ELECTRIC LIGHTING IN LONDON.

The city of London has at last fairly started upon a grand experiment in the way of lighting by electricity, and the are of light now stretching across the metropolis, from Westminster to London Bridge, has no rival in the civilised world. It may, however, be considered as somewhat of a reproach to Britain that much as she contributed to the early development of electrical science, these latest practical illustrations have been mainly worked out by foreigners. So much is this the case that English firms have avowedly abstained from assisting at the present Electrical Exhibition at Paris, on the ground that they draw their own supplies from that city. It is greatly to be feared that the monopoly in use claimed by the Telegraph department of our own Post Office has done much to retard invention and improvement here in one important application of electrical science, and that naturally reacts on the rest. Be this as it may, the fact remains that for the electric lighting of London recourse is had to Jablochkoff, a Russian ; Siemens, a German ; Brush, an American ; and Lontin, a Frenchman.

The Jablochkoff system is the one which was first introduced into this country by Messrs. Wells, of Shoreditch, whose stand at the Building Exhibition is now lighted up by it. Subsequently it has been "exploited" by one if not two companies, and it appears to be temporarily in abeyance, since the district of the city apportioned to it has been turned over to the Lontin company. The Metropolitan Board of Works has, however, for the past two years maintained a row of Jablochkoff lamps on the Victoria Embankment, and this system is therefore pretty well known to Londoners. The Lontin system is to be adopted in Queen Victoria street, but owing to the short notice at which the contract was taken up, it will not be in operation till the 1st of May, though a few lamps are to be seen in a shop on Ludgate Hill. Consequently the two systems of Siemens and Brush mainly require our present attention.

The first point we have to note is as to the money cost of the experiment, which will be for plant and maintenance 1,410*l.* for the 32 Brush lights, 3,725*l.* for the 34 Siemens' lights, and 2,930 for the district allotted to the Lontin light. The discrepancy between the cost of the two first systems is most remarkable. The Brush Company has taken the contract at the price of gas, and astonishing as it seems, its managers assure us that they expect to make a profit out of the contract. Deducting the expense of plant, the maintenance of 32 Brush lights will be 660*l.* for a year, that is about 21*l.* per lamp. Calculating the Siemens' light in a similar manner, and allowing the larger lights to cost twice as much as the small ones, we find that they cost 2,270*l.* for the district, an average of 57*l.* for the lower lights, and 114*l.* for the high ones. The contractors may all be supposed to know their own business best, and it is impossible for anyone to criticise their prices until experience furnishes the necessary facts, but the proportion between their charges is a thing well deserving of being borne in mind.

As to the quality of the light supplied by the competitors, it will probably be admitted that for whiteness and steadiness the Brush bears off the palm. At King street, where it can be seen in contiguity with Siemens' light, the latter seems to have a pink tint, while the Jablochkoff at its point of contact with the Brush at Blackfriars Bridge, appears even bluer than at Waterloo. The intensity of the light is of course great, but although attempts are made to express it in figures our readers must bear in mind that these are only estimates, and that no trustworthy mode of measurement has yet been applied to the electic light.

