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Importance of Advertising.

The value of advertising is so well understood by old established business firms, that a hint to them is unnecessary; but to persons establishing a new business, or having for sale a new article, or wishing to sell a patent, or find a manufacturer to work it: upon such a class, we would impress the importance of advertising. The next thing to be considered is the medium through which to do it.

In this matter, discretion is to be used at first but experience will soon determine that papers or magazines having the largest circulation among the class of persons most likely to be interested in the article for sale, will be the cheapest, and bring the quickest returns. To the manufacturer of all kinds of machinery, and to the vendors of any new article in the mechanical line, we believe there is no other source from which the advertiser can get as speedy returns as through the advertising columns of the SCIENTIFIC AMERICAN.

We do not make these suggestions merely to increase our advertising patronage, but to direct persons how to increase their own business. The SCIENTIFIC AMERICAN has a circulation of from 25,000 to 30,000 copies per week larger than any other paper of its class in the world, and nearly as large as the combined circulation of all the other papers of its kind published.

PAINE'S ELECTRO-MOTOR.

In recent numbers of the SCIENTIFIC AMERICAN, we have given accounts of the extraordinary claims put forth by Henry M. Paine and friends, concerning his improvements in electro-magnetic machinery. They assert that his engine, now running at Newark, N. J., develops two horses' power by the use of a battery of only four ordinary telegraph cups; and, further, that any desired degree of power may be obtained with the same four cups, simply by multiplying the number of magnets.

In other words, Mr. Paine has discovered the perpetual motion, and found the long sought philosopher's stone.

This absurd proposition has been received, yea, swallowed whole, by persons who have heretofore enjoyed reputation for common sense, if not sagacity, in things scientific. But this easy credulity in the present case, shows that they have been over-rated. They belong to that large class of individuals, intelligent and sound in ordinary matters, but in whose minds there runs a vein of lunacy upon the perpetual motion question; the result of careless and deficient training in scientific principles. From this class, Mr. Paine will draw followers and money; in fact, he has already done so, with much success, unless we are misinformed.

The exhibition of the original machine, which, for a time, was open to a favored few who had money to invest, is now closed, for the purpose, it is stated, of perfecting preparations to show the improvements on a more grand scale.

Mr. Paine's patents have been assigned to a joint stock company, capital three millions of dollars, called the Paine Electromagnetic Engine Company; and they are now busy, at Newark, in building a new machine, by which they expect to convert all such doubters as the SCIENTIFIC AMERICAN, and bring the world in general to a realizing sense of the astounding nature of their discoveries.

The company is said to be composed, for the most part, of gentlemen of wealth, who are abundantly able to lose any amount of money that they choose to subscribe. It is to be hoped that they will be liberal in their estimates, and give us an example of the mechanism on a scale sufficiently large and brilliant to attract the attention of the world. It is only by the exhibition of the most striking examples of absurdity and failure, that the malady to which we have alluded can be reached or suppressed.

We understand that the new machine is to be of five hundred

horse power, and is to run, as before stated, with only four cups, at a cost of about twenty cents a day, and is to be ready for operation about the 4th of July next; after which date, unless the company should be disappointed, steam boilers will be no longer wanted, horses may be turned out to grass, and workmen may take things easy. Their places will be supplied by electric engines, electric horses, and magnetic laborers.

During the brief interval that remains before the inauguration of this great electromagnet revolution, we have thought it best to prepare and enlighten the minds of our readers concerning the nature of the mechanism by which the Paine Company expect to accomplish so much. We have, accordingly, provided a series of engravings, representing the salient points of Mr. Paine's improvements, which we print on another page, together with his own explanations of them, as presented in his patents.

These patents embody several apparently good improvements in electro-dynamics; but we are unable to detect in them anything that is likely to turn the world upside down, in the astonishing manner that Mr. Paine and his worthy coadjutors so confidently predict.

THE NEW SYSTEM OF PIERS FOR NEW YORK.

