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Comets.

During the early part of last year, the whole civilized world was agitated by a foolish prediction that a comet was about to appear, which would strike the earth at a tangent, and knock it into the condition of a tempest-struck hulk. The public press of Europe and America presented an immense spread of paper on the subject, and there was a convulsive time of it generally. The year 1857 passed away, however, without the expected wanderer of the skies making his appearance; and astronomers and the public settled down into the dull routine of common regularities, not anticipating any brilliant comet for some time to come. We have all been most agreeably disappointed. For some weeks past we have been enjoying nightly one of the most beautiful sights that ever appeared in the starry dome.

On the second of June last, an Italian astronomer named Donati discovered the present comet approaching slowly towards the sun, in a northwesterly direction, and it has been increasing in brightness—as all comets do—as it draws nearer old Sol. No fears are excited by its presence; it is gorgeous beyond language to describe, and is beheld only with a thrill of admiration. Like a streaming torch of silvery light, extending fifteen millions of miles in length through the heavens, it hangs evening after evening gracefully over the northwest sky. Its head resembles a ring, with a bright nucleus in the middle, or something like an illuminated globe, with its intense flame in the centre. The diameter of this ring, as measured by Prof. Mitchell, of Cincinnati, is 18,000 miles. It has been approaching the path of our planet, with the apparent intention of giving us a friendly brush, and on the date of this number of the SCIENTIFIC AMERICAN, it will have attained to its maximum brilliancy. It approaches the sun with its tail flashing behind it, and at a certain distance from the great luminary, it will suddenly turn round to the other side and *back out* of our planetary system in a contrary direction to that by which it entered. In 1843 a comet appeared far less bright than the present one, but its tail was reckoned to be 170 million miles in length. When it wheeled round the sun, it moved through its curved path with the velocity of the lightning's flash. In two short hours its immense tail swept through a range of no less than 3,740 millions of miles. From the flight of objects on earth, it is impossible to form a comparative idea of the awful velocities of comets and other heavenly bodies.

Of the composition of comets, the most learned are ignorant. They must be composed of some matter more subtle than anything with which we are acquainted on earth. Stars are clearly visible through this comet's tail, and it possesses little, if any, gravity. This is deduced from a large comet which appeared in 1799, and got entangled among the satellites of Jupiter. It was there arrested for several weeks, yet its attractive force upon the satellites was so limited as not to produce the slightest effect upon their movements.

In ancient times comets were believed to be prognosticators of *dire* events. One appeared when Julius Cæsar was assassinated; another when Constantinople was taken by the Turks; one during the terrible persecutions in the reign of Charles the Fifth; and another in 1811, when all Europe was deluged with war and bloodshed; but no intelligent person has any superstitious dread of their presence in this age. From what is known of the insignificant effect of the comet of 1799, it is reasonable to infer that were a comet to come in collision with our planet, it would produce no greater effect than the blast of a bellows upon the Rocky Mountains. Some men, however, of profound acquirements, have expressed their belief that our globe at one period was struck by a comet, and that in consequence of such a collision it was made to rotate on a different axis from that which it once had. M. Arago, the eminent French astronomer, however, denied that such a result had ever taken place, and he founded his deductions upon the fact, that the earth now turned on a *principal axis*, whereas had it been so struck, it would have turned on a different axis, one not passing through the poles of an oblate spheroid. All the planets revolve round the sun in one direction, but comets enter our system in every direction, and completely baffle the reasoning of philosophers to account for their actions. It is also unknown whether they are self-luminous, or shine with a borrowed lustre. Sir Isaac Newton believed they were feeders to the sun, and that they supplied that luminary with the matter, which, according to his corpuscular theory of light, the sun was continually projecting into space.

The present comet is a stranger to the living inhabitants of the earth; it may be the same as that which was witnessed ages ago, when our painted progenitors went forth to battle against the iron legions of Rome, but this is mere conjecture. It will soon depart from our vision to wander once more through the vast solitudes of unknown space, never, perhaps, to visit our system again. Who can tell but it may yet become a wreck among some of the stellar constellations while sailing through the boundless ocean of the universe?

