M. Boutaric points out that although in nearly all optical matters French savants are the pioneers, yet the French optical industry is very small as compared with the German. In an interesting paragraph he endeavors to analyze the reasons for this success. "Here, as in everything else, the Germans have been saved by their deep sense of business. The German industry demonstrates by a wise publicity the worth of its goods, sometimes excellent, but sometimes also copies of our models and inferior to ours; their catalogues, well edited and illustrated, are published in many languages, and give full details of the instruments they describe, their travelers, men of parts, knowing intimately their instruments . . . and trying to satisfy the wishes of their customers."

M. Boutaric points out that the collaboration between the man of science and the manufacturer is far more close in Germany than in France. In the former the man of science is in intimate touch with the works, and is well paid for his services. The foreman and apprentices are trained in the theoretical side of their subject in classes they are obliged to attend. In the firm of Zeiss half the time spent by the workers in the technical classes is counted as time spent in the works. No steps are neglected to perfect the organization as a whole; everything is done to make the machine independent of a single individual. In France the success and reputation of a firm have too frequently depended on one individual. That some steps are being taken to strengthen the optical industry in France is shown by the fact that a large factory has been built by La Société française d'Optique, formed in conjunction with the firm of Lacour-Berthiot, for meeting the competition of the best German firms. M. Boutaric urges that if the future of the industry is to be assured, new blood must be introduced, young mechanics trained, and a school of optics founded. This school, for which M. Violle has pleaded, should be divided into at least two sections: optics proper and photography. In it practical classes on glass grinding, etc., should be given in conjunction with theoretical work.—*Nature.*

SCIENTIFIC BOOKS

A System of Physical Chemistry. By W. C. McC. LEWIS. New York: Longmans, Green, and Co., 1915. 19 × 13 cm.; 2 vols. Pp. vii + 552; xiv + 523. Price $2.50 net, each volume.

In the preface the author says: "The scientific treatment of any set of phenomena consists in applying the minimum of general principles or theories which can afford a reasonable explanation of the behavior of matter under given conditions; and predict its behavior under new conditions. The principles referred to as far as physics and chemistry are concerned are the kinetic theory and thermodynamics. In the kinetic method of treatment emphasis is laid upon the actual molecular mechanism of a given process; in the thermodynamic method the emphasis is laid upon the energy changes involved. Both methods should be familiar to any one who undertakes the task of original investigation. . . . I have therefore divided the book into three parts, in which the phenomena exhibited by systems in equilibrium and not in equilibrium are treated first from the 'classical' kinetic standpoint only; then independently from the thermodynamic; and finally from the standpoint of thermodynamics and the new or 'modified' principles of statistical mechanics."

One obvious criticism of this plan is that the same subject is treated more than once, which seems a pity. The author has covered an enormous amount of ground. He takes up electrochemistry pretty thoroughly; he has one chapter on colloid chemistry, another on Nernst's heat theorem; a third on photochemistry, and a fourth on the quantum theory. In a sense it is therefore a pretty comprehensive treatise on physical chemistry, covering something the same ground as Nernst's "Theoretical Chemistry" but in more detail. The plan of the book is an ambitious one; but the task was rather more than the author could handle. The treatment is essentially not critical and the reviewer finds the book much less interesting and inspiring than Mellor's "Chemical Statics and Dynamics."

WILDER D. BANCROFT