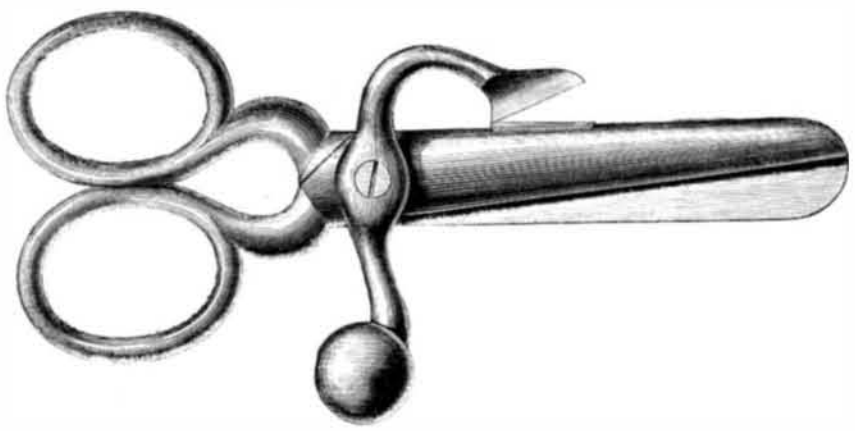
with the firmament beyond. Within a few feet of the summit, on a large rock, we found some papers deposited, and among them two copies of the *Pacific Christian Advocate*, dated July 21, 1866, and others dated August 2, 1867. These with some buttons and small pieces of coin, were the only articles found. The papers were well preserved, having no appearance of being damp since deposited.

"A cold wind blew from the east and was disagreeable, the mercury standing almost at zero. Water boiled at 180°, making the hight of the mountain 17,600 feet, at a point 30 feet below the summit. Having completed our observations we began the descent, after being on the mountain one hour and fifteen minutes, and reached camp in two hours, thankful that we had been permitted to stand on those isolated cliffs and view a portion of the works of Him 'who doeth all things well.'"

Improvement in Scissors Combined with Buttonhole Cutter.

The engraving gives a perspective view of a pair of ordinary scissors with a blade for cutting buttonholes. The same rivet connects the two blades of the scissors proper and the buttonhole cutter, the edge of which passes by a piece inserted in one of the blades or impinges on the edge of a portion of the back of the blade prepared for the purpose. This device is actuated by the finger of the operator, the end of the cutting lever being formed into a ball, as in the engraving, which by its weight brings the blade back after being used, or into a ring to be controlled by the finger. While this attachment does not interfere with the ordinary use of the scissors, yet the implement can be readily used to cut the buttonholes in any description of fabric. Its representation is so perfect that no difficulty will be experienced in understanding its construction or operation. It appears to be well adapted to the purposes for which it is intended.



ALTHOUSE'S COMBINED SCISSORS AND BUTTONHOLE CUTTER.

A patent for this was obtained through the Scientific American Patent Agency, Oct. 8, 1867, by J. A. Althouse, of New Harmony, Ind., who will reply to all inquiries relative to the invention.

Science Familiarly Illustrated.

Salts and other Foreign Matter in Water.

Owing to its extensive solvent powers, water is never met with naturally in a state of purity. Rain water, collected after a long continuance of wet weather, approaches nearest to it, but even that always contains atmospheric air, and the gases floating in the air, to the extent of about 2½ cubic inches of air in 100 of water.

Spring water, although it may be perfectly transparent, always contains more or less of saline matter dissolved in it; the nature of these salts will of course vary with the character of the soil through which the water percolates. The most usual saline impurities are carbonate of calcium, common salt, sulphate of calcium, and sulphate and carbonate of magnesium. The waters of the New Red Sandstone are impregnated to a greater or less extent with sulphate of calcium. Most spring waters are charged with a notable proportion of carbonic acid, which dissolves a considerable amount of carbonate of calcium; the calcareous springs in the chalk districts around London contain from 18 to 20 grains of chalk per gallon, 6 or 8 grains of which become separated by exposure of the water to the atmosphere, so that a running stream will seldom contain more than 12 or 14 grains of chalk per gallon in solution. Waters which have filtered through a bed of chalk also often contain carbonate of sodium in considerable quantity, as is the case with the deep-well waters of London.

