On some Geometrical Instruments invented

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X. *On some Geometrical Instruments invented by*
Mr. E. SCOTT and Signor MONTICOLA.

[Abstract.]

MR. E. SCOTT, at the meeting on January 24, 1896, showed some Geometrical Instruments invented by himself and Signor Monticola.

The instrument designed by Signor Monticola is intended for drawing arcs of circles of such large radius that compasses cannot be employed. It can be used to trace arcs of circles of which the radii vary from 50 cm. to infinity.

The second instrument exhibited was a modified form of hatchet planimeter, which Mr. Scott has devised with a view of avoiding some of the defects of the ordinary form of instrument. Thus, to avoid the cutting of the paper, which occurs when the knife-edge is sharp, and the side-slip which occurs when the knife-edge is blunt, the author uses a wheel with a sharp edge. To avoid the inclination of the instrument to one side, which may easily occur with the ordinary form, a flat celluloid plate with a dot at the centre is used as the tracing point; this plate being kept pressed flat on the surface of the paper. A small wheel with a recording disk is attached, and may be used to measure the distance between the first and last position of the knife-edge.

Mr. Scott also described a form of planimeter which he had invented, and in which the disk and cylinder movement is used to perform the integration

DISCUSSION.

Mr. C. V. BOYS said that an instrument designed by Mr. Clarkson had been exhibited before the Royal Society which was capable of drawing arcs of circles of large radius. This instrument only drew an approximation to a circle, but the approximation was so close that it nowhere was more than the thickness of a thin ink line away from the truth. It would be interesting to hear from the author whether Signor Monticola's instrument drew a rigorously exact circle or not. The upright position of the hatchet

planimeter might be secured by using two wheels in place of one. The planimeter described was really a modified form of one he (Mr. Boys) had described before the Society in 1881.

Mr. BLAKESLEY gave a short geometrical proof showing that the curve traced by Signor Monticolo's instrument was rigorously an arc of a circle. Mr. Blakesley also drew attention to the fact that the instrument in its present form cannot be used to trace the arc on both sides of the starting point.

Dr. C. V. BURTON described an idea for an instrument for drawing circular arcs which had occurred to him, depending on the use of two wheels of different radii connected by an axle conveying a tracing point.

XI. *An Analytical Study of the Alternating Current Arc.*

By J. A. FLEMING, M.A., D.Sc., F.R.S., Professor of Electrical Engineering in University College, London, and J. E. PETAVEL*.

ALTHOUGH the physical phenomena of the Electric Arc have received of late years very considerable attention, there are many points in connexion with the study of the alternating current arc which seem to us to have been insufficiently explored. The investigation which is here described is a contribution to the further examination of the mode in which the variation of the luminous and electric effects takes place in the alternating current arc.

The first portion of the research is concerned with an analytical study of the variation of the light thrown out from different radiating regions in the arc, and the delineation of the periodic value of this illuminating power by graphical methods. The object of the first set of experiments was to record and represent by an appropriate graphical method the periodic value of the light thrown out from the carbons and from the true electric arc region when the arc is supplied with electric

* Read February 28, 1896.