

and two angles being given, a very simple operation in plane trigonometry. In astronomical observation there are always some determinate errors, arising from refraction and other causes, which may, however, be readily corrected, and do not affect the general principle of the method as above illustrated.

In calculating the distance of the sun from the earth, the stations, from which the observations are made, can be so placed that the semidiameter of the earth becomes one side of a triangle. The parallax of the sun was thus calculated from the transits of 1761 and 1769, and found to be 8.65 seconds angular measurement, and the distance of the sun was hence determined to be 95,173,000 English miles, as given above. Subsequent calculation by Encke made the parallax to be 8.5776 seconds.

It will be seen that the correctness of these results depends upon the accuracy of the observations upon which the mathematical calculations were based. That these were not accurate, seems probable from the fact that there is every reason to believe, from the sun's parallax, as more recently determined, that the distance as originally computed is wrong by at least 4,000,000 miles.

Many hypotheses have been made as to the origin of such a grave mistake—some attributing the error to confounding a part of the planet with its penumbra, and others to mistakes in the computation, but these are of little importance. The time is approaching when the problem can be reworked, and, with the improved apparatus now possessed by astronomers, and the wonderful advances made in methods of observation, it may well be hoped that this time a reliable result will be obtained. The *Standard* (London) says of the extensive preparations now initiating for the observation of the coming transits, that "the Astronomer Royal is doing good service in preparing betimes for the great event. Though it may seem a long time to look forward to, to those who are unacquainted with the amount of preparation required for such observations, those who know the difficulty of procuring a large number of first-rate instruments, unless plenty of time is allowed, will know that there is really no time to be lost, especially if, as we should hope would be the case, all the expeditions sent out are provided with precisely similar instruments and apparatus. It is imperative upon the government to put no obstacle in the way of carrying out these observations in the most perfect manner. England must not be behind the Continent, at any rate. If any amount of failure takes place, it will not be from want of preparation on Mr. Airy's part. At the late meeting of the Royal Astronomical Society he showed that there was nothing indefinite about his ideas; he had already prepared careful maps both for observing the ingress and egress of the planet. He showed the importance of sending expeditions to several places, because, among other considerations, a thousand obstacles might interfere with the observations in any particular place. There are places which, if weather, etc., are favorable, will be admirable for all purposes, but, as in the case of Kerguelin Island, the chances are very much against a clear atmosphere. Captain Toynebee said that this island is seldom to be found on account of the fog. If practicable, no expedition will be of the importance of one sent to the South Pole, that is, as near to it as possible. At the South Pole the effect of parallax will be the greatest—that is to say, the position of Venus will vary to the greatest extent on the sun's disk. The Astronomer Royal in his maps suggests two points, one in Enderby's Land, but here the sun would be too low for it to be a certainly advantageous position—he greatly preferred a point in the Antarctic Continent, where Sir James Ross landed. As a place for observation nothing could be better. The only point is, Will the severity of the climate admit of the expedition? Captain Richards, the hydrographer to the Admiralty, spoke well upon it. He showed that if properly fitted out and provided with good huts, clothing, and food, there would be no further objection to the place than must stand in the way of any Arctic expedition. Those, however, who joined in it would have to make up their minds to one thing, namely, that they would have to spend a year upon the spot; for that it was unapproachable at anything near the time when the transit will take place. To show, however, that he did not consider this in any way fatal to the position as a station for observation, he said that he should much like to be one of the party himself. In this he was fully borne out by Captain Davis, who landed there with Sir James Ross. So that we may hope that this, at least, will be one station, and that the government will not postpone till too late the preparations to make it as favorable for the comfort of the spirited observers who will join in the expedition as for the objects of the enterprise. It may possibly be advisable to send out an exploring party previously, though Captain Davis did not seem to think that it would be necessary. The first great difficulty in all places will be to get the absolute longitude. No ordinary nautical longitude will be of the slightest value. Observations necessary can be made at many places easily accessible, as far as England is concerned, as at Alexandria, where the telegraph will be of great use; at many places, too, in the United States, where we can safely leave the work to Americans. We may especially do the same in the case of the Russians, where the exact longitude of Orsk, the extremity of the great arc of longitude extending from that place to Valencia, is known to a millionth part of a second, or in other words, to absolute certainty. The other places which are recommended to the English government are—Mauritius for one reason, and Madagascar for another. If, however, it should be thought unnecessary to fix both of these spots, then an intermediate station—viz., on the Island of Bourbon, would be preferable. If the Astronomer Royal can show that the two stations would be of considerable advantage, we hope that no financial reasons will prevent his wishes being carried out. Above all things we would urge upon the authorities the importance of making up their minds

