To Prevent Incrustations in Boilers.

MESSRS. EDITORS—Permit me to lay before your readers a process for the prevention of incrustations in the boilers of ocean-going steamships. The incrustations are composed of the carbonates, sulphates and muriates of lime, magnesia, and soda; the two first being the most abundant, contrary to what from an *a priori* view of the composition of sea-water might be anticipated. Any incrustations which I have examined contain but a very minute portion of muriate of soda, which, according to the analysis of Murray and Vogel, constitutes at least four-fifths of the solid ingredients of sea-water, this salt being almost entirely got rid of by the mechanical process of blowing "through," resorted to by engineers for the purpose of keeping their boilers clean. My experiments have been directed to the discovery of a substance which, when introduced into the boiler, would communicate to the *whole* mass of solid matter contained in sea-water, a fluidity equal to that of the muriate of soda, and I think that this is effected by the employment of masses of metallic antimony. These being placed in the boiler, the action of the muriatic acid contained in the sea-water forms muriate of antimony, which imparts to the other salts with which it comes in contact the necessary degree of solvency to permit of the whole mass being got rid of by the ordinary process of "blowing-off" above mentioned. Analogous instances of increased solubility by amalgamation and admixture are common in chemistry. I may cite the well-known fusible metal compound of bismuth, lead and tin, none of which singly melt at a lower heat than 442° Fah., whilst in conjunction they are soluble at a point at or under that of boiling water. I am led to believe that antimony possesses the power of imparting increased solvency to some of the substances with which it comes in contact by a consideration of the properties of the tartrate of antimony and potass (common tartar emetic). Tartrate of potass by itself is so slightly soluble in water as to have led to the employment of tartaric acid as the special test for the detection of the various combinations of potassa, but as it exists in the above-named preparation with antimony we have a salt of familiar solubility. I think it also not unreasonable to suppose that owing to the contact of the antimony with the metal of the boiler, aided by the liberation of the muriatic acid, sufficient electricity may be generated to assist in the prevention of the adhesion of the earthy particles, a view which is substantiated by the discovery of Davy, who found that a piece of zinc the size of a pea inserted into the copper-sheathing of a vessel was fully equal to the preservation of forty or fifty square inches of the latter metal from corrosion.

I have been engaged for some years in experiments bearing on the prevention of incrustations in boilers, and have found that in models the employment of antimony is all-sufficient for the purpose. Soon after its introduction into the boiler, the presence of antimonial salts in the water can be demonstrated by the usual re-agents, and I have found it quite possible to keep a small boiler in which very strong sea water was constantly boiling, evaporating and digesting perfectly clean and lustrous interiorly for an indefinite length of time, without resorting to "blowing through" one tenth part as often as is usual at sea.

I have made no experiments on the large scale with sufficient material to enable one to arrive at any definite conclusion, and I am aware that my experiments are in consequence defective, as several processes for the same purpose which have been apparently correct in theory, and have answered well with the model, have been found worthless when applied to large boilers; but I have been induced to give the results of my researches so far as they have gone, as some of my notes have been stolen, and I am apprehensive of the use which may be made of them. I am also in hopes that the publication of my remarks may lead to a trial which may end in some discovery by which the desired result may be attained. HENRY FISHER, M. D.

121 Bleecker st., New York, March, 1858.

[This is an important communication. It suggests the use of a new substance to prevent incrustations in marine boilers, which, if it answers the purpose, must be far superior to astringent matters which are sometimes employed, as it will not injure the iron like these. In sea steamers, there is no choice of water; they must use the salt brine of "old Ocean." This is so highly charged with depositing saline matter, that a crust of about one-eighth of an inch thick is formed in a boiler during a voyage between New York and Liverpool. As this scale on the inside of the boiler is a non-conductor—in comparison with the metal—it follows that a great waste of fuel is caused by its formation. It also tends to injure the metal of the boiler, especially the flue tubes, and much labor is expended to remove it at the end of every trip. Any simple, cheap, and efficient remedy for these evils is therefore an object of great consequence.

