Correspondence

The Ames "Union" Gun a Practical Triumph.

MESSRS. EDITORS:—In defiance of the theories of ordnance officers, of both the army and navy, the value of cohesion as a mechanical means of obtaining strength, is being fully developed in the Ames wrought-iron gun "Union." This gun aptly illustrates the value of two antagonizing principles in politics and mechanics—the "Union" against secession as a principle of strength, and wrought-iron against cast-iron as a material for guns. The granulous crystalline properties of cast-iron render it unfit to be brought under the separating tendencies of powder, a fact beginning to be realized in the loss of life from the bursting of cannon.

The trial of this "Union" gun has been in progress since Sept. 1st, under direction of Gen. Gilmore, Major Laidley and Commodore Hunt, who, after witnessing its tenacity under the most trying circumstances of excessive charges of the strongest powder, with projectiles which did not and could not be made to fit any gun, from their roughness of manufacture, expressed a desire to see how these guns were made, and proceeding to the iron-works at Falls Village, satisfied themselves of the value of the material and mode of making the gun, and returned with different impressions. After firing 600 rounds the Commission determined to take ranges. The time selected was the 20th of October—a fine day if we except the fresh breeze blowing from the gun toward Long Island shore.

Major Laidley had taken position near the gun with a plane table to note the angles at which the projectile struck the water. Commodore Hunt was at Point-no-point, E.S.E., two miles distant, with a plane table to note the angles, from his position, at which the shot struck the water. Another held a stop-watch to note the time between the flash of the gun and fall of the projectile. Observation was also taken on board of the "Light-ship," ten miles distant, almost directly in range of the gun, by Colonel Morris at the request of Major Laidley. Immediately in front of the gun, about 100 feet distant, was a large embankment of sand within an inclosure of posts and planks. Several of the projectiles of the morning firing were seen and noted on board of the "Light-ship;" one of them fell about two and a half miles from the vessel, or more than seven miles from the gun. In this instance the projectile was seen to strike the water two seconds before the report was heard. The gun was fired 45 times during the day, the charges varying from 25 to 30 pounds of No. 7 powder—the elevation varying from 30 to 34 degrees. The projectiles were of the Hotchkiss pattern, the shell averaging 104 and the shot 125 pounds; some having three flutes, others five, and others none; the workmanship of these projectiles was not creditable to the maker, and it is believed that with cylindrical projectiles of the same pattern, properly made, a range of an additional mile would have been obtained with the same charge of powder. The greatest time of flight was 43 seconds; the fall of the projectile in the water could be distinctly seen. Thirteen charges were subsequently fired with four patterns of projectiles. The two first were Gen. Gilmore's pattern, weighing 151½ pounds each, with 25-pound charge and 13 degrees elevation. The range was very good for the small angle of elevation. Four shells of the Stafford pattern (with an improvement upon them) weighing 110½ to 112 pounds, were also fired, two with 13 degrees, another with 17, and another with 23 degrees elevation, and, with 20 pounds of powder, obtained a very good range, the two latter in 26 and 27 seconds respectively. Two solid subcaliber shots of the bolt pattern were also fired, designed for penetration. The remaining five charges were with projectiles of the Hotchkiss pattern, which terminated the work of the day, the powder being exhausted. The gun has been fired 700 rounds officially and 13 times unofficially, and the commission are unanimously of the opinion that "no gun ever fired so well, or stood so much as this gun;" they recommend that it be bored out to eight-inch caliber and put into service. Gen. Butler has requested the President to permit him to have some of these guns to throw shell into Richmond. J. G. R.

New York, Nov. 3, 1864.

Preserving Potatoes in Molasses.--Government Vinegar.--Repeating Rifles.

MESSRS. EDITORS:—Your issue of Oct. 8th, contains a statement made by Professor Reed, before "the Polytechnic Association," that he had seen potatoes which had been preserved in molasses "brought back from a two years cruise which were perfectly sound." On calling the attention of two old whalemen who have "cast anchor" on this part of the Prairie State to this publication, both agreed that they were familiar with the practice of using potatoes and molasses as an anti-scorbutic, but that the potato became worthless, having parted with all its properties, nothing remaining but a tasteless insipid mass of vegetable matter. One of these parties has made two whaling voyages, and gives the process of making what the whalemen call "potato wine." Molasses casks are filled with potatoes and molasses; in the course of some months the molasses has extracted all the properties of the potato, and fermentation accelerated by the motion of the vessel has taken place, producing a palatable liquid, or "potato wine," which is served out to the crew, and which is claimed to be a preventative of scurvy. Now I would like to find out which of these statements is correct; or are they both to be relied on? Cannot some of your correspondents who are practically engaged in the business let us know all about it? What say you, whalemen?

