

#### Means of Preventing the Formation of Incrustations in Boilers.

The following is for the most part an abstract of a recently-published work by Dr. Elsner, German:—

On the means hitherto employed in preventing the production of scale in steam boilers, with the addition of some original observations upon this subject.

**POTATOES.**—Of these, one-fiftieth of the weight of the water is said to be sufficient to prevent the incrustation. According to Elsner, crusts already formed are not removed by potatoes. The action is mechanical; the calcareous particles, when separated, becoming coated with the slimy matter of the potatoes, which prevents their forming a coherent deposit.

**FATTY OILS, TALLOW.**—Oil, when poured into the water, is said to prevent incrustation. According to Kennedy, the inside of the boiler should be well rubbed with a mixture of three parts of black lead and 18 parts of tallow. Newton recommends 1 part of tallow, 1 part of black lead, and  $\frac{1}{4}$ th part of powdered charcoal. The statements as to the degree of protection afforded by this agent are satisfactory.

**SAWDUST.**—A patent was obtained in this country about eight years ago, for the exclusive use of mahogany sawdust introduced into the boiler. Indian meal introduced into the boiler has also been tried with success. Ira Hill replaced the mahogany dust by oak dust, and any other wood will serve equally well. The disadvantages of this prevention is the readiness with which the sawdust may be carried into the pipes, cocks, valves, &c., where it might produce evil consequences. The action of the sawdust is also mechanical.

Clay, free from sand, and worked up with water, is recommended by Chaix. Aldefeld found that this agent prevented the formation of scale; but that, on the other hand, it produced a slimy coating in the pipes, and rendered the steam cylinder rough. Its action is also mechanical.

**AMMONIACAL COMPOUNDS.**—Ritterbrand, in 1844, patented certain ammoniacal compounds, especially muriate of ammonia. Elsner regards this proposition as the most deserving of notice. As much muriate of ammonia is added to the water as it contains carbonate of lime in solution. This agent also softens old incrustations, but for this purpose something more than the quantity just mentioned is required. Its action is chemical; from the muriate of ammonia and sulphate or carbonate of lime, are formed chloride of calcium and sulphate or carbonate of ammonia. The latter salt is somewhat volatile; if the steam is to be employed in heating color baths, it is necessary to ascertain whether the volatile alkali will have an injurious action. Elsner states that 1 lb. of muriate of ammonia is sufficient for 20 cubic feet of well-water containing gypsum. Muriate of ammonia is preferable to carbonate of ammonia. In the 'Verhandlungen des Hollandischen Ingenieurvereins,' there are two papers on the employment of muriate of ammonia. The first, by A. A. C. de Vries-Robbe, shows, that in the locomotives on the Dutch railways 2 ozs. of muriate of ammonia for each boiler is sufficient to clean incrustated boilers in a few days. This quantity, put in twice a week, keeps the boiler quite clean; iron and copper are not dissolved by it. The second paper, by C. Scheffer, states that in the royal wood-cutting establishment of Holland, a perfectly clean boiler was supplied weekly for four months with  $\frac{2}{10}$ ths of a pound of muriate of ammonia, when 40 lbs. of scale were found to have deposited. The boiler was worked fourteen hours daily with water containing gypsum.

With the addition of  $\frac{4}{10}$ ths of a pound of muriate of ammonia twice a week for five months, with the same amount of daily work and the same water, 60 lbs. of scale had deposited. In both cases the deposit was more upon the sides than upon the bottom of the boiler, and much less than without the use of sal-ammoniac.

**MIXTURE OF EXTRACT OF TANNIN.**—J. Delfosse patented a mixture of 12 parts chloride of sodium,  $2\frac{1}{2}$  parts caustic soda,  $\frac{1}{4}$ th extract of oak-bark,  $\frac{1}{4}$  of potash, for the boilers of

stationary and locomotive engines. The principal agent in this appears to be the tannin of the extract of oak-bark. Elsner recommends the roughly-cut root of the common tormentil for this purpose, on account of the large quantity of tannic acid it contains.

A patented process is now in use England, which must be mentioned here. Spent tanner's bark is put into the boiler. To avoid the chance of the bad result already referred to with the sawdust, the bark is put into a perforated vessel, which is suspended near the surface of the water, and kept in the right position by means of a float. The bark is renewed from time to time. The patentee supplies the whole apparatus for about £2 10s., and publishes many testimonials to show that his process is perfectly successful.

According to Cave, pieces of oak wood, suspended in the boiler and renewed monthly, prevent all deposit even from waters containing a large quantity of lime. The action must depend principally upon the tannic acid.

