Davis (naval architect), Mr. W. Vavasour, A. E. Eastwood, Esq.

The boiler, which was rather an old one, imperfectly adapted to the purpose, and with incomplete arrangements for providing a thorough draught, did not exhibit Mr. Barff's principle of working to the best advantage. Nevertheless, the visitors were much interested in the experiments, and they undoubtedly served a good purpose. The material employed was our home-made shale oil, which was conducted by a small supply pipe from a reservoir above to the red-hot internal surface of the generator, which is fitted up near the front of the boiler, and a sufficient interval having been allowed between the drops to permit the surface to recover its red heat, the greater part of the liquid was at once converted into gases identical with some of those ordinarily generated by coal. The boiler was supplied with a jet pipe bent, in order that there might be no return, through which the liquid was allowed to flow into retort. The result was that in three minutes 5 lbs. of steam were generated, the rate of evaporation obtained being very highviz., about 22 lbs. of water to one of oil, or in a proportion of four to one as compared with ordinary steam coal. Until the steam reaches 10 lbs. pressure, the apparatus does not act, but so soon as this point is gained, all heavy smoke-which of course represents so much oil unconsumed-disappears, and the economy in the burning of the oil is apparent.

It is now some time since the public heard of the progress of Mr. Richardson's experiments, which, it will be remembered, have for some time been carried on under Government adspices, hut have of late been left to Mr. Richardson's sole responsibility. We have now before us a printed circular of invitation to see the petroleum boiler at work in Woolwich Dockyard It appears that the Admiralty have given the patentee permission to exhibit his process for one week from Monday next, and, from what we hear, we have no doubt the attendance of those interested in the subject will be considerable. Mr. Richardson announces his intention of mixing other oils and oleaginous refuse with shale oil, so as to further lower the already low price of crude mineral oils. The plan may be worth a trial, but the main thing which it is essential for Mr. Richardson, or some other inventor, to demonstrate, is, that crude mineral oil can at its present price be effectively and economically substituted for coal as steam fuel. When this has been clearly demonstrated, it will be early enough to look about for additional saving. The precise profit or loss consequent upon the adoption of mineral oils as fuel cannot now be ascertained, but must be determined by the success or partial success of one or other of the inventions, and the consequent effect upon the market.

Reverting to Messrs. Sim and Barff's patent, it may interest our subscribers to know that a limited liability company is being formed in anticipation of its success, with C. B. King, Esq., as engineer. Mr. Bloxam, the well-known Professor of Chemistry at the Royal Academy, Woolwich, has, after a series of trials and inspections, given the patentees a report, which is really scientific and exceedingly interesting, if not practically useful. As to the effect of introducing steam into the generator, he

says, when the petroleum, or shale oil, is allowed to drop into the red-hot generator, a portion of the gas thus produced is always decomposed by contact with the heated surface. The gas consisting of a large weight of carbon, united with a small proportion of hydrogen, the effect of bringing it into contact with the red-hot surface is to cause the separation of a considerable quantity of carbon in the solid state, part of which is deposited upon the inside of the generator, which it seriously obstructs, whilst another part may be seen in a finely-divided state, communicating a dark colour to the smoke accompanying the gases from the generator. The carbon thus deposited inside the generator is so much heat-giving material wasted, which ought to have been conveyed into the combustion chamber and there consumed. This is effected when steam is introduced into the generator, for the steam, consisting of hydrogen and oxygen. is decomposed by the red-hot carbon in the generator, its oxygen uniting with the carbon to form carbonic oxide gas, which is highly combustible. and burns in the combustion chamber where the heat is evolved; the hydrogen of the steam is liberated, and, being also a combustible gas, contributes its share to the heat produced in the combustion chamber. It is evident, however, that the additional heat produced in the combustion chamher by burning the carbonic oxide and the hydrogen obtained by the action of steam is not all clear gain, but is attended with a certain expenditure or loss of heat in the generator; and the question arises, whether the amount of heat gained in the burner, or combustion chamber, is greater than that lost in the generator.

Mr. Bloxam finds by calculation that when the gases burn in the combustion chamber so large an amount of heat is generated that a considerable surplus, or gain of heat, remains, after deducting the loss of heat due to the decomposition of the steam in the generator, as well as the heat consumed in raising the carbon and the steam to the temperature necessary to effect the decomposition of the latter (estimated at 2,000° F.). By calculation, each pound of carbon converted into gas by the action of steam in the generator represents a gain of heat sufficient to convert 11bs. of boiling water into steam. Theoretically, this amount of heat would be gained independently of and after deducting that expended in raising the carbon and the steam to a red heat in the generator; but it must not be forgotten (in practice) that if a separate fire be employed for heating the generator, so much more fuel will be consumed than is required (by calculation) to heat the carbon and the steam, that the actual gain would be much diminished, and could, by bid management, be converted into a loss, so that it is very desirable that the generator of gas and the boiler which supplies the steam should be heated by the gas itself, and not by a separate fire. Even if the heat lost in the generator by the introduction of steam were exactly equal to that gained in the burner, the process would still be attended with the great advantage of removing from the generator the solid carbon, which forms a serious obstruction, and would interrupt the continuous working of the apparatus.

It appears to be desirable that the temperature of the generator should be maintained at a bright