Potatoes are considered one of the very best of our anti-scorbutics, but their liability to freeze in winter and grow in warm weather, renders their transportation in large quantities—such as our gallant armies require—a matter of the greatest difficulty, and taking into consideration the large crop of "sorghum molasses" which has been raised in the west this year, no better use could be made of it than the manufacturing of some 50,000 barrels of "potato wine" for the supply of our troops.

Now that I have got on the army question, let me say a few words about that infernal and villainous compound, "army vinegar," that really destroys more teeth and constitutions than the scurvy ever can.

The Government never had, nor never will succeed in having delivered, the quantities of pure cider vinegar called for by the terms of contract. There is no such article in market. It may with safety be asserted that ninety per cent of all the cider vinegar issued by our quartermasters is made with mineral acids of the most pernicious character. The only safe course that the Government can adopt for securing a supply of pure vinegar, is to erect establishments to be under their own supervision, for the manufacture of vinegar from malt. "Malt vinegar," which can be made in any quantity, being just as good as "cider vinegar," which cannot be had in large quantities at any price. It won't do to trust contractors where chemistry can be made available in substituting a cheap and villainous article for a costly but genuine one.

[The molasses in fermenting would form rum, and the starch in the potato would also be converted into alcohol. The liquor would doubtless make the sailors drunk, and the potash in the potato would, if not separated, tend to prevent scurvy.—EDS.]

BREECH-LOADING REPEATING RIFLES.

The "Rip VanWinkles" of the War Department have at last waked up to the importance of this arm of the service, and by contracting for the delivery of 35,000 Spencer rifles may in part redeem themselves. How there could be any great deliberation about arming our men with repeating rifles long before this cannot easily be explained. The testimony of soldiers from the front, who have seen the advantages of them, is almost unanimous, that no body of rebel troops can be brought into action against men known to be armed with repeating rifles.

The — Illinois were so well satisfied of the superiority of the repeating rifle, that at an expense to themselves of $40 apiece they purchased the Henry rifle, the Government giving credit for the price of the musket not issued, and agreeing to furnish suitable ammunition. Last spring the Colonel of the — Illinois Cavalry made requisitions on the War Department for horses and repeating rifles for his regiment. The rifles came, with an intimation that it was doubtful about the ability of the Government to furnish horses. He remarked that "he did not care much about horses now that he had secured 'repeating rifles,' his regiment 900 strong was equal to a brigade."

It will be found that the secret of Sheridan's success is the 10,000 cavalry armed with repeaters or breech-loaders. In the last battle the infantry on our wing, armed with muskets, were repulsed, and the rebels when attacked by the cavalry on the other wing—armed with repeaters—converted their success into a route. J. T. D.

Springfield, Ill., Nov. 1, 1864.

The Wheel Pendulum.

MESSRS. EDITORS:—Permit me in reply to the communication of your correspondent, A. S. C., in No. 19 of the present volume of your paper, to suggest that there are several causes why the vibrations of the wheels mentioned by him should not be isochronous. The first may arise from the rolling friction, which, though proportional to the weight of the wheels, is not proportional to their velocity. Hence the wheels, moving with a velocity dependent on the extent of their vibration, and varying with their position in the space through which they move, meet with a varying resistance, unfavorable to isochroniety. A second is, that it is not true that a point in any part of the wheels except their circumference describes a cycloid during their vibration. Any point within the circumference describes a curve varying from a cycloid in proportion to its nearness to the center, which vibrates in a right line. Hence the center of gravity of the wheels, which is the locus of their moving force, does not describe the isochronous curve.