as to the instruments to be used, and in losing no time in having them put in hand. There is one more point worth noticing. How far photography can be depended on as to accuracy in helping to discover the sun's distance is not easy to answer off-hand; but certainly it is not to be doubted that much useful and interesting information may be secured by its means; and it is highly desirable that at none of the stations its use should be neglected. This part of the question is not, however, of the same pressing importance as the fixing of the stations suitable for observing the ingress and egress of the planet, and of the preparation in good time of the instruments and apparatus required."

Our readers will now be prepared to appreciate the importance of this subject, and to understand why its discussion is likely to occupy, to a large extent, the attention of the scientific press for a considerable time to come.

#### GALVANIZED IRON WATER PIPES.

In the opinion of some, the use of galvanized iron for water pipes, conveying water for drinking and culinary purposes, is injurious. Others take opposite ground in regard to this matter, and express themselves strongly in favor of such pipes. Our opinion upon the question has been asked by parties interested.

The use of zinc as a coating for the surface of iron pipes is not merely mechanical. Being more readily oxidizable than iron it produces an electric state in the latter metal which protects parts not covered perfectly as well as other portions of the pipe. The oxide which forms upon zinc is insoluble in pure water. Acids dissolve it readily, and when hydrated, as is the case in water pipes, solutions of the caustic fixed alkalis and solutions of ammonia will dissolve it.

Whether the oxide which forms upon the surface of galvanized iron pipes will be dissolved, depends therefore entirely on the character of the water, flowing through them. Rain water contains more or less ammonia when first precipitated. The oxide upon a galvanized iron roof would of course be dissolved to a certain extent, during a rain storm, a fact that has been noticed in connection not only with this material but with roofs of sheet zinc.

It is probably rare that water does not contain traces of free ammonia, or salts, the acid of which has a greater affinity for the oxide of zinc than the base with which it is combined. In such cases we should expect to detect traces of the zinc in water which has remained for any length of time in the pipes.

There are waters, doubtless, which could be passed through such pipes without the slightest danger of becoming charged with the poisonous oxide, and before their adoption an examination and analysis of the water should be made.

But while we have no doubt that in many cases, it would not be proper to employ galvanized iron pipes, we do not think that in a large majority of cases, the possible evils which attend their use, would be likely to prove serious. A great deal of exaggeration is to be expected upon the part of those who deal in pipes of other materials, and whose interest it is, to excite the fears of the public in regard to any wares that damage their particular trade. People are too apt to become excited by newspaper statements upon such subjects as these, and alarm themselves needlessly. If the fact exists that water flowing through galvanized iron pipes is impregnated with zinc, a simple chemical test by a competent person will readily determine it.

All metallic pipes in use are open to some objections. A great deal has been said upon the danger of using lead pipes, but the injury that has resulted from their use has undoubtedly been over-estimated. Lead poisoning is by far more subtle than zinc poisoning, and as its effects may follow without premonitory symptoms of sufficient extent to excite suspicion, we think them fully as dangerous as galvanized iron pipes under most circumstances.

A material for water pipes, cheap, durable, and capable of resisting the chemical action of all waters fit for household use is a long sought for desideratum. Until it is found we must do the best we can with such materials as we possess. Glass has been proposed and used to a considerable extent, but there are practical difficulties, which will probably prevent its ever being generally adopted.

The matter may be summed up by saying that the circumstances of any particular case can only determine whether galvanized iron pipes, are safe or otherwise. For most cases we think their use admissible.