Moonology.

MESSRS. EDITORS—On page 183 of the current volume of the SCIENTIFIC AMERICAN, is an article under the head "Moonology," about which volumes of the most wild speculations might be collected. It is truly astonishing to notice the almost universal prevalence of the superstitious notions with regard to such things. And so long as scientific men encourage such things, by sending forth to the world thousands upon thousands of almanacs, containing different "weather signs," just so long will the mass of mankind be subject to such superstition.

As I have never seen or heard any arguments, except those of a speculative kind, in favor of regarding the moon's phases, as peculiarly favorable to planting, laying fences, spreading manure, and a thousand other *et ceteras*, I must regard the whole as an offspring of superstition and speculative philosophy.

Last spring I planted my potatoes in the "new" of the moon, (the unfavorable time,) but at digging time I had an excellent crop, rather superior to any in the neighborhood, both as to size and number of bushels, according to the quantity of ground. I had first-rate soil, and then tended them well.

Both the sun and moon, undoubtedly, exercise an influence on our atmosphere, through attraction, in the growth of vegetation, and in producing chemical changes which cause *wind*, rain, hail, &c.; but the peculiar position or phase of the moon, with regard to the time of planting only, can have no such influence whatever.

Now, as a matter of curiosity and question, if we put a potato in a cellar which has but one window, and if the cellar be sufficiently warm, the potato will sprout, and the leading vine will run directly towards the window, especially if it (the window) be very small. The vine will run along the floor of the cellar until it reaches a point where a direct ray of light through the window could not reach it; it will then raise its head, and still aim directly for the window, and will continue to grow in that direction, as long as it can support itself. Will some one explain this upon natural principles?

E. PERIN.

Blue Grass, Iowa, March, 1858.

[Animals have certain constitutional qualities which we term *instinct*, and so have plants, although the two are different in their character. What is it, then, but vegetable instinct, which makes the potato vine seek the light in a cellar?—the same law which makes the roots of bushes and trees strike into the soil in the direction of a stream, or where they can obtain moisture, for nourishment. Light is as essential to the life and vigor of a plant as moisture. Many persons suppose that most of the almanacs published are edited by men of science; this is not the case; and those referred to by our correspondent are certainly not the productions of scientific men.—EDS.

Trial of Fire-arms.

MESSRS. EDITORS—On page 214, present volume of the SCIENTIFIC AMERICAN, I find a challenge from Lieut. J. C. Symmes, addressed to all inventors of breech-loading guns. I am ready to accept the challenge, upon the conditions that at least three hundred shots shall be fired without cleaning the guns. This will give a fair test of their accuracy of fire, and at the same time test the working of the machinery. This last test I consider the most important feature in connection with breech-loading fire-arms. GILBERT SMITH.

Buttermilk Falls, N. Y., March, 1858.

[We admit Mr. Smith's card in response to the challenge of Lieut. Symmes, as it is the first one which we have received, and it specifies conditions which are important in judging the utility of this class of fire-arms. Parties who propose to enter upon this contest will in future address their responses to Lieut. Symmes, at the Watertown (Mass.) Arsenal, instead of to us.—EDS.

Feeding Horses.

A correspondent of the *Michigan Farmer* says:—

"The actual amount of food consumed by a horse will depend upon his form and disposition. I have found that horses of a compact form and quiet disposition, weighing 1,200 pounds, and exerting a force equivalent to moving 150 or 200 pounds, at the rate of two miles per hour, for ten hours per day, and six days in the week, will require each twenty pounds of oats, fourteen pounds of hay, and seventy pounds of water, with a comfortable stable, to keep them in good order. Much depends upon the horse having a keeper who knows how to use him without harshness."

[The feeding of horses is an important subject. We have heard farmers and others well acquainted with the noble animal assert that the best feed is a mixture of Indian corn, oats, and barley, cracked in a "corn crusher." The Arabs feed their horses almost exclusively on barley. About four quarts of the above-mixed feed will answer for a meal, with a moderate quantity of hay afterwards.—EDS.