Loss of the Steamship Austria.

One of the most awful accidents which has ever befallen an Atlantic steamer, has recently occurred—the burning of the *Austria*—by which about five hundred lives were lost and as many homes have been made desolate, by the want of a very simple thing called *discipline*. All our readers have, we presume, ere this, become acquainted with the details of the catastrophe, and it is now simply our intention to offer some comments on the sad disaster. With the ship herself, no fault could be found; she was well and strongly built, and divided into compartments by iron bulk heads, for extra safety, and she was, as the advertisements say, "fitted up with every regard to comfort, luxury and convenience." The captain and doctor thought that she wanted fumigating, and so two officers of the ship went into the steerage with a red hot chain and a bucket of tar; the chain was too hot, it dropped into the tar, which upset and in a few seconds the vessel was in flames. All was now hurry and confusion, the dreadful cry of "The ship is on fire" resounded through the ship, and panic-stricken, the passengers and crew aided in their own destruction. The captain and pilot, it is said, deserted their posts—we hope this is untrue—and the ship was given over to the advancing flames. The scene of horror which then followed we will not attempt to describe, for no pen has ever succeeded in depicting such sufferings as were then endured, but we will plainly ask why this method of fumigation was adopted. It must be understood that it was not as a disinfectant, but only to drive the sea-sick passengers out of their berths by the horrid smell, that the steerage might be washed and cleaned. This method is common on emigrant ships, and should be at once forbidden, as highly dangerous and of no more use than playing a good stream of water on the sick passengers would be. If they objected to vacate their berths for the purpose of cleansing, then let the berths be cleansed while they are in them, and they would soon more

Again, why were the women screaming, and whole families precipitating themselves into the yawning gulf of waters? Because their minds hightened the danger from want of other occupation. Were each passenger, steerage and cabin, taken at the earliest opportunity after leaving port, and shown their respective places in the boats and on rafts, and each assigned some special work in case of accident, then, the moment an alarm was sounded, self-preservation would dictate to every one to do the duty assigned them, and take without hurry or confusion their proper positions. Had there been any system at all on board the *Austria*, every life might have been saved, but for want of discipline *five hundred* lives have been lost. We must not merely sympathise with the sufferers and their friends or relatives, but must also derive from it the lesson which the Great Providence, who permitted the calamity, intended it to convey. That lesson seems to us to be the necessity of discipline among the passengers, and this appears in clearer characters when we recollect the burning of the *Sarah Sands*, in which all the lives were saved by the exercise of this simple thing. If our shipowners and captains will learn this lesson, then the five hundred persons who have perished will be recollected with grateful memory by every future passenger across every sea. We hope they may.

Tempering Wire and Steel.

Having had several inquiries in regard to the improved method for securing the above objects, for which a patent was issued to Henry Waterman, of Brooklyn, L. I., on the 24th of August last, we will give a brief description of its essential features. The specification solely describes its application to wire tempering. The wire to be operated is secured on the circumference of a broad wheel, which is provided with a tension brake. This wheel is placed at one end of a furnace, which has a hole in its wall, through which the wire is drawn, passing through the fire, then into a trough for tempering, containing oil, thence to the circumference of another broad-rimmed iron wheel, on which it is wound up. This latter wheel has a screw on its shaft, so that as the wire is wound it is taken up spirally, and the strands not overlaid. The coil of wire to be tempered has one end attached to an iron rod or thick wire, then drawn through the furnace, and secured to the winding-up wheel before operations are commenced. The fire for heating the wire must be bright and clear, the wire must not be overheated—a dull red heat being about the proper temperature—and the whole process must be conducted with great care.

The tension on the brake and take-up wheels takes out all crooks in the wire while passing through the fire, so that it is wound up smooth and evenly, and of the same curve as that of a guide bar placed in the tempering trough. A coil of wire any number of miles in length may be hardened in this manner. When the wire required for one operation is hardened, the wheels are removed from their position near the furnace, and the wire wound back, from the take-up to the delivery wheel, passing through clean warm sawdust, to remove the oil. The temper is then reduced or *toned*, by placing the wire in a heated oven, and revolving it on the wheel till the desired uniform and elastic temper is secured.