A third reason may be thus assigned; the center of gravity of any wheel or cylinder at rest upon a horizontal plane will lie somewhere in a perpendicular let fall from its center of extension to the supporting plane. If the wheel be now made to oscillate, no point in such line will describe a cycloid. As shown before, no point within the circumference will describe such a curve, and supposing the center of gravity to occupy the point where the perpendicular intersects the circumference, it will describe not one cycloid, but parts of two, joining each other in an acute angle and lying with their convexity upward, conditions unfavorable to isochronous oscillation. Were it possible to convey the center of gravity to that point in the circumference which is perpendicularly over the center of the wheel when at the middle of an oscillation, it would describe a true cycloid, and the vibrations would be isochronous. In the second experiment of your correspondent, the weight of the hinge by which his wheels were fastened together probably constituted an approach to this latter condition. I do not think the angle at which the wheels were joined had any very considerable influence. If A. S. C. will place the weight that represents his pendulum at the top of his wheel, and can contrive to support it in that position, he may succeed in obtaining an isochronous movement. I would suggest, however, that he support the wheel, by magnetic attraction or otherwise, under the plane on which it rolls. A weight then placed upon the lowest point of its circumference would describe the isochronous curve. R. D.

Washington, D. C., Nov. 5, 1864.

Tool for Scaling Boilers Wanted.

MESSRS. EDITORS:—Our naval engineers stand greatly in need of a tool that will effectually and expeditiously remove the scale from the tubes of Martin's boiler, which, you are aware, is in general use throughout the service. Here is an opportunity for the exercise of the genius of the readers of the SCIENTIFIC AMERICAN.

In former years, when the duties of our naval vessels were not so exigent, scale was not allowed to accumulate on the boiler tubes to a greater thickness than $\frac{1}{8}$th or $\frac{3}{16}$ths of an inch. It was then considered very dangerous to allow it to collect to a greater extent. The tools then used were effectual. But now it is not unusual to allow scale to accumulate to the thickness of $\frac{1}{2}$, and often $\frac{5}{8}$ths of an inch, upon the tubes.

We will not question the danger of such practice; at all events it does not seem to trouble the minds of

our naval officers, though many of our naval engineers have protested against it.

Now the usual scraping and chiseling scaling tools, formerly introduced, are no longer effectual. It is true, tubes are scaled with them, but at the cost of great labor and time, and often the boiler is disabled by injuries inflicted.

The most expeditious tool used at present consists of a double-lipped chisel, which fits the bore of the tube, and is driven down by a hammer, removing the scale sometimes in fine powder, sometimes in lumps, according to its thickness. This being the most expeditious tool, it is in general use; but it is most injurious to the boiler tubes. The heavy blow necessary to operate the tool parts the tube from the tube sheet, and often bursts them at the center. We need a boring tool to remove the scale that can be easily handled, is durable, simple in construction, and expeditious. As long as the present system of scaling is continued, the boilers of our naval steamers will be worthless. The practice of allowing scale to accumulate to such great extent is deplorable. It is unfortunate that our naval officers permit it. Scale should never be allowed to collect to a greater thickness than one-eighth of an inch, and then it can be readily removed, and much time and expense saved.

As it is not probable this article will have any influence upon the officers who command our fleet of steamers, let the inventors endeavor to supply us with a tool that will remove five-eighths of an inch scale from boiler tubes without injuring them. All tools operated by hammering are objectionable for obvious reasons. For the convenience of those who may feel inclined to attempt the desired invention I will state that the tubes of Martin's boiler are $1\frac{3}{4}$ inches internal diameter, 27 inches long, and that the distance of shell of boiler from the tube sheet is about 30 inches.

B. Edme. Chaissaing,
Chief Engineer U. S. N.

Off Charleston, S. C., Oct. 26, 1864.

Sweet's System of Screw Bolts, Etc.

Messrs. Editors:—In addition to the many suggestions already made in your paper concerning a "uniform system of screw bolts, etc.," permit me to present the accompanying tables from the trestle board of Mr. John E. Sweet, the mechanical draftsman of the very enterprising firm of Sweet, Barnes & Co., of this city.

Mr. Sweet has traveled extensively through Europe and this country, for the investigation of such subjects as belong properly to the department of mechanical engineering, and at one time was employed by an extensive firm engaged in the manufacture of bolts in Birmingham, England, to furnish plans for some of their machinery, which made him quite familiar with the English system, its advantages and defects.

There is no doubt that any system will find objectors, and that there will be some practical mechanics even who will persist in making bolts and nuts according to their own preconceived or fancied notions. But if it is desirable to have a "uniform system" why may not a plan be adopted which is a combination of the best features of those most popular with an element which is seldom mooted among theorizers on this subject, but one that will save more to the manufacturer than any other, or perhaps all the other points combined? I refer to the "relative sizes of the heads and nuts," a point to which you recently referred the Committee of the Franklin Institute as one that would probably be most difficult of adjustment.

