For the Scientific American.

Incrustations in Steam Boilers.

Sir.—In No. 50 of your valuable journal, I find an article upon "Incrustations on Steam Boilers," by R. Bartholomew. The labor of the article seems to bedirected against Mahogany dust which was patented some time since as a preventive of deposits and incrustations on steam boilers by Samuel D. Anthony and Daniel Barnum. Of Mr. Bartholomew I know nothing. But on reading the article with its *italics* and *cants* at *mahogany dust* and *exhausted dye stuffs* as a *patent*—the idea is presented to the mind, that he imagines himself to be witty in attempting to ridicule the "profession" that mahogany dust was a useful as a preventive of incrustations—and also that he belongs to that class of men (which are far too numerous) who are incapable of appreciating an honest effort at improvement—even where it is successful, and who delight in the want of success—acting upon the principle that it is easier to pull down than to build up. If these traits do not belong to Mr Bartholomew he has done himself injustice in giving the article the sanction of his name, for whatever may be his standing as a man or engineer it is no disparagement to him to say that Mr. Anthony at least is his equal in respectability and unpretending merit, in both respects. An honorable and manly criticism is commendable and does no injustice but often stimulates to greater exertion, where success is wanting—but an attempt at wit at the expense of truth, is most contemptible, and should consign the author of it to his proper level. I would fain believe that a penchant for notoriety tinctured with a little vanity prompted Mr. Bartholomew to make the exhibition of himself rather than to believe him guilty of a wilful perversion of the truth, when he says "Mahogany dust, which was ONCE to be the panacea for all incrustations whatever, has utterly failed to confer a single anticipated benefit." So far from the truth is it that it has utterly failed to confer a single benefit, that in no instance (known to me at least,) has it been properly used without conferring decided benefits in preventing incrustations (not stopping leaks.) That mahogany dust may have been occasionally used without any apparent benefit, by engineers possessing similar feelings with him, without the requisite information for its successful use is not doubted, but that it has been *properly* applied without benefit is confidently denied, upon the positive practical knowledge of more than one. I instance the last case which has come to my knowledge. The "Crescent City." Capt. Stoddard was requested by Mr. Anthony to make trial of it on his last voyage, and the result was, according to Captain Stoddard's voluntary statement and from his own examination of the boilers, that the scale was all loosened from the surface of the iron under its use—that he was highly pleased with it. I refer to this as a recent case in a sea steamer running to Havana and New Orleans, as the water used could not be worse. That Indian meal and potatoes are useful for stopping leaks is not doubted, and the reasons for it are correctly given by Mr. Bartholomew, to wit, they *settle and harden*—but unfortunately for him this proves too much—for the fact of this settling and hardening proves their tendency to precipitate and increase the difficulties arising from deposits and incrustations, hence from the "practical evidence of more than one," their use for the *prevention* of *incrustations* have "utterly failed to confer a single anticipated benefit."

That mahogany dust is inferior to potatoes and meal for stopping leaks is readily conceded, for its tendencies are to prevent the deposits of carbonates and salts, keeping them in suspension until they are blown off by blowing water from the boiler, which is of course necessary to be done occasionally, although much less frequently with than without the dust.

To realize the "anticipated benefits" from mahogany dust several things are necessary to be observed, and the first is, care should be taken to obtain pure mahogany, as other kinds of foreign wood do not produce the same beneficial result— and in the second place, the boiler should be seasonably replenished, for which purpose conveniences are necessary for its introduction underway—the proper time and quantity of water to be blown from the boiler should be understood, else the dust may be thrown from the boiler before it has produced its effect, &c. And I venture the assertion and without fear of successful contradiction, that any, and all engineers, (who have used mahogany dust and who are ready to give evidence that it has failed utterly to confer a single anticipated benefit,) have not observed the necessary requisites for a proper application and test of its merits, and all such are respectfully requested to make a thorough and fair trial, and if "a single anticipated benefit" cannot be obtained, they will most certainly confer a benefit, or at least a favor, by informing me of it.

Daniel Barnum.

New York, Sept. 3, 1848.

American Association for the advancement of Science.

This association of distinguished men assembled last week, on the 20th, in Philadelphia, and we here present some condensed extracts of their transactions.

MINERALOGY.

