

Scientific Museum.

To Remove Incrustations from Boilers.

We have received not a few communications on this subject, lately; some want to know how to remove incrustations, and others how to prevent the formation of them. If rain water was exclusively used for boilers, there would be no incrustations, but this is impossible in almost every case where a steam boiler is used. All mineral waters contain salts, which are mechanically held in solution. These salts are deposited in the boiler by the evaporation of the pure water in a state of steam. With the best of care, incrustations will sometimes form on boilers. They are dangerous and expensive deposits, because, being non-conductors of heat, they waste an immense amount of fuel, and they have sometimes, it is said, been the cause of explosions. Water used for feed from a well on a limestone strata, is peculiar for depositing scale. We know of a boiler which had to be cleaned every month; at first this was chipped off with hammer and chisel, but this was a tedious process. A weak acid was then used, but this was found to injure the metal, and it was abandoned. Salamoniac was then introduced along with the water, and it was found to answer well, but it was expensive; however, it was a saving in comparison with allowing the incrustations to form, and then losing one day every month in a factory for cleaning out. Potatoes are said to be good to prevent deposits, and mahogany sawdust has been patented for the same purpose, by Messrs. Barnum & Barnard. M. Delfour, of Paris, took out a patent four years ago for the following composition, to prevent incrustations:—12 ounces muriate and $2\frac{1}{2}$ hydrate of soda, with $\frac{1}{2}$ of an ounce of sub-carbonate of potash, and the same of catechu. This amount was to serve for a horse power for 336 hours. To prevent incrustations, the boilers should be frequently blown out; and small leaden bullets, placed in the boiler, have done, it is said by some engineers, essential service. They roll and prevent the formation of the scales. One thing should be particularly observed, viz., the hard scale is formed in the cooling, not when the boiler is hot.

The following are the directions given by Bourne for the removal of scale:—

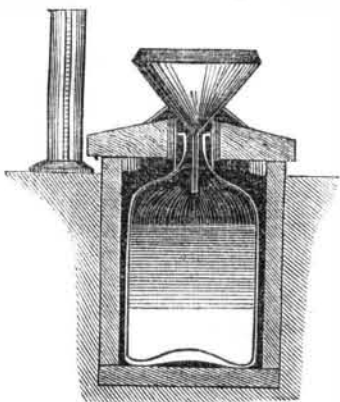
"Lay a train of shavings along the flues, open the safety valve to prevent the existence of any pressure within the boiler, and light the train of shavings, which by expanding rapidly the metal of the flues, while the scale from its imperfect conducting power can only expand slowly, will crack off the scale; by washing down the flues with a hose the scale will be carried to the bottom of the boiler, or issue with the water from the mud-hole doors. This method of scaling must be practised only by the engineer himself, and must not be intrusted to the firemen, who in their ignorance might damage the boiler by over-heating the plates. It is only where the incrustation upon the flues is considerable, that this method of removing it need be practised; in other cases the scale may be chipped off by a hatchet-faced hammer, and the flues may then be washed down with a hose in the manner before described. In tubular boilers a great deal of care is required to prevent the ends of tubes next the furnace from becoming coated with scale. Even when the boiler is tolerably clean in other places the scale will collect here, and in many cases where the amount of blowing off previously found to suffice for flue boilers has been adopted, an incrustation five-eighths of an inch in thickness has formed in twelve months round the furnace ends of the tubes, and the stony husks enveloping them have actually grown together in some parts so as totally to exclude the water. When a boiler gets into this state the whole of the tubes must be pulled out."

Distances Across the Ocean.

The nearest geometrical distance between Liverpool and the North American ports, is traced to the great curve which sweeps by Cape Clear, in Ireland, and Cape Race, in Newfoundland, and thence down the coast to

the various ports alluded to. The distance to Cape Race, which is a common one to all the ports, measured carefully on a globe, in round numbers, is 33 degrees, or 1,980 marine miles. From Cape Race to the different ports—or, more strictly, to the entrances, on the sea coast, of the several harbors—the distances are as follows, viz: To Halifax 390 marine miles; to Boston 840; to New York 990; to Philadelphia 1050; to Norfolk 1190. Hence the total distances from Liverpool are: To Halifax 2,370; to Philadelphia 3,030; to Norfolk 3,150. Boston is 45 miles further than Halifax; New York 600 miles further; Philadelphia 660; Norfolk 780.

