraid to ask questions about it; have it thoroughly explained to you how to oil, to adjust the bearings, how the wear in the various parts is "taken up," how to take out the wheels, etc. I don't suggest that you immediately take it to pieces; but know how, so that when necessity requires it you can do so understandingly. When you do take apart, mark each piece, have a box in which to keep the bearing balls, adjusting boxes, etc. Keep all together, and see that they are put out of the way of the children, or any one of an "inquiring turn of mind."

Have an assigned place for your wheel, the same as you would for a horse; if a club man, in the club wheel room; or if not, a place in the house, shed, or stable, where it is thoroughly dry and accessible; if possible, let this place be light, that you may see to clean and take proper care of it; before a run look over the nuts and dust caps and see that all are tight; and after turn it up on an Acme stand and clean it—if a bright machine use cotton waste and oil; if nickel, a chamois skin and a fair portion of "elbow grease." If you have a neat, light place for your wheel, you will take more pleasure in looking after it; and the better order you keep it in the more you will enjoy riding it.

Tires.—I have found that an ordinary gray Para tire will last as long as there is any life in the rubber—in an ordinary

climate about seven or eight years. In our country the climate of the far West and South is most destructive to them. I have exposed a tire to the sun at 110° and in winter to 3° below zero. The heat started the cement to running, and yet with these alternating changes this tire was run three years, and is now four years old and apparently good yet. So there need be no fear of your tire giving out; yet I would suggest that in winter you give it not the coldest place; a heated room preferred. It is safe to say that a rubber tire lasts about as long as a buggy tire.

Cementing on the tire is very simple. Use any means to heat the felly with the cement in it, place your tire in evenly, and ride your wheel a few times to force it into place. Should your tire come apart at the splice, it must go to a rubber factory and be respliced. I have found none of the advertised rubber cements that would perform this service. Tires are now made continuous or of a solid mould, and the last named difficulty will thus be obviated.

Care of the Bearings.—Use good oil; take four parts of sperm to one of paraffine for a good lubricant, and use sparingly. I have run a wheel with balls to every part three hundred and twenty-eight miles with one oiling, and the second was on the seven hundred and fortieth mile; but distance is not a perfect guide, as it is better to oil a little and often. Yet I sincerely believe that most riders oil too frequently. "Now and then" fill your bearings with kerosene, and cut out any oil that may have become gummy. Keep your bearings tight, and the dust out. A little piece of kid over the vents and under the oiler spring does good service, also felt washers on pedals and rear wheel. Keep the steering bearings well oiled, and a drop at times on the spring clip and spring bolt.

Nickel.—Don't suppose for a moment that nickel won't rust! It will, unless you are careful to polish it often. When it has been wet rub it well with an oiled cloth, and then polish with chamois skin. Enamel is best for a lazy man, or one who lives or uses his wheel at tide water; and for a tricycle enamel is preferable any way.

Storage.—A bicycle can be kept nicely in a hallway; but a tricycle must have more room, and a double door to admit it, as a house seldom has doors wider than three feet. I prefer my wheel to hang by the handle bar, if possible, with both wheels clear of the ground.

If a bicycle is to be taken up stairs, take it by the handle bar, in the position of "a header," and push it up with the little wheel in the air; and to descend the same position, letting the wheel down in front of you, holding it back by the handle bar. I know some enthusiasts who keep their full nickel wheels in their parlors, taking them up and down stairs in this way.

Repairs.—If so unfortunate as to break or damage your wheel, send it to a good repair shop, where it will be trued or mended, usually at a charge of fifty cents per hour. If an ordinary "buckle," the average cost will be about three dollars. If you try your 'prentice hand you will probably fail, as truing a wheel requires one skilled in that particular branch. If you "buckle" your wheel on the road, get some one to give you a hand; usually you can spring it back in good enough shape to ride home.

Good repair shops can be found in all the large cities, but, as you value your wheel, keep away from the "village blacksmith."

The best wheel made will "buckle" upon occasion. Your care should be to see that there is no occasion. The writer came to the above conclusion when he saw an express wagon pass over his wheel.

Transportation.—By far the safest way to transport your bicycle is to ride it. Yet we all know this is not always practicable. A good crate will protect your wheel, and as one always comes with your bicycle, take care of it, and it can be used time and again. When a baggageman on the train takes your wheel, go into the car and see where it is placed; no one has the same interest in it as yourself; a trunk resting upon the driver may do much mischief, while a cigar may drive away a baggageman's wrath. It is to the interest of wheelmen to show people how to handle machines. An expressman I have in mind broke his index finger by getting it caught between the spokes and fork; and to this day a wheel is his abomination.