#### VELOCIPEDE NOTES.

The Paris correspondent of the *London Orchestra* writes:

"I see a playful statement made by one of the Paris correspondents of the daily press—in an ultra-waggish mood, I presume—to the effect that the Customs returns here show £40,000, or a million francs, as the value of velocipedes exported to the United Kingdom in the course of a year. During some weeks past I have made bicycle statistics a particular study, and I have learned enough to convince me that the above figure must cover (with plenty to spare) the value of the total manufactures. Nine-tenths of these, to speak with moderation, are for home use; and of the exports, by far the greater number go to the United States. Every manufacturer—and manufacturers have sprung up like mushrooms—has his hands full. Any man whose productions are six weeks' delay—an elastic convention stretching indefinitely.

"Velocipedes have become a rage. Everybody talks of them. Athletes and gymnasts led the way, and now you see them in the hands of old, young, serious, and gay. *Emploqués de commerce* ride down to business on them in the morning,

and home at night. They stable them during the day in obscure nooks of warehouses, in yards, or cupboards. They fly over the ground at race-horse speed, and their hobby horse takes no more expensive feed than the occasional *goutte* in the patent greaser. Thus they economize time and omnibus fares. The faculty have pronounced it a sanitary exercise, and lo! the obese are seen in shoals on iron horses bringing down the superfluous pound or so at eight miles an hour—and they for the most part, like their patent wheels, provide their own grease—an increasing supply that gathers in globules on their brows and streams down their glowing faces. Ergo, the bicycle supersedes Banting, for of a surety it is more congenial to the fat to do deeds of daring in the pigskin than to go off their sugar.

"The house of Michaux et Cie., of the Champs Elysees, have already one hundred and fifty workmen going as hard as they can. Now Michaux, the king of the trade, can barely produce five a day. 'What!' cries the critical reader, 'one hundred and fifty workmen to make five velocipedes in a day; a very queer speculation for Michaux.' Not at all. His velocipedes sell for three hundred and fifty francs in the plainest form, to five hundred francs in polished iron, with the patent improvements. They are really models of perfection, but they cost as much as a horse.

"They very politely told me '*Nous donnons deacons gratuites à tout acquereur*,' and if I purchased an instrument of their London agent, I was welcome to my free lessons in their *manège*. They led me into a spacious riding school, I should say three or four hundred feet long by a hundred wide. It was a dazzling sight. You are in an ordinary warehouse, a door is opened, and a field of thirty hunters bursts on your view, all dashing madly to cover! There are riders of every kind—more tyros than proficient of course. One young man of twenty, or under, at once fixed my attention; a fearless fellow this that can perform more daring tricks than a Prussian rough rider. He starts it on at a desperate pace and leaps into the saddle as it flies—out again—a run and he's up again *en amazone*, working one pedal only—off again—a run and he jumps back—on to his knees—and then he's standing bolt upright, like a circus rider; and all the while his velocipede is dashing away at the rate of a London Hansom. He slackens his space to breathe awhile, and then 'again he urges on his wild career.' He dashes full at the fence, and you shrink in your boots for a brief second, thinking he has lost command of his velocipede, but he turns off at a right angle when within an inch or less of the paling. I asked the gate-keeper of the *manège* who this was. 'It is the *Michaux*,' was the reply, 'and if he would only go to the Palais de Crystal, to run in the race on Easter Monday, your competitors wouldn't stand a chance.' Thus I had to learn the doings of Sydenham from the Champ Elysees. I learned too that Michaux meant to send over a first-rate man—he was shown me—and one second only to the daring son of the house, to uphold the honor of France in the contest at the Crystal Palace. It is a plucky thing to do, and (patriotism apart) I wish them every success.

"You see that young fellow in the gray suit," said the gate-keeper to me in a whisper, pointing out a tall, English-looking youth of fourteen; 'that's the cousin of the Prince Imperial. The Prince has given him a velocipede fit for a gamin of eight years, and he has come to get it changed. That tall gentleman *decoré*, no beard, is Monsieur —; then *sotto voce* the name of a public character that rather astonished me; 'that little disdainful-looking boy is a Spaniard, the Marquis de—' (I forget what—suppose we say Carrabbas). In fact, nobles, notables, and princes were plentiful in Michaux's *manège*, and there was proof positive that the highest in the land incline to the bicycle."