The Rain Gauge.



This is an instrument for measuring the depth of rain that falls. A very simple and excellent instrument for this purpose is shown above. It consists of a copper funnel, from 5 to 7 inches in diameter. The rain being collected in a glass bottle it should be placed in a small stand near the surface of the ground, to protect the bottle from the action of the sun. The amount of rain fallen in a given time is measured in a graduated glass jar, one-tenth the area of the funnel, similar to that shown in the figure, and so divided that every inch in depth of the tube shall indicate one-tenth of an inch falling in the funnel. The amount of rain falling can be measured by such an instrument to 1-5000th part of an inch, or even less.

Coke.

The most valuable of the secondary products of a gas establishment is coke; the best kind is obtained from coal when carbonized in large masses, in ovens constructed on purpose. In a gas manufactory, the production of coke being of minor importance to the formation of good gas, it is generally of an inferior quality to that made in coke ovens, where it is the primary, and indeed sole object for which the coal is carbonized. But gas-coke is excellent for many purposes in the arts and manufactures, producing as clear a fire as that of the first quality, though it is neither so lasting nor so free from slag: for domestic use, however, it is unobjectionable, and may be burnt both in the drawing-room and kitchen with economy and comfort.

The distinguishing characters of good coke are, first, a clean, granular fracture in any direction, with a pearly lustre, inclining to that exhibited by cast iron. Secondly, density, or close proximity of its particles, which adhere together in masses, and specific gravity of 1.10, or rather higher. Thirdly, when exposed to a white heat, it consumes entirely away, without leaving either slag or ashes.

It is invariably the case that the quality of the coke is inversely as that of the gas. The manufacturer must not expect to produce both of the best quality. The process by which the best gas is made generally leaves the coke light, spongy, and friable, although an increase of quantity is gained: for the simple reason, that the degree of heat and other circumstances required to form perfect coke, must be entirely changed when gas of a high specific gravity is to be obtained. Thus large masses of coal exposed to a red heat in close vessels are acted upon by slow degrees, the external portions preventing heat from penetrating into the interior until most of the bituminous portions are given off in condensable vapour, or as charcoal and free hydrogen; the after-products being light carburetted hydrogen, carbonic

oxide, and carbonic acid gasses. The residue is a carbon of a dense granular composition.

Scientific Memoranda.

METHOD OF HARDENING OBJECTS IN PLASTER OF PARIS, AND RENDERING THEM LIKE MARBLE.

Take 2 parts of stearine, 2 parts Venetian soap, 1 part pearlsh, and 24 to 30 parts of solution of caustic potash. The stearine and soap are cut in slices, mixed with the cold lye and boiled for about half an hour, constantly stirring. Whenever the mass rises a little cold lye is added. The pearlsh, previously moistened with a little rain-water, is then added, and the whole boiled for a few minutes. The mass is then stirred until cold, when it is mixed with so much cold lye that it becomes perfectly liquid, and runs off the spoon without coagulating and contracting. Before using this composition, it should be kept for several days well covered. It may be preserved for years. Before applying it to the objects, they should be well dusted, the stains scraped away, and then coated by means of a thick brush with the wash, as long as the plaster of Paris absorbs it, and left to dry. The coating is then dusted with a leather or soft brush. If the surface has not become shining the operation must be repeated.

GOLD IN CALIFORNIA.

The Weekly Alta Californian publishes a communication of a gentleman who had lately returned from a visit to the Southern gold mountains. He says that the reports concerning the richness of the gold deposits there are well founded, as he has himself proved upon personal examination. The party to which he belonged brought a number of superb specimens to San Francisco, which were examined by hundreds of its citizens. A company has taken possession and commenced working the mine. A large amount of machinery and provisions have been taken to the spot, and those engaged in the enterprise have determined not to dispose of shares in the stock, but to retain every fraction of it possible.

