By the aid of this principle, choosing as base points MN (*Gazette*, p. 257), the extension of Feuerbach's Theorem given there can be established.

(f) Let S denote the circumcircle of a triangle.

If P coincide in turn with the circumcentre, incentre, and excentres, the corresponding values of (PS) are

$$-\tfrac{1}{2}R, \ -r, \ r_1, \ r_2, \ r_3.$$

To prove the second: $R^2-d^2=2Rr$ by Euler's Theorem; where d is the distance of the circumcentre from incentre. Hence

$$(PS)\equiv(d^2-R^2)/2R=-r.$$

It is obvious that we may substitute "sphere" for circle, and "plane" for straight line in (a), (b), (c), (d), (e). C. E. M'VICKER.

OBITUARY.

The Mathematical Association has lost an efficient officer in the sudden death of Samuel Oliver Roberts, who had been one of our honorary secretaries since 1897. His mathematical tastes were undoubtedly inherited from his father, Mr. Samuel Roberts, F.R.S., whom he has predeceased. Mr. S. O. Roberts went to Cambridge as a scholar of St. John's College in 1879, and was seventh wrangler in 1882. At Cambridge he made many fast friends, some of whom he constantly revisited there, thus ever retaining a close touch with his Alma-Mater. After leaving Cambridge he was for three or four years at the Royal Grammar School, Newcastle-on-Tyne. Thence he was appointed in 1888 to the second mathematical mastership at the Merchant Taylors' School, and retained the post till the time of his death. He was an active member of the Physical Society and the London Mathematical Society, and an ardent student of modern languages and modern history. But it was to his school work that he devoted his enthusiasm and abundant energies. He was pre-eminent as a teacher, and often took delight in contrasting the mathematical teaching which he himself experienced at school with that of the present day, to the glorification of the latter. He also took a great interest in school sports, and won the admiration of his pupils by his mastery of chess. He was the admiration of all his friends for his strenuous devotion to work. He laboured hard for his school, possibly so hard as to have an adverse influence on his health, though we would fain believe not. He had been suffering from an apparently slight indisposition for some little time; this suddenly took a serious form just before Whitsuntide, and ended fatally on the evening of May 31st. A more detailed account is given in the school magazine, *The Taylorian*, Vol. XXI., No. 6, July 1899.

MATHEMATICAL NOTES.

73. *On the circles touching three given tangential circles.*

If O, O_1, O_2 be the centres of the three given circles; r, r_1, r_2 their radii; I the centre of one of the circles touching each of the three; θ, θ_1, θ_2 the angles $O'IO''$, etc., and R the radius of the circle, centre I, then the sides of the triangle $O'IO''$ are r_1+R, r_2+R, r_1+r_2.

Then $\sin^2\dfrac{\theta}{2}=r_1r_2/(r_1+R)(r_2+R)$, etc.

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