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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 182,

For the Week ending July 13, 1878.

Price 10 cents. To be had at this office and of all newsdealers.

THE INVENTION OF THE MICROPHONE.

In our issue of June 22 last we gave the substance of a communication to us from Mr. Edison, wherein he claimed the origination of the principle of the carbon telephone and the discovery of the variability of the conducting power of many substances under pressure; these facts being those which underlie the construction of the microphone, which is alleged by Professor D. E. Hughes, of London, to be an original invention of his own. Mr. Edison also commented upon an apparent breach of confidence on the part of Mr. W. H. Preece, electrician of the London Post Office Department, to which gentleman Mr. Edison states he communicated the results of his investigations during their progress, including those relating to the adaptation of the new principle to the measurement of minute degrees of heat.

Mr. Preece has cabled a reply, in which he gives "the most absolute and unqualified denial" to Mr. Edison's statements, and further says that "Hughes has not brought out any thermopile. His microphone is quite a different instrument from Edison's telephone." Mr. Preece denies being a coadjutor of Hughes, and adds that he knew nothing of the invention until Hughes communicated it to him. In a postscript Professor Hughes "emphatically indorses" all that Mr. Preece asserts.

It is to be presumed that the very positive expressions of Mr. Preece's answer will be modified by the more detailed defense which he will probably publish, and therefore it is scarcely yet just to express any opinion on the merits of the controversy. It may be pointed out, however, that it is difficult to reconcile the statements that Professor Hughes has brought out no thermopile, with the fact that the *Engineer* for May 17, 1878, published an engraving of such an instrument made by that gentleman from a quill tube filled with metallic powder, and the writer describes experiments which he saw Professor Hughes conduct with it. Mr. Preece also may possess some special knowledge warranting his assertion that the microphone is different from Edison's telephone, but save in a very unimportant modification in form that difference to most people will be imperceptible. The principle underlying the inventions is the same, although it may have been independently discovered by both inventors.

To the personal charges made by Mr. Edison against Mr. Preece, the latter gentleman will doubtless give a more specific reply. He might not, as he says, have been a coadjutor of Professor Hughes, but that he rendered material aid is probable from the fact that Hughes in the first paper read before the Royal Society tenders him his "warmest thanks for his kind counsel and aid in the preparation of this paper."

Since the above was written Mr. Edison has replied to Mr. Preece at length, giving many citations, etc., in support of his statements, the main points, however, being those which we have noted.

PREPARATION OF IRON FUELS.

It is well known that the preparation of coal for smelting purposes by coking is attended with only partial success, so far as the elimination of sulphur and phosphorus is concerned, while at the same time it involves the loss of the hydrocarbons with their high thermal values. Many other methods have been tried, some of which are now in limited practice, having for their ultimate object the purification of the iron to be treated.

Those acquainted with inventors and their fortunes know that many valuable discoveries are long withheld, or not earnestly pressed upon public notice, because the times do not seem propitious or because of the difficulties and disappointments encountered in the attempt, and in not a few instances the patents for these discoveries are permitted to expire unexploited and the invention to become public property.

Of this character is one of which we propose to give a brief description for the advantage especially of those who produce iron from the blast furnace, melt it in the cupola, or work it in the forge, though it is not unlikely that the matter may cover much more extended and other fields.

A suggestion that coal might be desulphurized, and observation of the fact that a handful of common salt thrown into a heated stove liquefied and removed the clinkers, led to a long series of experiments, eighteen or twenty years ago, which resulted in demonstrating that sulphur could not be removed from coal as suggested, but that the coal could be so treated that not only would its impurities be rendered harmless, but that it could also be made to operate as a detergent upon the impurities contained in iron and its ores.

The experiments proved that at certain moderate pressures steam would take up and convey the alkaline salts according to their measures of solubility; that steam thus saturated and conveyed into closed bins or like receptacles containing coal would penetrate to the center of the hardest anthracite as well as of the softest bituminous, the coal becoming expanded by the heat of the steam, and condensing therein would deposit the conveyed chemicals throughout the innumerable interstices; that not more than from six to eight hours of this steaming was required to charge the coal with such fluxes as common salt, potash, lime, etc., in the proper degree and proportions for the purposes intended; and that the operation did not make it more friable or in any way change its appearance.

Thus prepared the coal contained within itself all the necessary elements for neutralizing by chemical action during the process of combustion its own sulphur and phosphorus, as well as for removing these impurities from the ore and iron in contact with it.

