

## Scientific Museum.

## Spheroidal State of Water.

Two weeks ago we reviewed the letter of Mr. V. Beaumont, C. E., respecting the discovery of M. Boutigny, and the invention of M. Beauregard, of Paris. Although we assert that Boutigny was not the first to discover and write about the spheroidal state of water, yet he has developed some very interesting phenomena connected with it, but such phenomena prove the very reverse of intensely heated surfaces being good for the rapid generation of steam. M. Boutigny has discovered that if the hand be sufficiently moistened with water, it may be passed through molten metal with impunity. According to a letter of Mr. Beaumont, in the Tribune, some time ago, this has been done at the Allaire Works. Although such things are but beginning to be noticed now among some of our engineers, Boutigny's experiments have been before the world since 1845. It was ascertained as far back as 1843, at least, that the greatest rise of vapor in a given time, resulted from water thrown upon iron heated to about 400, and that evaporation decreased with an increase of temperature, and almost erased when the iron attained to 800°. This is a consequence of the slender radiation of the heat of the iron into the water through the atmospheres of the spheroids, which form upon the intensely heated surface of the iron and separate them from the heating surface like balls standing over a plane, for there exists a repulsive condition between the water and the metal; and to prove this if a small quantity of nitric acid be thrown upon silver, cold, it will soon corrode it; but if it be thrown upon a hot crucible of silver, to induce the spheroid state, no corrosion takes place. Alcohol and all the liquids possess the property of assuming the spheroid state when thrown upon surfaces at a certain heat—alcohol at 273° and ether at 140°.

By our Washington correspondent, last week, a Mr. Tippet of Va., it seems, has invented a plan of producing steam upon the principle of M. Beauregard, which we stated before to be about one hundred years old. By Mr. Tippet's plan the steam is raised by means of a small jet of cold water injected upon a large plug of iron fixed in the furnace, and of sufficient bulk to retain the heat that might be dissipated by a very simple but perfect contrivance, this steam enters the cylinders, and moves the piston in a manner similar to a common engine. This plan, it is stated, will prevent steam boiler explosions.—There is no doubt of it, and it prevents the generating of a sufficient quantity of steam, likewise. Iron frequently heated to redness, soon oxidizes, if exposed to the atmosphere, or if subjected to the action of water, and it then becomes a very bad conductor of heat. Some things are very deceptive for a few experiments. Experience has proven that a boiler filled well to the water line, when its water is at 212°, will generate as much steam, and as fast as it would if only filled half full, and this is reasonable, when we take into consideration that the whole water in the boiler is at the boiling point, and receives the benefit of the whole heating surface. There is, therefore no advantage, economically, taking this view of the case, viz., in generating steam in a small vessel, by injecting the cold water of supply on an intensely heated surface, but there is a decided disadvantage, especially when we take into consideration that 17 gallons of water, in the state of steam, will raise 100 gallons of water from 60° to 212°, and it cannot but be that there is some economy in injecting the feed water among a reservoir of hot water in the boiler. By this old fashioned plan there is no intermission in generating the supply of steam, but in the new proposed plan intermissions of the requisite supply of steam are highly probable. While steam is employed as a propelling power, steam boilers will be used to generate the steam. There will be great improvements yet made in economising fuel, but we never expect to see great mechanical effects produced, without great mechanical means employed.

## History of Propellers and Steam Navigation.

[Continued from page 264.]

MR. EWBANK'S (COMMISSIONER OF PATENTS) EXPERIMENTS.

FIG. 43.

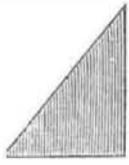
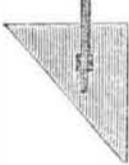


FIG. 42.



The same paddles (fig. 41, last No.) were next attached to the arms in the position represented in the margin, and distinguished as fig. 42, the upper side being, as in all other instances, 13 inches from the centre of the axis. Through repeated trials, they overcame the test paddles, fig. 40, and in a rather more marked manner than fig. 40, surpassed fig. 41. They entered the water silently, but observers on shore thought they raised more water behind, but did not raise it as high as fig. 40.—Their points were nearly 3 inches lower in the water than the lower edges of fig. 40. The boat described a circle of 400 feet, and another of 600.

