

They will represent the sheaf of Sturm, consisting of all the cubics having the same osculating tetrahedron, if

$$\alpha'_x \equiv b_x \quad \alpha''_x \equiv b'_x.$$

Surfaces generated by ∞^1 of these cubics, *e. g.*, all those cutting a fixed line, touching a plane, etc., are discussed at some length. The plane depiction of these surfaces is also taken up. This chapter takes up nearly half the paper. Many interesting theorems concerning this sheaf are proved, also the corresponding ones for the sheaf of Reye and of Sturm are given. Several problems are suggested in the course of the discussion, some of which the author states he expects to solve.

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Das Erdsphäroid und seine Abbildung. Von Dr. EMIL HAENTZSCHEL, Professor an der kgl. technischen Hochschule und am kölnischen Gymnasium zu Berlin. Leipzig, Teubner. 1903. viii + 140 pp., 16 figures.

THE purpose of this book is to discuss the practical problems of map drawing. It differs from many other works on the subject by leaving aside all those problems which are only of theoretical interest, and by including most of the numerical calculation of those considered. The author makes no claim for completeness, but still he presents enough of the subject to make his problem of the actual construction of geographical maps entirely intelligible. The book is very full of references to more extensive treatments of each particular problem discussed. A knowledge of the relations between exponential and trigonometric functions and of the elements of analytic geometry and the calculus is presupposed, although most of the formulas are derived with great detail. An introduction presents the evidence for the spheroidal form of the earth; it is assumed to be of revolution and Bessel's constants are used. The author mentions that probably Clarke's determination is more accurate than Bessel's.

The first chapter discusses the relations between the various kinds of latitude, geographic, geocentric and reduced (eccentric angle), and the determination of the maximum difference between them. The length of a degree along a meridian is fully discussed and it is clearly shown why a knowledge of its length is valuable. The area of a zone defined by two parallels of latitude is shown not to depict on the concentric sphere in