

Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Rubber and Leather Belts.

To the Editor of the Scientific American:

I have had considerable experience with belts for fifteen years, a good deal of it under varying circumstances, in dry and hot places, in damp and wet places, and exposed to rain, snow, and ice, with portable saw mills, grist mills and other machinery; and my experience has been the very opposite, in nearly every particular, to the statements in your journal. I began almost exclusively with leather belting, but, occasionally trying gum belting, I liked it so much better that I do not think I will ever buy another foot of leather belting; and indeed, in half the situations or uses of belting, I would buy gum in preference to using leather if furnished without cost. The severest test, that ever I put belts to in actual use, was a two inch belt on a quarter twist for driving sawdust elevators. The best leather I could get lasted only from 6 to 10 days, double lasting but little longer than single. Running two single belts, one on top of the other, however, increased their durability about fifty per cent. After wearing out several leather ones, I got a three ply gum one which lasted two months before it finally failed; and it required less than a fourth the time to tighten and repair that the leather did. With larger belts my experience has been somewhat similar, though I have never yet worn out a gum belt where it was not overstrained for want of width or sufficient pulley surface. I once had a seven inch leather belt run off a drum, draw tight across the corner of it, and, while I could run down two pair of stairs and stop the engine, the belt was cut and burnt about half off, so that it had to be repaired before it could be further used; afterwards a gum belt ran off and caught in the same way, remained the same time and only had the surface gum rubbed off for a few square inches; it was hot, but sustained no substantial damage and needed no repairs. The writer further asserts that it is next to impossible to repair rubber belts; while wide ones cannot be cut up into narrow ones like leather. Now I have never found it any more nor any less difficult to repair gum than leather belts, and I do it in precisely the same way; and I have cut up pieces of wide gum belts and riveted them together into narrow belts and, when properly run, I find no difficulty with the cut edges. "A rubber band, costing hundreds of dollars, may be spoiled in a few moments by the lacing giving out, and the band being run off into the gearing, or by being caught in any manner so as to damage the edges, or by stopping of either driving (!) or driven pulley." Exactly so with a leather belt; they can be repaired alike. I once tore a new eleven inch belt in two, because it had not adhesiveness enough to do the work, and flew off and caught fast. If it had been only a nine inch gum belt, it would have done the work without slipping off; or if it had torn in two, I should have mended it in precisely the same way, namely, laid the two ends together, and put a patch of leather or gum on the outside to lap on each end and riveted through with copper rivets, a job taking ten minutes when tools and material are kept ready as they always should be. Speaking of tearing a gum belt, the writer says "if the rent strikes a seam, it is most certain to follow it, even the entire length, if the machinery is not stopped." Is he so ignorant of the subject whereof he writes as to suppose there are seams in gum belts running lengthwise? This shows how much practical knowledge he has, and how much he would impart to us. Every person, I presume, who has any practical or even correct theoretical knowledge of this subject knows that the webbing in gum belts is in long seamless bags placed one within another when over "three ply," while the three, or five, etc., ply consists of one or more bags with a flat selvaged edge strip in the center, with the gum placed around and between all parts cementing it together, making it waterproof, and giving it 30 to 50 per cent more adhesiveness than leather, as long as the gum is on it; and, if worn off, still as much as leather. Gum belts do sometimes though rarely, tear lengthwise, not because of seams, however. I have seen but one torn in that way to any length, and that was about ten feet, but was repaired without much difficulty. Animal oils spoil the gum on a belt; there is no demand nor expense for oil on them as for leather, and no intelligent person allows any put on them, though I have seen ignorant men pour oil on when the trouble was in not setting the pulleys right. A gum belt will stretch the first day or two as much as leather till it gets a certain length, or set, then it stretches very little and will run frequently for years without having to be altered, while leather continues to stretch as long as there is anything left of it; and leather stretches every dry warm day, stretches more on getting damp, then again on drying, and so on; while dampness or dryness has no effect on gum. I have never known moisture and water to soak into a gum belt, much less have I had water freeze in a belt and burst it; I never knew the gum to pull off the belt when frozen to the pulley, though I have very often started them when frozen to pulleys and sheeted with ice between pulleys; but one round scale off all ice by bending over the pulley, while a leather belt must be taken off and folded away in the dry, or you have trouble. I have used gum belts sewed and quarter twist, and with sliding friction for hoisting and stopping loads, where they would heat too hot to bear my hand upon them, and they were not damaged when used with discretion at the start till they get a polish and a good solid working surface, after which there is little danger. A gum belt requires more care while new than afterwards, as the gum is more sticky and softer; but it may be heated to over 300 degrees any time without injury, if not done by