The Atlantic Telegraph Cable.

No signals have been transmitted through the cable for some time, and it is asserted that there is a leak in it about two hundred miles west of Ireland, where the water suddenly becomes very deep, the cable passing down the side of a submarine mountain. Wherever the leak is in the cable, it is mere conjecture to assert that is here or there—one mile or two hundred miles from Ireland. No person can reliably tell without lifting the cable.

UNKNOWN MODELS.—We have several models now in our office from sources unknown, therefore we cannot write to their inventors. This oversight is a cause of much inconvenience to us, and no doubt the delay in our response to the wishes of the inventors thus situated is annoying to them. We wish to be very prompt in attending to all cases submitted to us; and if those who send models would just attach their address in some way to them, it will save mutual trouble and delay.

Fair of the American Institute.

The produce of the manufacturing arts and the operations connected with their development, are objects of interest to every sensible mind. The subtle mechanism, and the intricate, yet graceful motions displayed by some machines, afford wonderful examples of inventive genius applied in the best manner to secure useful results. Industrial exhibitions, therefore, are calculated to please and instruct those who visit them. The present Fair of the American Institute is not equal to some of its predecessors in regard to the number and variety of articles displayed, but the peculiar novelty of some of these, also the public display of operations in some of the arts—never before thus witnessed—more than makes up for the absence of some things less important to the public.

SILVER PLATING.

Articles denominated "Silver ware," are usually very beautiful. The artists engaged in this branch of manufacture generally display a refined taste in the classic form and exquisite ornamentation of their productions. There are very few articles, however, of this denomination which are made of solid silver; the mass of them are composed of a body of an inferior metal, such as brass, or tin and copper, having their surfaces merely coated with a thin cuticle of pure silver. These articles are termed plated ware. The old process of plating consisted in laying thin leaves or sheets of silver on the clean surface of articles made of brass, then partially fusing the two metals together in a furnace, after which they were pressed together and burnished. This process is called fire plating, and is still practiced for many purposes; but the great mass of silver plated articles now produced have their bodies made of white metal (mostly tin), and their surfaces coated with pure silver, by lightning-electricity. It was early discovered by Sir Humphrey Davy, that a *quantity* current of electricity from a battery would deposit pure metals from their moist oxydes. This was soon afterwards applied to deposit silver, gold and copper from their solutions, and thus to cover—by a very perfect union—the surfaces of articles of an inferior metal. If an article of tin, such as a vase, or a teapot, is connected with one pole of a Smee's battery, and placed in a solution of silver—such as the silver cyanide of potash—and the other pole of the battery brought into the galvanic circuit, the whole surface of the tin vase will soon be covered with a thin coat of pure silver, precipitated upon it by the electric current. The vase is then taken out of the solution, and is thoroughly washed in soft water. In appearance, it is a dull white, but by a burnishing tool rubbed over its surface, it is rendered bright and shining. This is a brief description of the process of electro-silver plating, which is now carried on so extensively in our country, and which is but a very few years old. It is exceedingly simple, and is one of the most useful applications of electricity. All the operations of this beautiful art are publicly conducted at the Fair, in the East nave, by artists from the establishment of Haughtwout & Co., corner of Broome street and Broadway, this city.

KNITTING MACHINES.

Progress is the watchword in this inventive age. This is exemplified in a number of very ingenious knitting machines or looms, exhibited by J. B. & W. Aiken, of Franklin, N. H. A stocking machine resembles a large ring, having a revolving top plate, and a number of under hooks, moving back and forth towards, and from the central opening to receive the thread or yarn from a rotary ring traveler, to form the loops, interlace them, and then throw them off in the form of a long knit tube hanging down in the centre. To produce a ribbed knit fabric, two sets of needles are required, the one set working vertically through, and transverse to the loops formed by the other set; one set of needles only are required for plain work. A large machine for knitting shirts has five feed bob-

bins, and a stop motion for each, so that the break of a thread at once stops it. It is a most ingenious loom, and will knit 50 yards in one day.