Don't lend, don't borrow! Keep your wheel, like your toothbrush, for your personal use. When a number use one machine, you will find that the greater the number the poorer the care it gets.

A padlock and chain keeps the wheels from moving, and you have the pleasure of knowing that you carry the key.

Periodic Changes of Temperature.

From records kept at Montpellier, France, and Brussels, Belgium, for thirty-six years in the last century and for forty years in this century, it appears that oscillations of temperature occur, probably simultaneously, over western Europe at intervals of about fourteen days, corresponding to a half rotation of the sun with respect to the earth. The French astronomer Flammarion suggests that the solar rotation may be the cause of the periodic changes of temperature, owing to some variability in the radiating power of different parts of the sun. These observations indicate that the climate of Europe has not undergone any appreciable change for a century, and if it could be ascertained whether the periodic changes observed in France and the Netherlands extend over the whole earth, a great step would be made toward an understanding of the causes of temperature changes, whether they exist upon the earth or in the sun.

The Science of Ball Pitching.

Base-ball playing has become so common in many parts of the country, and the interest so generally taken in the college and professional contests, by the friends and champions of the players, that base-ball may be said to have become our national game, as cricket is to England. The *Philadelphia Press* has recently given the subject considerable attention, and the following it gives as the history of the curve as practiced by skillful pitchers of to-day:

The curve delivery in base-ball pitching was the greatest change ever introduced into the game; and in these days, when an old-time straight pitcher would be knocked out of the box in an inning, there are a good many claimants for the credit of originating it. College men, with the exception of those from Harvard, always insist that Avery brought it to light at Yale; while the Harvard men, who naturally would refuse to see a curve of two feet in a Yale pitcher's delivery, incline to the opinion that Mann, of Princeton, was first on the diamond with it. Harvard's men have grounds for their belief, from the fact that the Harvard team first had a practical sight of the curve at Princeton, in 1874; but as it did not have the effect of winning the game from them then, they regarded it more as a curiosity than anything of importance in the game. The fact was that Mann was so much excited about his new delivery that he did not know when to quit; and after the Harvard men had noticed that the ball always turned about a foot outward after leaving the pitcher's hand, they made their calculations and hammered at it accordingly. The game, up to the fifth inning was right in the hands of Princeton's catcher, who captured the men one after another as they struck out, but when Harvard began to bat the prospects changed at once, and Princeton lost by clear three runs. Mann had only one curve, and he did not even vary it by straight balls, so it failed of success against the straight pitching and fine head work of Ernst and Tyng. Avery, at Yale, came out with his curve the same year, and many of the college nines of that time remember yet how he promised something new for the Harvard batters as the result of his winter's practice in the gymnasium. He did succeed in defeating them, and next year, by his effective pitching, helped his team to the championship.

Before that time, however, curve pitching was practiced in professional games, and, though its nature was not much understood, everybody seemed to know that a peculiar kind of ball could be delivered and that Matthews, the present "curver" for the Athletics, was the man who was doing it. Arthur Cummings, who played in the Mutuals in 1872 and in the Stars, of Brooklyn, in the years preceding, also was known to pitch a deceptive ball, but, as he quit playing professionally about 1874, his work was gradually forgotten.

Matthews himself says that Cummings was curving the ball before he knew anything about it, and he gives further credit to Cummings by adding that he got his first lessons in the art by watching the Mutual pitcher's delivery.

In those days, when the first professional association was just getting on its feet, there were no cast iron regulations about where the players should sit or stand, and very often a whole team stood close around the batter, giving him points when they could, and spending the remainder of the time in "chaffing" with the umpire or pitcher. Cummings' delivery was known to every man in the profession as very peculiar, and Matthews, whose straight work was beginning to give way before it, made up his mind to take advantage of a position near the bat to learn the secret. He watched Cummings' hands carefully, noting how he held the ball, and how he let it go, and after a few weeks' careful practice in the same way could see the curve in his own delivery. Then he began to use it in matches, striking men out in a way that no one but Cummings had ever done before, and in a short time he was known as one of the most effective pitchers in the field. To-day he is pitching the same old curve, with all the tricks in delivery that years on the diamond have taught, and the batters don't seem to hit him much better than they used to.

Other pitchers had to take up the curve or quit playing, just as McBride and Pratt did, and before the Centennial the regular craze for curve pitching had set in which finally forced both League and Association managers to abolish old pitching rules and allow any throwing delivery which would assist in puzzling the batsmen. Every pitcher was popularly supposed to have a choice selection of curves which he sent in at pleasure, and his value was usually reckoned on the number of different ones he could use. That idea, by the way, is still prevalent, and there are many people who believe in an "up" curve and a "down" curve, an "in" curve and an "out" curve, a zigzag and a "double" curve, and "shoots" and "jumps," and fast and slow balls to match.