The pitch of the threads, their angles, and the various theories of weight, strength, etc., all dwindle into insignificance when compared with that pernicious but quite "uniform system" of monkey wrenches. Their destruction in a machine shop, to say nothing of their own actual cost, cannot be surpassed by any species of the monkey tribe, and when we see, in otherwise nicely kept shops, a host of gnawed and mangled heads and useless nuts caused by them, and their careless use, I think they would be more properly termed "gorillas."

Each bolt of one size should have a nicely-fitting wrench, such as our best machinists always furnish with machines, and it is to forward such a cause that I have persuaded Mr. Sweet to let me send you his plans, which are pronounced by all "practical" mechanics who have examined them to be well worthy of adoption.

You will observe that the dimensions of all the parts are even divisions of standard rules in common use in this country, and what he terms his "standard" bolts, from a $\frac{1}{4}$ to $\frac{4}{4}$ths, vary by $\frac{1}{8}$ths; all above an inch vary by $\frac{1}{4}$ths. But when it is desired, as is often the case, to use an intermediate size, as $\frac{3}{16}$ths, $\frac{5}{16}$ths, etc., these shall be termed "bastards," and their heads and nuts shall be made the size of the head next larger or the nut next smaller. Consequently a wrench or key that will fit on a nut on the lower "standard" will fit both ends of the "bastard" and the head of the next higher "standard," thereby saving at once half the wrenches required for the Whitworth system. Observe also that if the standard sizes vary by $\frac{1}{8}$th up to $\frac{4}{4}$ths, and $\frac{1}{4}$th above an inch be adopted, the wrench that will exactly fit a standard nut will also exactly fit the head of the next larger standard, and cannot be used at all on the other sizes except the "bastards," and therefore a careless operative will be compelled to use the nicely-fitting wrench or none at all.

By a reference to the annexed table of the comparative sizes it will also be apparent that Sweet's system is a very fair compromise with all the systems in most common use in this country and England, at the same time giving the workman an opportunity of using intermediate sizes; it is also capable of being measured by rules which are at hand, and with which he is already familiar.

COMPARATIVE SIZES OF BOLTS, HEADS, AND NUTS IN ENGLAND AND AMERICA.

No. Threads to the Inch.	20	18	16	14	13	12	11	10	9	8	7½	7	6	6	5½	5	5	4½
Diameter of Bolts	¼	5/16	3/8	7/16	½	9/16	5/8	¾	7/8	1	1 1/8	1 ¼	1 3/8	1 ½	1 5/8	1 ¾	1 7/8	2
Extremes in Common Use. Minimum Nuts.	1/16	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16
Extremes in Common Use. Maximum Nuts.	4/16	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	13/16	14/16	15/16	16/16	17/16	18/16	19/16	20/16	21/16
Whitworth's Standard	2/3	3/4	4/5	5/6	6/7	7/8	8/9	9/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20
Seller's Scale for Nuts	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8
Sweet's Scales. Nuts	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8
Sweet's Scales. Heads	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8	2 1/2	2 5/8	2 3/4	2 7/8

As to the threads, the whole numbers are used, except it may be for large sizes, the same as proposed by Messrs. Sellers, of Philadelphia; commencing with 20 to the inch for $\frac{1}{4}$-inch bolts, and so on, as per table; and may I not add that if the simplicity and convenience of such a system will not entitle it to be worthy of adoption, then may we conclude that "the day of compromises" is in fact pretty much passed.

Boyd Elliott.

Syracuse, N. Y., Nov. 7.

[We are pleased to receive Mr. Elliott's communication. Since we began the publication of the cone-pulley rules and those for pitches of screw threads, formulas for gears, etc., in this volume, we have received many letters of thanks from mechanics, expressing their satisfaction at the information. Our correspondent is too severe on the screw wrenches. For fine-polished nuts they are not desirable, but they are indispensable in machine shops, and can be made available in many places where a fixed wrench could not be used at all. The tracings referred to cannot be published.—Eds.

Preparing Furs for Market.