One of the peculiarities of velocipedism in this country is the large inventive talent displayed in framing names for it. Velocipedism, velocipedist, velocipede, velocipedism, velocipedian, velocipeddler, velocipediana, are some of the names applied to riding, riders, and items on the velocipede.

People who want to establish a velocipede rink can call it by any of the following names: Amphicyclotheatron, gymnacyclidium, velocipedrome, or bicyclocurriculum. Monocycle, bicycle, tricycle, quadricycle, are terms used to indicate the number of wheels. But we have seen one name, that in classical beauty and richness of conception, seems to us to eclipse all competitors. The machine which rejoices in this appellation is a water velocipede, and it is called "Tachypodosaph." Greek scholars will understand this to mean "a swift foot-boat," or, as Artemus Ward would have said, "words to that effect." In view of this amazing fertility of language would it not be well for some enterprising publisher to print a velocipedictionary?

*Pickering's Velocipedist* says: "We have had so many inquiries in regard to the monocycle, or one-wheel velocipede, that we have determined to get up one, which shall be clear of many of the objections which are urged against those we have so far seen. We shall have it completed in time to give an engraving of it in our next number. We think that we can dispense entirely with the use of not only the steering arms, but even the cranks, although it is worked by the feet; and we consider that the same machine will be adapted for either boys or men, short or tall persons—and even ladies. It may be easily mastered (we think), and in case the rider falls, the machine will not fall on him; in fact, it will not be capable of falling on its side; and further, it will not infringe any known patent. Still further, it is not a wheelbarrow."

Mr. Benton, master mechanic of the Terre Haute & St. Louis Railroad, has invented a railroad velocipede, and has made passenger train time on the same, making about twenty miles an hour between Litchfield and St. Louis, a distance of fifty-five miles. An Ohio inventor also proposes to make a veloci-

pede to run on one rail of a railroad, and thinks it can be propelled at a rate of a hundred miles an hour.

Professor "Ab" Brady, of Hanlon's, announces that the challenge of Fred. Hanlon will be kept open only one week longer, and if not then accepted Fred. will claim the championship.

It is stated that a velocipede clock has been invented, having numbered pins to correspond with the numbers of the velocipedes used in the schools and halls. These pins are stuck in holes drilled in the face of the clock, and prevent disagreements about time, as they indicate exactly when the time for which a machine taken has expired, and thus provide against slips of memory said to be common among velocipede learners.

Editorial Summary.

**BROADWAY RAILROAD.**—We had occasion a few days since to visit Albany, in reference to some matters pending before the Legislature, affecting the interests of our citizens, and we are obliged to confess that the atmosphere about the legislative halls was anything but wholesome. It was commonly believed that schemes of the most villainous character were "put up" and parceled out among members to secure their votes. The proposition of Mr. A. T. Stewart, of this city, offering to give \$3,000,000 for the franchise of the "Broadway Surface Railroad," was deliberately voted down in the Senate—that body evincing a determined purpose to rush the bill through, regardless of the rights and interests of citizens and property owners. Governor Hoffman, however, has put a check upon these corrupt proceedings by vetoing certain railroad bills, and showing by able arguments that the franchises of this city are too valuable to be voted away without affording our heavily taxed citizens some remuneration. We honor the Governor for his high and statesmanlike action. The people will sustain him in the position he has taken.

**YEAST FOR HOT CLIMATES.**—*Morgan's Trade Journal* gives the following recipe for yeast adapted to hot climates: Boil two ounces of the best hops in four quarts of water for half an hour; strain it, and let the liquor cool down to new milk warmth. Then put in a small handful of salt and half a pound of sugar (brown); beat up one pound of the best flour with some of the liquor, and mix all well together. The third day add three pounds of potatoes boiled and mashed, and let it stand until the next day. Then strain, and it is ready for use. Stir frequently while making, and keep near a fire. Before using, stir well; it will keep two or three months in a cool place. I kept this two months in the cellar, where the thermometer ranged between 90 and 104 degrees. This yeast is very strong; half the usual quantity necessary for a baking is sufficient.

