

of iron to be the produce of Scotland, and supposing the value of the coal used to be 3s. a ton, the saving that would thus be effected on the make of Scotland would amount to 112,500*l.* a year; to which might be added 20,000*l.* a year of saving in wages and repairs, which would make a total saving of 132,500*l.*, or about 4s. 5d. a ton on the produce of Scotland, which on the present price of 44s. per ton, was about 10 per cent. on the value. If the gaseous escape could be extended to the uses of the forge, a further saving of three tons of coal would be effected,—thus making, at least, a saving of 20s. a ton on all the iron manufactured into bars, sheets, and rails.—*Ibid.*

On a Peculiar Form produced in a Diamond when under the influence of the Voltaic Arc. By S. P. GASSIOT.*

M. Jaquelin was the first to show that when the diamond is submitted to the high temperature and influence of the voltaic arc, it quickly becomes converted into a black carbonaceous matter, having all the appearance of coke:—the diamond when in a native state is an insulator or non-conductor of electricity, but when thus changed into coke it becomes an excellent conductor. At the Chemical Section of the British Association, held at Oxford, in 1847, Dr. Faraday exhibited some specimens of the diamond coke which had been forwarded to him by M. Jaquelin, and subsequently, on the 16th of June, 1848, he publicly showed the experiment in London, in the theatre of the Royal Institution. On repeating the experiment a short time since before a few private friends, I obtained a product so totally different from that of M. Jaquelin, that I am induced to bring the subject before this Section, in the anticipation that it may tend to elicit some observations on a phenomenon which at the time attracted the attention of many electricians. The apparatus I used in the experiment consisted of forty series of the usual size of Grove's nitric acid battery,—the terminals were made from two pieces of well burnt box-wood charcoal, that attached to the positive or platinum end of the battery, being formed in the shape of a small cup or crucible, in which the diamond was placed,—to the negative or zinc end of the battery, a piece of the same charcoal (but *pointed*) was attached. The experiment was then made in the same form as described by M. Jaquelin, by first making contact with the two charcoal terminals, then bringing the flame in such a position as to cause it to *surround* the diamond;—in less than one minute the diamond as well as the electrode became in a state of intense ignition. The diamond gradually increased in size, rolling about in the heated crucible, when it suddenly expanded, forcing itself upward on the negative terminal, at which moment I separated the electrodes. The diamond, which was in a state of intense ignition, remained attached to the negative terminal. When cool, it exhibited the same state as it now presents. It was expanded to eight or ten times its original bulk. Instead of becoming a black carbonaceous substance, and a good conductor, it has a vitreous white opaque appearance, and remains a non-conductor. It has also a deep circular cavity

* From the London Athenæum, August, 1850.

on that portion which was opposite and nearest to the positive electrode; that part which was in contact with the negative electrode being clearly discernable by a small portion of the box-wood charcoal remaining attached to it. The centre of the cavity appears to be still brilliant, as if that portion of the diamond had not been in a complete state of fusion. In one or two other experiments the diamonds disintegrated, the fragments remaining in a carbonaceous state. Since which I have not had the opportunity of repeating the experiment.—*Ibid.*

*The Dover and Calais Electric Telegraph.**

Since the sinking of the first wire, circumstances have occurred calculated for a short time to retard the carrying out the project to completion, seeing that, in order to the complete establishment of an integral line of telegraphic service between London, Paris, and the continent, the promoters have to obtain a grant from the French Government of the eighteen miles of line extending from the coast to Calais, from which point to Paris the wires are erected. To secure that concession of this section, in the way of which some difficulties present themselves, Messrs. Brett, Wollaston, and Edwards, Directors of the undertaking, are now at Paris, awaiting the return of the President of the Republic, who granted the original decree, and to negotiate with the Government authorities on the subject.

In the meantime, experience of the experiments already made goes to prove that a stronger species of telegraphic tackle will be required. By the terms of contract with the French Government it was enacted—"That the Government does not reserve to itself the right of making any similar concession," but "that in case the experiment shall not result in a favorable execution by the 1st September, 1850, the right conceded will revert to the French Government." Consequent on the conditions laid down in the contract the promoters successfully submerged the wire; but, as is well known, it was subsequently cut asunder by some rocks on the French coast.

Since this happened, divers have been down, and on examination it has been found that where the rupture of the coil occurred it had rested on a very sharp ridge of rocks, about a mile out from Cape Grinez, so that the leaden weights, hanging pannier-like on either side, in conjunction with the swaying of the water, caused it to part at that point, while at another place in-shore the shingle from the beach had the effect of detaching the coil from the leaden conductor, that carried it up the Cape. The wire in its gutta percha coating was consequently cut in two places, representing a remnant of wire, of about 400 yards, which was allowed to drift away, till it came into the possession of a fisherman at Boulogne, who made a demand of 60 francs for the injury he alleges it did to his nets. Complaints are made by the fishermen, both on the English and French coasts, that the existence of this wire will interfere with their deep sea fishing, and that its track over the Varne and elsewhere is in the way of places most frequented by fish. It is intended, however, at

* From the *London Mechanics' Magazine*, September 28, 1850.