SHORTER NOTICES

Prolegomena to Analytical Geometry in Anisotropic Euclidean Space of Three Dimensions. By Eric Harold Neville. Cambridge, University Press, 1922. 22 + 368 pp.

The author's prolegomena are inspired by his feeling that to "let" the coordinates be complex instead of real is an indefensible absurdity. In order to justify the use of complex space he states and develops definitions, principles, and especially a vocabulary appropriate to real analytic geometry, builds a complex space, proves it to be unique, and then invests this ideal space with a geometry whose vocabulary he has previously developed. A word as to the title is necessary. In a euclidean four-space there are *isotropic* three-spaces, isotropic in the sense of the word as introduced by Laguerre. The study of the geometry of these isotropic three-spaces forms no part of the discussion.

The treatise is divided into five books. Books I–III deal with the avoidance of ambiguity in the measurement of angles and with projection, with vector analysis, and with Cartesian and vector frames. Book IV is devoted to the construction of algebraic space, the fundamental axioms involving vectors. The book concludes with a proof that complex space is unique. Especial attention is given here and later to the isotropic plane; a table of paragraphs relating to the isotropic plane is a welcome aid. Book V is devoted to a discussion of the geometry of this ideal space with special chapters on curves and surfaces especially conics and conicoids, on circles, and on spheres.

By the exercise of great care and ingenuity in his choice of definitions the author is enabled to state many important theorems without exceptions. Everywhere exceptional or degenerate cases are adequately covered. The treatment is rigorous, thorough, and careful. This care extends to the proof-reading. Only two slips of any kind were noted: (*a*) in 221.41, (*b*) in a contradiction between 553.49 and 562.53. In paragraph 445 the significance of geometric theorems relative to complex space is summarised in the clearest, most incisive manner that the reviewer has ever seen.

On the other hand, many readers will find that the subject-matter generally is, frankly, not inspiring. The chapters on vectors will attract some, the chapters on isotropic planes others, the frivolous (and others) will rejoice over the humor of the preface and foot-notes; but despite the elegance of this book, it is doubtful if many readers will be attracted to a serious perusal.

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