must not be subject to considerable fluctuations; or, if so, that the pontoon will only require to be displaced when the water is at a high level Thus, for example, it might be used over a tidal channel, provided the pontoon only required removal at, or near to, high-water. *In the present instance, the water is withdrawn from* the interior of the pontoon, by the self-acting agency of the syphon; but few situations would afford the requisite fall of ground to accomplish this. In such cases, therefore, the water would have to be withdrawn by a pump, wrought either by a small steam engine, or by manual labour. But where a natural facility for the extraction of the water, by a syphon, does not exist, the Author would propose, that the design should be so far modified, as that the pontoon should always float at the same level, the valves, &c., being abandoned; and that when brought into its berth, the overhanging deck beams should be caught and borne up, at a number of points equally distributed along the rabbates in the quay walls, by some moveable mechanical arrangement; as, for example, a number of eccentric rollers, upon a single shaft, lying along the rabbate, or a number of simultaneously moving screw-jacks, acted on in either case, by a single winch handle.

The communication is accompanied by three drawings, Nos. 4490–2, from which Plate 14 has been compiled.

Mr. Radford observed, that the paper did not explain how it was proposed to manage the pontoon in times of frost. Occasionally there was a great deal of ice in canals, and then, he apprehended, it would be a matter of some difficulty to move the pontoon freely about.

The President remarked, that although, in some places, the objection raised by Mr. Radford, might prove a positive disadvantage, yet, he believed, there was very little frost in Dublin; and as no great nicety of fit was required in the apparatus, a moderate amount of ice would scarcely be an incumbrance, and might readily be overcome. A vertical lift-bridge* had lately been discussed at the Institution, which, he thought, might have effected the object; but this did not in any way deteriorate from the merits of the present design.

Mr. J. Neville Warren said, that he had seen the pontoon bridge in use, and could not help noticing its peculiar applicability to the situation. The traffic passed over another bridge immediately adjoining, so that in fact this was the only access to the railway sta-

* *Vide* ante, page 303.

tion from the high road. The difficulties of making a draw bridge, in this particular situation, had been fully explained in the paper, and he need only mention, that on the lower side of the bridge there was a highway of considerable importance, whilst on the other side there was barely sufficient room for the open space in front of the station, to show that it would have been impossible to obtain the requisite room for working either a draw bridge, or even a lift-bridge.

No. 807.—"Description of a Wrought-iron Lattice Bridge, constructed over the line of the Rugby and Leamington Railway." By William Thomas Doyne, Assoc. Inst. C. E.

This bridge was built for the purpose of carrying a public road, over the Honingham cutting of the Rugby and Leamington Railway. It consists of two lattice girders, each 156 feet in total length, and 10 feet 6 inches in depth, placed 20 feet apart, and connected together by means of wrought iron transverse girders, which are 7 feet 8 inches apart, and are covered with corrugated galvanized tinned wrought iron, the corrugations being filled in with concrete, upon which a depth of 6 inches of gravel and loam metalling is laid. The clear span of the bridge is 150 feet, and the roadway is 18 feet wide.

The bottom of each of the main girders is constructed (Fig. 6, Plate 15,) of two angle-irons, each 5 inches by 5 inches by $\frac{5}{8}$ths of an inch, and of wrought-iron plates, each $11\frac{1}{2}$ inches by $\frac{3}{16}$ths of an inch in section, eight in number at the centre, but gradually diminishing as they approach the ends, where there are only three. These plates are in lengths of from 12 feet to 16 feet, and the angle-irons in lengths of 19 feet 5 inches; no two portions joint opposite one another, and wherever a joint occurs, it is strengthened by plates of an equal sectional area with the parts it has to unite. The effective sectional area of the bottom of each girder at the centre, after deducting loss by rivet-holes, is 26 inches; that of the top, which is constructed in the form best calculated to resist compression, is 40 inches throughout.

The lattices, which intersect one another at an angle of 60°, are made from a common section of spoke iron (Fig. 7, Plate 15), with a double rib to give lateral stiffness; they are crossed, at each of their intersections, by bars, 3 inches by $\frac{1}{2}$ an inch in section, running the entire length of the bridge, and forming with them equilateral triangles, the sides of which are each 1 foot 11 inches long.