THE SILBER LIGHT.

The substitution of coal gas for the various oils in the production of artificial light has become so universal, and its superiority so well established that it seems hardly within the limits of possibility that we should—except under the pressure of extraordinary circumstances—ever return to colza or cotton wicks. Expensiveness and uncleanliness in use have ever been the chief drawbacks to animal and vegetable oils, whilst the dangerous nature of those produced from the mineral kingdom, as well as the objectionable smell, and other disadvantages attending their use, have greatly limited the demand for their services, of which otherwise the public would have been but too ready to avail themselves. But we are ever working in circles, and it is a fact simple and absolute, that to-day finds us returning to the use of those materials for illuminating purposes which, not many years since, we were anxious to resign in favour of coal gas. But then we are returning to them under widely different conditions, and in place of the costly and inefficient system of illumination by vegetable oils formerly in vogue, and instead of the dangerous and disagreeable method of burning mineral oils as now practised, we have an economical cleanly, safe, and efficient mode of utilising to the utmost every class of oil. This result has been attained without a departure from the general principles observed in the construction of oil lamps although the details have been greatly modified and improved, until at length we have the apparent anomaly of a gas light produced from an oil lamp. It is true that all oil lamps are gas producers, but only to a limited extent, the impurities of the oil and the absence of exact proportion between oxygen and carbon, causing the wick to choke and char, and the light gradually to decline, whilst under the new system a wick will last for months, the lighting of the top edge being required only to give the initial start to the gas-manufacture it helps to carry on. The duty of the wick is simply to feed the flame, which it does without being itself consumed.

These great changes have been effected by Mr. A. M. Silber, whose new light bids fair not so much to supersede gas—although it may possibly do this to some extent—as to be used wherever coal gas is either inapplicable or cannot be obtained. But this altered condition of things has not been brought about by mere accident or by a happy inspiration, it is the result of several years of careful investigation and experimental research during hours not occupied by business, for Mr. Silber is a London merchant. More than two years since Mr. Silber brought his system of producing artificial light before the the public through the Society of Arts, but the public were not then willing to accept the facts laid down. Now, however, that the inventor has demonstrated the correctness of his theories by actual practice, there can be no gainsaying these facts, nor resisting the conclusions to which they lead. The principle involved in the Silber light is the conversion of the oil into gas a short distance below the flame, and the exact proportioning of the quantity of the gas produced, and of the atmospheric oxygen supplied to it. These conditions having been complied with by Mr. Silber, he obtains as a result perfect combustion which means a clear, bright, and smokeless flame, unaccompanied by any offensive smell or other drawback, a light, moreover, which is as suitable for a railway carriage, or the masthead of a ship, as it is for a drawing-room table. In order to approximate the conditions of his system to those of the ordinary gas supply as much as possible, Mr. Silber lays on the oil for wall and ceiling burners by means of cisterns and pipes. A main cistern is placed in the upper part of the house, and from it the oil is conveyed by gravitation to every other part of the building. The impurities of the oil are arrested at the outset by a strainer, through which the pure oil flows by pipes to each floor of the building, at which point is a reservoir, the supply being governed by a stopcock and float. Each reservoir is placed on a level with the burners it has to supply, and by this means there is no overflow, nor are there any taps to turn on or off. The oil flows freely to the burner, at a constant level, several inches below the flame, which is fed by the capillary attraction in the wick. As the oil in the wick becomes heated it is vaporised in an annular chamber, which in fact becomes the gasholder. The supply is maintained with perfect regularity, the delicately-adjusted float following the rate of consumption, and opening the cock to the exact extent required to keep up the supply, and no more.

In the burner, of course, lies the secret of the Silber light, and in perfecting the adjustment of the admission of air, several thousand experiments have been made, and much time and money spent by the inventor. The burner consists of a series of concentric tubular cases placed vertically one within the other with spaces of variable width intervening. The inner space forms an air passage by which the outer atmosphere is conducted to the centre of the flame; in the chamber surrounding this the wick is placed. On the outside of this chamber, which may be called the gas chamber—and surrounding it, is another passage for the supply of air to the exterior of the flame, whilst a fourth annular chamber contains the oil, and is in direct connexion on the one hand with the supply, and on the other with the wick. Covering the mouths of all these chambers is a dome-shaped cap having an aperture through which the flame issues, and at which point the air and gas are focussed so as to produce perfect combustion. The details of construction vary slightly with the varying natures of the oils to be burned, whether sperm, colza, or the light hydro-carbon oils. The principle however remains the same in all, and it is that of so accurately adjusting their proportions as to obviate smoke, waste, and danger. On a recent visit to Mr Silber's warehouse in Wood-street, Cheapside, we examined a number of these lamps, variously fitted, for general, and for special purposes, and in no one instance out of many burners tried, did we meet with anything to lead to the alteration of a primary opinion that the Silber light was a practical success.

But above and beyond all this comes the question of cost, and it goes for nothing, in commercial sense if the most perfectly successful invention be coupled with extravagant cost. In this respect, however, the Silber light comes out satisfactorily, the independent testimony of railway companies who have had the light in use for periods of—in some instances—over twelve months, being very conclusive on that point, and establishing the fact that in railway carriages the Silber light effects a saving of 6*l.* 18s. 8d. per lamp, per annum, as against the common rape oil lamps at the present market prices. In other trials, including a long series of careful experiments made by Professor Valentin, four times the light has been found to be produced, accompanied by a direct saving of 64 per cent in cost of production. Taking the result of its application to a train on the Metropolitan Railway, we find the saving in cost and the increase in illuminating power to be very marked. Each gas lamp in the carriages on that line consumes 4 cubic feet of coal gas per hour, or 1008 feet in 252 hours, at a cost of 3s 6d. per 1000, one lamp giving a light equal to 3 7 candles. On the other hand, the Silber light is reported to give a light equal to 12 candles at a cost of 1s. 7½d for 252 hours, besides which there is the saving of dead weight of the gas bags, and of time lost in filling them and attending to the lighting arrangements. With facts such as these in view, and bearing in mind the extensive stores of mineral oil awaiting a safe and efficient means of conversion into light, we may certainly predict a very large demand for the Silber light, and an adequate reward for its ingenious inventor.—*Engineering.*

RAILWAY TIMBER BRIDGE.

We illustrate, on page 20, a timber bridge, constructed to carry the Southern Railway of Canada over Kettle Creek, at St. Thomas, Ontario. The work not only is an excellent example of type construction, but is remarkable for the rapidity with which it was completed. Its extreme length is 1366 ft., divided into 736 ft of trestle work, and 630 ft. of house trussing; the latter is made up of 14 spans, resting upon timber piers, as shown on page 20. The extreme height of the structure is 92 ft. There were used in its construction 1,070,672 ft of timber, board measure, 4600 lineal feet of piling, about 35 tons of wrought, and 37 tons of cast iron. The work was commenced on the 20th September, 1871, and completed the 13th February last—a period of less than five months, and part of which lay in the severe season. Messrs. Dunn, Holmes, and Moore were the contractors, Mr. M Courtright being the president of the railway, and Mr. N. Finney the engineer-in-chief.