harp, cutting or scratching points or edges, while leather is crisped and ruined for all purposes at about 200 degrees, less than the boiling point of water. I lately put two seven inch leather belts on a machine for hoisting coal, because, as there was some sliding of belts, I thought they might do better than gum, but they utterly refused to lift the load required; so I laid them away to sell to the shoemakers, and got three ply gum ones, and the coal comes up easy enough now. The worst objection I have to gum belts is the disagreeable smell of the sulphur on their surface while new, which is hard to keep off one's clothes. But the advantage is that they always do their work well, without trouble, always run to their places true and straight as long as they last; while even the best factory leather belts will draw crooked by use, and the longer they run, the worse they get.

Waynesbury, Pa.

THOMAS HOGE.

How is Erratic Motion Caused?

To the Editor of the Scientific American:

I read, in an excellent and very interesting article, published in your journal of August 10th, that the results of Professor Agassiz's geological researches in Patagonia, prove that the grand march of the erratics, in that country, was northward. He says of them that the "grand general movement, was from the South, northward," and that "their direction is such that glaciers from the adjoining mountains cannot be supposed to have caused the abrasions and furrows of the rocks." Does not this scientific discovery, this mass of facts, go a great way in establishing the theory I propounded and published in your valuable journal, Vol. XVIII, page 37, 1868, nearly five years ago? I said, in that article, that all the glacial epochs that ever the earth saw were caused, and would be caused, by the poles of the earth laying in the ecliptic plane; and that through the combined attraction of the sun and ice, the grand movement of the vast fields and mountains of ice, which would be formed alternately at the poles, would be toward the equator, with an eastward or westward tendency, according to the position of the sun to the earth at the time. I venture to say that all geological research made, from Patagonia to the most northern boundaries of Brazil, will show that the grand march of the erratic family has been northward; and that all such research will as surely prove that all erratic motion from the north pole, has been in a southern direction.

I have merely thrown out these few remarks to, as it were, stimulate scientists, geologists and astronomers, to give the theory and the subjects it involves more candid consideration, and more thorough investigation. The earth has, undoubtedly, seen many glacial periods in its time, at least one undeniably; and to find out what is the cause of that one, or of the many, must surely be, to studious and scientific minds, of vast interest and importance. If the ice had grown and accumulated for many ages together, as some scientists think, then it seems to me that the tops of a great many mountains, and especially hills, would be worn off and furrowed, but such phenomena are very rare indeed; whereas striations on the rocky coasts of lower lands and of mountain sides show that the ice formed, though massy and magnificent, was not of such vast magnitude as to cover hill and dale of either hemisphere. The ice, undoubtedly, was formed annually, at each pole; and, in being presented gradually to the sun, by the movement of the earth in her orbit, it loosened and broke up, and was drawn in vast sheets and blocks towards the equator by the sun's attraction.

JOHN HEPBURN.

Gloucester, N. J.

Lightning.

To the Editor of the Scientific American:

Scientists tell us that lightning is of three kinds, zigzag, sheet and ball. But this distinction, I think, is without good foundation. Sheet lightning is nothing but zigzag lightning darting from one cloud or part of a cloud to another. Of this, one may satisfy himself by observing a thunder cloud in the evening which is manifesting the phenomenon of "sheet lightning." He will occasionally catch glimpses of the zigzag and be able to trace its general direction, which is most frequently horizontal, but sometimes upward into space. The streak is sometimes seen to divide into a dozen branches, radiating in all directions, and when shooting upwards, these branches occasionally extend several degrees beyond the outline of the cloud. This phenomenon I have witnessed scores of times. The reason why the zigzag is so rarely seen is because it is in the interior or upper part of the cloud, and seldom comes near enough to the surface to be caught by the eye. As to ball lightning, the evidence of it is not satisfactory. The witnesses of this phenomenon are, for the most part, ignorant peasants of Europe, living during the last century. I have yet to learn of a single instance of ball lightning of recent date being seen in this country by a person whose testimony is worthy of credit.