**PRESCRIBING IN CHEAP PERIODICALS.**—A most dangerous practice prevails of publishing in some of the cheap literature of the day various receipts for the cure of minor ailments, and it is one that is certainly upon the increase. Many of the prescriptions so given are absurd, and even dangerous; and this is not to be wondered at if we consider that the writer is often very deficient in all real knowledge of medicine, and that he is assisted by the errors of the printer, to whom the symbols of quantities are so many hieroglyphics. Our attention has been called to the following prescription, for instance: "Syr. of poppies, one ounce and a half; syr. of squills, half an ounce; of tincture of digitalis, thirty drops; a teaspoonful to be given to a child frequently." We can quite imagine a fractious baby being dosed into the effectual quietness of death by such a mixture.—*Lancet*.

**CHARGED SILK.**—It has recently been found that what is called charged silk, is very liable to spontaneous combustion. This article, some of our readers are aware, consists of silk, which, after having been exposed to the operations of bleaching, cleansing, etc., and losing considerable weight, is brought back to its original condition by the addition of certain astringents, such as catchu, gall nuts, and various salts, especially the sulphate of iron, by which means an increase in weight from one to two or three hundred per cent is sometimes effected. When dried, at about 212 or 225 degrees, this silk has been known to take fire spontaneously, as soon as the air had access to it. The result appeared due to the rapid absorption of moisture and an attendant oxidation.

**FALSE DIAMONDS** always contain silicon. Their true character may be determined by putting them into a lead or platinum crucible with pulverized fluor spar, and pouring thereon sulphuric acid. The hydrofluoric acid generated by the reaction will corrode or wholly destroy the imitation, while a genuine diamond will be totally uninjured. The experiment should be performed in the open air or under a hood, as the fumes of the gas are highly deleterious. The operator should keep at a distance until the reaction has ceased, to avoid inhaling the poisonous gas. He should be careful also to avoid getting the hydrofluoric acid on his hands, as otherwise they may be severely injured.

**CURIOUS PRODUCTION OF COLD.**—Dr. Phipson has recently discovered that an intense degree of cold is produced by dissolving sulphocyanate of ammonium in water. Many salts, especially salts of ammonia, lower the temperature of water while dissolving; but, according to Dr. Phipson, no compound produces this effect in so marvelous a manner as sulphocyanate of ammonium. In one experiment, 35 grammes of this salt, dissolved rapidly in 35 cubic centimeters of water at 23 degrees Centigrade, caused the thermometer to descend in a few seconds to -10 degrees Centigrade. The moisture of the atmosphere instantly condensed itself on the outside of the glass in thin plates of ice.

**HOP STEMS AS A MATERIAL FOR PAPER.**—A Brussels correspondent of the *Organe de Mons*, a Belgian paper, says a gentleman from Marseilles, traveling through the country last autumn, purchased large quantities of a valueless substance which farmers were in the habit of burning in heaps to get rid of it, and has succeeded in making an excellent, strong, pliable paper, the most important qualification of which is that it costs a mere trifle. A capitalist has joined him, and a large factory is now being erected to make paper from this substance, which is nothing more or less than the old hop stems after the crop has been gathered.

**NEW METHOD OF PILE DRIVING.**—At a recent meeting of the Franklin Institute, a new method of driving piles was described. It substitutes gunpowder for steam in working the drop weight. A charge of powder is used to elevate the weight, and another charge throws it down again with greater force than it would acquire by falling alone. Ordinary musket charges are said to be sufficient to work a four hundred pound hammer in this way, and the strokes are made with greater rapidity than in the old method.