**STARCH-SUGAR MOLASSES, SYRUP.**—Guinon put into a boiler, 17 $\frac{1}{2}$  feet long and 3 $\frac{1}{2}$  feet in diameter, 5 kilogrammes of molasses every two months; he found that this completely prevented incrustation.

Guimet proved the advantage of this process, but employed brown starch-syrup, three pounds every six months for a boiler of eight horse power.

Tin salt (chloride of tin,) is recommended by Delandre; it is similar in its action to muriate of ammonia; but as it is cheaper it is to be preferred.

Soda and potash have been recommended by Kuhlmann, and more recently by Fresenius. According to the latter, the property of forming crust occurs more with water containing gypsum than with that containing chalk.

Kuhlmann recommended the addition of 100 to 130 grms. of soda monthly to every horse power with water containing sulphate of lime. Elsner observes that too much soda might injure the solderings and joints. Zimmer, of Frankfort, who long employed this method, found that the boiler was strongly acted upon; he ascribes this to the presence in almost all sodas of cyanide of sodium, which possesses the power of dissolving iron.

#### Recent Foreign Inventions.

**HULLING RICE.**—G. A. Buckholz, of London, has obtained a patent for machinery to dress rice, and which he also employs for scouring wheat, &c. He mounts a conical stone on a vertical axle, and surrounds the stone with another forming a case. A thread is cut on the conical stone, and a space is left between it and the case stone, of such a form as to gradually contract. A number of pebbles are introduced along with the rice to be hulled, and the conical stone is set in motion, the rice being fed in at an opening near its apex, is carried down spirally, and discharged at the bottom.

**SUBSTITUTE FOR GUTTA PERCHA AND INDIA RUBBER.**—A. T. Sorel, of Paris, has taken out a patent for a new composition, asserted to be a substitute for the above named substances. It consists of two parts (by weight) of colophony, twelve of pitch or bitumen, eight of resin oil, six of the hydrate of lime, twelve of gutta percha, ten of pipe clay, and three of water. These ingredients are all to be melted together in an iron vessel, and when well incorporated by heat and stirring, the compound is to be used as a whole for gutta percha or india rubber, which substances are much higher in price than the new compound. The question arises, "is the new compound as good as the substances for which it was designed as a substitute?" We have given the quantities, so that any person may try the experiment.

**NEW VENTILATING HAT.**—R. Husband, of Manchester, England, has secured a patent for a hat in which there is a second band lining placed in the interior, and so secured as to preserve a space between it and another lining for the purpose of affording a passage for currents of air, which are intended to pass out at an orifice at the crown. We must say, that although the temperature of England is, on an

average, 20° lower than ours in the summer, more attention is paid by the hatters there in ventilating silk hats, than is paid by our hatters. The reason is that few black silk hats are worn during our hot weather. But we believe that the silk hat demands to be a ventilating one for winter as well as summer. It is almost air tight, and in this sense must be injurious to the health of the head. Every silk hat should be made a ventilator.

**PURIFYING GAS.**—The Rev. W. R. Boudich, of Wakefield, England, has obtained a patent for purifying gas, by employing clayey earths either alone or in combination with lime. The earths so employed are afterwards used by farmers for manure. It is well known that aluminous earths possess the quality of absorbing and retaining ammonia; they therefore absorb the ammonia which is set free in the distillation of the coal of which the gas is made, and as ammonia is an excellent fertilizing agent, the products of the gas works thus become servicable for raising wheat and corn.

**SUBSTITUTE FOR STEAM.**—C. H. Stansbury, of London, has taken out a patent for the employment of the bi-sulphuret of carbon in the place of steam, as a motive agent. The inventor fills an ordinary boiler of a steam engine with this substance and applies heat, or he fills the boiler partly with water and ejects the bi-sulphuret of carbon into it, as the constant feed, when the water is heated above 116°. This is an ignorant, foolish idea, as the vapor of bi-sulphuret of carbon is heavier than steam, just in proportion to its lower boiling point in comparison with that of water.