Mineral waters are impregnated with a large proportion of any one of the above named salts, or with some substance not so commonly met with; such waters are usually reputed to possess medicinal qualities, which vary with the nature of the salt in solution. Many of these springs are of a temperature considerably higher than that of the surface of the earth where they make their appearance. At Carlsbad and Aix-la-Chapelle this temperature varies rrom 160° to 190°. Such hot springs either occur in the vicinity of volcanoes, in which case they generally abound in carbonic acid, as well as in common salt and other salts of sodium; or they spring from great depths in the rocks of the earliest geological periods, and contain chlorides of calcium and magnesium, and almost always traces of sulphureted hydrogen. (Berzelius.)

Many mineral waters contain salts of iron in solution, which impart to them an inky taste; they are then frequently termed chalybeate waters; some of the Cheltenham springs are of this kind. In other instances carbonic acid is very abundant, giving the brisk effervescent character noticed in Seltzer water. Less frequently, as in the Harrowgate water, sulphureted hydrogen is the predominating ingredient, giving the nauseous taste and smell to such sulphureous waters. In other instances the springs are merely saline, and contain purgative salts, like the springs at Epsom, which abound in sulphate of magnesium, and at Cheltenham, where common salt and sulphate of sodium are the predominant constituents. Many of these saline springs also contain small quantities of iodine and bromine, which add greatly to their therapeutic activity.

River water is less fitted for drinking than ordinary spring water, although it often contains a smaller amount of salts; for it usually holds in solution a much larger proportion of organic matter of vegetable origin, derived from the extensive surface of country which has been drained by the stream. If the sewerage of large towns, situated on the banks, be allowed to pass into the stream, it is of course less fit for domestic use. Running water is, however, endowed with a self-purifying power of the highest importance; the continual exposure of fresh surfaces to the action of the atmosphere promotes the oxidation of the organic matter, and if the stream be unpolluted by the influx of the sewerage of a large town, this process is fully adequate to preserve it in a wholesome state. River water almost always requires filtration through sand before it is fit for domestic use; and if water works designed to supply such water be properly constructed, provision is made for this filtration. Suspended matters, such as weeds, fish spawn, leaves, and finely divided silt or mud, are thus removed; but vegetable coloring matter in solution, salts, and other bodies, when once they are dissolved cannot be arrested by such a filter.

In the gradual percolation of water through the porous strata of the earth, many even of these soluble impurities are removed, particularly those of organic origin, partly by adhesion to the surface of the filtering material, but chiefly by a slow oxidation in the pores of the soil.

The magnetic oxide of iron, indeed, seems to exert a peculiar influence in promoting the oxidation of organic matter contained in water which is allowed to percolate through it, and it appears to be probable that this action, to which Mr. Spencer has particularly called attention, may furnish a valuable auxiliary to the methods of filtration at present in use. Filtration through beds of iron turnings has likewise been practiced in some cases with advantages of a similar description, but the oxygen is in this case in great measure absorbed from the water by the iron.

The presence of organic matter in water is easily ascertained by the reducing influence which it exerts upon chloride of silver or of gold, or upon permanganate of potassium, when boiled with them. The chloride of silver becomes purplish; and chloride of gold imparts a brown tint to the water under such circumstances, owing to the precipitation of metallic gold. A very dilute solution of permanganate of potassium is rendered colorless, whilst a brown precipitate of hydrated peroxide of manganese is formed.

Water is familiarly spoken of as hard or soft, according to its action on soap. Those waters which contain compounds of calcium or magnesium occasion a curdling of the soap, as these bodies produce with the fatty acid contained in the soap a substance not soluble in water. Soft waters do not contain these salts, and dissolve the soap without difficulty. Many hard waters become softer by boiling; in such cases the carbonic acid is expelled, and the carbonate and part of the sulphate of calcium which were held in solution are deposited, and cause a fur or incrustation upon the side of the boiler.