**HON. ELISHA FOOTE** retires from the office of Commissioner of Patents enjoying the respect and confidence of all who know him. He was an upright, faithful Commissioner, and had already cleared off a portion of the obloquy that attached to the office. Had he been permitted to remain we have no doubt that the character of the office under his administration would have greatly improved. Judge Foote was an honest official, and escapes from political life without a stain upon his honorable character.

**DEATH TO CROTON BUGS AND ROACHES.**—The *Journal of Applied Chemistry*, gives the following remedy against croton bugs and cockroaches: Boil one ounce of poke root in one pint of water until the strength is extracted; mix the decoction with molasses and spread it in plates in the kitchen or other apartments which are infested by these insects. All that have partaken of this luxury during the night will be found "organic remains" the next morning.

**TO RESTORE FADED WRITING.**—When writing by common ink has become faded by age so as to be nearly or quite illegible, it may be restored to its original hue by moistening it with a camel's hair pencil or feather dipped in tincture of galls, or a solution of ferro-cyanide of potassium, slightly acidulated with hydrochloric acid. Either of these washes should be very carefully applied, so that the ink may not spread.

**ELDERBERRY INK.**—A correspondent says: "I write these lines with ink made of elderberries. My mode of making it is as follows: one-half gallon of juice of elderberries, as described in your paper; 1 ounce copperas, 2 drams alum, 20 drops creosote dissolved in a small quantity of alcohol. The ink kept the violet color several years, now it has a brownish appearance. It makes a fair copy."

A PITTSBURGH firm have recently made a steel roller for rolling metals at the Philadelphia mint, which, after a test of several weeks, has been pronounced superior to the Prussian. It is said to have been hardened by a new process, discovered by the manufacturers. Another roller has been ordered of the same firm for the same mint, to be used in rolling nickel.

ONE of the most forcible sayings that has ever emanated from the pen of Horace Greeley, is the following: "The darkest day in any man's earthly career is that wherein he fancies that there is some easier way of gaining a dollar than by squarely earning it."

PATENT CASES IN COURT.

THE ELLIPTICAL SUSPENDER CASE.

The United States District Court at Baltimore, Hon. Judge Giles, recently heard the evidence in the case of Chas. F. Cleveland vs. William P. Towles, an action to recover from the defendant damages laid at one hundred and sixty-five thousand dollars for an alleged infringement of the patent granted to Cleveland in the manufacture of what is known as elliptical suspenders. Some six months ago the plaintiff applied to Judge Giles for an injunction restraining Towles from manufacturing or selling the article in question, which was refused; Cleveland then brought suit for the sum above named, and the case was called for a hearing in November last, but the plaintiff failing to respond, it was continued until the present term. Quite a number of witnesses were examined, and the case was argued by Wm. Henry Morris, Esq., on behalf of Towles. The plaintiff was represented by the Messrs. Brent. After hearing the testimony, Judge Giles directed that the following issues be tried by the jury: First, whether the patent granted to the complainant is for a new and useful improvement. Second, whether the patent granted to the defendant is an infringement in whole or in part upon the patent of the complainant. Third, whether the defendant has manufactured and vendes suspenders in violation of the exclusive right conferred on the complainant by virtue of his patent. The case was then given to the jury, who decided all the issues in the negative, thus establishing the right of Towles to the entire use and profit of the patent under which he manufactures the elliptic suspender. The article manufactured by Towles and that of Cleveland are constructed on entirely different principles.

The Towles suspender is illustrated on page 56, Vol. XIX, SCIENTIFIC AMERICAN.

DIAMOND MILLSTONE DRESS.

Judge Olin, of the Supreme Court of the District of Columbia, has rendered a decree, declaring the letters patent of the United States, No. 73,542, granted to Samuel Goley on the 21st of January, 1863, for improvement in millstone dressing, invalid, inoperative, and void as to that part of the alleged invention set forth in the specification in the following words: "The main feature of my invention consists of a cutting tool, armed with a diamond or other hard stone, and so constructed and operated as to pick or cut grooves in millstones by a series of blows delivered in quick succession, and as claimed in the first and third claims. The proceedings in this case were instituted by a bill filed by James T. Gilmore against Samuel Goley, Henry B. Sears, assignee, and the 25th of April, 1868, and the Goley's patent, claiming that said Goley's patent should be declared null and void so far as it interferes with letters patent granted to said Gilmore on the 23d of May, 1863, about five years previous to Goley's patent. Messrs. Rice and Laski for complainant; Gifford and Bradley for defendants."

