

coordinates is also extremely well presented. In the chapter on trilinear coordinates the symbolic notation of Clebsch would be much briefer than the clumsy multiple summations, and fully as intelligible to most readers. Since the author writes down the simultaneous invariant of a conic and a line, it would seem worth while to point out that for variable coordinates u_1, u_2, u_3 this is merely the line equation of the conic.

It is somewhat disappointing that some of the features which make Salmon's Conic Sections a valued companion are not developed. There is nothing on invariants and covariants of systems of conics which are the subject of Salmon's most fruitful chapter. The theory of reciprocal polars is not very fully developed and such ideas as radius of curvature, evolutes, etc., are not introduced.

Part II. on surfaces is developed along similar lines. The most interesting features are probably the treatment of polar properties, the early introduction of line coordinates, and above all the clear discussion of the linear complexes arising. The next volume will doubtless contain much more of interest in space geometry.

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Analytische Geometrie der Kegelschnitte. By W. DETTE. Leipzig, Teubner, 1909. vi + 232 pages, with 45 figures.

THIS admirable elementary text on conic sections is worthy of examination by any teacher of that subject. Both in arrangement and in treatment, there are a number of innovations. The book is divided into three parts: the first of 94 pages is devoted entirely to theory and the study of the general equation in the form $ax^2 + 2bxy + cy^2 + 2dx + 2ey + f = 0$; the next 50 pages contain a classified list of over twelve hundred examples illustrating the text; the remaining part of the volume is devoted to answers to, and also suggestions for solving, the examples of part two.

In the text itself, the six chapter headings: the point, the right line, the ellipse, the parabola, the hyperbola, and the determination of a conic through points and lines, promise little different from the old line American text. But on the first page the author introduces the idea of relative "mass numbers" or magnitudes; that is, for any segment of a line AB , we say $AB = -BA$. The author calls AB and BA the relative "mass numbers," their absolute magnitude being the same. As soon