

INDELIBLE WRITING.

A paper was lately read on the above named subject, before the Scottish Society of Arts, by D. R. Brown. He defined indelible writing not to mean "indestructible" writing, for that is an impossibility, but it means writing which will endure for an indefinite period of time, and also resist known chemical agents to obliterate it without destroying the paper or parchment upon which it is written.

Old writings are very permanent. An examination of these reveals the fact that they have been produced by that wonderful substance carbon. The ruins of Assyria, Egypt and Greece, unite in giving up the black carbon which the old writers used in their caligraphy. Three thousand years have passed away since some of these writings were made, and the graves of the authors are unknown, but these carbon sketches tell us what the people on the earth then did, and what they thought. Scientific men of the present day justify the use of carbon as the most indestructible writing agent, but to apply it properly it must be combined with the paper in such a manner that it will constitute an integral part of it, incapable of removal without destroying the paper.

As all paper contains carbon, it occurred to Mr. Brown that by using a platina wire made red hot by galvanism, he could use this for a pen by tracing it upon the paper, and thus develop by burning, the charcoal in the paper itself to form the writing. The first attempt to develop this idea was a failure. When the hot platina wire was moved quickly upon the paper, it burnt through it. Thicker paper imbued with various vegetable substances were then tried, but failure attended these also. Tin foil was laid upon sheets of paper, and written upon with the platina wire; it left engraved writing upon the paper, as the foil was melted out. Brown paper having produced better writing than white, various thicknesses and different kinds of it were tried, and with one particular quality very natural and perfectly indelible writing was produced. This was due to a very minute portion of tar left in the paper. The color of the paper is objectionable, but it possesses qualities of a very useful character, it being obnoxious to insects, and not liable to be affected with damp or mold.

Great difficulty was experienced in using the galvanic pen, as the wire bent frequently, and the galvanic battery was not regular in its action. From the use of heat and a mechanical agent, the attention of Mr. Brown was directed to chemical agents to set the carbon in the paper free. Two powerful substances were tried, namely, a solution of phosphorus in bisulphuret of carbon, and strong sulphuric acid. The solution of phosphorus was found to be too energetic as a small stream of it ($\frac{1}{10}$ th of an inch) ejected from a fine tube, made deep black lines a quarter of an inch broad, and it penetrated through thick paper. It was therefore considered an impracticable substance. The sulphuric acid was next tried by writing with a fine tube. When written upon thick brown paper, and half an hour allowed to elapse, and the paper then held near a clear fire for about two seconds, deep black writing appeared. The sheet thus written upon was washed in water, aqua-potassa, nitric acid, and chlorine water, without effacing the writing. When put into the milk of bleaching powder (chloride of lime) however, the black writing disappeared, leaving clear cut lines in the paper resembling those made with a sharp-pointed instrument. The sulphuric acid may thus be employed to etch upon paper, and castings may be obtained from it. This hint may be useful to artists.

The result of Mr. Brown's experiments go to prove that he has not found a true indelible ink. Sulphuric acid has long been known to possess the power of charring white paper when exposed to a slight heat, and we have used it several times in the condition of a free sulphate of indigo for writing with upon white paper, but in every case it burned the paper, and, besides, it is unsafe to use. The old ink used by the Egyptians and Greeks was the very same kind as that employed at the present day by the Chinese, and which we call Chinese ink. It is formed into cakes, and is composed of the black or condensed smoke of camphor mixed with isinglass, and then dried. The camphor is burned and the smoke is caught by exposing a plate above the flame. The smoke adheres to the surface and is really very fine charcoal or carbon,

A Chinese scribe carries his "ink-horn" at his girdle and when his ink fails, he replenishes the bottle by grinding a stick of the "camphor-black" in water. This is a very permanent ink, but it does not flow so freely from the pen as the common inks now used, which are made of logwood, nut-galls, and the sulphate of iron. The facilities which all civilized nations now enjoy for printing, obviates the necessity which formerly existed for an indelible writing fluid, because the pen was the only printer known to the Greeks. Printer's ink is chiefly composed of carbon, the indelible agent used in the old writing inks.

IRON PLATING--IS THE WARRIOR A FAILURE?

In recent news from Europe it is stated that the famed iron-clad frigate *Warrior*, on a late passage from England to Lisbon, Portugal, excited the apprehensions of all on board by "laboring badly in the sea." The waves washed over the decks as she lay like a log in the water, "the cabins were flooded, and in nine cases out of ten she would not obey the helm." Such statements are quite contrary in their nature to the glowing descriptions which were published respecting the *Warrior's* trial trip in Stokes's Bay, in the month of October last. On that occasion she attained an average speed of sixteen and a half miles per hour, and she was said to be the swiftest as well as the strongest war vessel ever built. It was once proposed to send her to America, and the *London Times* even threatened to have her sent into the Hudson river, and thus demand terms in the face of New York and Hoboken. From the accounts that have reached us we may now feel certain that New York and Hoboken are safe.

