mination of all equations $F = 0$ whose characteristics form lines of curvature upon all integral surfaces and whose integral surfaces have for normals precisely lines of a given line complex. These prove to be equations having integral surfaces for which the complex of normals is the ∞^3 rays through a definite curve k. The characteristics are circles.

Geometrical intuition based upon configurations defined by Monge equations gives direction to the analysis. There is no introductory summary of the principles, although a desirable outline could have been given in a comparatively brief space and would have improved the exposition.

O. E. GLENN.

The Trisection of the Angle by Plane Geometry: Verified by Trigonometry with Concrete Examples. By JAMES WHITEFORD, B.A., M.D. Bowes and Bowes, 1911. 169 pp.

THE book under review is another illustration of how little the logic involved in the impossible construction proofs of Klein and others is appreciated by the ordinary mind. While actually quoting DeMorgan to the effect that the famous trisecting of the angle problem cannot be solved, yet the author claims to present a right line and circle solution of this famous problem. His confidence in his construction and proofs seems to rest upon the fact that they stand the test of trigonometry aided by logarithms in fifty concrete examples laboriously calculated to seven places of decimals. It is hardly necessary to say that he has not solved the famous trisection problem but simply exhibits a rather close approximation method. His construction is not even useful as a practical drawing-room approximation since simpler and more exact angle trisection methods are well known, although of course not euclidean methods. What a pity that so much time, patience, and labor should be wasted in such useless work!

ERNEST B. LYTLE.

Practical Algebra, Second Course. By J. V. COLLINS. American Book Company, 1912. x + 303 pp.

THIS book is intended to meet the needs of a text for a second course in algebra in such schools as offer a second course, often elective, in either the junior or senior year. After a rather rapid review of the usual topics of a first course in algebra, follow chapters on ratio and proportion, logarithms, arithmetical and geometrical progressions, the binomial theorem, inequalities, and exercises in physics.

The style is simple and the problems are numerous; the function notion is introduced and used in eight different places; the sine, cosine, tangent and cotangent functions are used in the solution of right triangles; correlation with geometry is made through problems involving geometric principles; graphic methods are used frequently; proper emphasis is placed upon translation from English to algebra and from algebra to English; historical notes and pictures of famous mathematicians appear in many places.

While the book as a whole seems to be a satisfactory text, yet we find a few points to criticise. Since ∞ is not a number symbol in elementary algebra, we dislike "The symbol ∞ denotes an exceedingly large number," etc., page 4. "The exponent 0 shows that x is used no times as a factor of the product, or has dropped out and so does not affect the product of the other factors," page 146, seems an unfortunate expression and not helpful in emphasizing the important fact that any number with a zero exponent is equal to unity. In the treatment of imaginaries it is feared that the student will miss the importance of expressing in the i-form before attempting operations with imaginaries. In variation the almost obsolete notation is used which many wish to see eliminated; the better equality form is mentioned but not sufficiently emphasized to avoid the difficulties students usually have with the language of variation. In the theory of the quadratic the general form $ax^2 + bx + c = 0$ seems much better and is more usual than the form $x^2 + px + q = 0$ which the author uses; $p^2 - 4q$ is certainly not the usual or common form of the discriminant of the quadratic.

ERNEST B. LYTLE.

Complete Business Arithmetic. By GEORGE H. VAN TUYL. New York, American Book Company, 1911. 4 + 416 pp.

ONE of the most serious problems which we have to face in the teaching of elementary mathematics at the present time relates to the work in our commercial courses. The world is far from coming to a decision as to what mathematics is best suited to the training of the boy and girl who propose to enter the field of commercial activity. The school of educators