Speaking of the country through which he passed to reach the "gold mountains," he describes it as a vast and desolate wilderness of burning sands and almost irrespirable winds. Boundless sand plains surround the spot, scorching and prostrating all who are exposed to them. The soil is so strongly infused, in many places with various alkaline properties, that the crust of the surface is strong enough to bear a man's weight.

ENGINEERING BLUNDER.

A very remarkable engineering blunder has caused the entire destruction of a dry dock built near the Mole of Naples, at an outlay of some \$150,000. The whole fabric fell in, from the pressure of water, fortunately when no workmen were on the works. The blame is attributed to Prince Ischitella, the Minister of War. It appears the king had been warned by some Neapolitan engineers that the walls were too slight; and for some time past, the works were pronounced as unsafe by more than one English gentleman, whose professional knowledge at once discovered the error. Had the accident taken place a short time earlier than it did, hundreds of lives would have been lost.

ANCIENT RELICS IN A COPPER MINE.

The Lake Superior News states that a copper arrow-head and a piece of human skull, and other bones, have lately been found in the ancient Indian Diggings on the Ontenagon river. Several instruments resembling chisels, having sockets like the common carpenter's chisel, and small gads and wedges have also been discovered in the Minnesota Mine. Besides these things, a stick of oak timber, about 10 feet in length, and 8 or 10 inches in diameter, having short limbs two feet apart and at nearly right angles with each other, was taken out of one of the ancient "pits" or shafts of the Minnesota mine, about 27 feet below the surface. It is, from its appearance, and the fact of its having been found standing nearly upright, supposed, with good reason, to have been used as a ladder by the ancient miners. Around and over the stick were rocks and

earth, with large trees growing over it, and it is probable that many centuries have elapsed since the ladder was placed there.

POWERFUL DRUG.

The Academy of Science, in Paris, has appointed a commission to ascertain the remedial powers of a drug, which, under the name of Cedran, has been introduced for the cure of hydrophobia, and of diseases produced by action upon the nervous system. It is said to have the property of counteracting the poison of the rattlesnake and all venomous reptiles.

Cool Impudence.

A certain literary gentleman, in this city, is in the habit of calling on us regularly for the purpose of reading the Scientific American; but to furnish him with such valuable information without cost is not sufficient, for he now requires us to furnish a *segar* to smoke whilst perusing that valuable sheet. After reading the last number, he thanked us very politely, and said, "it is the most interesting paper published in the United States." Query—Why don't he subscribe? the price is only \$2 per annum.—[Carruther's Advertiser, Savannah, Geo.]

Accounts from the southern portions of Kentucky represent the tobacco crop as greatly injured by the late frost.

LITERARY NOTICES.

DICTIONARY OF MECHANICS AND ENGINE WORK—Number 19 of this work, published by D. Appleton & Co., Edited by Oliver Byrne, contains articles on Glass, Gold, Governors for Machinery, &c., and is otherwise a good number.

BOURNE'S CATECHISM OF THE STEAM ENGINE.—A new edition of this incomparable book has just been published by D. Appleton & Co., N. Y. This new edition contains some valuable tables not found in any of the others. We need not say a word to recommend this work. It is well known as the only book of the kind published, and this is the best edition.

WAVERLY MAGAZINE.—Published by Moses A. Dow, Boston; price \$3 per annum. This is one of the most elegant quarto literary journals that we have ever seen; the typography is most beautiful, and the mechanical execution is not surpassed by any newspaper in America, while for choice family reading it has scarcely an equal. We understand it has already obtained a large circulation.

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TO MECHANICS, INVENTORS, AND MANUFACTURERS.

The Publishers of the SCIENTIFIC AMERICAN respectfully give notice that the SIXTH VOLUME of this valuable journal, commenced on the 21st of September, offering a favorable opportunity for all to subscribe who take an interest in the progress and development of the Mechanics' Arts and Manufactures of our country. The character of the SCIENTIFIC AMERICAN is too well known throughout the country to require a detailed account of the various subjects discussed through its columns.

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