Formula (6) shows at once that when n is even (say $n = 2m$), Q_n is exactly divisible by $(1 + x)^{m-1}$. For the numerator has the factor $(1 - x^2)^m$, and the denominator is $(1 + x)(1 - x)^{2m+1}$. Similarly when $n = 2m - 1$, Q_n is divisible by $(1 + x)^{m-1}$; for $D_t^n \dfrac{1}{1 - \sin t}$ has now the factor $\cos t$ in the numerator, whence Q_n has still in its numerator the factor $(1 - x^2)^m$. For example, from the table

$$Q_5 x = 61 + 150x + 118x^2 + 30x^3 + x^4$$

and this is exactly divisible by $(1 + x)^2$.

HAVERFORD COLLEGE,
June, 1897.

LINE GEOMETRY.

La Géométrie réglée et ses applications. Par G. KOENIGS. Paris, Gauthier-Villars et Fils. 1895. 4to. 146 pp.

The first general impulse to the study of the geometry of the straight line was given by Plücker's posthumous work in 1868–9, which was soon followed by a large number of contributions from German, French and Italian mathematicians ; the English people were soon interested in the application of the new geometry to mechanics and physics.

In the work of Plücker, point and plane coördinates are used nearly throughout the book, and in many cases the notation is so complicated that readers frequently lose interest before the most important parts are reached.

In most of the subsequent contributions the idea of point or plane coördinates is not considered; most of them presuppose a knowledge of the relation between these and the quantities which directly define a straight line, while others define the new coördinates as parameters, without discussing their meaning.

In view of the great interest which the subject has awakened and its fruitful application to the study of curves and surfaces, its analogy to the geometry of the sphere and its assistance to mechanics, one wonders why no elementary and systematic treatise on the subject has appeared. The work of Sturm is the only comprehensive work on line geometry that has as yet appeared, and it is by no means an elementary one. It is purely synthetic in its treatment