Franklin, N. Y.

J. H. P.

Sulphuric Acid in Vinegar.

To the Editor of the Scientific American:

The simplest way of detecting sulphuric acid in vinegar is to add a few drops of baryta water, when the liquor, if sulphuric acid be present, will become cloudy, sulphate of baryta being formed, which is insoluble. As baryta is poisonous, the experiment should be made with a small quantity.

Every druggist keeps or ought to keep baryta water.

New York city.

E. W.

TO REMOVE iron rust from linen, apply lemon juice and salt, and put it in the sun. Use two applications if necessary.

MISCELLANEOUS ITEMS.

An improvement "for imaginary horseback riding" is the designation given in a recent patent granted to C. E. S. Scripture, for a combination of see-saw levers, which are made to canter or trot the rider, to suit his taste. It is intended as a sort of mechanical gymnastic machine.

William M. Welling's patent for the manufacture of artificial ivory, has lately been extended by the Commissioner of Patents for seven years. The article is composed of 10 ounces of white shellac, 4½ ounces acetate of lead; 8 ounces of ivory dust, and 5 ounces of camphor. The ingredients are reduced to powder, heated, and mixed, then pressed in heated molds into sheets or other desired forms.

A PATENT BREAKFAST.—The Commissioner of Patents has lately issued a patent to John R. Weed for a hash of dried fish and potatoes, as an article of food. Boarding house-keepers will now have to discontinue the practice of letting their fish balls stand over.

The tornados, it appears, are not all confined to the western parts of our country. On the 15th of August, Massachusetts experienced a touch of one of these peculiar visitors. A tornado swept from East Longmeadow to Wilbraham, and leveled everything in its path for a distance of five miles, its course being northeasterly. Stone walls and fences were strewn in every direction. A strip from five to fifteen rods in width was cut clean through a forest of large trees, and several buildings were thrown down, but no dwellings. Total loss, about \$15,000.

The prospects for business this fall are excellent. The crops in nearly all parts of the country are good, and the merchants generally predict a large fall trade. Increasing activity is manifest in all departments of industry.

Dr. Robertson, in *Dental Cosmos*, gives an account of the destruction of a considerable portion of the jaw bone of a patient who had been poisoned by the fumes of zinc. The man was a brass founder, and in pouring the alloy of copper and zinc, the fumes of the latter were abundantly thrown off. The action of zinc fumes upon the bones of the human system appears to be analogous to that of phosphorus.

The Erie Railway is not likely to be very profitable to its shareholders for a long time to come, if we may judge from a recent report of its new directors, who succeeded the notorious Fisk & Co. in the management. According to this report, the Company own or have under lease 1,547 miles of track, on one of the best routes in the country. But the stock was so heavily watered by Fisk, the increase having been from \$16,000,000 to \$80,000,000 since 1867, that it will take a considerable augmentation in the receipts before the stockholders will receive so much as a one per cent dividend.

We recently alluded to the subject of bank robberies, and suggested that the managers of such institutions ought to furnish their premises with the improved electrical alarms as the most reliable means of protection. We further stated that some of the most daring bank robberies had been perpetrated even when special watchmen were employed to guard the safes. Another remarkable example of these bold depredations was lately committed in Baltimore, Md. The safes of the Third National Bank were opened, by cuts made through the walls of the adjoining building, and completely rifled. From five hundred thousand to one million of dollars in bank notes and securities were stolen. The bank building was guarded by watchmen, who knew nothing of the matter until after the thieves had fled. This robbery might have been prevented and the thieves captured had a suitable electrical alarm been attached to the walls of the safes.

Some of the glass tanks of the new aquarium at Brighton (Eng.) are 100 feet in length. Of smaller sizes, there are a great many. We hope that one of these days the Commissioners of this city will erect aquaria of large size at the Central Park.