Dr. P. A. Brown in his paper stated that a mineral (mullicite) found in Gloucester Co. N. J., was described in an imperfect manner by Dr. Thomson in his first volume on Mineralogy, owing, no doubt, to his not possessing sufficient specimens. Dr. Browne observed that, having in his cabinet a number of them which exhibit the mineral in all its phases he was induced to point out some of its peculiarities, and to endeavor to show its origin.

Upon examination, the mineral was found to be phosphate of iron. From a comparison of these specimens it is apparent that the "congeries of small needles" described by Dr. Thomson, as radiating from the centre of the fossilized Belemnite, are *not true crystal* of the mineral substance (Di-phosphate of iron) as he supposed; but are due to the *former structure* of a portion of the Cephalopedes, an animal fossil found at Mullica Hill. The iron was disseminated in the ferigenous sand and the animals after dissolution surrendered their phosphoric acid, it combined with the iron and water, forming the di-phosphate of iron, and as the operations of decompositions and transmission were gradual, it is natural that the new mineral should take the structure and form of the former animal substance.

Phillips, in his "Mineralogy," speaking of blue iron, (phosphate of iron,) says that in Liberia it is found in fossil shells, but he does not describe its crystalliztion.

TIDAL CURRENTS.

A curious paper was presented by Professor Pierce from Lieut. Davis, U. S. N. on the Geological Action of the Tides. The communication was prefaced by a few remarks on the general principal of his theory, the object of the paper being to exhibit the action of the Moon, as tending to alter the figure of the Earth.

By a study of the tidal currents on the North-eastern Coast of the United States, Lieut. Davis has been led to the discovery of a connection between the ocean tides and currents, and the alluvial deposits on its borders and in its depths. The connection is thus traced: the direction and velocity of the tides at any place where these deposits exist—that is where the ocean is freighted with matter held in suspension—decides the form, amount and locality of the deposits.—The direction of the tides is different at different places, but the result of their action is to produce certain uniform or similar formations, and it was the observation of this which led Lieut Davis to the introduction of a Tidal Theory into Geology.

The tidal current in Nantucket comes freighted with sand, and as it strikes the island it is deposited. Yet the current which is acting there all the time is not only depositing, but it is also taking away—so that, all the time flowing in every direction, and universally distributed, not very much is accumulated in any one place. The deposits are nearly equally made at various points.

The extremity of the Island has been supposed to be formed by deposits coming from the Island itself (i. e. by the shifting influence of the changing current)—but this is shown not to be the case; that portion of the Island being formed solely by the tidal currents.—As an instance of the force of these currents, Prof. Pierce cited an instance. A short time ago, a ship was wrecked at one end of the Island, and the Keeper of the Lighthouse at the other end actually supplied himself with fuel from the coal which was originally deposited with the wrecked vessel. The coal was brought clear round the Island and deposited at its farthest extremity, by the mere force of these currents. Bricks have in the same manner been carried, and at Siaconset there is now standing a chimney actually built from bricks which were carried all round the Island in the same way.

Regarding the theory of the Tides advanced by Lieut. Davis, some discussion was excited. Mr. Redfield opposed the views entertained by Lieut. D. He reasoned long and well that the deposits of sand are not so much owing to tidal action as to the direct agency of the waves. Other gentlemen thought, some one thing, others another, and nothing was agreed upon definitely.

Dr. Dickenson related a remarkble incident, where at the Island of Galveston in 1839, a vessel from New Oleans was wrecked (at the South end) with a considerable amount of specie. The officers of the Custom-House took measures to recover the valuable cargo and in a very little time the workmen reported the vessel nearly covered with sand. A few weeks after, and at the other end of the Island—some 28 miles or thereabouts—some fishermen brought up some of the doubloons. They were arrested and imprisoned on a charge of robbing the wreck, their protestations of having really found the gold at so great a distance not being credited for a moment, till scientific research convinced the authorities that the metal was really carried to that distance, of course by the force of the current. An instance of the way heavy bodies are transported.

AMERICAN FISHES.

Professor Agassiz presented quite a number of papers, and remarked that it had been his good fortune, during the past Summer, to have opportunities, in company with several friends—to explore the Northern Lakes, and more especially Lake Superior. His attention had been called particularly to the Fishes, a subject always of very great interest to him, and of which he had acquired at the Lakes some new and valuable knowledge. His object was to ascertain their geographical distribution and to satisfy himself whether they were indiscriminately distributed through all these Lakes, or whether there were differences in the localities where found.

