thinking in four dimensions can be cultivated so as to become almost intuitional.

The application of four-dimensional space-time to relativity is now well established, but the attempts made about fifty years ago to explain physical phenomena by assuming a fourth dimension of space alone met with no success, and have now been almost forgotten. H. T. H. P.

Lehrbuch der Physik in elementarer Darstellung. Von Arnold Berliner. Vierte Auflage. Pp. v + 658. (Berlin : Julius Springer, 1928.) 19·80 gold marks.

THE fact that after an interval of only four years a new edition of Dr. Berliner's text-book of physics has been called for, is sufficient testimony to the quality of his work. A comparison of the fourth with the third edition shows that the text has been carefully revised and a considerable amount of additional information has been incorporated. Although the subject matter has been amplified, the number of pages is nearly the same as before. It is, perhaps, to be regretted that the table of contents is so greatly reduced and the chronological table at the end of the volume omitted. Some of the diagrams have been diminished in size and the appearance of the pages is slightly less pleasing than that of the earlier edition. But in view of the continual growth of scientific knowledge, how is an author or a publisher to meet the new conditions ? We notice new sections dealing with tops and gyroscopes and with Coriolis motion. The important subject of crystal structure receives fuller treatment, and Dr. Haber contributes a useful section on flames. The additions in connexion with atomic physics are valuable and up-to-date ; there is, for example, a paragraph on the experiments of Stern and Gerlach in proof of the theory of quantisation in space, and a couple of pages dealing with the Compton effect. It is remarkable how much information the author is able to convey in a clear and interesting manner in a small space.

H. S. A.

Le théorème de Picard-Borel et la théorie des fonctions méromorphes. Par Prof. Rolf Nevanlinna. (Collection de monographies sur la théorie des fonctions.) Pp. vii + 174. (Paris : Gauthier-Villars et Cie, 1929.) 35 francs.

IN elementary algebra the well-known remainder theorem enables us to determine a polynomial, except for a numerical factor, when all the zeroes are given. If we replace the polynomial by an integral function with an infinite number of zeroes, we can still determine a good deal about the function, though not so much as about the polynomial. In 1879 Picard proved a theorem which at that time appeared to have no connexion with the preceding results. He showed that a function that is uniform in the vicinity of an isolated essential singularity takes infinitely many times every value with the possible exception of two. Much later Borel and others linked up these two subjects of investigation, and studied the distribution of values of a complex variable for which a meromorphic function is equal

to a given constant. This is the principal topic dealt with by the book under review. The discussion is based on the Poisson-Jensen formula, which connects the modulus of a meromorphic function at any point within a circle with its values on the circumference and the position of its zeroes and poles inside. For lack of space, Prof. Nevanlinna confines himself to a consideration of the *moduli*. The other half of the problem, the discussion of the *arguments* of the roots, can be found in Valiron's " Lectures on the General Theory of Integral Functions " (Toulouse, 1923) and elsewhere.

H. T. H. P.

E. Lechers Lehrbuch der Physik : für Mediziner, Biologen und Psychologen. Fünfte Auflage, bearbeitet von Prof. Dr. Stefan Meyer und Prof. Dr. Egon Schweidler. Pp. ix + 469. (Leipzig und Berlin : B. G. Teubner, 1928.) 18 gold marks.

ANY text-book of physics which seriously attempts to show the young medical student that a knowledge of physics is certain to be of real use to him in his future career certainly deserves to be brought to the attention of teachers of physics. The fifth edition of Lecher's text-book has been edited by Stefan Meyer and Egon Schweidler, whose names are sufficient guarantee of its excellence. It covers a rather wide range for an introductory course of physics, but the more advanced portions are dealt with quite briefly and may easily be assimilated. It is very well illustrated, and no pains have been spared to collect examples of the physical measurements necessary in physiological or medical practice.

Medical Sciences.

Blood : a Study in General Physiology. By Prof. Lawrence J. Henderson. (Yale University : Mrs. Hepsa Ely Silliman Memorial Lectures.) Pp. xix + 397. (New Haven, Conn. : Yale University Press ; London : Oxford University Press, 1928.) 23*s.* net.

THE application in recent years of physical and chemical methods of investigation to the subject of physiology has yielded an enormous amount of knowledge, which is usually of so detailed and descriptive a character that its literature is rapidly becoming the despair of the student with a strictly scientific mind. It is consequently very refreshing to meet a truly philosophical contribution like the present volume.

In the problem of the determination of the elementary condition of life enunciated by Claude Bernard, morphologists have been content with a description of the characters of the single cell while biologists have conferred upon protoplasm the possession of the elementary conditions. Prof. Henderson has effected a notable advance towards a more rational solution of this problem by shifting the focus of attention from the cell to the medium bathing it—the *milieu intérieur* of Claude Bernard —and carrying the processes of generalisation and abstraction further to a single physico-chemical system in heterogeneous equilibrium as representing the elementary condition of the phenomena of life.