We now come to the mechanical details by which the light is produced and distributed. The Siemens' plan of illumination differs from any so far tried in London for street-lighting, and shows what can be effected in the illumination of a town by placing a few powerful lamps at a considerable elevation, so that the light shall be diffused, and but little shadow be cast by persons and vehicles. For this purpose six powerful lights are employed, each approximately equal to 4,000 candles, and twenty-eight smaller ones of 300 candle power each. The six powerful lamps are about 80 ft. above the level of the street, and are placed on latticed iron poles like those used for signal-posts, made by Messrs. Stevens & Son, of Southwark. The furthest of these lights from the source of power is about three-quarters of a mile from the dynamo-machines. The twenty-eight smaller lights employed are placed on iron posts resembling ordinary lamp-posts, but higher, the light being about 20 ft. from the ground, or more than 8 ft. higher than the gaslights. The additional height at which the light is placed brings a larger field under the illumination of each, and aids the diffusion of the light. The electrical generators and their steam motors are in Old Swan lane, Upper Thames street. Each of the large lights is fed by its own dynamo-electric machine, separate conductors being led from the dynamo-machine to each lamp. The twenty-eight smaller lights are treated as if in four groups of seven lights each. To feed them two alternate-current machines are used, each machine supplying two groups, or fourteen lights. This method of subdivision has been adopted, not because all the small lamps could not be supplied by one machine, but for convenience in working, and with a view to prevent the danger of the streets in the district being left for a short time in darkness should any accident happen to the machinery. The generators, again, are dealt with in two equal groups, each of which is driven by a steam engine of ten-horse power nominal, supplied by Messrs. Marshall, Sons & Co., of Gainsborough. A third steam engine of the same power stands as a reserve between the two, so that it may be used to drive either set of generators when their own engine needs to be cleaned. The "leading" wires which convey the current from the dynamo-machines to the lamp consists of strands of copper wire coated with gutta-percha. Except over London Bridge, the conducting wires are laid in the ground, enclosed in cast-iron pipes. Those supplying the lamps on London Bridge are carried along the broad ledge outside the parapet, and are protected by a sheathing of iron wire. In the side of each lamp-post is a door opening to an iron box, within which the conducting wires from the lamp join those which come from the machine. The lamp, or "regulators," are fitted with one pair of carbon cylinders, the carbons being placed vertically one above the other. In those used for giving the lights of high power the upper one is 2 ft. long and 20 millimetres or a little more than three quarters of an inch in diameter, the lower one 1 ft. 8 in. long and 15 millimetres or nearly 6-10ths of an inch in diameter. The pair will last for about 18 hours without renewal. For the smaller lamps the carbons are 16 in. long and 12 millimetres or rather less than half an inch in diameter. Those in use are partly from the works of Messrs. Siemens Brothers, at Charlton, and partly from the works of Messrs. Siemens, at Berlin. The globes on the smaller lamps, of a material called alabaster, and of a quality made exclusively by Mr. Frederic Siemens, of Dresden, are estimated to absorb only about 20 per cent. of the light. Those on the high lamps are of clear glass. The high lamps which are fitted with reflectors above to intercept the upward and horizontal rays are suspended from iron brackets fixed at the top of the latticed iron pole. Guide wires passing through the reflectors steady the lamp when it is being drawn up and down to be cleaned and to have the carbons renewed. Such work is done on a platform, placed about 16 ft. from the street. The street work, the laying of the leading wires, and the erection of the posts, which was done by Messrs. Docwra & Sons, proved very costly, the difficulty of breaking up the asphalte and the interference with gas and water pipes adding materially to the expense.

The apparatus of the Brush light, which was fitted up by the Anglo-American Electric Light Company, is of a much simpler character than the foregoing. The nearly constant purity of colour and the steadiness of the Brush light already alluded to have been obtained partly by the improvement of the mechanical contrivances for regulating the current, and partly by the homogeneity of the carbons, analysis showing, it is said, but a-half of one per cent. of impurity in the manufactured carbons. The whole of the 32 Brush lamps are fed through a single leading wire from the works of the Company, which are in Vine street, near Waterloo Railway Station. The circuit is about 3¾ miles in length, over 20,000 ft. of wire being required to complete the round of the district. The conducting wire, one-eighth of an inch in diameter, is made like a wire rope for the sake of getting pliability of seven fine copper strands, and by thus using what is practically but one wire there is, it will be readily understood, a saving in the first outlay and afterwards in the cost of maintenance. The view with which the inventor of the system has worked is that he has to multiply and not to subdivide the electric light, assuming that, instead of dividirg a large light into a number of small units, with a loss in the total light by the subdivision, he should rather multiply one ordinary-sized light, of say 1,000 to 2,000 candle power, into a greater number of lights of the same size, absorbing energy proportionately to the increase in the number of lights. This result he obtained by increasing the speed at which the armature wheel revolves in the magnetic field. The current obtained is continuous. By the use of an appliance the inventor calls the regulator, the number of lights worked by a machine can be increased from one up to the highest number the machine is capable of feeding. The 32 lights in the district under experiment will be worked by one machine, absorbing for the entire circuit about 28 horse-power