experiments he carried out. Finally he formulates the laws which we use to-day. In the second memoir the formula for the mutual action between two infinitely small elements of conductors carrying currents is proved. Ampère's researches paved the way for much of Faraday's work, and Clerk Maxwell makes full use of his results in his treatise. Clerk Maxwell well called Ampère the Newton of Electricity. The guiding experiments and the theory seemed to start fully equipped from his brain just as Pallas Athene was born fully armed from the head of Zeus.

Small Talk at Wreyland. By Cecil Torr. Second series. Pp. vi+120. (Cambridge: At the University Press, 1921.) 9*s*. net.

IN his second series of "small talk," Mr. Torr, proceeding on the lines followed in his first volume, has brought together a number of pleasantly written discursive jottings on various matters drawn from his own recollections and from the letters and diaries of his father and grandparents. An antiquarian and a scholar, he writes with a light and pleasant touch on such matters as local lore and history, as well as of events in the larger world. The value of these notes lies in the light they throw on the social habits and customs of the middle of the last century; they deal with those illuminating details which are apt to evade the more formal historian. Interspersed are observations of and reflections on happenings which have befallen Mr. Torr during his travels in the Mediterranean and in Palestine. All topics, whether of a serious or a lighter character, are touched upon in a manner which can only be described as urbane. On one subject alone does Mr. Torr's urbanity desert him, and that is when he is moved to comment upon the Government regulations for the cultivation of the land during the war.

Chemical Reactions and their Equations: A Guide and Reference Book for Students of Chemistry. By Prof. I. W. D. Hackh. Pp. viii+138. (Philadelphia: P. Blakiston's Son and Co., 1921.) 1.75 dollars.

"THE inability to balance a chemical equation is a most common difficulty to students of chemistry." The author has attempted to remedy this very common weakness, and in addition to a concise explanation of chemical notation, including difficult cases of oxidation and reduction and ionic reactions, has provided a list of more than four hundred classified and indexed chemical equations. The book should prove a useful companion to degree students. In the list of solubilities "to be memorised" one finds: "BORATES are SOLUBLE," which is not strictly correct, since most borates are insoluble.

The Practical Chemistry of Coal and its Products. By A. E. Findley and R. Wigginton. Pp. 144. (London: Benn Bros., Ltd., 1921.) 12*s*. 6*d*.

THE analysis of coal, coke, ammonia liquor and ammonium sulphate, tar and its distillation products, gas (including calorimetry), pyrometry, and water analysis, are the topics dealt with in this book. The volume is very attractively printed and illustrated and should prove most useful in works laboratories.

Letters to the Editor.

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Definition, Resolving Power, and Accuracy.

IN scientific writings the term "definition" most often refers to the clearness with which details are shown by optical instruments; but by a convenient generalisation it might be taken to mean the ratio of the greatest to the least quantity which any kind of apparatus can render apparent at the same time, being thus distinguished from "sensitiveness" or "resolving power," which is determined simply by the smallest quantity measurable without reference to the size of the field.

In this sense the question of "definition" enters into every kind of measurement. In telescopes and microscopes, for example, it would denote the angular or linear size of the field of view compared with the smallest corresponding quantity which can be clearly distinguished; or, in a balance, the greatest arc through which it can swing compared to the least angle of swing giving a trustworthy measure of change of weight.

Since all measurements have in the end to be recorded by the senses either of sight, hearing, or touch (smell and taste have not yet been examined quantitatively), it is of interest to inquire what kind of definition can be expected in their case, and the following notes contain some of the results of various observations on the subject made at intervals during many years.

Sight and hearing are both dependent on wave-motion, and the sensations produced vary with the intensity, frequency, direction, and duration of the waves. The total range of sensible intensities is enormous; for it is seldom that a night is so dark, or a silence so complete, that absolutely nothing can be seen or heard, yet the eye can work without injury in bright sunlight, and the ear can hear with such noises as thunder or great explosions. In these cases the ratio of the greatest to the least appreciable intensity must be of the order of millions.

Although, however, the perceptions of intensities have such wide limits, the differences which can be recognised at any one time or in any constant conditions are much more limited.

In many respects the senses may be compared with a musical instrument which, while of restricted compass, can be tuned to almost any absolute pitch, so that though for any one tuning comparatively few notes can be sounded, yet by adjustment these notes may take any desired position in the audible scale. Each sense, in fact, seems to adjust itself to some kind of level suitable to its surroundings, and to be able (so far as my own observations go) to discern differences of from 5 to $\frac{1}{5}$ per cent. of the range then appreciable.

The same order of definition was found not only for each sense but also for the co-ordination of the senses with muscular action.

The following experiment on the greatest difference between the intensities of light which can be perceived at the same time always gave fairly consistent results. A long tube AB, Fig. 1, about two inches in diameter, and well blackened inside, was provided with a white paper flange at A, and a movable piston, C, also covered with white paper. A disc of white paper, D, of rather less diameter than the tube was placed at