Anthracite coal so prepared and used in a blast furnace which was quite foul, first scoured off the clinkers, and afterward, through successive weeks of use, produced an iron, we are told, bearing a tensile strain about twenty per cent higher than any former production of the furnace, while in a cupola furnace it was reported, through many months of trial, as having carried a one third larger charge of iron, and as having run it out in a much hotter and consequently more liquid condition and with an increased tensile strength of about 30 per cent.

Used in many blacksmith forges, bituminous coal so prepared imparted a welding heat more quickly, corrected the cold or red shortness of the iron, and caused perfect welding, while file cutters and tinsmiths successfully substituted it for charcoal in their work. Even the Broad Top coal of Pennsylvania treated by this process and used in locomotives burned with intense heat, without smoke and without forming clinkers on the grates.

It was natural that prominent chemists even should be found to assert not only that a mass of anthracite could not be penetrated by steam, but also that steam could not take up and carry the alkaline salts, and that indifference, opposition, and dishonesty should be encountered at every step, for such is part of the history of every discovery of importance. Nor is it surprising that an inexperienced inventor should withdraw in disgust from such encounters, and, applying himself to other subjects which he might hope would meet with more favorable reception, let the whole matter, as it were, drop out of his life. And yet it is strange that a discovery of such importance as this should have lain unnoticed for so many years, for not only does it enable the manufacturer and worker of iron to greatly improve its quality at a cost of, say, 8 to 10 cents per ton of coal used, but the process may, we doubt not, be applied with great advantage to the treatment of vegetable fiber used in the manufacture of paper, linen, etc.

In our issue of June 29th we spoke of the neglected flax and linen industry of America, and of the general complaint that the American fiber is less skillfully cared for than the foreign and carelessly cured and prepared, and it may be found that in this process there exists a remedy for these conditions, for the same chemicals (and others besides) that are used in the manufacture of paper pulp from straw may be applied to flax, ramie, and the like, and, we should think, without entanglement of the fiber, by suspending the stalks in strong iron tanks and subjecting them to the action of the chemical steam under pressure for a sufficient time for the removal of the silicious and albuminous coating, as well as for the required degree of bleaching, while pure steam might then be introduced for rinsing or cleansing.

Not only in our Southern and Southwestern States is there great necessity for improved machinery and processes for treating vegetable fibers, but the need is not confined to us, as our readers must be aware, for several months since we published the offer made to inventors by the government of India, by which it appears that fifty thousand rupees (about $2,300) are offered to the inventor of the best process or machine which will separate the bark and fiber from the stem, and the fiber from the bark of the ramie.

The best machines hitherto tried for this purpose have failed to meet all the requirements. May not this "chemical steam" process be substituted for or at least satisfactorily supplement them? JACOB I. STOVER.

298 Macon street, Brooklyn.

MILLSTONES.

In the proceedings of the Fifth Annual Convention of the Millers' National Association, held in Indianapolis in May last, there appears a valuable report on mill machinery, prepared by Mr. Joseph F. Gent, of Indiana. Among the practical suggestions given are several relating to millstones. In selecting a stone, Mr. Gent counsels preference for a medium stone in every particular, not too porous or open, and neither extremely hard nor soft. If a close stone is desired, one should be selected that has every block close alike; if an open stone is preferred the same rule should govern, but in no case should a stone be chosen in which the openings or porous parts exceed one tenth of the whole face.

As regards dress, one in which every furrow runs to the eye is preferred for high grinding, and in no case is a dress advisable which makes less than every other furrow a leading furrow. For most kinds of wheat grown in the Northwest, furrows should be $\frac{3}{16}$ inch deep at the eye, and $\frac{1}{16}$ to $\frac{3}{32}$ deep at the skirt. They should be wide enough to insure perfectly cool grinding, and to discharge the chop free and round. With stones grinding on winter wheat, the furrows required are equal to very nearly two thirds of the entire surface of the stone. Draught can only be decided upon when the dress to be put in, the amount of grain to be ground per hour, and the speed and diameter of burrs and quality of stone are considered. Mr. Gent states that with a medium close stone, 4 feet in diameter, at a speed of 130 revolutions per minute, to grind 5½ to 6 bushels per hour, every furrow leading to , 3½ inches would give probably a satisfactory result.

If the old-fashioned stone with small eye is used, the eye blocks should be kept a little below the face of the stone; or in other words, after applying the redstaff, it should touch the whole face of the stone, but show heaviest at the skirt, not in spots, but all the way around. If a stone, while grinding the proper amount of wheat, runs hot and glazes, the trouble is not enough furrow. The stone should therefore be taken up and the furr●w widened until the proper amount is ground cool.

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