"That's all a mistake," said Matthews, while talking over some of his experiences. "I never saw but one curve, and never made any more. Of course a ball will shoot in a little distance, but you can't call it a curve, because you can't hold that kind of a ball so as to make a curve out of it. The only genuine curve is the one which turns out from the batsman, but after two or three of that kind a straight ball, if it is properly pitched, looks as, if it was turning the other way. 'Drop' balls, or balls which apparently shoot or curve downward, are all deceptive work, and are thrown from the highest start the rules allow. Rising balls are the same thing, started from as near the ground as possible, and pitched upward. 'Slowed' balls are started slow, with an

apparently fast flourish, for if they were ever started fast I don't know what skill could hold them back, and, as to balls which go both in and out, why, that is a manifest impossibility. I know there have been several tests made of that, one particularly at Cincinnati, where four posts were put up and the pitcher required to make the ball go on one side of one and the other side of the next, but I don't think he did it. If he did, it was through some deception in regard to the place where he was standing. No, sir. Good, straight pitching, thorough command over the ball, a good out 'curve,' and a good in 'shoot' are what the great pitchers are working with to-day, and I, for my part, don't believe in anything else."

Dereliction in the Tanning Business.

The failures thus far in 1883 in this industry, and among old and large firms, cannot but have been a great surprise to most business men in other lines of trade. They exceed in number and magnitude anything of the kind which has happened within a generation, and probably there never has been a year within the history of the trade in this country so fraught with disaster to those connected with the business of manufacturing sole leather. Manufacturers of cotton and wool, iron and other metal workers, and jobbers and merchants generally, have been accustomed for years to look upon the sole leather business as among the most "solid" of our industries, and the banks and note brokers have been only too glad to take all of this class of paper offering, at the lowest market rates, through many periods when leading houses in other industries have been severely crippled by the stringency of the money market. But with several large failures early in the year, and the recent gigantic one in Boston—where the largest firm of sole leather manufacturers in the world has gone down, with liabilities of nearly ten million dollars—all this has been vastly changed; the banks, note dealers, money lenders, and hide importers have been heavy losers, and the outside public find it difficult to understand how such disasters could occur in one of our staple industries when most others are prosperous.

Perhaps, however, a little looking into the nature and peculiarities of the business will give a better understanding of the situation. There are few people who realize that, notwithstanding all our modern improvements, it usually takes as long to make a side of sole leather as is ordinarily required to build a ship, although such is the fact. From the purchase of the raw hide until it is returned to the store as leather, it has been usual to average the time in the trade at about eight months; all of this time is not required in actual tanning—although in some heavy leather as long as this is required in the manufacture—but there are many unavoidable delays in the business. With this long period, then, between the first and principal investment of capital in the raw material and the completion of a marketable product, it will be readily seen that there may be—as there often are—such wide changes in the value of leather as will either give the tanner a large profit or net him an inevitable loss, even with the wisest management. And this, too, has been so common in the trade that the best houses seldom congratulate themselves on the profitable business of a year or two, or take blame for the reverse, but rather on the average of their profit and loss for a series of five or ten years, so that the making of sole leather seems to have very properly come to be designated as a "long" manufacture, as it is commonly styled.

In cotton, wool, silk, iron, and nearly every other manufacture, the raw materials are produced directly with a view to the market therefor, and the slightest variations in their price are immediately seen in corresponding changes in the value of the finished goods. But hides are only a by-product. Cattle are never killed now in order that the tanner may buy their hides, although this was one reason some years ago in Texas and Buenos Ayres, when a small proportion were killed principally for the hide and tallow. The supply of raw material for the tanner is, therefore, neither greater nor less, whether the price be high or low, except as values may vary in different countries, when the highest rates will bring the greatest abundance in special localities. In most of the other great industries, too, the production is concentrated in but few places, compared with the way in which our tanneries are spread out all over the country, so that, with the uncertainty attending any calculation of the supply of raw material, or the actual amount of leather at any one time in process of manufacture, and with a money market particularly easy for leather firms wanting to borrow, the practical result has been that, beginning with the high prices for sole leather in 1879, there has been such undue competition for hides as to keep their cost abnormally high, while the production of leather has been so great as to make it impossible for any but a few of the best tanners to make a profit in the business.