Before her voyage to Lisbon the *Warrior* made a trip from Chatham to Portsmouth, and in this brief voyage, it is stated, she betrayed decidedly defective qualities. In alluding to one of these the *London Times* says;—

One serious defect, of an almost if not quite irremediable character, exists in the construction of iron-cased ships as constructed at present, and is fully exemplified in both the *Warrior* and *Black Prince*. This evil is the penetration of water between the teak and armor plates. This water naturally forces for its exit a passage between the joints of the armor plates; and the opinion at present is, that nothing can remedy this under the circumstances of tongued and grooved edged plates hung on a ship's sides by through bolts. Caulking is stated to be useless, and that cannot be wondered at, considering the slung weight to be dealt with and the ship's motion at sea. But the effect of the action of the water in the grooves of the plates and upon the iron bolts can only be expected to be such that in four or five years from the time of commission each ship will require replating.

If the *Warrior* had proved to be a good and safe sea-going steamer in her voyage to Lisbon, the peculiar defect in the plates alluded to by the *Times* could be easily avoided in the construction of other iron-clad frigates. The plates of this vessel are tongued and grooved like pine planking for floors. This work was executed at great expense with the object of securing perfectly tight seams when the plates were fastened to the wooden planking inside. The matching of the plates by tonguing and grooving, reduced their strength about one-third at the seams, and was therefore objectionable on this account. But the most unfavorable sign of the utility of such a heavy iron frigate is its defective sea-going qualities. Of course these remarks are based upon common reports, and they may be greatly modified when the circumstances are more fully explained.

The defects of the *Warrior* should not be urged against the utility of iron plates for war vessels. Our Western gunboats have fully demonstrated the great benefits arising from iron plates of moderate thickness. In addition to the information which we gave in the last issue of the *SCIENTIFIC AMERICAN*, the *St. Louis Democrat* states that the plating of the flag boat *Cincinnati* was very efficient. In the attack upon Fort Henry one of the largest shot struck the iron-clad wheel house, producing a fearful concussion, but it only indented the plates and did no further harm.

Operations of the Confederate Patent Office.

The *Richmond Dispatch* of the 11th Feb. says:—

We have a copy of the report of Rufus R. Rhodes, Esq., Commissioner of Patents, giving a history of the operations of the office under his control, and showing its condition on the 1st of January, 1862, from which we make up the following brief summary: Number of applications for patents during the past year, 304; caveats, 110; patents issued, 57; United States patents and assignments thereof recorded, 112; amount of fees received, \$9,000 90; amount of expenditures, \$6,188 28; excess of receipts over expenditures, \$2,812 62. The patents issued were distributed

among the several States thus: To citizens of Virginia, 15; Georgia, 9; Alabama, 7; Louisiana, 6; North Carolina, 5; South Carolina, 4; Mississippi, 4; Tennessee, 3; Arkansas, 2; Florida, 1; Texas, 1. Eighteen of the patents that have been allowed cover improvements in firearms, or other destructive implements of war, and with the view of showing that some of them have striking merit the Commissioner points to the fact that they have been adopted by the Government for use against the enemy, after trial, in preference to inventions of a similar character, which, originating in foreign countries, have received there the highest approval of scientific and military men. A considerable proportion of the mechanical improvements for which patents are sought relate to agricultural implements. It is also noted, as an illustration of the inventive genius of the South, called into action by a desire to aid the common cause, that a village schoolmaster in the State of Arkansas, has received a patent for an instrument for measuring distances without the use of logarithms or other difficult process of calculation, which, if it but fulfill the expectations of the inventor, is likely to be of immediate practical value in the adjustment of artillery to different ranges, whether in fixed batteries or in service in the field. The Commissioner is informed that the instrument is soon to be tested with guns at Nashville, and there are strong grounds for believing it will prove a complete success.

The excess of receipts over expenditures sufficiently demonstrates that the office is most prosperous in its financial department, and that it is entirely self-sustaining. The report makes various suggestions concerning the administration of the office, as well as some changes in the Patent laws, which, we presume, will receive the early attention of Congress.

It appears from the above summary of Commissioner Rhodes's report of the doings of the Confederate Patent Office, for the past year that but 304 applications were made during the whole year, which is rather a poor exhibit when the fact is taken into consideration that many of the cases were mere re-applications for patents, which were previously granted to Southern inventors by the United States government.