Sea water is largely impregnated with common salt, and with chloride of magnesium, to which it owes its saline bitter taste. It might be supposed that the quantity of salts which it contains is continually on the increase, as the sea is the receptacle for all the fixed contents of the rivers discharged into the ocean, since pure water alone evaporates from its surface; but here also there is a return to the surface of the soil provided for in the marine plants, the fish, and their representative guano, which are perpetually being raised from its depths by the force of storms, by predatory birds, and by the industry of man. The specific gravity of sea water is subject to trifling variations, according to the part of the globe from which it is taken. The waters of the Baltic and of the Black Sea are less salt than the average, while those of the Mediterranean are more so. The waters of the Mediterranean in the Levant are more salt than those of the same sea near the Straits of Gibraltar. The mean specific gravity of sea water is 1·027, and the quantity of salts ranges from 3·5 to 4 per cent.

Tyrian Purple.

The Tyrians were probably the only people of antiquity who made dyeing their chief occupation, and the staple of their commerce. The opulence of Tyre seems to have proceeded, in a great measure, from the sale of its rich and durable purple. It is unanimously asserted by all writers, that a Tyrian was the inventor of the purple dye, about 1.500 years before the birth of Christ, and that the King of Phœnicia was so captivated with the color, that he made purple one of his principal ornaments, and that, for many centuries after, Tyrian purple became a badge of royalty. So highly prized was this color, that in the time of Augustus, a pound of wool dyed with it, cost at Rome, a sum nearly equal to thirty pounds sterling. The Tyrian purple is now generally believed to have been derived from two different kinds of shell fish, described by Pliny under the names *purpura* and *buccinum*, and was extracted from a small vessel or sac in their throats to the amount of one drop from each animal; but an inferior substance was obtained by crushing the whole substance of the *buccinum*. At first it is a colorless liquid, but by exposure to air and light it assumes successively a citron yellow, green, azure, red, and, in the course of forty-eight hours, a brilliant purple hue. If the liquid be evaporated to dryness soon after being collected, the residue does not become tinged in this manner. These circumstances correspond with the minute description of the manner of catching the purple dye fish given in the work of an eye witness, Eudocia Macrembolitissa, daughter of the Emperor Constantine the Eighth, who lived in the eleventh century. The color is remarkable for its durability. Plutarch observes, in his life of Alexander, that, at the taking of Susa, the Greeks found, in the Royal treasury of Darius, a quantity of purple cloth, of the value of five thousand talents, which still retained its beauty, though it had lain there one hundred and ninety years. This color resists the action even of alkalies, and most acids.

Pliny states that the Tyrians gave the first ground of their purple dye by the unprepared liquor of the *purpura*, and then improved or hightened it by the liquor of the *buccinum*. In this manner they prepared their double-dyed purple—*purpura dibapha*—which was so called, either because it was immersed in two different liquors, or because it was first dyed in the wool and then in the yarn.—*Prof. Dussauce.*

ALUMINUM---ITS PROPERTIES AND USES.

The discovery of this metal dates back only to 1827, when Wöhler, a German chemist succeeded in extracting it from clay. It is a white metal, not like silver, but having a bluish tinge, Its specific gravity is from 2·5 to 2·67 according to its purity. It is considerably lighter than flint glass, being, as seen above, only about two-and-a-half times heavier than water. Bulk for bulk it is four times as light as silver and a little more than quarter the weight of copper. It is nearly as hard as iron, but can be softened by annealing; has great rigidity and tenacity; can be turned, chased, and filed with ease, never clogging the file; and can be drawn into wire as fine as a hair and rolled or beaten into sheets whose thinness can be surpassed only by those from gold or silver.

For mustard and egg spoons it would be an excellent material, as, unlike silver, it it not affected by sulphureted hydrogen or other sulphureted compounds. It retains its luster in the ordinary atmosphere and is not affected by boiling water, diluted sulphuric, or strong nitric acid, which attacks silver, but has no action upon aluminum when cold, and it is not affected when plunged into melted niter, potass, or sulphuret of potassium, a test which even gold or platinum cannot withstand. It is dissolved, however, in muriatic acid and has a powerful attraction for chlorine.

