The author is unfortunate in that he wrote his book just before Upton's paper on the carbon-steels appeared. The result is that this portion of the book was obsolete before it appeared. The rest of the book is interesting though there is some question whether the physical chemistry here presented is really of much use to technical men. One cannot help feeling that there is a certain lack of contact.

Wilder D. Bancroft

Grundriss der allgemeinen Chemie. By Wilhelm Ostwald. Vierte, völlig umgearbeitete Auflage. 16 X 24 cm; pp. ix + 661. Leipzig: Wilhelm Engelmann, 1909. Price: linen, 21.20 marks; bound, 22.50 marks.—This new edition differs from the preceding ones in two respects. The phase rule point of view is predominant throughout and there is a very marked epistemological tendency. To one who knows the subject already, the book is more interesting than ever, because it goes deeper. It will not, however, arouse the enthusiasm in the beginner, which so many of us felt in regard to the first edition.

Concurrently with the change in the point of view there has come a lack of interest in regard to details. Many statements re-appear in this edition even though their inaccuracy is a matter about which there can no longer be any dispute. On p. 113, we have the familiar law that what is in equilibrium in one way is in equilibrium in all ways. Saturated solutions of salt in alcohol and in water are in equilibrium with the same solid phase; but they are not in equilibrium with each other. On p. 334, we read that catalytic agents do not displace the equilibrium. This is not true for a solvent and it is not true for what are apparently irreversible reactions. On p. 460, we have the erroneous statement that two solutions which are isohydric with a third solution are necessarily isohydric with each other. The color of methyl orange as an indicator, p. 474, is referred to the sulphonic acid group, although we get practically the same color changes when there is no sulphonic group present.

The voltage of the gas cell is given on p. 509, as 1.06 volts and no one could tell from the text that the surface tension method does not give true single potential differences. On p. 521, the excess voltage for mercury is stated to be due largely to the smoothness of the liquid surface in spite of the fact that frozen mercury shows the same characteristics.

The reviewer admits frankly that he cannot understand the point of view which makes it possible for a man to put in Fig. 36 on p. 356 and still to maintain that the only difference between solvent and solute is one of relative masses. Some day the present attitude of the chemical world in regard to this point, will be looked upon as analogous to that of the fetich worshipper.

The last three sections of the book deal with microchemistry, photochemistry, and chemical affinity. When we have a two-phase system in which one phase occurs as a number of separated masses while the other phase forms a continuous mass, the first is called the dispersed phase and the second the dispersing phase or medium. When there are only two phases to be considered, they may be classified as follows:

(a) The dispersing phase is gaseous. Since two gas phases cannot coexist, the second phase must be either liquid or solid. If liquid, we are dealing with a fog; if solid, with a dust.

(b) The dispersing phase is liquid. Gas bubbles in a liquid form foam; liquids in a liquid form a milk; and solids in a liquid form slimes.

(c) The dispersing phase is solid. Gas bubbles create a pumice-like structure. Liquids give rise to the entrapped drops so familiar to the mineralogists, while solids give solid mixtures. Pulverulent mixtures of solids do not belong under this head because powders are really solid particles in air or, in other words, dust.

So far as one can judge, Ostwald accepts the Brownian movements, p. 542, at their face value. Of course, that is the most natural and obvious thing to do; but the reviewer has always had a sneaking feeling that the particles only danced when some one was looking. The fact that particles have been seen to dance to-day and also ten years ago is no proof that they have been vibrating continuously during those years. The question is whether the particles vibrate because they are in an inhomogeneous field or because it is their nature to. We know that they will march and countermarch under the influence of an electric current, we know that they are electrically charged, and we know that they are in an inhomogeneous field all the time that we watch them; but we do not know as yet whether the actual motion is due entirely to the inhomogeneity of the field or not. Ostwald looks upon the calculations of Einstein and of Smoluchowski as final, in view of the experiments of Svedberg; but an elaborate mathematical calculation is a thing to be tested very carefully.

Wilder D. Bancroft

General Chemistry for Colleges. By *Alexander Smith*. 13 × 21 cm; pp. xiii + 529. New York: The Century Co., 1908.—“The present work differs from the Author's Introduction to General Inorganic Chemistry, in being intended for pupils who can devote less time to the study of the science, and whose needs can be satisfied by a less extensive course. It resembles the larger work in the arrangement of the contents and in the general method of treatment. The matter, and particularly the theoretical matter, however, has been simplified and has been confined strictly to the most fundamental topics. Such parts of the theory, as are thus given, are presented with the same fullness as before, and are illustrated and applied with all the persistence needed to insure full apprehension and, ultimately, spontaneous employment by the student. Such parts as could not be treated in this way, within the limits set by the plan of the book, have been omitted.”

One of the problems confronting every teacher of elementary chemistry is as to the amount of physical chemistry to be introduced into such a course. The answer to the problem depends largely on the amount of physical chemistry which the teacher happens to know. Consequently, we are not surprised to find a lot of it in this book.

In the chapter on solution, the subheads are: general properties of solutions; the scope of the word; limits of solubility; recognition and measurement of solubility; terminology; solution, one of the physical states of aggregation of matter; kinetic-molecular hypothesis applied to the state of solution; kinetic-molecular hypothesis applied to the process of solution; independent solubility; two immiscible solvents and law of partition; influence of temperature on solubility; equilibrium in a saturated solution.