MOSCOW INDUSTRIAL EXPOSITION.—A large and extensive industrial exposition is now open in Moscow (Russia), and attracts great attention. We find here, as in other European countries, that the inventions of citizens of the United States, such as firearms, sewing machines, reapers, and woodworking devices, occupy the prominent places and receive the highest patronage. But in a material point of view, this is of little benefit to our people. In the first place, our tariff and tax laws have brought up the costs of manufacturing goods in this country to such a high figure that we cannot fill orders for our own goods half so cheaply as can the foreign imitator. Specimens of our improvements are eagerly sought for from abroad, simply that they may be copied; but we get comparatively few important orders. In the second place, many of the continental patent laws are so framed as to discourage American inventors from undertaking the introduction of their improvements. For example, in Russia the expenses of securing a patent are very heavy, and the grant only lasts for ten years. The formation of companies, the inauguration of new enterprises, the movement of individuals, are all burdened and discouraged by governmental surveillance and official interference. At the present Moscow exhibition, the best specimens of Russian cotton are those raised from American Sea Island seed. The display of American sewing machines is quite large; although few, if any, of the machines came from this country. They were mostly made in Germany, and are copies of our patterns.

The celebrated American yacht Sappho is now in England, and Mr. Douglas, her owner, has challenged all the British schooner yachts to race with him across the channel and back. It is believed that the Sappho can beat anything there is afloat of equal size in European waters.

Recent Patent Decisions.

APPEAL FROM THE BOARD OF EXAMINERS-IN-CHIEF IN THE MATTER OF THE APPLICATION OF PHILIP C. SCHUYLER FOR LETTERS PATENT FOR IMPROVEMENT IN FLOUR SACKS.—DECIDED JULY 31, 1872.
Leggett, Commissioner.

The alleged invention in this case is a flour sack, made of a fabric consisting of cloth and paper attached to each other; to be made in such a manner that the cloth shall be on the outside.

The applicant is rejected upon an application made by Charles E. Howland, who invented a bag made of precisely the same fabric, except that he describes it as having the cloth on the inside and the paper out; in other words, Howland's bag is made of a fabric with one side out, and applicant's of exactly the same fabric with the other side out.

It seems to me ridiculous to talk of the difference between these two bags constituting an invention. The reference I regard as well made and as fully answering the claim of the applicant; but even in the absence of any reference I would not regard a bag made of such a fabric as being patentable.

Bags have long been made of cloth, and also of paper. The fabric consisting of paper and cloth, or a fabric having one surface composed of paper and the other of cloth, is old, and has been used for a variety of analogous purposes for many years. To say that a person entitled to the use of this fabric should not have the right to make it into so common an article as bags, with either side out that he might prefer, would be placing a restriction upon the use of the article which is not justified by the patent laws nor by common justice.

The decision of the Board is affirmed.
HENRY AND F. J. L. BLANDY.—EXTENSION OF LETTERS PATENT No. 21,059, FOR IMPROVEMENT IN STEAM ENGINES.—DECIDED JULY 27, 1872.

Novelty.—Diligence.—Remuneration.

Where the validity of the patent has been sustained in court, and no new references are brought to the attention of the Office, the novelty of the invention patented must be regarded as unimpeachable.

Where the inventors have manufactured their improvements, but their reasonable profits have been reduced by inferior machines put upon the market by infringers, and where active and persistent efforts have been made to bring such infringers to justice: *Held*, that it cannot be charged upon the inventors that it is through neglect or fault of their own that they have failed to secure reasonable remuneration for their invention.

The invention having been proved of great practical utility in its application to portable steam engines: *Held*, that a net profit of \$9,000 is an insufficient remuneration for the time, ingenuity, and expense bestowed upon the invention.

Thacher, Acting Commissioner.

United States Circuit Court, Western District of Pennsylvania.—Smith et al. vs. Frazer et al.—In Equity.

PATENT OF J. R. SMITH, AUGUST 27, 1867, FOR STONE CRUSHER—MECHANICAL MODIFICATIONS WITHOUT INVENTION—NOTICE OF PRIOR KNOWLEDGE AND USE.
MCKENNA, Circuit Judge.