Messrs. Editors:—In the discussion of the Polytechnic Association, reported on page 292, current volume of Scientific American, I see it stated under the head of "Furs and their Preparation" that Dr. Parmelee said:—"The first process in dressing furs for use belongs to the hunter, who, on capturing the animal, strips off the skin and hangs it up to dry in the open air without fire. If it be well dried, and carefully packed, it reaches its destination, however distant, in good condition; but, if any moisture be left, or, if it be packed with others imperfectly dried, so that the slightest putrefaction takes place, then it is unfit for use so far as the furrier is concerned. A minute examination of the skin is, therefore, his first business. The next step is to cleanse it from greasiness. This is accomplished by the use of water, bran, alum and salt."

I have seen and dressed hundreds of thousands of furs of all kinds, both in New York and London, but I have never seen any practical workman use this process; farmers and Indians use it where they do not understand any other. I do not believe that a man can put what we call a leather on a skin with the use of salt and alum; for when it is damp weather, the fur will be soft, and in dry weather it will be hard and stiff.

The process that has been used these last thirty years, both in Germany and England, is as follows:—

When the furs come from the hunter, in the raw state, to the furriers, they are sorted over and then prepared for tanning; the term we use is "leathering." They are greased with common grease, on the leather side, and then put in a tub large enough for a man to get into and work easily at them. A cloth is then bound around the man's waist so as to keep the steam in the tub, and the skins are then worked by the feet until warm, which takes an hour or more; they are afterward taken out and greased again; when the skin and grease are worked again a few handfuls of mahogany sawdust are thrown in and worked to leather. When the skins are leathered they are taken out and pulled through a rope; they are then pickled over night in water and sawdust, and in the morning they are ready for the flesher. When fleshed they are hung up to dry, then greased again, and leathered once more; they are then taken out and the fur combed, well beaten and drawn over the knife, or "pared" as we call it. The skins are again put into the tub with plenty of fresh, clean sawdust, and worked into the sawdust until the fur is perfectly freed from grease. It may be necessary to change it two or three times. The fur is then taken out and well beaten and corned, and it is then ready for the cutter. This is the way all fine furs are dressed, from the muskrat to the Russian sable. Buffalo and bear skins are dressed in a somewhat different style, but still under the same general processes.

Charles A. Reight.

Middletown, Orange Co., N. Y., Nov. 7, 1864.

An Inventor's Experience.

Messrs. Editors:—Enclosed please find fifty dollars, expenses for the Patent Weather Strip. Accept my heartfelt thanks, also, for your valuable services in procuring me my patent; I shall always feel obliged. If I had applied to you in the first place I would have been considerably in pocket, which makes the old adages correct, that there is nothing like putting "the right man in the right place," "every man to his trade." In regard to your agency and paper I will most certainly recommend both to my friends.

S. G. Spicer.

Philadelphia, Nov. 7, 1864.

[The writer of the above after a great deal of trouble and vexatious delay, at last put his case into our hands. The result is, the patent is ordered to issue, and, like hundreds of others who have confided their business to us after having unsuccessfully tried other agencies, he has received his just deserts, and is gratified. Other persons having meritorious inventions, and who have had trouble in getting their claims allowed, owing to the incompetency of their

agents, or for other reasons, are cordially invited to correspond with the publishers of this paper regard ing their cases.—Eds.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Shoe for Mill-stones.—This invention consists in providing the shoe of the hopper of a pair of mill-stones with a screen arranged in such a manner as to effectually separate sand, cockle, and other impurities from the grain before the latter passes into or between the stones. The machines now used for cleansing grain, previous to the grinding thereof, do not perform the work thoroughly; some sand and other impurities will escape, especially if the grain be quite foul. This improvement will separate these impurities from the grain, in consequence of the latter passing through or over the shoe in small quantities just previous to entering into the eye of the stone. Henry P. Crouse, of Hartland, Michigan, is the inventor.

Improved Faucet.—This invention relates to certain improvements in the construction of cocks or faucets whereby the principles and features of a compression valve and the opening and closing motions of the ordinary plug valve are combined, and an article produced which is simple in construction, durable in wear and which can be operated more easily than any other. John Broughton, of 41 Center street, is the inventor.

