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METROPOLITAN IMPROVEMENTS.

Having recently given a detailed description of the Metropolitan Main Drainage Works, we shall now give only a brief analysis of their nature, object, and extent. This great scheme consists of the construction of three main sewers on each side of the Thames, running east and west, and intercepting the sewage, which is conveyed by the present system in mains running north and south, and flows into the Thames. The entire drainage of the metropolis and of the immense area combined with it, instead of falling into and polluting the river, will be carried through the new mains along the banks of the Thames, and deposited in reservoirs thirteen miles below London. Here the sewage will be deodorised and discharged into the river at a proper height and flow of the tide for carrying it out to sea, and rendering the return of any portion of it back to the metropolis an impossibility. When the works are completed, the ebb and flow between the bridges of 300,000 gallons of putrescent fluid, which now daily contaminate the stream, will cease, and the once silvery Thames will be restored to its purity. The other evils of the present system will be removed. The miasma from the stagnation of sewage in the drains, engendering disease of the most virulent character, and the periodical flooding of low-lying districts by the mains being tide-locked, will altogether cease, and the health and cleanliness of the metropolis will be greatly increased. A few figures will give us an idea of the vast magnitude of the undertaking. The three gigantic main sewers on each side of the river will form a total length of fifty miles. The underground tunnels, which will extend from London to Barking on the north and to Erith on the south side, will be 9ft. and 10ft. in diameter, and are calculated for the conveyance of twice the amount of the present drainage. The main sewers are of three classes — high, middle, and low level — corresponding to the levels of the districts to be drained. At a little distance below London the sewage will be lifted from the lower to the higher level on each side of the river by 8 pumps of 7ft. diameter and 4ft. stroke, with engines of 500 horse-power, which will each daily raise 19,000,000 cubic feet of sewage from 19ft. below low water to the high level ducts, and will be capable of raising 25,000,000 cubic feet per day. From these ducts the sewage will descend on the north side by 3 tunnels, each 9ft. 6in. in diameter, and nearly 4 miles long, and on the south side by one tunnel 10ft. in diameter to the depositing reservoirs, which will cover 14 acres on the north and 5 acres on the south side. One continuous tunnel, which will pass under Woolwich, will be 1½ miles in length, and 80ft. under the surface of the ground. On the north side the high level main is completed and at work, the middle level is in a forward state, and Mr. Bazalgette, the engineer of the Board of Works, calculates that in a year and a half from this time all the main sewers will be constructed. Before all the works are completed, 800,000 yards of concrete and upwards of 300 millions of bricks will be used, and 4,000,000 cubic yards of earth will be removed. A plan is organised for the formation of a company to utilise the sewage as liquid manure on a large scale, so that the question as to its value will be determined.

The total cost of this grand work is estimated at 4,000,000*l.* sterling; and, before its completion, with the supplementary works, which it cannot fail to call into existence, will probably be increased to 6,000,000*l.* What an idea does not this give of the magnitude, grandeur, and wealth of a city which expends such vast sums on underground works for the comfort and health of its inhabitants!

The Metropolitan Subterranean Railway Works were inspected last week by a party of the directors and other gentlemen interested in the undertaking, who passed through the entire length of the line from the junction at Paddington to within a few yards of the temporary station at Farringdon Street. The inspection commenced at the terminal station at Paddington, the construction of which is a difficult piece of work, arising from the confined and awkward nature of the ground on which the station has to be fitted on either side of the up and down lines of the metropolitan branch. At this point an artificial roadway is carried on girders to give room for a standing, and for an approach for cabs and omnibuses. The engine used on Monday was especially designed for the line by Mr. Fowler, the engineer of the company. It consumes its own smoke and condenses its own steam, and gives off neither smoke nor vapour when it once enters the tunnel. The carriages are lighted with gas on a simple and efficacious plan. In an india-rubber bag, on the roof of each carriage, the gas is enclosed, and feeds two lamps for two or three hours. This arrangement has been at work for some time on many of our northern lines and on the continent, and has always worked with safety. When empty, the bags are replenished in a few moments from an ordinary gas-stand pipe. The train proceeded at the rate of about twelve miles an hour — a speed that was seldom exceeded, from the constant stoppages to visit all the stations. The tunnel was perfectly clear, free from close air, dry, and well lit. The directors were perfectly satisfied with the result of their inspection. The line, it is reported, will be open for traffic on the 1st of October.