A claim for introducing water into the pan of a stone crushing machine to aid in disintegrating the rock and to cleanse and discharge the pulverized sand, the auxiliary and dependent relations of the water to the mechanism and its cooperative agency being fully set forth in the specification, held to embody patentable subject matter.

The patent of John R. Smith pronounced invalid in view of the Chilian mills previously used in crushing and washing ores.

Where the gate in a machine for crushing and cleansing gold ores had been placed in the side of the pan, above the bottom, with view to discharging the water and lighter impurities, but retaining the gold: *Held*, that if it were desired to discharge the entire contents of the pan, this could so obviously be effected by extending the aperture to the bottom that the change would fall far below the rank of an invention. To conceive and make it would require but a small amount of mechanical knowledge.

If, in the notice of special matter relating to the novelty of the patented invention, the sources of defendants' proofs are indicated with such distinctness that the complainant can identify and resort to them, the purpose of that provision of the law which requires the defendant to give "names and residences of those whom he intends to prove to have possessed a prior knowledge of the thing, and where the thing had been used" is answered.

Where the defendants gave the name of certain mining establishments in a specified county as the places where the prior use of the invention had taken place: *Held*, that they had fairly supplied the complainants with the means of verifying their proofs, and had filled the measure of their legal duty.

Complainants, John R. Smith, William H. Denniston, and Christian Snyder; defendants, William E. Frazer, Harvey Fry, George H. Holtzman, and David L. Furnier, trading as Fry, Frazer & Co.

The claims of the patent were as follows:
1. The introduction of a stream or flow of water into the crushing pan of a revolving sand, sand rock, or sandstone crusher, to aid the crusher or crushers in disintegrating the rock, and to cleanse and discharge the pulverized sand, substantially in the manner and for the purposes hereinbefore set forth.

2. The rotating and revolving crushing wheels, *b*, in a sand rock crusher, in combination with a crushing pan, *a*, provided with a discharge gate, *s*, and a water supply pipe, *h*, or its equivalent, all constructed and operated substantially as and for the purposes above set forth.

Bakewell and Christy, for complainants; John Mellon and John H. Bailey, for defendants.

THE AMERICAN INSTITUTE OF INSTRUCTION held its forty-third annual meeting in August last at Lewiston, Me. Several of our prominent and indefatigable workers in the cause of improved education were present, and quite a number of valuable papers were read. Mr. Nathaniel T. Allen, who, as an agent for the United States Government, has visited Prussia and examined the educational system there in vogue, stated that he found the Prussian system to be far ahead of the American system, and urged a course of united action among educators which shall bring ours up to a level with theirs. He, however, considered the Prussian system to be defective in the following particulars, namely: 1. It is autocratic; 2. It is unjust to girls; 3. It is thoroughly undemocratic in its teachings; 4. It is sectarian.

Glass Lined Iron Pipes.

This is a new and valuable manufacture now carried on in this city by the Glass Lined Pipe and Tube Company of New York. Through these pipes the water comes in contact with nothing but glass, and cannot become impregnated with any oxide, as in all metallic pipes; there being no oxidation or corrosion, their purity and durability cannot be questioned. The inner surface of the pipes being perfectly smooth, there is no friction, and the flow of water is greater, and can be carried up in houses with less pressure than through any other pipe of the same diameter. The lining between the iron pipe and the glass tube inside consists of plaster of Paris, a nonconductor of heat; this prevents the water therein from freezing in winter and keeps it cooler in summer, thus saving these pipes from bursting. The lining in the pipes is protected against any moisture by a layer of hydraulic cement, which is put on the end of each length of pipe, thus preventing the plaster of Paris from being affected. The resisting power of the glass lined pipe is five times greater than lead, and the difference in the expansion and contraction between iron and glass is overcome by the compressible plastic substance between the two materials. The glass lined pipes are invaluable for conveying chemicals or any other liquids that are to be kept free from impurities, and also for ale and beer pumps, condensing of salt water on steamers, purifying gas, and for numerous other purposes. It is a fact well known that quite a percentage of gas escapes through the pores of the iron. When lined with glass this waste is prevented, and the pipes rendered much more durable. Great expense for continual repairs is almost entirely overcome, and the cost of this pipe is not much above lead pipe.