Lords and Locomotives.

Recently a case was tried in England in which a writ of insanity was applied for by General Windham with other rich noblemen, his relatives, against his nephew a wealthy Windham, whom they thought had rather degraded the family by marrying a girl of lower rank, and who was also in the habit of doing things very peculiar, unbecoming his high blood. One of these things was sometimes driving a locomotive, and this formed one of the specifications respecting his sanity. The case has been terminated in favor of the young Windham, and the following is the evidence of Lord Claude Hamilton, M. P., whom he obtained for one of his witnesses on the locomotive question:—

I do not consider a taste for driving railway engines a proof of insanity, and such is the opinion of many who hold a distinguished rank in society. Many years ago I joined with half-a-dozen others in studying the great motive power of modern times. We attended a course of lectures at the Polytechnic, and went into the matter as thoroughly as we could. After a time we were allowed, under proper supervision, to drive engines on railways. I must say, however, that we were not permitted to experiment with passenger trains, but were restricted to ballast and coke trains. I can assure you that it requires a good deal of skill, self-possession, coolness of head and delicacy of touch to drive a railway engine. It is decidedly an intellectual study."

More Culpable Loss of Army Horses.

In addition to the large number of horses which were lost by the improper method of placing them on shipboard, as stated by us on page 105, current volume of this paper, the *Boston Bulletin* states that 143 horses have since been killed, out of 200 shipped in the *Black Prince* to Ship Island. They had been packed on board by Col. George in pens containing ten each. These horses cost \$143 each, and thus the loss to the government, in this single case, is no less than \$17,875. The treatment of horses purchased for the army demands a thorough investigation.

At a late meeting of the Franklin Institute, Philadelphia, Mr. Howson exhibited some remnants of a rifle barrel, to illustrate the results of a recent dangerous experiment. The barrel was filled with cartridges, each cartridge consisting of a ball with a charge of powder, and each ball having a hole through it for the reception of a fuse. The supposition was, that after igniting the powder of the first charge, a short time would elapse before the explosion of the next charge. On igniting the first cartridge, however, the whole exploded, and broke the barrel into a thousand pieces.

The Value of Old Coins.

Macaulay speaks of the great value of collections of coins to the historian. They verify dates, preserve the likenesses of rulers, and serve as measures of the price of labor and commodities in different ages. In all old civilized countries there arises a class of persons especially interested in the study of numismatics and the collecting of coins. An interest in this study has been rapidly extending in this country within a few years, and there are now many persons ready to pay large prices for rare old coins issued by the American colonies, or by the United States government in its early years. Recently Messrs. Bangs, Merwin & Co., sold by auction a very large collection of coins, medals and storecards, at their rooms, Nos. 504 and 596 Broadway. The audience was very large, and the competition almost unceasingly spirited for scarce American and Colonial coin. There appeared to be but few dealers present, the bidders consisting mainly of gentlemen anxious to complete their private collections. Of the foreign coin offered, a miscellaneous lot of farthings, half pennies and pennies, of the reigns of the Georges, Charles the Second and Queen Anne, sold at from 25 cents to \$1. A large number of Roman coins—of the days of Constantine, Faustiana, &c., were bought at from 8 to 25 cents each.

A large number of American cents were next bought at the following prices:—A cent of 1793, now very scarce, with liberty cap legible, \$2; another specimen of the same date, \$2 63; a palm-leaf cent of 1793, \$1 50; other descriptions, \$1 @ \$1 12; a cent of 1794, \$1 87; of 1795, \$1 87; of 1796, 50 cents; of 1794, 40 cents; a cent of the year 1798 sold for 30 cents; one of 1799—now the scarcest of this class of coin, \$1 63. This price was owing to the poor condition of the piece, the date alone being plain. A cent of 1800—the die of which was altered from 1799—brought 30 cents; one of 1804, in good condition, \$3 12—this cent has advanced about \$1 during the last few months. Other cents, from 1806 to 1857, sold at from 5 to 25 cents each. A half cent of 1793 was bought at \$1, and other from 1795 to 1856 at from 5 to 75 cents.

There was a spirited competition among the bidders for Washington pieces—one of which, a proof cent of 1791, brought \$11; one large eagle Washington cent, of that year, brought \$6 75; other cents of this class, including copies, were sold at from 20 cents to \$2 50—the latter price being for one bearing the inscription "Liberty and Security," on the obverse. A small eagle Washington cent of 1795 was sold at \$20. This coin is now very rare.

A Flying Eagle dollar, of 1836, was purchased at \$10. A dime, of 1798, brought \$1 25; of 1800 and 1803, 80 cents each.