"THE HOOK-HEADED SPIKE CASE" DECIDED.

The hook-headed spike case, commenced in 1841 by Henry Burden, proprietor of the Troy Iron and Nail Factory, to recover damages of Corning & Winslow, proprietors of the Albany Iron Works of Troy, for the infringement of Mr. Burden's patent upon the machine for the manufacture of railroad spikes, has at length been finally adjudicated, and an award made to the complainant for his damages. The case has been twenty-eight years in the courts, during a large portion of the time, however, in the hands of the late Chancellor Walworth, of Saratoga Springs. It has become one of the *causes celebres* of the country. It was originally commenced by the late Samuel Stevens, of Albany, and upon his death, Judge Elisha Foote, ex-Commissioner of Patents, assumed charge of it for the complainant. The total amount awarded to the complainant, including about \$50,000 costs, is \$80,000—a very good offset to the water-power suit recently determined against Mr. Burden and in favor of Messrs. Corning & Winslow. Chancellor Walworth commenced the present case on the 25th of April, 1868, and filed his report in May, 1868. In October, 1867, Hon. Wm. D. Shipman, of New York, was appointed to review and pass upon Walworth's report. His decision, concurred in by Judge Nelson, as stated, has just been received.

MANUFACTURING, MINING, AND RAILROAD ITEM

**MANUFACTURING IN RHODE ISLAND.**—The Boston *Commercial Bulletin* says that the region including Woonsocket and vicinity—Cumberland, Smithfield, Blackstone, and Bellingham, has seventeen cotton mills, employing 3,500 hands, running 207,000 spindles, 4,080 looms, using 10,000,000 pounds of cotton, and making 40,000,000 yards of cloth per annum; eight woolen mills employing 2,050 hands, running 114 sets of cards and 450 looms, using 5,300,000 pounds of wool, and making 2,900,000 yards of fancy cassimere per annum. Other cotton mills, which will have 55,000 spindles, are in process of construction. Just beyond the limit of three miles from Woonsocket are two more cotton mills with 30,000 spindles, and a woolen mill with 19 sets. Other branches of manufacture are represented in this region by a rubber factory, which employs 150 hands and produces \$500,000 worth of goods annually, machine shops, foundries, one boiler shop, one scythe shop, two manufacturing of agricultural implements, one glue factory, two roof factories, one bobbin, one shuttle, one worsted mill, one tape mill, four or five sash and blind shops, contractors and builders, etc.

The mills now in operation in the White Pine silver districts are the Oases, ten stamps; Moore's, eight stamps, and the Metropolitan, fifteen stamps, at Silver Springs; the White Pine Silver Mining Company's ten stamps, and Felton's five stamps, at Hamilton. A thirty-stamp mill is being erected to crush ores from the Aurora mine. A twenty-stamp mill is being removed from Smoky Valley, and three other mills, numbering about fifty stamps, are being brought from Virginia City. But there is work for five times these one hundred and fifty stamps. The miners charge \$50 a ton for reducing ores.

Senator Sprague, of Rhode Island, who is the largest cotton manufacturer in the United States, having 10,000 hands in his employ, says that the business is not profitable and the operatives are poorly paid. If there is not soon a change for the better, he predicts that the cotton factories will be suspended.

An Indiana speculator went to Chicago in the early part of the past winter and harvested 20,000 tons of ice. During the panic among the ice dealers in the subsequent warm weather he sold his stock at \$17,000 profit and went home. Since that time the price of ice has greatly declined on account of the cold weather and the gathering of a full supply.

The Wamsutta mills corporation at New Bedford, Mass., paid over \$30,000 monthly internal revenue taxes in 1868.

A Fitchburg, Mass., manufacturer of bird traps, recently received a single order for 50,000.