The Report of the Commission for the Embankment of the Surrey Side of the Thames has lately been published. The commissioners were appointed to examine plans for embanking the Surrey side of the river within the metropolis, and to report which of the plans will conduce with the greatest efficacy and economy to the improvement, embellishment, and convenience of that part of the metropolis, improve the navigation of the river, and provide a public thoroughfare without stopping such trade as must be carried on upon the bank of the river, and also upon the cost and means of carrying the same into execution. Responding to an advertisement, twenty designs were submitted to the commissioners for examination, and a short description of each is appended to the report. The excellence of many of these plans, which embrace the banks of the Thames from Deptford to Battersea Park, is admitted; no one of them is recommended for adoption in its entirety, but the principal features of some are embodied in the scheme proposed by the commissioners. The proposals comprised three sections, namely, Deptford to Westminster Bridge, Westminster Bridge to Vauxhall Bridge, and thence to Battersea Park. The commissioners are of opinion there is no necessity for a public road from Deptford to Westminster Bridge. It would, they say, cause a vast expenditure of money, and great disturbance of the trade on the south side of the metropolis. They foresee, however, that the owners and occupiers of wharfs may wish to carry out a plan of embankment, and they recommend that every facility should be afforded for securing uniformity of design and navigation in the execution of the works, but not at the public expense.

In executing the second section, from Westminster Bridge to Vauxhall, a great improvement would be effected by an embankment and railway between those points. The frequent flooding of the low grounds on the Surrey side, which are the source of great distress and sickness, affecting the poorer classes, would be prevented, and that part of the metropolis would be greatly embellished. The third section, between Vauxhall Bridge and Battersea Park, is strongly recommended. An embanked roadway would afford access to the Battersea station of the South Coast Railway and to the goods station of the South-Western and Chatham and Dover Railway, would improve and embellish that part of the metropolis, and afford a convenient and agreeable approach to Battersea Park. The report proposes that an embanked roadway of about two miles in length should be formed from Westminster Bridge to Battersea Park, on a viaduct of ornamental character, opposite the Houses of Parliament as far as Bishops' Walk, and thence on a solid embankment to the new Suspension Bridge at Battersea. Dredging the fore-shore to a level of five feet below low water will improve the navigation, and the nature of the works would prevent the accumulation of mud. The estimated cost of the works, including land and compensation, is 1,000,000*l.* If the present opportunity is not embraced at once, the cost will be much greater, by reason of the increasing demand for land and houses. To meet the expense, the coal and wine dues would have to be appropriated for a *further period.*

The third great iron bridge, carrying the Charing Cross line over the Southwark Bridge Road, was commenced last week. Those over Stamford Street and Blackfriars Road are successfully completed. The works and foundations for that over the Borough to London Bridge are also progressing.

In connection with the approaches to the permanent Crystal Palace Exhibition at Paris, it is announced in the *Moniteur* that the foundation works of the bridges across the Seine between the Pont de Genalle and the Pont de Sevres have commenced. These bridges, of which several have been already built, are on the system of the engineer, M. Legrand, of which the merit is facility of construction and economy of expense. The bridge is formed of two massive girders, extending from shore to shore, which are twelve mètres apart, and tied together by means of a system of rigid lattice-work, supporting a platform of cast-iron plates, on which the roadway is laid. The iron-work will be fitted together piece by piece on the surface of the abutment pier on the right bank, and will be pushed forwards on to the supporting cylinders in the river gradually as the fitting of the iron-work progresses. This plan has been successfully practised with several iron bridges and viaducts, thereby avoiding the inconvenience of scaffoldings, which are indispensable in other systems of fixed bridges.

In Class No. 10 of the International Exhibition is exhibited a model of Mr. Asprey's plan for connecting the railways on both sides of the Thames, and relieving London Bridge of the traffic to and from the different railway stations. This plan embraces a line of railway