A stocking loom occupies no more space than a common sewing machine; but one is required for knitting the legs and another the feet. The work of the former is taken off in the form of a long tube; this is cut in proper lengths, put on the footing machine, which weaves a single square piece to the leg, and this is closed by crotchet work by hand to form the foot. One girl can attend eight looms, and produce 100 dozen pair of stockings in a factory every day. They are the most perfect machines for this purpose we have yet examined, and no less than five patent are em braced in their operation and construction. The cost of a machine to knit ribbed stocking legs, is $200; one for feet, $100; a family machine for plain work, $50.

SEWING MACHINES.

The interest manifested in these machines seems to continue unabated, and the competion among the makers and sellers of them is maintained with unflagging zeal and energy. No less than nine different classes of these iron stitchers are on exhibition by as many different parties, and each, it is stated, possesses peculiar and valuable features. Such a variety appears to countenance the prevailing opinion that the sewing machine business has become an important American institution. The names of the parties exhibiting are Bartholf, Grover & Baker, Wheeler & Wilson, Ladd & Webster, Fincle, Weed, and the National Sewing Machine Company. All these hold out their shingles in that important thoroughfare, Broadway. The other two are W. B. Bishop, of Brooklyn, N. Y., and J. M. Willcox, Philadelphia.

GLASS STEAM ENGINE.

The lovers of unique and novel art applied to engineering, cannot but be surprised with the exhibition of a glass beam-steam engine, working away with the utmost precision and beauty of movement. This curiosity is on exhibition in the South gallery, and is the first working steam engine made of glass ever brought before the public, we believe. The different parts are of various colored glass, and the ornaments and finish, would paralyze all the workers of iron to imitate. The very crank pin, and every journal in it is of glass, and the ingenuity and skill displayed in its production, are of no ordinary character. All the parts, we were informed, were spun by hand, by the blowpipe and a spirit lamp. There are several glass spinners conducting their operations ajacent to this engine. This business seems to be on the increase, as one of the ornamental *and curious arts*.

The Machine Department is not in full operation, nor are the arrangements all completed.

The Refreshment Department, which has hitherto been much neglected, is this year very admirably provided with all the necessary eatables and drinkables, under the competent management of Mr. Treadwell.

Something for our Railroad Companies to Think About.

Between the 7th of September, 1835, and the 31st of December, 1836, the number of railroad passengers in France was 224,345,-769. Of this number 1,979 were injured, and 999 killed—in all, 2,978. It is worthy of remark, that of these accidents 1,134 only—334 killed and 800 wounded—arose from defects in the working of the railroads; while 1,844—665 killed, and 1,179 wounded—resulted from individual imprudences, which were not attributable in any degree to the railroad companies. Taking away the agents and servants of the companies, the number of passengers killed by the working of the trains is but 111, that is, 1 in 2,021,133; and of passengers wounded, 402—1 in 558,074. Unfortunately for English management, this is a more favorable return than can be shown by any railroad company in England, and it behooves the Board of Trade to direct their attention to these French facts. So says a British journal, and so say we, in reference to the railroads of this country.

From a personal scamper through Belgium in 1855, we can state that the railroads of that country are admirably managed. The guards have a semi-military uniform, and the cars are started by the blast of a musical trumpet. In a long train there are two trumpet calls, one of which says, "All right at my end," and another, "All right at mine; so off we go." Sometimes the engine starts off with a clumsy attempt at a laughing chorus, but generally breaks into a wrong note, and is too glad to smother its blunder in the puff puff of its steam and the whirr of its wheels. Then there is another peculiarity of the Belgian and German trains, namely, that by means of a strong bar fixed to the side of the carriages, the guard is enabled to make his way along the wooden step from one to the other of the train; he does this repeatedly, collecting tickets where they are due, and ascertaining the destination of each of his passengers, so that, after a few visits, he knows them all by heart, and gives them the instructions they may chance to require. "You get down at the next station," he says to one; "You change cars when we stop," he says to another; and then, if there be any questions to be asked, the traveler obtains every information, most civilly bestowed, from the guard of the train. The guard commences his visits the moment the train is in motion, which enables him to see that all is right.