The Colonial coin brought fair prices—a Chalmers Annapolis shilling of 1798, selling at \$4, and a Massachusetts pine-tree shilling, of 1652 at \$3 37; a thirteen bar cent—very rare—\$4 25; a Franklin cent, of 1787, which has been designated the "ring penny," and which is now very rare, \$1 75.

Several storecards, in copper, were also offered. One struck for Mott's Jewellers—the first of the kind issued in this country—sold at 90 cents.

The Grand Jury and Combustible Agents.

On the 21st ult. the grand jury in this city made a presentment respecting the causes of fires in consequence of several extensive conflagrations which have lately taken place in the city. Especial attention is directed to the danger arising from storing petroleum, the keeping of turpentine and burning fluid in tenement houses, and they direct attention to the report of Fire Marshal Baker, which was furnished by request. It says:—

Petroleum, rock oil, or earth oil, in an unrefined state possesses a large percentage of volatile and inflammable matter, which is evolved to a considerable extent at the usual temperature of the atmosphere, and is materially accelerated by a high temperature or artificial heat. When confined in warehouses or cellars, in large quantities, the evaporation from it is as explosive as coal gas when in contact with a light, thereby jeopardizing the building and adjacent property. When these oils are on fire the heat generated soon becomes intense, and the application of water appears to have a tendency to spread the devouring element. Benzine, benzole and naphtha oils, which are distilled from petroleum or earth oil, are still

more inflammable and dangerous, and should be excluded by an ordinance from within the fire limits the same as gunpowder, and only permitted to be kept on sale in limited quantities."

Benzine and benzole is one and the same liquid, and is not a product of petroleum. Petroleum, however, yields a very light eupion oil, which is as dangerous as benzole.

Our Mechanical Productiveness.

The work of preparing the statistics of the last national census for publication has so far progressed as to afford valuable information to the Committee on Ways and Means and the Treasury Department, in preparing a tax bill. The different branches of manufacturing industry have expanded marvelously since the census of 1850. In that census the cotton manufactures were set down at \$65,500,687. The returns from New England alone in 1860 amount to \$79,000,000. The woolen goods of the United States were estimated at \$39,848,557, but New England alone in 1860 returns the value of woolen goods at \$32,000,000. In boots and shoes the census of 1850 for the whole United States returned only \$53,967,408; Massachusetts alone in 1860 estimates her production in this branch of industry at \$46,060,000. Philadelphia returns nearly \$6,000,000. The production of pig, bar, railroad and rolled iron, which in 1850 was of the value of \$30,823,374, in 1860 has reached \$62,055,000, having doubled in ten years. The malt liquors produced in 1850 were valued at \$5,728,508. In 1860 the amount is 3,235,000 barrels, valued at \$18,000,000, or more than three times greater. The spirituous liquors in 1850 were valued at \$15,770,240; in 1860 the production is 86,000,000 gallons, valued at \$23,500,000. The value of the products of industry of all branches in 1850 was computed at \$1,019,106,616. In 1860 it will reach \$1,900,000,000, or an increase of about eighty-seven per cent! The greatest increase since 1850 is in agricultural implements, iron, malt.

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SCARCITY OF GRAIN IN EUROPE.—The regular wheat crop of Great Britain and Ireland, is 164,000,000 bushels, but last year it amounted only to 96,000,000. To make up this great deficiency and supply seed for the new crop, it is stated that no less than 122,000,000 have been required from abroad, mostly from America. Of this amount it is stated that one half has not yet been obtained. The granaries of Great Britain were probably never so empty at this season of the year as now. Yet the price of wheat in London is not very high, being about \$1 90 per bushel, just about the same as it was in January, 1847, the year of the Irish famine! and yet before the first of June that year, the price had advanced to \$3 20 per bushel.

THE MOON'S INFLUENCE ON RAIN.—From the comparison of a series of observations, continued for twenty-eight years at Munich, Stuttgart, and Augsburg by Professor Schubler, it appears that the maximum number of rainy days takes place between the first quarter and the new moon. The number of rainy days in the last of these intervals is to that in the first as 696 to 846, or in round numbers as 4 to 6. And this proportion is not only true of the twenty years taken together, but also of the separate groups of four years, which give analogous numbers; we therefore, conclude that it rains more frequently during the wane of the moon. The results maintained by Schubler received support from a series of observations made by Philgram, at Vienna.

UNITED STATES CIRCUIT COURT—INFRINGEMENT.

Patent for Steam and Fire Regulator.