It has been used in France and England for ornamental purposes, as finger rings, brooches, chains, etc. A cup made of it, although very thin, was not indented by falling from the hand to the pavement. These peculiar properties would seem to make it a proper material for light field guns, cuirasses, helmets and coins, but for the cost of extracting it from its earthy base of argil or clay.

When the inventive genius of man has discovered a cheap and rapid process of extracting aluminum we may expect it to assume a much more important position in the useful, as well as the ornamental arts, than it occupies at present. A beautiful compound is now manufactured in France and England composed of aluminum 10 and copper 90 parts. We have seen a paper cutter, the blade and handle made of this, which had a beautiful yellow or deep straw color, was elastic, tough, and of a very fine finish. Its color is more grateful to the eye than gold and its luster brilliant. The earth metals, of which aluminum may be considered the head, will in time become as valuable for use as they are now for ornament or for the purposes of the chemist.

Is an Illustrated Description a Good Advertisement.

This question is most emphatically answered by the experience of the agent of the Hinkley Knitting Machine, Mr. G. E. Harding, who, since the illustration of the machine appeared in the SCIENTIFIC AMERICAN—less than one week ago—has received orders for not less than 1,750 machines, which he states were obtained in consequence of that publication. Perhaps part of this success may be attributed to the undeniable excellence of the machine, but some of it is undoubtedly due to the influence of this paper.

Native Wines at the Exhibition.

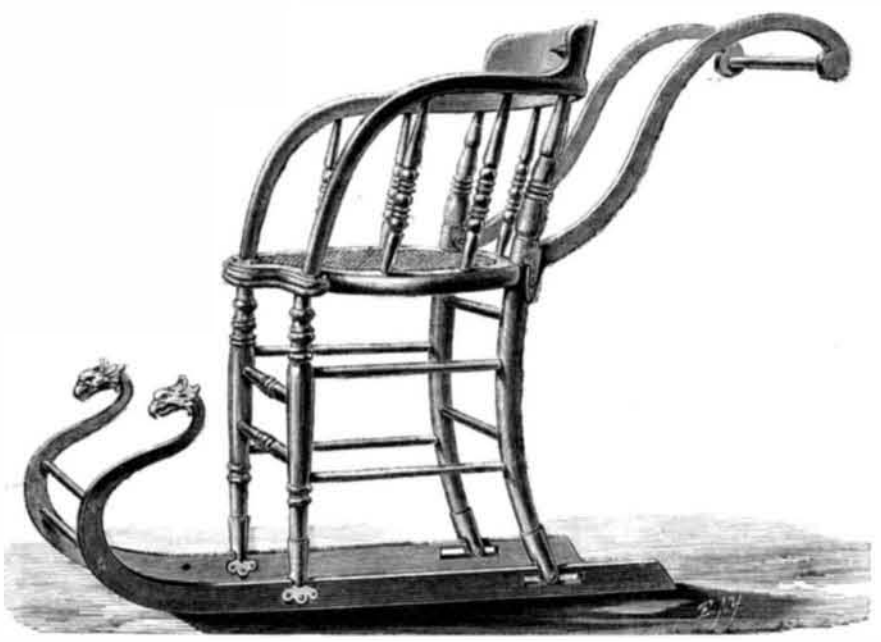
Speer & Co., of Los Angelos, Cal., and 243 Broadway, New York city, exhibited at the Fair of the American Institute a fine collection of specimens of their Catawba, Port, and Sherry wines. Of undoubted purity, manufactured from California grapes, these wines were pronounced by judges fully equal, if not superior to those of authoritative genuineness which are imported under the same name.

"THERE IS NOTHING LIKE LEATHER."—The *Shoe and Leather Reporter* suggests that our government might with profit follow the example of the Walrussians in using a leathern currency, and thus find a valuable substitute for our present torn and defaced promises-to-pay.

