April 23, 1885.

THE PRESIDENT in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

The following Papers were read:—

I. "Magnetisation of Iron." By JOHN HOPKINSON, M.A., D.Sc., F.R.S. Received March 30, 1885.

(Abstract.)

The paper contains an account of the results of experiments which have been made on a considerable number of samples of iron and steel of known composition, including samples of cast iron, malleable cast iron, wrought iron, ordinary steels, manganese, chromium, tungsten, and silicon steels. The electrical resistance and the magnetic properties are determined in absolute measure. Amongst the electrical resistances the most noteworthy fact is the very high resistance of cast iron, as much as ten times that of wrought iron. The fact that manganese steel is almost non-magnetic is verified, and its actual permeability measured. The action of manganese appears to be to reduce the maximum magnetisation of steel, and in a still greater ratio the residual magnetism, but not to affect the coercive force materially. It is shown that the observed permeability of manganese steel containing 12 per cent. of manganese would be accounted for by assuming that this alloy consists of a perfectly non-magnetic material, in which are scattered about one-tenth part of isolated particles of pure iron. Some practical applications of the results are discussed.

II. "On the Changes produced by Magnetisation in the Length of Rods of Iron, Steel and Nickel." By SHELFORD BIDWELL, M.A., LL.B. Communicated by Professor GUTHRIE, F.R.S. Received April 1, 1885.

(Abstract.)

The earliest systematic experiments on the effects produced by magnetisation upon the length of iron and steel bars are those of