Cork Hat.—This invention consists of a cork hat made of two layers of cork which are prepared with composed oil, and packed or attached to an intervening piece of canvas, muslin or other textile fabric, in such a manner that a hat is produced which is durable, elastic and impervious to water and to the rays of the sun. By preparing the cork with such oil the hardness is removed from the same, and it is rendered soft, elastic and impervious to water. Thus prepared, the cork is applicable to hats, bonnets, caps and, in fact, to head coverings of every description. The hats made according to this invention are superior for lightness, strength, durability and coolness, and it is particularly applicable to hats used in summer and in warm climates. A. C. Crondal, 706 Broadway, is the inventor of this improvement.

Machine for grinding and polishing Saws.—This invention relates to a new and improved machine for grinding and polishing hand saws, whereby the work may be done in a very expeditious and perfect manner. The invention consists in the employment or use of a horizontal wheel provided with grinders or polishers, and having its shaft fitted in a suitable framing on the top of which there are placed a series of boxes to receive the saws to be operated upon by the grinders or polishers, which, as the wheel rotates, pass over the saws and perform the work. J. H. Weaver, of Waynesville, Ohio, is the inventor.

Raising Machine.—The object of this invention is an improvement in that class of machines which are used to raise or turn up the edges of sheet metal articles, such as plates, dishes, waiters, coffee-trays, etc., and it relates particularly to a machine intended for producing the raised edges of oval or elliptical coffee-trays. The invention consists in the employment or use, in combination with the rotating raising dies, of a swinging platform which can be raised to, and retained at, any desired inclination, in such a manner that the blank can be gradually brought from a horizontal to an inclined position while its edge is exposed to the action of the raising dies, and thereby the rim is turned up and shaped according to the configuration desired. In turning between the dies the blank is guided by its edge being held in contact with two adjustable stops, which determine the hight or width of the rim to be produced. Henry Facks, of New York City, is the inventor.

Preparing Moldings.—This invention relates to an improvement in that class of machines, by means of which the preparation made of glue and chalk is spread upon the surface of wooden moldings previous to the application of the metal foil used in gilding. The invention consists in the employment or use of a box to contain the preparation, said box being provided with a steam or hot water jacket, and arranged in combination with an endless belt with carrying hooks acting upon the moldings to be prepared in such a manner that the preparation is kept at a uniform temperature, and applied at such temperature to the surface of the molding in even and uniform layers; also in the use of an endless carrying belt running over smooth pulleys or drums for the purpose of feeding the moldings along under the box containing the preparation, and under the scraper, in such a manner that the motion of the moldings is perfectly uniform and steady, and the jar consequent upon the use of cog wheels or toothed racks for feeding the moldings is avoided; finally, in the application of side flanges to the scraper, the under surface of which is tapering down from its inner edge to the scraping edge in such a manner that said scraper forms a receptacle to retain the preparation and to prevent it running over the sides of the molding. Gustave Henze, of 329 Fifth street, New York City, is the inventor.

The Way to Make Black Ink.

We publish in full the directions and remarks of Dr. Ure in relation to making this article of universal use:—

Nutgalls, sulphate of iron, and gum, are the only substances truly useful in the preparation of ordinary ink; the other things often added merely modify the shade, and considerably diminish the cost to the manufacturer upon the great scale. Many of these inks contain little gallic acid, or tannin, and are therefore of inferior quality. To make 12 gallons of ink, we may take 12 pounds of nutgalls, 5 pounds of green sulphate of iron, 5 pounds of gum senegal, and 12 gallons of water. The bruised nutgalls are to be put into a cylindrical copper, of a depth equal to its diameter, and boiled, during three hours, with three-fourths of the above quantity of water, taking care to add fresh water to replace what is lost by evaporation. The decoction is to be emptied into a tub, allowed to settle, and the clear liquor being drawn off, the lees are to be drained. Some recommend the addition of a little bullock's blood or white of egg, to remove a part of the tannin. But this abstraction tends to lessen the product, and will seldom be practised by the manufacturer intent upon a large return for his capital. The gum is to be dissolved in a small quantity of hot water, and the mucilage thus formed, being filtered, is added to the clear decoction. The sulphate of iron must likewise be separately dissolved, and well mixed with the above. The color darkens by degrees, in consequence of the peroxydizement of the iron, on exposing the ink to the action of the air. But ink affords a more durable writing when used in the pale state, because its particles are then finer, and penetrate the paper more intimately. When ink consists chiefly of tannate of peroxyde of iron, however black, it is merely superficial, and is easily erased or effaced. Therefore, whenever the liquid made by the above prescription has acquired a moderately deep tint, it should be drawn off clear into bottles, and well corked up. Some ink-makers allow it to mould a little in the casks before bottling, and suppose that it will thereby be not so liable to become mouldy in the bottles. A few bruised cloves, or other aromatic perfume, added to ink, is said to prevent the formation of mouldiness, which is produced by the ova of infusoria animalcules. I prefer digesting the galls to boiling them.