An Improved Skating Chair.

The exercise of skating has within a few years become very popular in this latitude, and perhaps deservedly so; at least it is "the rage" during the frozen months, and has partially usurped the place of the old-fashioned sleighing parties as a recreation for out-of-doors. It may be it is too violent for some, and that the practice necessary to perfection entails many a hard knock, and therefore the inventor, whose device is exhibited in the accompanying engraving, has designed a contrivance which shall be an assistance to the skate learner, and a help to those whose age or weakness prohibits the practice of this graceful but laborious art.

As may be seen it consists simply of a pair of magnified skate irons braced together in the form of a cutter or sled, and provided with devices for securing an ordinary chair upou them. The legs of the chair rest in pivoted sockets attached to the skate irons, the rear ones being adjustable by means of longitudinal slots in the runners and secured by thumb or other nuts. To the back of the chair is attached a guiding bar supported by arms. This contrivance may be secured in any desirable manner, so as to be detached as required. Of course any fanciful form may be employed to give grace and beauty to the contrivance.



ADAMSON'S SKATING DEVICE.

The advantages of this device are to be seen in the fact that the runners may be either smooth and without engaging edges, as the ordinary sled runners, or may be *bona fide* skate irons, capable of adhering to the glassy surface. For the conveyance of children, feeble persons, or ladies, it may be used either as a drawn sled or a pushed chair, and for those just learning to skate it affords a certain support and guide. For the latter purpose it will be, we think, invaluable, diminishing the risks and adding to the confidence of learners.

The patent is dated March 5, 1867, granted to Alexander Adamson, 506 Ninth street, Washington, D. C., whom address for information. Rights for sale.

Champagne Country.

Robert Tomes, an American resident at Rheims—pronounced Rans—for sometime, has written a very instructive and entertaining book on the champagne growth, manufacture, and trade of that great wine-producing province. And that is not all. He cautions the public against the use of the most popular brands and tells them how to select a good wine, and how to drink it. It is full of useful hints to champagne drinkers. We copy as follows:

"The champagne which explodes the loudest and flows out the frothiest, is like a great many other things in this world of sound and show, by no means the best. It is, in fact, a proof of its inferiority. Good wine absorbs largely the carbonic acid gas generated in the course of its manufacture. In bad wine the gas, instead of being absorbed, accumulates in the vacant space above the liquid, and thus, when the bottle is opened, the cork explodes with great violence, followed by a cataract of froth. When this escapes the wine remains comparatively flat. In good wine, on the other hand, the cork may require a great effort to draw, and when drawn there may be little or no froth, but the liquid will be seen to sparkle full with those minute gems of brightness tossed up and down by the juggling spirit of the ethereal element. The explosive force and effervescence of poor champagne, great as they may be, soon vanish like those of soda water, but the sparkle of good wine will continue, even if uncorked, for twenty-four hours."

The Hoosac Tunnel Disaster.

From the *Troy Times* we gather the following particulars respecting the terrible accident at the central shaft of the Hoosac Tunnel on the 19th of October, which resulted in the loss of thirteen lives.

The central shaft is located at a point equidistant from the two portals of the tunnel, in a valley on the summit of Hoosac mountain and is in the shape of an ellipse, designed primarily to enable the work to be carried on from additional faces in the center of the tunnel, and secondarily, when the great bore is completed, to admit fresh air and light into the work. The distance from the opening of the shaft to the bed of the tunnel below is 1,040 feet, about 700 feet of which have already been sunk. Arranged around the mouth of the shaft were a series of buildings, consisting of an office, machine and blacksmith shop and sawmill, and also tanks wherein naphtha was confined and manufactured into gas for the purpose of illuminating the work below. Timbers, with platforms sixty feet apart, were placed in upright positions around the shaft from top to bottom, and within these a bucket, supported by wire rope, ascended and descended the shaft as occasion required, bringing up the *debris* from below and carrying the operatives up or down as each relief went on or came off duty.