It seems at last that the Dock Commissioners have resolved upon definite action in the matter of the improvement of the docks and piers. Many plans have been submitted to them, but it is finally announced that the one adopted will be that of a magnificent street, completely surrounding the water front, to be in width not less than 150 feet in any part. The river front is to present a solid wall of granite masonry, in combination with *béton*, which has proved its value for this purpose in many European harbors.

The plan is a very expensive one. Its cost is estimated at about two and one half millions of dollars per mile. The building of docks and piers is, however, essentially a costly undertaking, and we are inclined to believe that the plan proposed could hardly be replaced by another, embracing greater durability and convenience at less cost.

In any system of public works, durability is an element that should be considered of primary importance; especially in structures where frequent repairs entail interruption to business.

The depth of water along the frontage is to be not less than twenty feet. From the granite wall will project piers, from three hundred to five hundred feet in length, and from sixty to one hundred feet wide, according to situation. The super-structures will be, for the most part, of timber, supported on iron, stone, or timber pillars, but having at the head of each pier a column of solid granite masonry the full width. It is stated that some of the piers will be constructed wholly of iron, and a limited number entirely of stone.

The iron columns are to be hollow and six feet in diameter, so that men may enter them to work, while sinking them to their permanent foundation. Each pier will have three rows of these columns, which, when sunk to bed rock, will be filled with a concrete of stone and cement. The spaces between the piers will be two hundred feet in width. The sewers are to be carried through under, and made to discharge their contents at the outer ends of the piers, so as not to fill up the slips.

The completion of this work is not intended to be accomplished at present, but it is designed to at once carry out the system from Grand street to East Fourteenth street, on the East River, which, it is stated, will give a pier length of twenty-one and one half miles, and will for a long time to come amply accommodate the commerce of the port.

It seems to be the general opinion among those qualified to judge of the merits of this plan, that it is one of the best that could have been adopted, and it is estimated that the additional rents will pay the interest on the bonds to be issued, without advancing the rates at present demanded.

The completion of this great work, and that of the East River suspension bridge, together with the removal of the Hell Gate obstructions, will render the East River famous for the engineering skill devoted to its improvement.

There is, however, one point which the system proposed does not cover. It makes, so far as we can see, no provision even in anticipation of any disposal of sewage, other than its discharge into the river as now practiced. The results attained by several processes, particularly that known as the "A. B. C. process," in which sewage is treated by the use of alum, blood, and clay, indicate that the time is coming when the discharged filth of cities will be used to restore fertility to impoverished lands instead of being allowed to poison the water about docks and piers. In constructing a work of such permanence as the one under consideration, it would have been wise to have anticipated the future employment of improved methods of treatment in such a way that their application would not entail expensive alterations. This could be done without increase of first cost to any noticeable extent.

DOCTORING IRON.

The attempts made, from time to time, to obviate the process of puddling, in the manufacture of iron by doctoring, are, while they have some warrant in chemistry, still entirely empirical. The two principal substances sought to be removed—carbon and phosphorus—possess strong affinities, and form combinations in the metal, very difficult to break up. Their presence in undue quantity produces qualities in iron which unfit it for many purposes; and, practically, only oxygen, administered in large doses, has, as yet, been able to remove these undesirable elements. The introduction of oxygen mixed with nitrogen, as in atmospheric air, is the es-

sential feature of puddling and of the more recent Bessemer process. In the Heaton process, which has now ceased to attract much attention, the oxygen was introduced in the nitrate of soda employed, the salt, being decomposed by the heat, yielding its oxygen to the crudities contained in the metal, and forming with them gases which passed off. In the Ellershausen process, oxygen is introduced in the oxide of iron employed in making the pig blooms. The Peters process, which, we understand, is soon to be put into practical operation in Rhode Island, is a new way of introducing and controlling the admission of oxygen.

