In a communication dated 1654, and addressed to a society of savants, which in 1666 became the Academy of Sciences, Pascal stated that he had written a complete treatise on the conics, founded mainly on a single proposition. This work, as we have already stated, was, after its author's death, sent for examination to Leibnitz; and though it has been lost, we have the analysis of it which Leibnitz made for M. Périer, Pascal's brother-in-law. In spirit and method it anticipates the Modern Geometry of our century, and entitles Pascal to the credit of having been one of its founders.

Sixth Meeting, April 10th, 1884.

THOMAS MUIR, Esq., M.A., F.R.S.E., President, in the Chair.

On the Teaching of Elementary Geometry.

By A. J. G. BARCLAY, M.A.

[*Abstract.*]

This paper was prepared at the suggestion of the committee as the first of a series on the teaching of elementary mathematics, in the belief that an occasional paper of this nature, with discussions, would be useful.

In the introduction it was suggested that, as secondary education in this country was apparently on the eve of considerable changes, the present was an opportune time for discussing the whole subject of school mathematics; and also that the Society should be prepared to form a scheme of a mathematical course for both teaching and examination purposes.

The following points were specially referred to:

(1) That the most suitable time for a pupil to commence geometry is about the age of twelve. (2) That the introduction to the subject should be made with the usual definitions, along with numerous exercises in the making and naming of figures; this, rather than the course of geometrical drawing, unaccompanied by definitions, suggested by the Society for the Improvement of Geometrical Teach-

ing. (3) That propositions should not be repeated in a rigid form of words, but that the teacher insist on intelligent expression. (4) That geometry is a subject eminently fitted for oral exposition; and that each proposition, before being prescribed to be learned, ought to be taught to the class. (5) That the text book should contain the propositions put as clearly as possible with easy exercises accompanying. (6) That symbols and contractions, as far as their use tends to simplicity, should be employed. (7) That the work be systematically reproduced in writing. (8) That revision might occasionally be made by retracing the chain of propositions. (9) That the quality of the geometrical work done, rather than its quantity, determines its educational value.

On Voting.

By A. MACFARLANE, D.Sc., F.R.S.E.

Suppose that we have c candidates, e electors, s seats, v votes.

There are at least three different kinds of voting to consider: Simple, Combinational, and Cumulative.

I. *Simple voting.* By simple voting I mean any case in which an elector has only one vote. Denote the candidates by A, B, C, D. The possible ways in which elector No. 1 can vote are given by

$$A_1 + B_1 + C_1 + D_1;$$

similarly for elector No. 2,

$$A_2 + B_2 + C_2 + D_2.$$

The possible results of No. 1 and No. 2 voting are obtained by multiplying together the possible ways for each, hence they are :—

$$\begin{aligned} &A_2A_1 + A_2B_1 + A_2C_1 + A_2D_1 \\ &B_2A_1 + B_2B_1 + B_2C_1 + B_2D_1 \\ &C_2A_1 + C_2B_1 + C_2C_1 + C_2D_1 \\ &D_2A_1 + D_2B_1 + D_2C_1 + D_2D_1. \end{aligned}$$

It will be observed that along one diagonal we have the cases in which the two electors vote for the same candidate. If it is considered inessential from whom the vote comes, then the ways to the left of the diagonal are duplicates of the ways to the right.

When there is a third elector, we have to multiply the result by

$$A_3 + B_3 + C_3 + D_3.$$

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