We would not purposely do injustice to our railroad system, but that there is something radically wrong in its general management is self-evident, and its managers can profitably study European systems.

Weaving by Machinery.

The improved mechanism by which the gigantic cotton mills of the present day are carried on is most varied and ingenious in its construction. There is, for instance, the winding machine, by which the yarn is wound on large bobbins; there is the beaming machine, by which the yarn is transported to large beams or rollers; there is the dressing machine, by which the yarn is drawn out into parallel lines of warp thread, and stiffened with an application of flour paste; and lastly, there are the looms—power looms for the great factories, and Jacquard looms for the more abstruse figured goods. Steam unwinds the warp from the beam, steam raises the alternate thread to form the shed or opening for the shuttle, steam drives the shuttle from side to side, steam drives up or consolidates each thread of weft as it is thrown, steam winds the calico or cloth on a large roller, and steam rings a bell to tell the attendant how the loom is getting on with its work. The attendant really does none of the weaving; she (for it is generally a female) watches a couple of looms alternately, to see that the beam has enough warp, and the shuttle enough weft, to mend any threads which accidentally break, and to make a number of little minor adjustments; but the giant power of steam—that power which will forge an anchor or make the eye of a needle—moves everything, does everything. In short, so far as regards the bulk of cotton goods now produced, steam power is the opener, the scutcher, the corder, the lapper, the drawer, the rover, the spinner, the doubler, the winder, the warper, the dresser, the weaver—he is the master workman, and the several machines actuated by his direct agency are his fingers.

HOOPING COUGH.—Great numbers of children laboring under hooping cough now visit the gas works in Preston, England, for the purpose of breathing the exhalations from the gas lime. It is said that all the little sufferers feel considerably relieved, and many are absolutely cured by this simple remedy.

First Suggestion of an Electric Telegraph.

While it is generally conceded that Professor Morse was the first to bring the application of electricity to telegraphic purposes from the region of speculative theory to that of practical operation, it is not so clear to whom the world is indebted for the first suggestion on this subject. M. Ampere, the celebrated French electrician, did much to give the problem a practical solution, but from the following extract from the London *Mechanics' Magazine*, of as old a date as April 17th, 1830, it would appear the idea of applying this wonderful agent to the transmission of messages was not new with him. The magazine says:—

"M. Ampere, who has acquired so much distinction by his electro-magnetic researches, proposes to establish, by means of voltaic currents, a system of telegraphic communication between distant places, which, if found to answer in practice, will be of unrivaled celerity, and of equal efficacy in all weathers. The idea of applying the electric fluid to this purpose is not new, but its revival by an individual of such high authority in this department of science as M. Ampere, is likely to obtain for it a degree of consideration greater than it has ever before, perhaps, received."

Ampere, who died in 1836, was distinguished above all others of his day for the experiments and extraordinary developments made by him in electro-magnetism, and there is no doubt that from his direct suggestions arose the idea of our present telegraph. How long anterior to the date of the suggestion mentioned, the idea of applying electricity to telegraphing was first proposed in Europe, we do not know, but we have evidence of the fact, on the authority of the Hon. Ellis Lewis, of Pennsylvania, that Professor J. R. Cox, of Philadelphia, as early as 1816, in a letter written to a scientific gentleman in London, expressed the opinion that electricity would in time be used as a means of establishing telegraph communication between distant points. This remarkable letter contains the following:—

"I have contemplated this important agent (electricity) as a probable means of establishing telegraphic communication with as much rapidity, and perhaps less expense, than any hitherto employed. I do not know how far experiment has determined galvanic action to be communicated by means of wires, but there is no reason to suppose it confined as to limits, certainly not as to time. Now, by means of apparatus fixed at certain distances as telegraphic stations, by tubes for the decomposition of water, and of metallic salts, &c., regularly arranged, such a key might be adopted as would be requisite to communicate words, sentences, and figures, from one station to another, and so on to the end of the line. However fanciful and speculative, I have no doubt that, sooner or later, it will be rendered useful in practice. JOHN REDMAN COX."