Thus we find that oxygen is the giant of the chemistry of iron. This fact, however, is not, and should not alone be, a bar to experiments with other materials, although the uniform failure which has attended dosing with chemicals, is, to say the least, discouraging. There would be more hope in this direction were our knowledge of iron more complete than it is. There is scarcely a field of industry more beset with difficulties and perplexities, than that of the iron manufacture. So manifold have the varieties of iron and steel become, that no one knows where to draw the line of distinction between them, and the terms have become entirely too indefinite. There are so many things called steel, that no one knows where to say iron leaves off and steel begins.

There are also mysterious reactions and physical changes, in the condition of these metals, yet unexplained, upon which more light must be shed before the use of chemicals, salts, etc., can be intelligently applied.

To attempt to doctor iron is, then, to grope in the dark. The attempts may add to our stock of knowledge, but there is little prospect of their revolutionizing the processes now employed. For this reason we accept with much allowance the glowing statements indulged in by some English journals, in regard to the Sherman process, and also that of a central New York paper, which now lies on our table, containing an enthusiastic encomium of what it calls the "Bendell" iron, which, it states, is produced by dosing, the drugs and medicines employed being exceedingly cheap, but the names of which are not given. The sanguine author of the article in question regards the process as destined to revolutionize iron working throughout this country. We hope it may—but for the reasons above assigned, we doubt it.

MENTAL EMACIATION.

A strange title, do you say? What new disease is this? Not by any means a new disease, dear reader, but one astonishingly prevalent. The number of men whose minds are weaker and smaller at forty or fifty than when they were twenty-five, is legion. Their bodies are sleek and plump, their purses, many of them, are fat; both have been well nourished; but their minds are in a feeble, emaciated condition, unable to cope with the great questions of this pre eminently advancing age.

Engage them in conversation upon any topic involving much grasp of thought; propound to them any one of the great problems of vital importance to the human race; you shall see how their minds shrink from effort they are incapable of performing; and how they fall back upon the supports of old superstition and prejudice, and there find rest from the labor such questions involve. This general mental emaciation is one reason reforms move so slowly. The best and strongest minds are tugging at the mysteries of nature, and expending their energies in physical researches. Some intellectual giants are also grappling with problems of social construction, political economy, and morals, but, as their teachings are directed mainly to the mentally emaciated, they make but little headway in correcting existing evils. Men, in the hot pursuit of wealth, which is the most absorbing of present human aims, neglect systematic thought, feed their minds upon little else than the sloppy pabulum of sensational daily papers, and become mentally starved. How few there are that can safely think for themselves upon any subject not immediately related to their profession or calling! What millions might be counted, who might far better shut their eyes and accept without thought the conclusions of such men as Mill and Spencer than even to attempt to reach a conclusion or form a definite opinion from their own thinking!

Talk with men engaged in professions which imply greater breadth of thought than ordinary business occupations, and how often you will hear the admission, that their habits of thought have unfitted them for correct thinking upon topics which require systematic thought, and strictly logical method! Ask nine out of any ten, selected at random, what is their religious belief? and you will find that they either have none, or that they accept a creed they cannot comprehend or explain. If they vote at general elections, they are guided by hastily formed opinions, for which they have never sought good and sufficient reason. Somebody's plausible speech, or some half conceived principle of right or wrong, is enough to influence their action; and so they give their minds the rest they crave, and trust to luck that it will all come right in the end. Many are going on through life, similarly trusting that their future will all come out right—hoping that it will—which they call having faith; and when they suppose themselves to be trusting in God, they are simply trusting in luck.

Hence it follows that sects and creeds multiply, charlatans prosper in politics, religion and medicine, and false teachers only find it necessary to assert, with show of authority and with simulation of knowledge, to win numerous disciples.

The majority of men prefer to have other people think—or pretend to think for them. Glittering generalities that either mean nothing, or mean falsehood, are accepted as formulas of action, and repeated as maxims for the guidance of individual conduct. If such a formula be attacked by