The naphtha gas was introduced on Friday last—the day before the accident—for the first time. The contractors had made, as they supposed, every preparation to guard against any disaster from the ignition of the dangerous material; but on Saturday at 4 o'clock a lighted candle, standing about twenty feet from the tank, communicated a flame to the gaseous substance, and in a moment almost, the tanks, the buildings, and the timbers in the shaft were all on fire. The men at work in the surrounding shafts barely had time to escape with their lives, the engineer making his way out only after his shirt had been burned off his back and his person considerably scorched.

At the time of the accident there were seventeen men at work in the shaft, four of them near the mouth and the remainder in the bottom of the pit. The four escaped—the others were all suffocated. Not the slightest assistance could be rendered them. The men above had to flee for their lives, and the bucket, the only means of escape for those below, was soon burned and fell down the pit. A great and impenetrable sea of fire rose up between them and the earth above. Every one of them must have died a horrible death from suffocation, or if any long survived the calamity they must have been drowned by the vast volume of water which poured down upon them upon the suspension of the pumps and machinery used in keeping the shaft dry.

On Sunday a sailor named Marshall, at the peril of his life, was let down in the shaft, in the hope that possibly some of the men might be alive. At a point six hundred feet down, he was able to see the bottom covered with water to a depth of twenty feet, and hence not the slightest hope for any of the men in the pit.

Of the thirteen killed only three were married. One of them leaves a wife and seven children. The families of the unfortunate men resided in cabins in the vicinity of the accident, and the scenes of mourning which succeeded the catastrophe were of the most agonizing description.

The loss of property and the detention to the work are considerations only second to the loss of life. The machinery at the mouth of the shaft was very valuable, costing thousands of dollars, and was of the most elaborate and perfect description for carrying on the work. The delay at this point in conducting the great enterprise to a successful issue will necessarily be very great.

The History of the Stove.

For an article of such general use, so indispensible in every household, it is astonishing how brief has been the history of stoves. With all of its multiplicity of forms, patterns, and varieties, it is a creation of the present age—a modern convenience—which our grandfathers knew naught of. The Troy *Times* thus relates the history of stoves in general:

"Stoves are comparatively of recent general use, though they were known in this country as early as 1790. In that year a Mr. Pettibone, of Philadelphia, was granted a patent for a stove, which was claimed to be capable of warming houses by pure heated air. Pettibone's stove was soon after put up in the almshouse at Philadelphia, and Drs. James and Chapman, and several members of Congress, gave testimonials of its utility for warming and ventilating churches, courts of justice, hospitals, manufactories, etc. This was probably the first attempt to use stoves, at least in this country. From this time forward for many years, the stove was confined to public places, its use for warming private houses, or for cooking purposes not having been thought of. The long box stove, capable of taking three feet wood, was the only stove our ancestors knew anything about.

Cooking stoves have come in use within the last few years. The first advance toward a cooking stove was making the Franklin stove with an oven; and the first that deserves the name of cooking stove was an oblong affair having an oven running the whole length, the door of which was in front and directly over the door for supplying fuel, and having also a boiler-hole and a boiler on the back part of the top near the pipe. Then a stove similar in arrangement, with swelling or eliptical sides, was made, generally called the nine-plate stove. About the year 1812 cooking stoves were made at Hudson from patterns made by a Mr. Hoxie, who was the first to elevate the fire-box above the bottom. This improvement was patented, and was sustained in suits against parties who in any way elevated fire from the bottom, In Hoxie's cooking stove the fire was made above and upon the oven, and he was the first who made any stove in which the flame was made to descend from the top to the bottom of the oven. In 1815, William T. James, of Lansingburgh, afterward of Troy, made the stove known as the "James' Stove," which not only continued a leading cooking stove for nearly a quarter of a century, but may yet be seen on board of small eastern coasting vessels, where, being cheap and durable, it supplies the place of a caboose. James' stove is probably better known as the "Saddle bags Stove."

