

New Mode of Lighting by Electricity. By MR. STAITE.

Mr. Staité, having described his galvanic battery and other apparatus, which are on an entirely new principle of his own maturing, and which cannot be well described without diagrams, observed that the production of light from electricity was not a new thing *per se*. The experiment of the charcoal points, and the phenomena of the voltaic arc, with powerful batteries, were well known. The difficulties hitherto experienced had been—1. The economical production and application of the electric currents.—2. The discovery of a suitable material for the development of the light.—3. The rendering of the light permanent (the greatest difficulty of all). By what means, and to what extent, he had overcome these difficulties, Mr. Staité informed his audience. He produced, under a glass receiver, a brilliant light, before which the gas jets of the lecture-room turned, not pale, but yellow. “The peculiar characteristics of the electric light (said Mr. Staité) were its purity and volume. The most delicate shades of color might be detected, while the eye was not distressed by its effects. The same quantity of light, developed by gas, or any other known means, would be absolutely unendurable. That the light was not the result of combustion, strictly speaking, was evident. There could be no combustion without the presence of oxygen; and, as the light was developed to the best advantage under a closed glass, from which supplies of atmospheric air were excluded, it was quite certain that combustion had nothing to do with the matter.” The light, in fact, the lecturer remarked, could be produced as readily in water as out of it. He showed its peculiar applicability to coal mining, for it could not explode the foulest atmosphere. He then came to the comparative cost of the electric and other lights. With a battery consisting of four small cells, a light was developed equal to 380 mould candles (sixes), or 300 wax candles, or 64 cubic feet of the best gas, burnt in the standard burner. This was effected by a consumption of zinc equal to 0.77, or 77-100ths of a pound, being little more than $\frac{1}{4}$ lb. of zinc per hour. When the light, however, was brought to its maximum, by increasing the distance of the electrods to their limit, the light was increased nearly threefold, whilst the current itself was reduced to about three-fifths in quantity. “This curious fact (continued Mr. Staité) I have frequently observed before. So that the light, when developed under the best circumstances consistent with its permanence, was produced by a consumption of a seventh part only of a pound of zinc per hour—and that light equal to 380 tallow candles. Assuming that the zinc so consumed was worth one halfpenny, and that the cost of the working solution, deducting the value of the products (sulphate of zinc, &c.), was as much more, we have the following comparative result:—Electric light, 1d. per hour; gas light, equal thereto, 6d. to 8d.; tallow candles, 7s. 6d.; wax, 12s. 6d.” [But, in addition to the zinc and solution, an allowance must be made for apparatus, skill, labor, &c., as in the manufacture of other lights—gas, wax, tallow, &c.] In conclusion, Mr. S. observed, “By a careful comparison of all modes of effecting artificial illumination

I think I am justified in saying that there is no light so cheap as that evolved by voltaic currents of electricity; and there is certainly none which exhibits such pure and brilliant results. The absence of all smoke and flame, and noxious gases—the non-consumption of oxygen—the impossibility of its igniting surrounding substances—and the simplicity of the apparatus—are powerful recommendations for the adoption of the light in all places where purity, and brilliance, and safety, and economy, are sought for.”

In the course of his address, Mr. Staite truly observed, in reference to the alleged jealousy of coal-owners, gas-makers, &c., that it was idle to throw obstacles in his way; if his electric light had superior merit on its side, it would come into use in spite of any local opposition; if, on the contrary, in practical value it was inferior to others, it would fall into oblivion.

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On the Use of Gutta Percha in Electrical Insulation. By MICHAEL FARADAY, F. R. S.

I have lately found gutta percha very useful in electrical experiments; and therefore, that others may take advantage of its properties if they have occasion or are so inclined, give you this notice for insertion in the Philosophical Magazine. Its use depends upon the high insulating power which it possesses under ordinary conditions, and the manner in which it keeps this power in states of the atmosphere which make the surface of glass a good conductor. All gutta percha is not however equally good as it comes from the manufacturer's hands; but it does not seem difficult to bring it into the best state: I will describe the qualities of a proper specimen, and refer to the differences afterwards. A good piece of gutta percha will insulate as well as an equal piece of shellac, whether it be in the form of sheet, or rod, or filament; but being tough and flexible when cold, as well as soft when hot, it will serve better than shellac in many cases where the brittleness of the latter is an inconvenience. Thus it makes very good handles for carriers of electricity in experiments on induction, not being liable to fracture: in the form of thin band or string it makes an excellent insulating suspensor: a piece of it in sheet makes a most convenient insulating basis for anything placed on it. It forms excellent insulating plugs for the stems of gold-leaf electrometers when they pass through sheltering tubes, and larger plugs supply good insulating feet for extemporary electrical arrangements: cylinders of it half an inch or more in diameter have great stiffness, and form excellent insulating pillars. In these and in many other ways its power as an insulator may be useful.

Because of its good insulation it is also an excellent substance for the excitement of negative electricity. It is hardly possible to take one of the soles sold by the shoemakers out of paper or into the hand, without exciting it to such a degree as to open the leaves of an electrometer one or more inches; or if it be unelectrified, the slightest passage over the hand or face, the clothes, or almost any other sub-