The operation may be abridged, by peroxydizing the copperas beforehand, by moderate calcination in an open vessel; but, for the reasons above assigned, ink made with such a sulphate of iron, however agreeable to the ignorant, when made to shine with gum and sugar, under the name of japan ink, is neither the most durable nor the most pleasant to write with.

From the comparatively high price of gall-nuts, sumach, logwood, and even oak bark, are too frequently substituted, to a considerable degree, in the manufacture of ink.

The ink made by the prescription given above, is much more rich and powerful than some of the inks commonly sold. To bring it to their standard, a half more water may safely be added, or even 20 gallons of tolerable ink may be made from that weight of materials, as I have ascertained. Sumach and logwood admit of only about one-half of the copperas that galls will take to bring out the maximum amount of black dye,

Chaptal gives a prescription in his *Chimie appliquee aux arts*, which, like many other things in that book, are published with very little knowledge and discrimination. He uses logwood and sulphate of copper, in addition to the galls and sulphate of iron; a pernicious combination, productive of a spurious fugitive black, and a liquor corrosive of pens. It is, in fact, a modification of the vile dye of the hatters.

Lewis, who made exact experiments on inks, assigned the proportion of 3 parts of galls to 1 of sulphate of iron, which, with average galls, will answer very well; but good galls will admit of more copperas.

Useful Application of "Slag."

It is with satisfaction that we are able to direct attention to the invention of an improved mode of applying blast-furnace slag to building purposes, which has lately been devised by Mr. Parry, of the Ebbw Vale Ironworks, the more so since this method appears to strike at the root of the difficulties which have hitherto been insuperable obstacles to the application of blast-furnace slag. By applying a blast of air, or a jet of steam, to the slag as it runs from the smelting-furnace in a melted state, it is suddenly cooled, and reduced to a state of extreme subdivision, so as to be easily reducible to powder, an operation that would be entirely out of the question for any purpose with the slag in its usual stony condition. By this ingenious device, the slag is converted into a material eminently suitable for the purposes of brick-making, and for the manufacture of artificial stone, and it is also proposed to use it as a manure. To any one who has visited iron-smelting works, and seen the enormous mountains of slag, or, as it is technically termed, "cinder," growing around them, and covering land which would else be available for other purposes, the importance of any means of rendering this material useful will be apparent. Those who have not had this opportunity of judging will readily understand the importance of the subject, on considering that for every tun of pig-iron made, some three or four tuns of slag are produced, and that the present make of pig-iron in this country amounts to the enormous quantity of four and a half million tuns a year.

The advantage of turning this waste slag to account would be almost incalculable, for not only would the profit of the iron-master be increased, but the cost of iron might be reduced, if Mr. Parry's method of using the slag should result in that success which there is every reason to anticipate it will meet with. Another point which is deserving of notice in regard to this application is that it is one which in its magnitude bears some proportion to that of the production of the material sought to be used. The rapid progress of building and of engineering operations is such as to offer a promising future to any good plan of providing materials for construction from other sources than those hitherto available, and probably of better quality than have hitherto been obtainable. The manufacture of bricks is one of those arts which has remained, probably, more stationary than is the case with most branches of industry, and the activity which has of late years been manifested in the attempts to produce artificial stone or building blocks shows that there is a want of something more, and, if possible, better than the old-fashioned clay brick, which has, in its time, done good service, and is, therefore, not to be despised, but which, in common with all other things, is liable to be superseded in the ordinary progress of improvement, and in consequence of the development of new requirements and new resources. We sincerely hope that this interesting invention of Mr. Parry's may prove to be all that he can hope and all that can be desired, both in advantage to himself and to the community generally.—*London Mining Journal.*

Preserved Fruit.—We are indebted to the Oneida Community, Oneida, N. Y., for some choice specimens of their preserved fruits. They are nicely put up in glass jars, and not only attract the eye but delight the taste. We recommend our friends who wish to purchase a good article in this line to call on M. L. Bloom, Agent of the Community, No. 40 Reade street, New York.