The same blades were next tried as fig. 43. From the experiment fig. 42, it was inferable that, if inverted, the effect of the blade on the boat would have a longer sweep through the water. Such was the fact, and to such a degree, that first two, and then four, were removed from the arms, when the remaining four were found equal to the eight of fig. 40. The plates were next raised, till their lower edges were on a level with those of No. 1. In that position, two inches of their upper extremities were above the surface of the river; but, notwithstanding, they had a decided advantage even then, over the square ones.

FIG. 44.

FIG. 45.



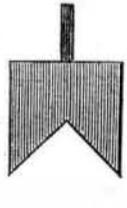
Lastly, the same blades were turned into the position of fig. 44, (being fig. 41 reversed.)—The boat was turned on No. 3 under all circumstances, describing circles from 80 to 150 feet in diameter. Four of them equalled eight of No. 3. They were thought to throw off more water behind than their competitors, which, from the greater extent of their extremities, was probably true.

The next form tried was fig. 40, placed in the position of fig. 45. These turned the boat round against the test ones, in circles varying from 50 to 200 feet. We then tried six of them against the other eight, when there was little observable difference in the result. Four were found superior, but three were equal to them. These, of course, entered the water, without jarring, and threw it off at their points. Mr. B. thought they threw up more than fig. 40.

Figure 46, formed by removing the upper corners below, as in the figure, seemed to have the advantage of fig. 45, but as light winds troubled us, we felt some hesitation in pronouncing them better. Four were superior to eight of No. 3. It was supposed that a slight accession of resistance to the lower ends,

FIG. 46.

FIG. 47.



sweeping through the water, might be derived from opposing currents meeting in the forks, but we had no means to ascertain if it existed.

Figure 47 is cut out of plates eight inches square, with one-fourth, (minus a superficial inch,) removed, as shown in the figure. After several excursions, these were thought to exhibit a very slight advantage over fig. 40; but

from subsequent tests, they seemed to be balanced. We, on another day, reversed them as fig. 48, which had a decided preponderance over their competitors. Six predominated slightly over the latter, and four seemed nearly equal to them. There was a difference of opinion on the last point—some thinking they were quite as effective as the opposing eight.

## The Employment of Chloroform.

The following article from Chambers' Edinburgh Journal, and is well worthy of attention by all our physicians and surgeons, although we must say that we are far in advance of the London M. Ds., as chloroform is generally used in all our hospitals. Chloroform has been employed in Edinburgh in from 80,000 to 100,000 cases, without a single accident or bad effect of any kind traceable to its use. Mr. Carmichael, a surgeon commenting on the fact says: "Would 80,000 or 100,000 full doses of opium, or medicine, have been followed with as great impunity?" Chloroform is habitually used in Edinburgh in all kinds of surgical operations, down to tooth-drawing. It saves many lives which otherwise would sink under the nervous shock which is experienced from a severe operation undergone in a state of consciousness. Such is the published opinion of the discoverer of its use as an anæsthetic, the now celebrated Dr. James Y. Simpson; and this opinion has not been gainsayed by any of the profession in Edinburgh. At the same time, chloroform has received the sanction and recommendation of the most authoritative bodies in France and the United States. Nevertheless, the public of London is almost wholly denied the vast benefits of this agent, purely through the prejudices of profession. This forms a curious illustration of the condition of medicine and of the medical mind in the metropolis, but it is not a new one.