On carefully comparing, he found that the distribution is entirely different—that particular families are in some, and other families in another part, and that they never leave their peculiar locality. He finds that there are families in Lake Huron which are not in Lake Superior, and some in Lake Superior which do not move down into the lower lakes, although the communication between them is always open and easy. The Fishes, then, of the several Lakes, are very different—another illustration of the great law of distribution and localization. Prof. A. considers that these Fishes originate where they are found; and it is a singular fact that they are generally located in very similar positions with the fishes of Europe—yet, although they so agree generally with the European varieties, they are greatly different in zoological characteristics. In Lake Huron there are many of the Perch family—none in Lake Superior and so on.

It is well known, from geological data, that North America is the oldest continental land upon earth. The general ancient character of this country is deeply impressed upon the mind of the active geologist, and he [Prof. A.] could not help feeling it when exploring the Northern shore of Lake Superior. This is interesting information. It is not remarkable that animals now exist which are old fashioned in their external zoological character—and that they should be of the same type with animals long since considered extinct. It is North America where the Garpikes live, and is the garpike the only representative of the periods when that fish only lived?

He had found in Lake Superior a new Fish! with spines upon the aperaular bones, and all the scales hard and serrated, and, what has never been before observed in hard scaled fishes, it has, like the Salmon, an adipose or fatty fin.

Here, then, upon Lake Superior, we have these old-fashioned fishes upon this old soil. He considered it important to trace our living animals in their relation to the Fossils, as also their geographical distribution. This country was undoubtedly first dry land, and the animals preserved seem to remind us of the olden ages.

Mr. Redfield asked if the White Fish of the Lakes was not common?

Prof. Agassiz replied, it is. He mentioned that he had collected 33 Fishes on lake Superior, and exhibited drawings of several.—About a dozen of them are entirely new varieties.

British.

At the late meeting of the British Association for the advancement of Science, Mr. J. Palmer Budd read a communication on the advantageous use of the gases in some of the blast furnaces in Germany. It appears that the gases which are evolved from these furnaces escape at a temperature which is about the melting point of brass. In the iron works at Ystalyfera, where the iron is melted by the use of anthracite coal, advantage has been taken of this in a most ingenious manner, by an arrangement, which is in its character exceedingly simple, but somewhat difficult to describe. The hot gas is led off into another channel by means of a strong current generated through a chamber and air-way from a point just below the iron furnace. It is conducted, very little heat being lost in the passage, under the boiler of a steam engine; and it is found to be at a sufficient high temperature to heat the boiler without the consumption of any fuel whatever. Hence an immense saving is effected. Although only one furnace and one boiler has hitherto been adapted to this purpose, it is found to effect a saving of $1,750 a year. We may consequently expect that when the experiment is further extended and more of the furnaces so arranged that this heat may be economized and employed for numerous useful purposes to which it is applicable in a large establishment, the saving will amount to many thousands annually.

This is a subject worthy of the attention of our iron manufacturers and some of them may dispense with their water wheels and make a saving by the operation.

Microscopic Discoveries.

Dr. Carpenter noticed particularly the formation of the great beds of chalk, several hundred feet thick, which substance is composed entirely of minute shells, that are invisible to the naked eye. The different cellular structure of shells, and the peculiar organization of the teeth of animals, Dr. Carpenter could trace, even in the invisible fragment of a shell or of a tooth, the class, and sometimes even the species, to which the fragments belonged. Refering to the general cellular structure of all organizations, he says that this structure could be seen alike in the leaf, in the bones, in the muscles, and in the blood. That all life seemed to originate in single cellular developements, but, notwithstanding this apparent similarity in the original cells, there is an inherent, though as yet undistinguishable difference, which determines the structure of the plant and of the animal. The bodies of the animalcules which inhabited the shells composing the chalk are still enclosed within them, being the mummies of a former world.

Cholera Liquid.

When persons experience the first symptom of Cholera they should resort at once to the following remedy, which every one can prepare and use with safety. Take gum camphor, gum opium, African cayenne, and oil of cloves, each one ounce, Hoffman's anodyne liquor, one pint. Shake up the ingredients frequently, in a bottle, and in ten to twenty days, filter through paper. Dose for adults, 30 to 60 drops every second, third, or fourth hour, until the stomach and bowels are relieved. It should be taken in a wine glass full of water.