Hood for bringing before the meeting such an interesting communication, upon a subject which it is of the utmost importance to railways, should be carefully examined. It was to be regretted, that the late period of the Session had prevented the attendance of those members whose attention had been more particularly directed to railways; but on the renewal of the subject next Session, upon the production of the report upon the projected experiments, promised by Mr. Hood, a very useful discussion might be anticipated.

June 28, 1842.

The PRESIDENT in the Chair.

The following were balloted for and elected:—Field-Marshal the Duke of Wellington, the Duke of Buccleuch and Queensberry, the Marquess of Northampton, Lord Lyndhurst, Lord Brougham, Right Hon. Sir Robert Peel, Bart., the Hon. Charles Shaw Lefevre, Professor George Biddell Airy, and Dr. Robinson (of Armagh), as Honorary Members; William Chadwell Mylne, as a Member; William Wilkins and Joseph Bennett, as Associates.

"An Account of the Bridge over the Thames, at Kingston, Surrey." By John Brannis Birch, Grad. Inst. C. E.

Kingston Bridge.

Previous to the year 1828, when the present bridge was opened to the public, the communication between the town of Kingston-upon-Thames in Surrey, and the hamlet of Hampton-wick in Middlesex, was carried on by an old and incommodious wooden bridge, which was so dilapidated that any attempt to put it into a substantial condition for the service of the public, would have been equivalent to an entire rebuilding of the structure.

The corporation of Kingston, therefore, resolved upon erecting a new bridge, on a design by Mr. Lapidge, their architect, and in the year 1825 obtained an Act of Parliament, granting them the powers necessary for that purpose.

The trustees appointed under the Act applied to the Exchequer Bill Loan Commissioners for pecuniary assistance to the amount of £45,000, but the application was not entertained until the working drawings, specification, &c. had been submitted to their engineer,—the late Mr. Telford, when he gave the following opinion:—"Having "carefully inspected all the working drawings, I consider it only "justice to Mr. Lapidge to say, that they are very complete and do "credit to his judgment and assiduity; and as the blue clay has

" been found quite across the bed of the river, I am of opinion that " with the precautions provided in the working drawings and specifi- " cation, that the work is very practicable, and if well executed will " prove a substantial and useful edifice." He also said, " I have gone " through the detailed estimates, and compared the same with the " proposal accepted by the corporation, and am satisfied that the " works may be properly executed for the sum therein mentioned, " viz., £31,300 ;" and he stated " the amount of the general estimate " including the above sum—the expense of houses and ground—the " flood-arches and roads of approach, &c. to be £47,457."

Upon receipt of this report, the Commissioners consented to make the required loan, but it being found that the Act limited the amount to be raised to £40,000, alterations in the structure were suggested by Mr. Lapidge, which received Mr. Telford's approval, and the works were commenced on the reduced scale.

The bridge is of Grecian architecture and consists of five elliptical arches; it is constructed chiefly of brick, with ashlar facing. The abutments are terminated by towers, and the structure is surmounted by a cornice and balustrade, with galleries projecting over the piers. The span of the centre arch is 60 feet, with a versed sine of 19 feet; the side arches are 56 feet and 52 feet span, and 18 feet 3 inches and 16 feet 6 inches rise, respectively. The highest flood rises 6 feet above the springing line, and the lowest summer level is about the same distance below it. The foundations are all laid upon the substratum of blue clay. The length of the bridge is 382 feet to the extremes of the abutments, and the width between the balustrades is 25 feet. The proportion of the piers to the span of the arches is about $\frac{1}{8}$th. The roadway is formed at an inclination of 1 in 40.

The author then describes fully the construction of the abutments, piers, arches, and the superstructure. The work occupied about $2\frac{3}{4}$ years to the completion, the first stone having been laid on the 7th of November, 1825, and the bridge opened in form on the 17th of July, 1828.

On the completion, Mr. Telford again made a report to the Exchequer Bill Loan Commissioners in these terms:—" With Mr. " Lapidge, I examined the whole of the bridge and approaches, and " taking it for granted that the foundations of the piers and abut- " ments, which are under water, and which I had no opportunity of " inspecting while in progress, are according to the working draw- " ings, all the other parts are found in a very perfect state, executed " in a workman-like manner."

The bridge has in every respect answered the object for which it

was intended, and it has justified the good opinion Mr. Telford originally formed of it.

During the fourteen years which have elapsed since its erection, it has required none other than the most trifling repairs, and the expectations of the trustees have been realized by the tolls having paid the allotted portion of the principal, up to the present time, as well as the interest of the money borrowed for its execution, and the cost of it did not exceed the amount of the estimate.

The communication was accompanied by seven remarkably well-executed drawings, showing accurately all the details of the construction, and the Paper contained all the quantities of materials in the work, together with Mr. Telford's reports upon it, with other documents of interest.

" Description of a Self-acting Signal for Railways." By Charles Berwick Curtis (of Acton), Assoc. Inst. C. E.

Railway Signal.

The object of this invention is, that notice shall be given by a marked signal, both by day and night, to the trains on the railway, that they may proceed with safety, and to regulate their speed. The signal being worked by machinery, the policemen would not be required, as at present, to remain on one spot, but could extend their sphere of inspection; and thus, by fixing the apparatus at given intervals along the line, the passage of the trains could be arranged with such precision as to render collision less frequent.

The apparatus (Fig. 1) consists of a round signal, composed of glass, the upper third part red, and the remainder green, descending into view from a casing of three colours, such as black, green, and red, in equal divisions: upon the signal is a white plate, which projects in front of and through a slit in the casing; and in order that the signal may be used by night as well as by day, a lamp is placed immediately beneath the centre of the casing.

On the near side of the rail, at a suitable distance, and at a proper height to be cleared by the steps of the carriages, is fixed a trigger, which is attached to a horizontal shaft revolving on bearings, with a counterweight, and these are connected by suitable shafts and levers with the signal-field. When an engine passes and depresses the trigger, the signal-field is released, and falls below the casing; by this means the machinery is set in action, and in a given time (which is regulated by clock-work) gradually raises the signal-field up again within the casing, indicating by the coincidence of the coloured compartments of the casing with those of the signal, the length of time