The Clark's Patent Steam and Fire Regulator Company vs. Charles W. Copeland—SHIPMAN, D. J.—This was an action for damages for an alleged infringement of a patent owned by the plaintiffs, which was granted to Timothy Clark on the 21st August, 1847, and was afterwards extended. The patent was for an apparatus for regulating the intensity of the fire in the furnaces of steam boilers by the pressure of the steam generated. The apparatus consists of a flexible vessel which is expanded by the pressure of the steam, the outside of it being connected with the damper of the furnace by levers controlled by a weight or spring set to the required pressure of steam, so that if the pressure of steam in the boiler exceeds this the dampers are closed, and if it falls below the required pressure the weight or spring shall open the dampers. The effect is to maintain a uniform pressure in the boiler, save fuel and prevent explosions.

The defendant was alleged to have infringed by making and selling what is called the "Reliance Regulator," under a subsequent patent for an alleged improvement in the structure of the flexible vessel. On his part, the defendant claimed that Clark was not the first inventor of the apparatus, and he brought forward three things to establish this, viz., the float regulator, the piston regulator, and Brunton's operative thermometer, all of which were well known before Clark's patent.

It was agreed that the verdict if in favor of the plaintiffs, should be for nominal damages only.

Judge Shipman charged the jury, in substance, that the important question of the jury was, whether Clark's patent was valid; that, to make it such, the invention must be both new and useful; that a small degree of utility is sufficient to support a patent, and in this case the defendant admitted it was useful, and, therefore, the patent was valid as far as utility was concerned, thus leaving but two questions for the jury: 1. Was the invention new? 2. Has the defendant infringed?

That the invention described in the plaintiff's patent is a mechanism so organized and connected with the boiler of a steam-generator that, when properly set to a given pressure in the generator, it will automatically and promptly, by force of the pressure in the generator, open and close the damper as that pressure rises above or falls beneath the figure at which the mechanism is set.

That the patent is *prima facie* evidence that the invention is new.

That as the piston regulator and the float regulator were both known before Clark's invention, it was for the jury to say whether, in any description of them, they found this invention of Clark's; that in order to affect the validity of Clark's patent, the jury must find that the description of one of these other regulator embodiments substantially the same organized mechanism, operating substantially in the same manner as that described in Clark's patent; that the plaintiffs urged that if either of these were the same as Clark's, they would have come into use as his has, and that of the force of this argument the jury were to judge.

Mr. Brunton, in his patent, describes his machine or apparatus as to be expanded by liquids only; that it does not necessarily follow from this construction of it that the apparatus could not operate by the expansive power of steam, and whether the organized mechanism which he described was substantially like Clark's, and would operate substantially like Clark's by the pressure of steam, was a question for the jury on the evidence.

That the elastic vessel in Brunton's apparatus was substantially like Clark's; but this is not of itself enough to invalidate the plaintiff's patent. Old instruments, placed in a new and different organization, producing in it different results, or the same results by a new and different mode of operation, do not prevent such newly-organized mechanism from being patentable.

That if the jury did not find such a mechanism as Clark's not only substantially the same in its parts, but so organized as that, when set in operation, it will produce substantially the same results in substantially the same way, then Clark's patent is valid, unless the change made by Clark is so obvious that it required no invention or labor of thought to make that change.

That as to the requisite degree of that invention or labor of thought, the law has no nice or rigid standard. There must be some inventive skill exercised, but the degree of that skill is not material.

That if Clark supplied to what was old some new element, instrument, or organization, and thus produced a better practical result than had been produced by the old means, he is entitled to the merit and fruits of his labor.

That as to the defendant's claim, that the hand of the engineer is a better regulator than any automatic machine, and that this is a sufficient answer to the question why these other regulators are not in use and have not attracted more attention from engineers, the jury were to judge of it in the light of the evidence as to the value of Clark's invention, and in view of the fact that the defendant, an engineer himself, has patented an apparatus having the same object.

That the jury could have no difficulty as to the question of infringement, if they found Clark's invention to be new. The mere change in the form of the flexible vessel, or the material of which it is composed, does not take it out of Clark's invention, if the organized mechanism is substantially the same and operates substantially in the same way.

That if the jury found for the plaintiffs, they must assess the damages at six cents.

The jury found a verdict for the plaintiffs. For plaintiffs, Mr. Keller; for defendant, Mr. Gifford.

PETITIONS have been presented to Congress from shipowners and builders, requesting the passage of an act prohibiting the export of ship timber. The petitioners state that such timber is becoming scarce and high in price, owing to large orders received for it from abroad.

THE largest-sized Armstrong gun yet made is a 10-inch bore. It is intended to use 300-pound elongated shot with it.