New Process for the Preservation of Alimentary Substances.

In a communication recently made to the French Academy, M. Sacc described his process and submitted specimens of meat and vegetables so prepared. The food to be preserved is placed in a barrel, with layers of powdered acetate of soda, in the proportion of one fourth by weight. In winter, the temperature must be raised to 20° C. After twenty-four hours, the barrels must be turned, and after forty-eight hours the process is complete, the salt having absorbed the water of the meat, which may then be headed up in the pickle, or dried in the air.

If the barrels are not full, they are to be filled up with brine of one part acetate of soda in three parts water. The pickle is evaporated down to half its bulk, crystallizing and regenerating for use one half the salt employed.

The mother liquors form an excellent extract of meat, representing three per cent of the total weight, and must be preserved and poured over the preserved meat when prepared, so as to restore the original flavor of the fresh meat, of which it is otherwise bereft by the retention of the potassic salts in the pickle.

For cooking, the preserved meat must be steeped for from twelve to twenty-four hours, according to size, in tepid water containing ten grammes of sal ammoniac per liter. This salt decomposes the acetate of soda contained in the meat, forming salt, and also ammoniacal acetate, which causes the meat to swell, and restores to it the odor and acid reactions of fresh meat.

The bones also yield an excellent and tasty soup. By adopting the precaution of simply removing the intestines, animals, etc., may thus be preserved whole. Fish, poultry, and game have been so treated, with excellent results. Meat may be dried in a stove, losing one quarter in weight thereby, in addition to one quarter lost in pickling; but, in general, fish cannot be dried at all.

Vegetables are similarly prepared, losing generally five sixths of their weight; before salting, they should be heated until they lose their rigidity. In twenty-four hours they may be pressed and dried in the air. For use they must be steeped for twelve hours in fresh water, and then boiled as if fresh. Potatoes must be steamed before salting.

Finally, all food thus prepared must be kept perfectly dry, as the salt absorbs moisture from the air.

New Galvanic Battery.

M. Gaiffe has recently introduced to notice a new electric pile, devised by him with a special view to its universal cheap production. It resembles in form Callaud's cell, which has been employed for some years on telegraph lines, but the elements are different. The poles are rods of lead and zinc, immersed in a ten per cent aqueous solution of ammoniacal chlorhydrate, contained in a suitable vessel. The zinc rod is only half the whole depth, whereas the lead rod reaches to the bottom, where there is a layer of saline oxide of lead (minium). The electro-motive power of this pile is about one third of that given by a Bunsen couple; its internal resistance is small and little variable, as the chloride of zinc formed does not sensibly change the conductivity of the exciting liquid; its constancy is great; and finally the cost is merely nominal when the circuit is open.

The Medicinal Use of Carbolic Acid.

Carbolic acid is very largely employed in the treatment of wounds and festering sores of all descriptions; but hitherto few experiments have been made with it as an internal remedy. There is good ground, however, for believing that in certain cases it will be found a very valuable therapeutic agent, and under these circumstances the *Lancet* describes some experiments which have been made by two French savants to ascertain in what doses it may be poisonous.

MM. Paul Bert and Jolyet, of Paris, have undertaken experiments to make out this point. Between forty-five and

sixty grains will kill a dog of large size; nor should it be concluded that a man could bear a dose in proportion to his weight compared to that of the dog, as thirty grains of hydrochlorate of morphia have been injected into the jugular vein of a dog without killing him. Of course one fourth of this dose would kill a man. The above mentioned authors state that carbolic acid is a powerful poison, which, very imprudently, is left in the hands of anybody, either in solution or in the solid state. The former is the most dangerous, as some weak solutions for internal use are sold, as well as very strong ones intended for external use. Thus mistakes may easily occur. MM. Bert and Jolyet find that carbolic acid acts like strychnine on the excitability of the spinal marrow. It increases its sensibility, like strychnine, at first; but it diminishes that sensibility, or completely abolishes it, when the convulsive stage has exhausted the medulla. The phenomena resulting from carbolic acid are said by our authors to be quite similar to those produced by chloroform, chloral, ether, woorara, and the section of a motor nerve.

