with iron struts. Here the rail level is 28 ft. below the surface, and the covered way is succeeded by a length of open cutting extending to within about 50 ft. of Graham-street; here, as there was not room to construct the retaining walls of sufficient thickness, their tops are strutted apart by cast-iron struts extending across the line. From Graham-street to Sloan-square the line passes through ordinary arching. The sewer which traverses Graham-street is carried over the line in a pipe 4 ft. in diameter, this pipe, which crosses on the skew, being supported partly by the brick-arched covering, and partly by five girders provided for the purpose.

The Sloan-square Station is 307 ft. 6 in. long by 50 ft. 5¼ in. wide between side walls. The platforms are each 13½ ft. wide, and the general details of the building, roof, &c., are similar to those of the Victoria-street Station. At this point the Bannalgh Sewer—a 9 ft. barrel—crosses the line of the railway, and is carried over it through a cast-iron tube, this tube intersecting the station at an angle of 48°, and nearly at a point where the clear distance between the station walls is 50 ft. on the square. The length of sewer which has to be supported upon girders and carried over the rails is therefore a little over 66 ft., and the arrangement adopted is shown in Plate XXXII.

The cast-iron tube which has replaced the old brickwork is supported on two wrought-iron main girders, and on two smaller girders of cast iron, which span the staircase constructed at the back of one of the retaining walls of the station. It will be seen that the tube is made up transversely of six segments, which vary in thickness from ¾ in. at the crown to 1¾ in. at the invert. The segments are 5½ ft. 11 in. long, except at the end, where the difference of the skew is made up, as will be seen in Fig. 4, Plate XXXII.; and they are stiffened on the lower side by intermediate longitudinal ribs, in addition to the flanges by which they are bolted together. These are, however, omitted in the upper half, where the plates have but little work to do. Longitudinally the joints are made by flanges 1½ in. in thickness, and ½ in. bolts, pitched 4 in. apart, are used throughout, the joints being made good with canvas and red lead. Figs. 1 and 2 show the general construction of the tube, with the arrangement of the transverse and longitudinal flanges, feathers, &c. It was considered necessary to provide for any occasional variation in the length of the sewer crossing, and one joint is arranged as shown in Fig. 9, by which expansion and contraction are provided for. It will be seen, by reference to the section, that the end of one length of the tube is bell-mouthed to the depth of ¾ in. for about 3 in., and that the adjacent length has a corresponding recess. A wrought-iron ring, ¾ in. thick, is fitted to the recess, being bolted to one length of the tube, and left free to slide in the other. Externally, one connecting flange is increased from a depth of 5 in. to 9 in., the other being left the ordinary length. A wrought-iron ring, ¾ in. thick, makes the joint good, it being bolted to both flanges, and packed with two rings of india-rubber. The position of the expansion joint is shown on the side elevation (Fig. 1), and the sectional plan (Fig. 4). Behind the retaining walls the iron tube is built into the brickwork of the sewer, which was reconstructed for a short distance on each side.

The main supporting girders are of wrought iron, 73 ft. 8 in. long, 6 ft. 6 in. deep, with a width of top and bottom flanges of 1 ft. 10 in. and 2 ft. respectively, the former being stiffened by angle irons rivetted along the outer edge. The girders are of the ordinary type, excepting that while the stiffeners on the outer side are of the same width as the top flange of the girder, and are strengthened at the edge with light T-irons, on the inner side they conform to the contour of the sewer tube, and are bolted to it at every transverse flange junction. This arrangement determines the distance between the stiffeners to be 5½ ft. 11 in. Fig. 2 shows clearly the junction between the sewer tube and girder, and it will be seen there that the T-iron by which the stiffening plate is rivetted to the web of the girder is extended not only around the tube, embracing it above and below, and fastened to it by the same bolts which secure the flanges together, but also forms a part of the corresponding stiffener in the girder on the other side of the sewer tube. By this means the whole structure is securely bound together. Fig. 10 shows an enlarged detail of part of this connexion. Each main girder has a bearing of 3 ft. 8 in. on cast-iron bedplates, shown in plan and section, Figs. 7 and 8, the former of which includes also a plan of the light cast-iron girder which steadies the tube where it crosses over the staircase. The distance on the skew is 8 ft. 2 in., and the girder is connected with the sewer only by a light iron strip, 3 in. by ½ in., as shown in Figs. 1, 2, and 4.

The wrought-iron principals which carry the roof of the Sloan-square Station spring from a level above the crown of the tube, and a cast-iron girder, Fig. 5, spans the space on each side cut into the station walls for the passage of the sewer crossing. Fig. 6 shows the section of these girders, and the method employed for attaching the roof principals to them.

This work was commenced in 1866, when the length of sewer since reconstructed was cut away, and the sewage was carried in a wooden trough, supported at various points throughout its length upon trestles which rested on the rail level beneath. The iron tube was constructed around this trough, the girders being put in first on each side, and the invert plates built in place below it. As these were secured to the girders, the trestles were removed one by one, until the temporary trough rested entirely on the girders blocked up upon the