A passenger car for the Erie Railroad, to cost \$50,000, is building in Jersey city. It will be, it is said, the largest, costliest, and perhaps the most elegant car in the world.

It is said that more cotton will be planted in Texas this year than in any year since the war.

A letter from an old Nevada miner, now in Japan, says that the Japanese islands contain as rich gold and silver mines as any in the world, but the policy of the government represses their proper development.

St. Louis has forty-three miles of street railroad, ten miles of Nicholson pavement, one hundred and thirty miles of macadamized road, and over one hundred miles of sewers.

Nevada boasts of still another mining district 125 miles south of White Pine, said to be as rich as anything yet found on Treasure Hill.

The Warren Thread Company of Worcester, Mass., was inaugurated by the late Hon. Ichabod Washburn. The present capacity is 1,200 dozen spools daily which will shortly be doubled.

The work on the Missouri river bridge at St. Louis, is progressing favorably. The engineers expect soon to commence work on the center pier.

A large cotton seed oil mill is erecting at Mobile.

Answers to Correspondents.

**CORRESPONDENTS** who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

**S. S. G., of Mass.**—We know of no recipe for preventing damp woods from splitting when exposed to heat. Such a discovery would be valuable.

**J. M. B., of Mass.**—The most fusible alloy with which we are acquainted is made of 8 parts of lead, 15 parts bismuth, 4 of tin, and 3 of cadmium. It is called "Wood's metal," and is we think patented. It melts at 140 degrees Fah. and has a specific gravity of 9.4.

**F. G. D., of Ill.**—Two theories of the origin of the earth's magnetism have prevailed. The older, that of Hansteen, conceives the earth to be possessed of independent magnetism having its focus near the earth's center. It is now claimed that the crust of the earth and not its interior is the seat of terrestrial magnetism. To account for the pointing of the magnetic needle to the north, would be to assign a cause for the attraction, a positive pole for the negative pole of a magnet. This has never been determined.

**P. R., of —**—If you will refer to page 20, Vol. XIX, SCIENTIFIC AMERICAN, you will find your question in relation to apparent variation between position of crank and piston of an engine fully answered, and illustrated by a diagram.

**J. P., of Ontario.**—Securing belt splices by shoe pegs is not objectionable when rivets are not at hand; we have frequently practiced it with as good results as when sewed with lace leather. In "butting" or meeting belts the crossings of the lacings should be on the outside of the belt; the straight stretches on the inside next the pulley face.

**W. H. P., of N. Y.**—Case hardening to be quickly performed is done by the use of prussiate of potash. This is powdered and spread upon the surface of the piece of iron to be hardened, after the iron is heated to a bright red. It almost instantly fluxes or flows over the surface, and when the iron is cooled to a dull red it is plunged into cold water. Some prefer a mixture of prussiate of potash 3 parts, sal ammoniac 1 part; or prussiate 1 part, sal ammoniac 2 parts, and finely powdered bone dust (unburned) 2 parts. The application is the same in each case. Proper case hardening, when a deep coating of steel is desired, is done by packing the article to be hardened in an iron box with horn, hoof, bone dust, shreds of leather or raw hide, or either of these, and heated to a red heat, for from one to three hours, then plunged in water.

**D. S., of Minn.**—Common yellow brass for turning may be made of copper 2 zinc 1. For heavy work, tin, copper, and zinc are used in the proportions of tin 15, copper 100, and zinc 15, or tin 13, copper 112 zinc 1.

**J. G. S., of Va.**—The magnetic meridian does not correspond with the geographical meridian, except in very few places. It also is subject to variations. The magnetic needle is also subject to so many variations that an attempt to establish the true meridian by its use, would cause you considerable trouble. You can get it near enough for your purpose, by allowing the sun to shine through a vertical slit at noon when the sun is neither fast nor slow of clock, provided you can take time from a clock which is right with the sun or varies from it by a known rate. You may get it quite accurately by describing a circle on a level surface and placing a vertical wire, seven or eight inches long, in the center. Through the top of the wire should be drilled a small hole to permit it