BLACKFRIARS' BRIDGE.

The following extract from an article in *Engineering*, relative to removing of the old Blackfriars' Bridge on the Thames, and the centreing for the new bridge, may prove of interest to our readers :

The points to be considered were how the old bridge could be removed in the most expeditious manner, at the cheapest cost, and at the same time to proceed with the construction of the new bridge. After careful consideration, it was determined to erect a double gantry, or scaffolding for traversers to run on, so as to have complete command for hoisting, and lowering over the whole space of area of the works. The reason that a double gantry was adopted was that with a single one the traverser girders would have been too heavy and cumbersome, as the span required for them would have been upwards of one hundred feet, and in case of a breakdown or repairs, the traverser would have blocked the whole width of the works. Between the two gantries, and from one side of the river to the other, a gangway or footway was constructed, which was found very useful, not only because of the facility with which the workmen and others could get to any part of the works, from which a considerable saving of time resulted, but in setting out and measuring spans it was of great service. The widths of the gantries from centre to centre of rails were 50ft. each, with a 5ft. space between them, for the gangway. The level of the rails above high-water mark was 38ft., and about 65ft. above the bed of the river. These gantries were strongly built and braced in a manner shown in the engraving,. It will be seen that the centre uprights rested on the old arches. As the arch stones were removed the uprights were supported on piles, driven exactly plumb underneath to receive them, which was very successfully accomplished. Where the centre gantries crossed the old piers, trusses were constructed to carry them. Dolphins, that is to say, groups of piles, were driven, to which booms—balks of timber—were fastened in such a manner, that they could rise and fall with the tide, all round the works, to protect them from river traffic, and so as to leave three navigable openings in the most convenient positions for navigation. Inside these booms, stages to receive materials, plant, &c., were made as the work progressed for each of the new piers, and besides these, in consequence of the small areas of available space at either end of the bridge, other stages were constructed inside the booms, one for the blacksmiths' shops, and a large one in the centre of the river on which to store materials, and to make the centres for use in taking down the old bridge, all of which last were set out full size by chalk lines for the carpenters to work to. They required careful setting out, as owing to the foundations having given way, the arches were of irregular shapes, so that the centres had to be set out accurately, to allow them to fit in as required when fixed in position. The method of taking the shapes was as follows :—A level staff 25ft. long was used with a plumb-bob attached to it to enable the staffholder to see when it was upright ; at the bottom of the staff a long piece of iron was fixed at right angles to the staff to touch the soffit of the arch at the points to be taken. This was requisite, owing to the projection of the cornice of the bridge. Then points were marked at equal distances on the cornices, and levels taken with an ordinary dumpy level at each of these points gave the shape of the arch very accurately.

As the centres were completed, they were launched from off the middle staging and towed to their respective arches, where they were raised by traversers and skidded along bulks of timber under the arches and fixed in proper position. There were six sets of centres under each arch, placed at a distance of 7ft. 11in. apart.

Where the navigable openings occurred the centres were fixed without stopping the traffic on the river. The engraving represents those used in removing the third arch from the Surrey shore, and they were similar in design at the other navigable openings. It shows them after the old arch was removed, just before they were taken down. Piles were driven and the lower struts fixed in the first place, and fitted into holes cut in the old piers to receive them. Then the sides or wings were placed in position, and held so by chains fastened to lewises let in to the old bridge. Then the top portions were hoisted and skidded along balks of timber to their proper places. After this was done, the whole was fixed and tied together in the manner shown. In removing them, they were hauled bodily over into the river, towed ashore, and taken to pieces there.

In December, 1864, so much of the old bridge had been removed as to admit of the commencement of the excavation for the south abutment dam. A trench was excavated through the ballast, and a single row of piles 13in. by 13in. scantling were driven as closely as possible, after having their sides adzed. The small spaces between them were well and carefully caulked down to below the top of the trench, after the strutting inside had been completed. Then the trench was filled with clay puddle, and the water kept out. This dam answered very well and kept particularly free from leakage, more especially as it was a single pile dam, to withstand a 20ft. rise and fall of tide, sometimes even one greater. It was thoroughly well strutted, which is an important point in the construction of dams, while the pile-driving was very carefully executed. Woodford's patent centrifugal pumps were used in the sump during the excavation and concreting for the foundations. They did their work effectually.

In January, 1865, the centre arch of the old bridge was removed, and it was found that some of the arch stones were considerably crushed—it was remarked more so at the extrados than the intrados. There was great care taken in removing these, for fear that they might fall out of the sling chains into the barges placed to receive the stones, and consequently send them to the bottom of the river. Considering the large quantities of stone removed, and that the work was pushed on by day and night without cessation, excepting in cases of exceedingly bad weather, there was but a small amount of damage done to the craft employed during the work. During frosts, chains require looking to frequently, and to be carefully examined. Passing them through a fire is necessary not only for its action on the chain, but because it also thoroughly cleanses the chain and enables the better examination thereof to be made. Too much care cannot be used in looking after and keeping chains in good order on works. Examinations should, therefore, always be carefully done.

A NEW PHOTOGRAPHIC PRINTING PROCESS.

It is well known that a layer of gelatin containing bichromate of potash, or the so called bichromate of gelatin, possesses the property of becoming insoluble by the influence of light. If a glass plate is covered with such a layer and exposed to the sun or to daylight under a negative, the places exposed to the light become insoluble, and those protected or shaded will remain soluble, and may afterward be water-soaked, while the insoluble portions will remain dry, and thus having the advantage of taking up the oily printing ink, such a plate can be used as a lithographic stone and printed from in a lithographic press ; this is one of the known methods of photo-lithography. Other modes have been invented, intended to prepare plates in such a way that they become similar to wood-cuts, and may be printed on a common press. Some of them are now in use in this country, but the simplest and best is perhaps the method of Despaquis, in France, lately published, and chiefly intended for manufacturing purposes. Instead of a glass plate, he uses a corresponding large belt of linen, on which he places the layer of bichromate of gelatin, develops the image in the usual way, removing that part of the gelatin which has remained insoluble as much as possible, he then sews the ends of the belt together, and stretches it between two pulleys, while by the addition of a little glycerine the whole is kept flexible and prevented from drying hard. On one of these pulleys, revolving by steam power, the belt is inked by an inking roller ; by the other pulley the pressure is produced on an endless strip of paper or other material, which thus receives a continually repeating impression of what there is on the belt. It is proposed to accomplish in this way the reproduction of photographs in a cheaper way than thus far has been possible by any other method, while the use of the principle to print new patterns of calicoes, wall-paper, etc., forms another new industrial novelty.—*Manufacturer and Builder.*

To the Editor of the
CANADIAN MECHANICS' MAGAZINE and PATENT OFFICE RECORD.

Dear Sir,— On page 57, No. 2, Vol. IV of your valuable paper, you illustrate my "Governor Steam Engine," under the head of "Rigg's Patent Expansion Valve." This principle of governing an engine was patented by me in Canada and the United States in 1871, and provisionally in England in 1872 ; circumstances, however, unexpectedly prevented me completing my patent in England. Hence its introduction under an another name.

Yours truly,

CHAS. LEVEY.

TORONTO, April 1st, 1876.