

ties, and a list of industries which have adopted the tintometer. Mr. Lovibond tells us also that colour is "a determinable property of matter, and the purpose is to make known methods of colour analysis and synthesis which have proved of great practical value in establishing standards of purity in some industries." "The purpose is also to show that the methods (tintometer?) are thoroughly scientific in theory and practice," and also that "a new law (the law of specific colour development) has been developed." This is a new name for well-known observational results.

The first chapter has some introductory remarks, and there is a page and a quarter (with a coloured plate) devoted to what is headed "past" (colour) "theories." This does not give any novel matter, nor does it contain any criticism of the six theories which he enumerates. Chapter ii. is the most interesting of all, as it relates to the "evolution" of the tintometer. The tintometer is an admirable instrument for registering the colours of objects, opaque or transparent, which do not show pure colours. Its principle is to match such colour illuminated by white light by sending a beam of the same white light through one or more red, yellow, blue, and neutral-tinted glasses on to a white screen having various depths of colour till the colour of the object is matched. The choice of the glasses, and the skill with which Mr. Lovibond ground them to give the varying depths of colour which he required, approaches to the marvellous. His method of regaining his standard tints if lost is ingenious, so that observations made with the same quality of white light will always give the same results. The one weak point is the choice of the white daylight used, which is light from a north sky, that, of course, can vary in quality from day to day. A recognised standard of artificial light would be better.

Mr. Lovibond rather fights shy of the spectrum, and has given no results of matches to the band of spectrum colours by the absorption method. The spectrum throughout its length is unmatchable by this method.

When he makes statements regarding the spectrum analysis he sometimes gets out of his depth. He tells us that there is one red ray in the spectrum between A and B which cannot be absorbed, and that this (red) energy has never been investigated "as a separate form of spectrum red." Mr. Lovibond should look to the absorption by his glasses.

The book has its value when the theory part is left out, and may serve as a practical guide to "tintometry" through the useful examples which are shown in its later chapters.

NO. 2409, VOL. 96]

OUR BOOKSHELF.

Field Analysis of Minerals for the Prospector, Mining Engineer, Traveller, and Student. By G. D. McGrigor. Pp. 86. (London: *The Mining Magazine*, 1915.) Price 3s. 6d. net.

THE methods of mineral determination here advocated by the author have been found useful by him as a prospector beyond the reach of laboratories. He has no doubt observed that a student who has passed through an ordinary course of chemistry is still poorly equipped for dealing with natural chemical compounds as they are presented to him in the field. In some colleges, however, the chemical curriculum includes a course in practical mineralogy, in which field conditions are, so far as possible, reproduced. Even Mr. McGrigor's book will not do away with the desirability of a sound course of inorganic chemistry as a prelude to such work as he marks out, and few will agree that this foundation should involve only "a very short period of instruction." The student of chemistry, for instance, will know that when Mr. McGrigor speaks of substances containing sulphur on p. 13, he means sulphides, and that there are also such things as sulphates; he will note the slip on p. 12, where the weight in air divided by the weight in water is said to give the specific gravity of a substance; and he will know (p. 19) that the oxidising flame does not "impart" oxygen to the material under examination. Possibly he will never have used microcosmic salt, and this is just where the author might have helped him (p. 22), by pointing out cases where it provides conclusive tests, instead of suggesting that it gives the same results as borax. Sir Warrington Smyth is cited as the authority for some of these statements; but the author's practice must have led him somewhat farther.

The reactions described in the systematic portion usefully include those of tellurium, vanadium, osmium, and tantalum, which are omitted in many treatises. A just balance of simple wet tests and ordinary blowpipe-tests is indicated. The use of some good text-book on mineralogy is very properly recommended, especially Brush and Penfield's "Manual of Determinative Mineralogy," to which Mr. McGrigor's book may well serve as a pocket introduction.

G. A. J. C.

Egypt of the Egyptians. By W. Lawrence Balls. Pp. xvi + 266. (London: Sir Isaac Pitman and Sons, Ltd., 1915.) Price 6s. net.

MR. LAWRENCE BALLS not only knows Egypt of the modern Egyptians, but during his years of residence there he bore his part in adding to her material prosperity. Indeed, he writes with authority on the problems of cotton cultivation, and while applying himself to their solution he formed opinions upon many other subjects connected with the country. This book is the result of such study and observation on the spot, and it is well worthy of study in its turn.

The chapters on the Nile, on irrigation, and the crops are perhaps its most valuable sections,