

*Leçons sur la géométrie projective complexe.* Par Prof. E. Cartan. D'Après des notes recueillies et rédigées par F. Marty. (Cahiers scientifiques, Fascicule 10.) Pp. vii + 325. (Paris : Gauthier-Villars et Cie, 1931.) 80 francs.

IMAGINARY elements in geometry were for a long time considered solely as an auxiliary to the study of real points. Projective complex geometry, considered as an independent branch of mathematics, owes its origin to von Staudt (1858) who introduced the notion of a chain, and it was greatly developed by Juel (1885) and Segre (1889). The latter showed the importance of *antiprojective* transformations, *anti-involutions* and *antipolarities*. Prof. Cartan treats complex projective geometry from a higher point of view, linking it with non-Euclidean geometry of three dimensions, following the example of Poincaré, who linked real projective geometry with non-Euclidean geometry of the plane.

The first part of the book is restricted to the projective geometry of the complex line and its relations with the geometry of Lobatchewsky. The second part deals with the complex projective geometry of three dimensions. The last chapter treats of the harmonic polynomials of complex projective space and their applications to the representation of this space, or rather of Hermitian elliptic space, by real algebraic varieties without singularities contained in a Euclidean space of a suitable number of dimensions. The writing is clear and attractive, and the book is a useful exposition of one of the less-known branches of geometry. H. T. H. P.

#### Miscellany

*This World First.* By J. H. Curle. Pp. v + 212. (London : Methuen and Co. Ltd., 1932.) 6s. net.

MR. CURLE is like the road-mender who, when accused of pessimism, said "I ain't no pessimist; I thinks badly o' most things and most people—that's all." Mr. Curle declares himself to be no pessimist; but he sees the world as a series of problems or riddles. Thus: Nature, on one hand a thing of beauty and perfection, on the other is "a spectacle of overwhelming cruelty and horror", which makes "the idea of a Living, Personal God" behind it "a nightmare" and unthinkable; Christianity is dying after nearly two thousand years; Western civilisation is nearly at an end; and science "deeply enheartening when we think of genetics, psychology, bio-chemistry, and medicine; deeply disconcerting when we think of aspects of relativity, of physics, of bacteriology, of poison gas, of weapons of war". We need pursue the list no further. The problems are such as present themselves to all who are not content with a blind acceptance of things as they are, and a familiar symptom of the questioning spirit, which for our good, if not for our comfort, has been all pervasive since the War.

Mr. Curle has travelled widely and pondered his many and varied experiences. As the result he

sees a way of escape from pessimism on the line he has suggested in the title of his book: "This World First". If we may no longer look for the intervention of a personal God in the arena of the struggle between good and evil, which we call the world, man must take up the cudgels on his own behalf. Holding fast to the beauty of the world, he must co-operate with law and order in Nature against cruelty and oppression; he must fight on the side of science for the betterment of mankind in the war against degeneracy and disease. Mr. Curle thus sees the solution of his problems in the form of a duty of us all to make secure and hold the good against the encroachment of evil. If this does not help us "to grasp the sorry scheme of things entire", it is at least a sound enough practical philosophy for a work-a-day world which is content to leave the riddle of the universe to solve itself while it "gets on with the job".

*Astronomische Paradoxa.* Von Dr. Georg Alter. Pp. 72. (Prag : J. G. Calve'schen Universitäts-Buchhandlung, 1932.) 25 Kc.

THIS work is a series of short essays explaining a number of points that often cause perplexity to students of astronomy. The earlier ones are elementary; why the sun is not on the meridian at 12 o'clock; why the moon's orbit is concave to the sun, though it revolves round the earth; why it is winter when the earth is nearest to the sun. The following ones are more difficult; why the crest of the tidal wave lags behind the moon; the effect of the earth's rotation on the motion of projectiles, etc.

Chap. viii explains why the effect of a resisting medium is to shorten the time of revolution, although it reduces the initial speed of the body. Chap. ix deals with the Einstein bending of light by the sun, and explains why the star's image is pushed outwards though the light rays are bent inwards. The final chapter explains why the variation oval of the moon is pushed inwards at full and new moon, though these are the points where the outward perturbing forces are strongest; this is a cause of perplexity to many. The author's explanation would not be clear to the 'man in the street', as it needs a considerable knowledge of dynamics.

Some of the problems dealt with are explained in nearly all astronomical primers; but the explanations in this book are fuller and more rigorous than those often given. The mere fact of a result seeming bizarre and unexpected often attracts the attention of earnest students.

A. C. D. C.

*Fractures.* By Meurice Sinclair. (Modern Surgical Monographs.) Pp. xxxiv + 550. (London : Constable and Co. Ltd., 1931.) 24s. net.

THE exceptionally vast and various experience of the treatment of fractured bones provided by the War was responsible for bringing this, like many other departments of applied science, to a