Importance of Truth in the Cultivation of the Memory.

When we reproduce what we have seen or otherwise experienced, it must be with scrupulous fidelity. No details must be filled in by the imagination. It is one of the most difficult things in the world to speak the exact truth, or even to represent to ourselves the exact truth. If we hear an event frequently related, we soon begin to confuse it with our own recollections. In this way, honorable and conscientious persons have testified to witnessing occurrences which really took place before they were born, but which had been often repeated to them in childhood. The imagination is an active and deceitful faculty, often putting on the guise of recollection. Without the most vigilant care to distinguish the two, men may come to utter the most absurd falsehoods, without any suspicion that they are not telling the truth. Imagination is but a rearrangement of our experiences, and the faculty of taking note of this rearrangement gets untrustworthy without a persistent and conscientious exercise of it. Hence, though, as the proverb says, liars have need of good memories, they are of all men the least likely to have them. The best cultivation of the memory, therefore, forbids us even to lighten the color of a narrative, or sharpen the edge of a witticism, when professing to narrate what has occurred, but to accept dulness rather than admit inaccuracy. —*American Exchange and Review.*

The Reffye Cannon.

This piece, so called the Reffye, after its inventor, is a gun recently employed in the French artillery; it is a breech-loader, and can throw a projectile weighing 7 kilogrammes (15½ lb.) to a distance of 5,500 yards.

This gun combines the lightness and portability of field pieces with the accuracy and range of siege guns of average caliber. The grooves are numerous, in order that an equal action may be imparted to the whole surface of the lead-covered projectile. The gun is of bronze, made of 100 parts of copper to 11 of tin. The total length of the piece is 6ft. 8½ inches, the diameter of the bore is 3 5 16 inches, and the weight of the complete weapon is 1,320 lb. The charge is divided into two parts, the cartridge and the projectile, their respective lengths not permitting of their being united. Forty-two ounces of compressed powder, arranged in disks, form the charge, which is placed in a metallic envelope, the net price of which, complete, is 1-10 francs. As to the projectile, it is cylindrical, of cast iron, 9½ inches long, and covered with a zinc envelope. The shells are ignited by a percussion fuse. This type of ordnance, rendered celebrated during the defence of Paris, principally on the plateau of Avron, will play an important part in the future of French artillery.

CERESINE.—Ceresine is a new product destined to play an important part as a lighting material. It is obtained from ozokerit or fossil wax by the following process: Ozokerit is heated up to a temperature ranging from 250° degrees to 300° Cent. in order to separate, by volatilization and subsequent condensation, the liquid oils. The mass being cooled down to 60°, it is heated with from 10 to 20 per cent of the sulphuric acid of Nordhausen. The temperature is then raised to 100°, and care is taken to maintain this heat until the precipitation of the carbon takes place and forms a viscous residue, which is carefully separated from the supernatant oils, heated and then treated with about ten per cent of diluted sulphuric acid, afterwards neutralized by aid of an alkali. The mass is then heated to about 180°, poured upon plates and pressed through linen cloths in order to separate the greasy matters; this residue of wax can then be melted and filtered. The product is ceresine, which is employed in the manufacture of candles.

LEE, THE LEARNED CARPENTER.—Samuel Lee, Professor of Hebrew at the University of Cambridge, England, was seventeen years of age before he conceived the idea of learning a foreign language. Out of the scanty pittance of his weekly earnings as a carpenter, he purchased a book, and when this was read, he exchanged it for another, and thus he advanced in knowledge. He had not even the privilege of balancing between reading and relaxation, but was obliged to pass directly from bodily fatigue to mental exertion. During the six years previous to his twenty-fifth year, he omitted none of the hours usually appropriated to manual labor, and he retired to rest regularly at ten o'clock in the evening, and yet at the age of thirty-one years he had actually taught seventeen languages. This illustrates that "where there is a will, there is a way."