Not only is there a distaste amongst scientific men in England for every thing that comes from the north, but there is a generally benightedness in the London medical world.—They opposed vaccination while it was embraced in the provinces, and to the indelible disgrace of all concerned, inoculation with small-pox maintained its ground in a London hospital devoted to the purpose a quarter of a century after Jenner's discovery. The London public should take this matter into their own hands. Let them not be too ready to lay stress upon accounts of fatal effects from chloroform. Of such there have been a few; but it is remarkable that in Edinburgh, where the article is prepared in perfect purity, with the benefit of first-rate apparatus, and where it is administered with judgment and due care, not one accident has happened. Even admitting that the accidents which have happened elsewhere were not avoidable by any degree of care, they should be placed beside the lives which have been saved by the special use of this agent. Taking the matter on still lower ground, the rejection of chloroform because of a few fatal cases is no more rational than it would be to refuse to travel by railways because one person in several millions has been killed by a collision.

## Case-Hardening.

Case-hardening is a superficial conversion of iron into steel by cementation. It is performed on small pieces of iron, by enclosing them in an iron box, containing burnt leather, bone-dust, or any other carbonic material, and exposing them for some hours to a red heat.—The surface of the iron thus become perfectly metalized. Iron thus treated is susceptible of the finest polish.

## Expedient Mode of reducing Iron Ore into Malleable Iron.

The way of proceeding is by stamping, washing, &c., the calcine and materials, to separate the ore from extraneous matter; then fusing the prepared ore in an open furnace, and instead of casting it, to suffer it to remain at the bottom of the furnace till it becomes cold.

## To make Edge-tools From Cast Steel and Iron.

This method consists in fixing a clean piece of wrought iron, brought to a welding heat, in the centre of a mould, and then pouring in melted steel, so as entirely to envelope the iron, and then forging the mass into any shape required.

## Gravity Vs. Folly.

It was a saying of Paley, that he who is not a fool half of the time, is fool all the time.—Robert Hall, who held a similar opinion, on being reproached by a very dull preacher, with the exclamation, "how can a man who preaches like you, talk in such a trifling manner?" replied, "there, brother, is the difference between us; you talk your nonsens in the pulpit—I talk mine out of the pulpit." The eminent Doctor South, being in the midst of a frolic on one occasion, and seeing a dignified, unbending acquaintance approaching, exclaimed: "Stop! we must be grave now, there is a fool coming!"

## LITERARY NOTICES.

THE HISTORY OF THE DECLINE AND FALL OF THE ROMAN EMPIRE. By Edward Gibbon, with Notes by H. H. Milman. Boston: Phillips, Sampson & Co.—Volume 3 of this work has appeared upon our table. We earnestly recommend our friends to purchase this cheap and beautiful edition, as they may not again have so favorable an opportunity. Dewitt & Davenport, Tribune Buildings, have the three volumes for sale, at 62 1-2 cents each.

Messrs. Dewitt & Davenport have just published the life of Jenny Lind, the Swedish Nightingale, edited by G. C. Foster. Our people will be anxious to get hold of it, now that the fact is settled that we are to have her here in September.

THE PHRENOLOGICAL JOURNAL.—The May number of this Journal, published by Fowlers & Wells, Clinton Hall, this city, is a very excellent one: it contains a likeness of President Monroe, who has a very Celtic countenance, with a phrenological description of his character, and his biography.

THE BANKER'S MAGAZINE.—This very excellent and useful Magazine for May contains some of the most interesting articles, we have ever read. Some may think it a dry and a peculiarly moneyish book, but while it furnishes all useful and necessary information about the "potent dollar," it contains some of the most readable information of any Magazine whatever. It is edited by J. Smith Homans, Boston.

HOLDEN'S DOLLAR MAGAZINE, May Number: W. H. Deitz, publisher, N. Y.—This number is brimful of the most fascinating matter, besides several spirited illustrations. To think that such a beautiful magazine is furnished for one dollar. People have no excuse for being ignorant, when choice literature is furnished at such low rates.

H. Wilson, No. 49 Ann street, N. Y., has just issued a very neat and convenient guide book of the Hudson River, comprising a diagram of the river and proper location and description of the most prominent places, and objects of interests along its banks. It is really a valuable publication for all who have any desire to know the full particulars of this, the most beautiful river in America. We think the price is 25 cents.



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