

than those of the U. S. A. and Canada. There are, nevertheless, many physicists and chemists who should find the book an unusually readable review of basic alloy theory and basic principles of atomic physics. Nuclear physics is discussed in brief, and plastic deformation of metals is given a few pages.

There are no mathematical derivations or detailed discussion of theories, but much effort is given, on the other hand, to explanations of what the theories are about and why they are important. Jones' theory of alloy phases is given considerable emphasis, as in all of Hume-Rothery's books.

The concluding chapter of the book points out the need for more science in metallurgy in the future and is a rousing plea for more fundamental science courses and less technological courses in the training of metallurgists in universities, together with a plea for the metallurgical industry to hire more scientifically trained men than in the past. The average man entering the chemical industry, it is emphasized, has a much wider knowledge of the science of his subject and a smaller knowledge of technology than the average man entering the metallurgical industry—and this fact has contributed to the enormous progress of the chemical industry in the last fifty years. This chapter was written in 1947 and was based on conditions in Britain as the author saw them at that time. There has been a gradual change since that time in the direction that is urged, in curricula, in the type of research problems undertaken in the metallurgical departments of several British universities, and in the use of scientifically trained men in metallurgical industry. Nevertheless, changes in this direction have been slow, both in Britain and on this side of the Atlantic, and the chapter has a message that is still of value.

Variational Principles in Dynamics and Quantum Theory. By Wolfgang Yourgrau and Stanley Mandelstam. 155 pp. Pitman Publishing Corporation, New York, 1955. \$5.50. *Reviewed by Arthur Beiser, New York University.*

The variational principles of dynamics, which assert that a certain quantity (generally an integral of motion) be an extremum along the actual path, are intuitively appealing and have played an important part in the formulation of this subject. An account of their long (since 600 B. C. or so) and colorful history, together with an exposition of their present status, is contained in this book. The formal development of such topics as transformation theory and the Hamilton-Jacobi equation is conventional, but the historical and philosophical discussions make interesting reading.

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