#### A Microscopic World.

The city of Berlin, in Prussia, is situated in the midst of a broad, flat plain, and is built upon both sides of the sluggish river Spree. Beneath the city there is a deep bog of black peat, through which borings for water have frequently been carried. Professor Ehrenberg, a gentleman whose explorations into the mysteries of microscopic life have attained for him a high position among the scientific men of the age, says that this peat, at the depth of fifty feet, swarms with infusorial life; that countless myriads of microscopic animals live there and wriggle and die. The perpetual motion of these little animals causes the whole mass of peaty matter to be in a state of constant though generally imperceptible movement.—In Berlin the houses, however, are wont to crack and yawn sometimes, in an exceedingly curious manner, even though built on apparently stable foundations; and Professor Ehrenberg believes this to be owing to the changes and motions of this invisible world—to the combined efforts of infinite millions of tiny forms, which, conspiring in the same direction, produce sensible, and oftentimes disastrous movements of the surface, resulting in the injury or ruin of the buildings above.

#### Water Wheel Challenge.

Henry Van Dewater, of West Troy, N. Y., takes exceptions to our reply to a correspondent in No. 50, in reference to Parker's water wheel, and demands a trial with the best wheel which can be brought against his improved one.

He is very sensitive upon the subject, and is willing to bet almost any amount. This brings up a subject which we have often thought of, viz., a thorough test of the power of different water wheels, so as to determine their relative merits. We would like to see a sharp competition upon this subject, and here is a chance for any one who thinks he has the best wheel extant. We advise Mr. Van Dewater to keep cool and not to bet a cent with any one. The better plan would be for each competitor to pay his portion of the expenses. Who now among our manufacturers of water wheels stands ready to take up Mr. Van De Water's proposition, and enter into a correspondence with him for bringing about the trial at an early date.

#### Advance in Railroad Fares.

A meeting of the representatives of the New York and Erie, New York Central, Hudson River, Pennsylvania Central, and Baltimore and Ohio Railroad Companies has been held in this

city, and an advance of the rates of passage and freight has been agreed upon, and a reduction of the service and the speed. Whatever prices are necessary for a fair return to the stockholders should be cheerfully submitted to, but the speed should not be diminished unless from considerations of safety.—The convention decided against the employment of runners or agents for the sale of tickets, and against issuing free passes to persons sending goods over the roads, and this we think was right. Measures were also recommended to secure adequate compensation for mail service, which is represented as being below the rates of freight.

#### Things to be Remembered.

Hints when seasonably applied are often the means of bringing the mind to mature and satisfactory conclusions. There is no condition in which they may not be found valuable, and we do not think of any occupation more perplexing than that of the Editor and Publisher when his patrons omit to observe the following hints. Mark them down on the tablet of memory, and when you take up your pen to write to a newspaper publisher, come right to the business at once, and in plain terms. If you write for publication, use only one side of the sheet, and be sure not to omit your name, as otherwise you might be mortified if your MSS had been destroyed. Always take copies of correspondence, this is easily done, and may save future trouble.

In sending subscriptions state plainly to what address you wish the paper sent; we are often bothered and abused by those who have only themselves to blame, in not receiving the paper. We are glad to say there are few who are so unmanly.

Publishers of respectable journals always desire to increase their circulation; they would soon ruin their business by any other than the most honorable management. When our paper is not regularly received we always wish to be advised, and the error will be corrected if it lays in our power to do it.

We do not send receipts by mail; if the paper is received it is evidence of the receipt of the money, as we invariably discontinue it at the time the subscription expires. We make no exception to this rule. If a subscriber gets more papers than he has paid for, he is welcome to them, and if less, we will correct the error if satisfactorily pointed out to us. We solicit articles from practical men upon all subjects relating to the arts and sciences, and if deemed useful and interesting, they will be published for the benefit of our readers; we shall exercise great care and independence on this point. We attend to binding volumes in a substantial manner for seventy-five cents. Missing numbers will be supplied when we have them, and specimen numbers are sent free upon application.

#### Hilly Ground and Sea Winds.

Richard Adei, of Liverpool, in an article in the "Edinburgh Philosophical Journal," asserts that hills, near the sea shore, check heavy currents of winds, and tend to preserve vegetation—trees, and flowers, in their neighborhood. He had observed, where the sea-board was backed up by hills, that trees grew with vigor a comparatively short distance from the coast, whereas, in those places which presented a broad and extensive level near the sea coast, the trees were stunted and had a poor appearance. During storms at sea, when the wind blows on the shore, there is what is called "spoon-drift," a technical term employed by sailors to water raised into the air from the sea by the wind striking the tops of agitated waves, and carrying this salt water drift in sheets and showers to a great distance. This salt spray is sometimes carried far inland, and of course acts as a poison to the foliage of trees and shrubs.

There are but few who have not noticed the rich foliage of some trees near certain parts of the sea coast, and the stunted scrubby appearance of some trees on other parts of the coast. The cause of this is accounted for by the above observations.