It is evident, from the foregoing facts, that overproduction is not likely to be so quickly checked in the leather trade as in most other lines of business. In stopping textile manufactures the greatest loss is in interest, and this is often overbalanced by the opportunity afforded for repairs; to stop a blast furnace is more detrimental, but not in these, or any of our industries, are the results of "shutting down" so serious as with the tanner. In the first place he has always to supply himself with bark for the year in the brief bark peeling period, but this bark greatly deteriorates in value if kept much more than a year; then the liquor in the vats, in case of stoppage, rapidly sours and becomes useless, the leather in process of tanning is greatly injured, and the whole plant

is reduced in value far more rapidly than is the case in any other manufacture. The large and steady demand for our sole leather for export, and the undoubtedly healthy condition of our boot and shoe business, have kept up the faith and stimulated the production of tanners through three years in which the business has been generally unprofitable; but these great failures certainly seem to indicate the urgent necessity of so limiting production that a fair profit may be realized, which would come as surely from a natural decline in the price of hides, under a less active demand, as from an advance in leather.

New Statistics of Vaccination.

Our readers are well acquainted, says the *Pacific Medical Journal*, with the herculean struggle of the British anti-vaccinationists, now continued for ten or fifteen years, directed against the compulsory vaccination law. From year to year the movement has been gaining strength. Societies have been organized in all quarters, periodicals established, funds largely contributed, and many of the leading men and women of England, including not a few of the nobility, enlisted in the enterprise. Judging from the clamor that filled the air, the heart and head of the kingdom were gained over to the humane enterprise. At last the long travail of the mountain culminated in the introduction of the repealing bill in the House of Commons. The hour of promise was come, and a triumphant majority of the representatives of the people of Great Britain would reward the labors and verify the sanguine predictions of the anti-vaccinationists. The vote was taken; of 302 members present, 16 voted for repeal and 286 against! "Ridiculus mus!" It is probable that a majority of the sixteen were favorable to vaccination, but, like John Bright, hostile to the compulsory clause; so that a vote on the merits of vaccination simply would have found not more than eight of the members opposed to it.

The advocates of vaccination were prepared for the contest. Sir Lyon Playfair led the way by showing that whereas in the last century the annual deaths from small pox in England and Wales averaged 3,000 in the million of population, in the forty years of the voluntary vaccination that followed, the average was 600 in the million; that in the period from 1841 to 1854, when gratuitous vaccination was introduced, the average fell to 305; that under the first obligatory act from 1854 to 1871 there was a further reduction to 203; and that from 1871 to 1883, the time during which the present compulsory law had been in operation, the average had been reduced to 156 in the million.

Dr. Cameron said that in the last fifty years, out of 27,215 ascertained cases of vaccination and non-vaccination, in 8,600 cases of non-vaccination the deaths were 3,400, or 40 per cent, while of the remaining 18,515 cases of vaccination the deaths were only at the rate of 7½ per cent. Sir Charles Dilke, Secretary of the Local Government Board, also came to the support of vaccination with some interesting figures. There were 10,504 persons, he said, employed in the London Postal Service, all of whom were required to be vaccinated on entering the service, unless the operation had been performed within seven years previously. In the ten years from 1870 to 1880 there had not been a single case of death from small pox in this force, and although there had been an epidemic during that period there had been only ten cases among the men, and they very slight.

Another point, which, we presume, was not overlooked in the discussion, though no mention is made of it in the account before us, relates to the deformity among those who survived. In his sketch of Oliver Goldsmith, Thackeray mentions that the disease "fell afoul of the poor little child's face when he was eight years old and left him scarred and disfigured for life." At the same time, he adds, the "small pox scourged all Europe and ravaged the roses off the cheeks of half the world." Persons now living can recollect the pock-marked faces which abounded among foreigners in the first quarter of the present century, particularly among immigrants from Ireland. At the present date a pock-marked face is comparatively rare.

Terrible Volcanic Destruction.

The island of Java suffered a dreadful visitation by volcanic outbreak, accompanied by subaqueous earthquake, August 25 and 26, by which the loss of life is estimated at not less than 75,000, and a large extent of territory was sunk under thesea, believed to cover an extent of fifty miles square, containing three towns and a number of agricultural villages. The navigation of the Strait of Sunda is also rendered difficult by the destruction of lighthouses and the change in the shore lines by the subsidence of the land. These are the items sent to Lloyd's, London, by telegraph; but the Netherlands Trading Company's representative in London has dispatches of the same date which seem to reduce the extent of the catastrophe considerably.

Effect of Peculiar Perspiration.

An exchange mentions as a curious instance of the slight causes which promote oxidation, the experience of a manufacturer of fine cutlery, who found at one time a large portion of his goods being returned to him as in damaged condition. Instead of bright, clean surfaces he found rusty, deeply oxidized blades. After much watching to determine the cause, it was located upon the man who sorted and wrapped the knives in packages. Everything he touched was found to rust, from the peculiar acid character of his skin exhalations.