being a specialist on the subject, has not very definite ideas where to look for information. The need for an up-to-date treatise on the metallography of iron and steel has long been felt.

In view of the above mentioned state of affairs, it is not surprising that such an authority as Professor Sauveur should undertake to compile a work on the metallography of iron and steel.

Professor Sauveur's book is divided into twenty-four lessons, a list of which is given at the end of this review; a chapter on the apparatus of the metallographic laboratory, and two appendices on the manipulation of apparatus and the nomenclature of microscopic constituents. The illustrations throughout are very clear; this being particularly true of the microphotographs of the various specimens. To anyone at all familiar with the photographing of metallographic specimens this will be keenly appreciated. Only too often is good subject matter spoiled by blurred microphotographs that convey no real idea of actual conditions.

It might be pointed out that the system of dividing the book up into Lessons instead of Chapters rather detracts than adds to the value of the book. There is, perhaps, rather too much of the academic suggested, whereas really the book is written with a good, practical style. Then, also, the numbering of the pages by the Lesson, i.e., beginning anew at each Lesson instead of consecutively from the beginning of the book with an ordinary index, is certainly not a time-saver.

In Lesson No. I. on Pure Metals, the author very clearly points out the difference between crystalline growth and the formation of grains. The term crystalline grains as applied to grains resulting from crystallization is a good one.

In Lesson No. 5, page 12, under the heading Micro Test for the determination of carbon in steel, the statements made are perhaps a trifle misleading. It is said that, "after a little experience and by taking the necessary precautions it will be found that, in the case of decidedly hypoeutectoid steels at least (steels containing, say, less than .6 per cent. carbon) results are obtained fully as accurate as those of the colorimetric method, and on the whole more reliable, since the possibility of serious errors is practically eliminated." Undoubtedly the author refers to steels that are supposed to be homogenous in composition. Even admitting the value of the microscope in determining carbon content, the great trouble is that such a determination merely holds for the surface examined—the steel one-eighth of an inch below this surface may be, and often is, of a different carbon content. By chemical means, however, drilling being taken, a better average is obtained. Of course, one must admit that serious errors do often occur in colorimetric determinations, but these are mainly due to lack of skill. The same applies to the microscope. One cannot agree with the author that "after a little experience" carbon contents can be estimated. It requires a good deal of experience. As a check the microscope is invaluable, but should be used very guardedly in making determinations of carbon content.

In the investigation of the effects of mechanical and heat treatment on steels, the practical value of metallography is at once seen. This is undoubtedly the great field for metallography. In Lessons XI. to XIV., on the mechanical treatment, annealing and hardening of steel, Professor Sauveur has given a very thorough presentation of the subjects. The illustrations show very clearly the effects of the treatment to which the specimens have been subjected. These portions of the book form a valuable practical piece of scientific literature.

Lessons that should be at the end and not the beginning of the book seem a trifle strange. One can make very little real progress in the metallography of iron and steel before understanding the equilibrium diagram of iron and carbon. Be this as it may, it is pleasing to note that Professor Sauveur takes the stand that in iron carbon alloys above about 1.7 per cent. carbon, the eutectic formed is that of austenite and cementite, and that any graphite that may be found subsequently, results by the breaking up of the cementite into ferrite and graphite. This is surely the more practical way of treating the subject. The explanations of the iron-carbon diagrams are very clear, the points of historical interest being very neatly worked into the subject.

The entire book is a valuable addition to scientific literature. The book can be said to contain everything pertaining to the metallography of iron and steel written from an ardent metallographer's point of view.

The following is a detailed list of the Lessons in the book: Pure Metals, Pure Iron, Wrought Iron, Low Carbon Steel, Medium High and High Carbon Steel, Impurities in Steel, The Thermal Critical Points of Iron and Steel, Their Occurrences, Causes and Effects (three Lessons), Cast-Steel, Mechanical Treatment of Steel, The Annealing of Steel, The Hardening of Steel, The Tempering of Hardened Steel, Theories of Hardening of Steel, Cementation and Case-hardening of Steel, Special Steels (two Lessons), Cast-Iron, Impurities in Cast-Iron, Malleable Cast-Iron, Constitution of Metallic Alloys, Equilibrium Diagram of Iron-Carbon Alloys, The Phase Rule, and two Appendices mentioned before.

Theory of Structures.—By R. W. Angus, B.A.Sc., Professor of Mechanical Engineering, University of Toronto. Published by the Engineering Society, University of Toronto. Cloth; size, 6¼ x 9¼ in.; 232 pages, 147 figures. Price, $3.00.

The full title of this volume is the "Theory of Machines, Including the Principles of Mechanism and Elementary Mechanics of Machinery." The book is intended as a text-book for students in engineering in the University of Toronto. The subjects treated in the chapters are: The Nature of the Machine, Motion in Machines, Velocity Diagrams, The Motion Diagram, Toothed Gearing, Bevel and Spiral Gearing, Trains of Gearing, Cams, Forces Acting in Machines, Crank Effort and Turning Movement Diagrams, The Efficiency of Machines, Governors, Speed Fluctuations in Machinery, Proper Weight of Flywheels, Accelerations in Machinery. The method of determining the velocities of parts of machines, used in the volume, is called the phorograph method, and is here published for the first time. This gives a convenient graphical method for determining accelerations, kinetic energies of links, etc. The whole matter covered in the treatise is presented in readable form, and is very clearly written. To the student or engineer interested in the study of the theory of machines the book will be of considerable assistance.

Modern Organization.—By Charles DeLano Hine. Published by The Engineering Magazine Company, N.Y. Cloth; size, 5 x 7½ in.; 110 pages. Price, $2.00.

This volume is the latest addition to the Works Management Library, issued by The Engineering Magazine Company, and is the first complete statement of Major Hine's theory and practice of "unit organization" that has been put forth. The unit system applied on the Harriman lines has been remarkably successful in promoting efficiency without causing trouble. It is peculiarly interesting, because it seems to involve so little physical change and to depend so completely upon the apparently subtle, but after all, very direct internal improvement that is brought about when the official is given a new viewpoint of his work and its relation to co-ordinate departments. The system establishes a third mode of bringing line direction and staff guidance into co-operation, a mode essentially different from either Emerson's efficiency staff or Taylor's functional management