Philadelphia, 1816."

Indian Steel.

The steel made in India is of such good quality that not only are Indian swords made from it, but the best of Persian swords likewise; and it is believed that the vast monuments of ancient Egypt must have been cut with tools made of Indian steel, in respect to the hieroglyphics on the intensely hard porphyry and syenite.

This Indian steel appears to be made from the magnetic oxyd of iron. The ore is stamped to fragments, and the adherent quartz is separated by washing and sifting. The smelting is effected in the most primitive way; the furnace is built of clay, and not more than four or five feet high; the bellows is formed of two goat skins, with a bamboo nozzle, tipped with a clay tube at the end which is to be nearest the fire; the fuel is charcoal. The iron produced by the appliances is such as our manufacturers of steel would treat with but little favor, but the Hindoo manages to obtain most excellent steel from it. The iron is heated to a low red heat, and is beaten for a long time with stone hammers on a stone anvil, the Hindoos having an opinion that iron implements are injurious. To convert this hammered iron into steel, it is broken into small pieces, and put into small crucibles with a little dry wood; the crucibles are stopped up with clay, and are put into a furnace, where they are entirely covered with charcoal. A blast is then applied for two or three hours, the crucibles are removed, allowed to cool, broken, and the metal, in the proper state to be fabricated into any desired form of article, removed.

Complimentary.

We believe that there are few persons who do not rejoice to know that what they undertake to perform for others is appreciated. It is a pleasure to have such services acknowledged to be satisfactorily and properly accomplished; and if such a feeling be indicative of a slight tinge of a business-like vanity, we are not ashamed to confess to the "amiable weakness," and to say that it gives us pleasure when our clients express their gratification to us in such terms as the following:—

Messrs. Cridge, Wadsworth & Co., writing from Pittsburg, Pa., say:—"We are much gratified with your success with our patent business. We cannot conceive how anything could be more efficient and complete for securing the rights of inventors, and bringing them favorably before the public than through the medium of your agency and your valuable journal."

Mr. N. T. Spear, of Boston, Mass., writes to us under date of September 16th, acknowledging the receipt of his Letters Patent, and adds: "I have not time to say all the complimentary things I feel prompted to express this morning. It is a pleasure to do business with your agency, and to recommend it to others."

From Cincinnati, Ohio, Mr. J. C. Macdonald writes to us on September 17th, saying: "I received my Letters Patent yesterday, and return you my sincere thanks for the prompt manner in which you have conducted the business through all its stages. When I have further business with the Patent Office I shall not fail to avail myself of your valuable assistance."

Mr. C. P. Stanford, of Mount Gregory, Cal., says:—"I have just received my Letters Patent. I did not expect it so soon—indeed, I had concluded not to look for it seriously until the 1st of January, so you may judge of my surprise at its coming to hand four months sooner; and the surprise was equaled by the satisfaction I felt, and I could not help shouting "Hurrah for Munn & Co. and Commissioner Holt!"

From Hazelton, Pa., Mr. J. P. Evans writes on September 23d:—"The only tribute I have now to offer you is my heartfelt thanks for the speedy and intelligible manner you brought my case through the Patent Office."

D. R. Knowles, of New London, Conn., on September 24th, acknowledges the receipt of his Letters Patent, and says:—"I embrace this opportunity to thank you for the prompt and satisfactory manner in which you discharged the business of making the application; and should I in future need a like service, I shall not forget your office."

These are but specimens of the many similar ones which we daily receive, and the flattering terms in which our clients speak of our system of transacting their patent business.

Rolling Tapered Steel Springs.

An English patent has been secured by J. B. Howell and J. Shortridge, for an improved mode of rolling steel springs by the employment of a pair of rolls, arranged in the usual relation to each other, one of which is turned eccentrically, and the other plain. By this means the spring is rolled out, bevelled, or tapered at each end at one operation, and a series of springs produced, according to the length of the bar of steel passed between the rolls.