"The first heating of houses by flues, from anthracite coal, was accomplishyd by a Professor Johnson, of Philadelphia, about 1825. The Professor succeeded in heating a large house by means of a furnace in a cellar, surrounded by an air chamber of brick work, whence the gaseous products of the combustion were carried through the building, passing through cylindrical drums, on the first and third floor, and out at the top. This mode of warming buildings rapidly grew into favor as our people came to be well acquainted with coal.

The ample supply of wood in the country was for many years in the way of the successful introduction of stoves. This fuel was at every man's door, and houses were all supplied with ample fire-places. The cost of preparing wood for stoves was an item which quite offset any economic advantages they had otherwise. And, besides, the people were loth to give up the cheerful open fire-place for "a little black box in the corner," as the stove was disparagingly called. Even now, the West uses few stoves compared with the East; and Eastern manufactures make stoves adjusted to wood for the Western market, while those for the market of the Central and Middle States are nearly all coal-burners."

Editorial Summary.

SEWING MACHINE STATISTICS.—During the year 1866 Wheeler & Wilson sold upward of 50,000 sewing machines, and during the past five years their sales have averaged twelve thousand machines per annum more than any other company's.

	1863.	1864.	1865.	1866.	Total.
Wheeler & Wilson,	29,778	40,062	39,157	50,132	159,129
Singer,	20,790	29,237	23,917	36,220	110,164
Difference,	8,988	10,825	15,240	13,912	48,965

At the Paris Exhibition the Wheeler & Wilson stood on the roll of merit No. 1, the Singer machine (exhibited by Mr. Callebaut) No. II.

In reference to the highest premium—the Gold Medal recently awarded Wheeler & Wilson at the Paris Exposition—the *Independent* well says: "That modern wonder, the Atlantic cable, seldom flashes messages between the two hemispheres fraught with more pleasing, as well as important intelligence, than was the announcement that a magnificent tribute of merit had been awarded to one of the most enterprising firms—the Wheeler & Wilson Manufacturing Company. This is the only Gold Medal awarded for sewing machines and button-hole machines. There were eighty-two competitors. That which has long been claimed by the Wheeler & Wilson Company, and which those who are acquainted with the superior qualities of the sewing machines have never hesitated to acknowledge as a rightful claim, must now be universally conconceded—namely, that the Wheeler & Wilson machines are *par excellence* the most desirable. To the perfecters of these machines their reward is in truth well deserved."—*Express.*

EXPERIMENTING WITH THE CHASSEPOT GUN.—Dr. Sarazin, of Strasbourg, placed five dead bodies, one behind another, at certain distances apart, as targets in firing one of these guns. The result was that the hole made by the ball as it entered the corpse was exactly the size of the projectile, while the orifice made by the ball as it passed out of the body was from seven to thirteen times larger than the bullet. The arteries, veins, and muscles were literally reduced to a sort of pulp. The bones were crushed to an immense extent all over the body, and the ball after accomplishing these results pierced a two-inch board, finally lodging in the wall behind.

THE EXPENSE OF DAILY PAPERS.—The *Evening Gazette* informs its readers that the editorial, reporter, and correspondent staff on the *New York Herald* number more than two hundred persons, that the sum paid Thos. W. King on his return from his around-the-world voyage was $5,000 in gold, and that only ten of his letters were ever published, making the cost of each letter $500 in gold. During the war Messrs. Richardson and Browne, while acting as correspondents to the *Tribune*, were captured and for some time imprisoned. They received $3,500 each on their release, and for which they wrote about three columns, costing the Tribune Association about $1,200 currency per column.

UNIFORMITY OF SHAPE IN WEIGHTS.—Pending the adoption of some uniform system of weights, M. Sequier has suggested the adoption of uniformity of form, which will cause the different weights to be easily recognized by the eye, from their sizes. A cylinder, the hight of which is half the diameter, he thinks will be found the most convenient form for the smaller weights, but the larger should be made of cast iron with a hemispherical depression at one end, through which is carried a round bar for the hand to grasp. A groove on the upper surface can be filled with lead for adjustment of the weight.

Two slight shocks of earthquakes were felt in Malta on Thursday and Friday, the 20th and 21st ult.