Railroad Management.

The New York State Engineer—Silas Seymour—in his report, dated the 15th ult., imparts some very excellent advice regarding investments, and the management of railroads. He says:—

"Disinterested parties should never be induced to invest in a railroad enterprise without first making an allowance larger than any limit yet ascertained, for exaggerations in the reports of engineers, and statements of other parties, who have either already invested or are to be benefited by its construction."

"The road and outfit should always be of the first-class, and kept in perfect condition."

"The control of the operating department should always be in the hands of men of sound judgment, large experience, and inflexible honesty."

"The true and only reliable source of revenue and profit to railroad companies is the local business naturally pertaining to the country and towns through which the road passes, or at which it terminates. This business should always be encouraged, by doing it upon the most reasonable terms, and to the satisfaction of those who create it."

This is good and much-needed advice, for some of our railroads, in their stupid management, act upon opposite maxims. Instead of encouraging the local business of towns along the lines, especially in passengers, they actually discourage it. Thus the New York and Erie Railroad charge three cents per mile on way trains, running at the rate of thirteen miles per hour, and only two and one-fourth cents per mile on express trains, running at the rate of twenty-five miles per hour. This policy of management is "penny wise and pound foolish."

"The expenses of operating well-managed roads are generally from fifty to sixty per cent of their gross earnings."

"The wear and tear of track and machinery are very nearly in the ratio of the speed of the trains; therefore (within reasonable limits) the slower the speed the less will be the expenses, when considered with reference to the amount of business done."

"The safest and most profitable speed is about twenty miles per hour for passengers, and ten miles for freight trains, and they should never exceed these limits except in cases of emergency."

He complains of the reckless manner in which railroads are managed in reference to high speeds, and advises a reduction of it to a much lower standard. There are 88 railroad corporations in the State; the total length of track (double and single) in operation, is 3,576 miles; the total expenditure in their construction has been $136,689,690.

The foregoing extracts deserve attention. We shall finish with the following one, which deserves to be written in letters of gold:—

"The employés upon a railroad, who have business intercourse with its patrons or the public, should be men of integrity, gentlemanly manners, firm purpose, and unexcitable temper."

Doctors in Beloochistan.

To the practice of medicine in Beloochistan there are only two slight drawbacks. When the physician gives a dose, he is expected to partake of a similar one himself, as a guarantee of his good faith. Should the patient die under his hands, the relatives, though by no means bound to exercise it in all circumstances, have the right of putting him to death, unless a special agreement has been made, freeing him from all responsibility as to the circumstances; while he, should they decide on immolating him, has no reasonable ground for complaint, but is expected to submit to his fate like a man and a hakim. In other respects, the amateur will find an easy field. No diploma or special qualifications are required of him; his ignorance will remain undetected; the ailments are few and simple, and the chances of recovery are great, for the healing power of nature is very strong. —*Blackwood's Magazine.*

Lacepede.

The Count de Lacepede, a great and comparatively unknown naturalist, was born at Agen in 1756. His friend, the great Buffon, obtained for him the post of keeper of the cabinets in the King's garden at Paris, in which position he pursued with many advantages his scientific studies. His writings were voluminous, and among them we may mention his natural history of oviparous quadrupeds and serpents, reptiles, fish, and cetaceous animals. He died in 1825, having lived through the troublesome times of the Revolution as a man of science who was universally respected.

Osage Orange Fences.

The *Southern Planter* says, regarding this plant for live fences, which should be extensively cultivated:—"Beyond all question, we think that the 'osage orange' is better suited for hedges in this country than any and all other plants which have been offered to the public. Its superiority is seen in that it is a native of the country. It is of very rapid growth, and the number and size of its thorns render it a terror to all animals."

Artesian Wells in Illinois.

We learn by the *Prairie Farmer* that the above kind of wells are becoming common in some parts of Illinois, and that they are of the greatest necessity and benefit to farmers residing on prairies distant from living streams. There are about a hundred such wells in Iroquois county alone; their average depth is about one hundred and twenty-five feet, and cost about $200.