

ing an inferior product of little commercial value. There is a reference on p. 384 to "Spanish oil of hops" or "Cretan oil of marjoram," described as obtained from *Origanum hirsutum* and *O. creticum*. This appears to refer to the material better known in this country as "Cretan origanum" or "red thyme" oil, which is generally believed to be obtained from *Origanum hirtum*. The tabular statement of the constituents of volatile oils is incomplete in some respects; thus, under "basil oil," there is no reference to the terpene ocimene isolated by van Romburgh from this source in 1901; and the information given under the head of "applications" in these tables is in some cases rather inadequate.

There is a reference in the list of "errata and addenda" to the recent confirmation by the Philippine Bureau of Science of Trimen and Bentley's statement that "elemi" is obtained from *Canarium luzonicum*, but, curiously enough, the generic name is wrongly given as *Coñarium*.

The arrangement of the subject-matter adopted facilitates reference to the information given regarding most of the products described, but it would have been an advantage if a fuller index had been provided.

As a guide to the analysis of commercial vegetable products this book fully maintains the high standard set in previous editions, and those concerned in its revision are to be congratulated on the satisfactory way in which they have accomplished their work.

T. A. H.

SCIENTIFIC ASPECTS OF PHOTOGRAPHY.

Investigations on the Theory of the Photographic Process. By Dr. S. E. Sheppard and Dr. C. E. Kenneth Mees. Pp. x+342. (London: Longmans, Green and Co., 1907.) Price 6s. 6d. net.

DURING the last four years the authors have been working with the object of preparing theses for their degrees according to the regulations of the University of London, and in this volume they present in order the records of their work by republishing together their communications to several scientific societies. That particular branch of photography that the authors refer to as *the* photographic process is the exposure, development, fixation, and sensitometry of gelatino-bromide plates—in short, negative making as now understood, but without reference to the after-treatment of the fixed plate by such processes as intensification, or to such collateral matters as the production of developer stains.

As indicated by the title, the volume is theoretical rather than practical, though the results often have an important practical significance. The subjects are dealt with from the point of view of what is now understood as physical chemistry, and the work is described in the language of that branch of science. This will make the volume probably more acceptable to students interested in photography who have devoted themselves specifically to physical chemistry, but it imposes a serious difficulty in the way of those who have not. This difficulty is increased by the constant use of symbols instead of words in the text. We would suggest the addition of a glossary giving the exact meaning of each of the symbols used.

Some of the apparatus used appears to be disadvantageously complex. For measuring opacities a spectrophotometer is employed, though dispersion of the light is unnecessary, and appears to be undesirable, for it must add sources of error. The authors use the bright green part of the spectrum, but do not say why they throw away the rest. They recognise the fact that the light transmitted by the silver deposits in films is largely scattered, and that their instrument takes very little cognisance of scattered light. They apparently assume that the scattered light generally bears a constant proportion to the whole, but it is very doubtful whether such an assumption is well founded. On certain occasions the authors endeavour to obviate the error due to scattering by making the film itself the practical light-source by means of a diffusing medium, placed in contact with it. Opal glass, which they use, is probably the best diffusing medium available, but the present writer does not call to mind any proof that it is thoroughly effective for such a purpose. Other methods of measurement are well known that do not suffer from these drawbacks.

The authors deal with many questions that are of a very debatable character, and it in no sense belittles their work to say that they remain debatable. They adopt the "germ" theory of the developable image, but limit the effect of each germ to the grain or nodule of which it forms a part. The "suspicion of a vicious circle in the argument" that the authors refer to in connection with the "molecular strain" theory is, we fear, much more widely applicable than they appear to realise. The authors remark that "it may be said of the physical theories that they shirk a real explanation by treating the phenomena to be explained as a quality of the physical modification of the halide"; to which one might reply that those who advocate the chemical theories assume a decomposition of which there is no evidence. And so it remains a matter of opinion as to which is the safer and more useful hypothesis. We make only one other observation, namely, that it seems undesirable to speak of the *law* of constant density ratios, when, as the authors themselves admit, it is "frequently not followed." When this "law" was first propounded by Messrs. Hurter and Driffield they maintained that it was really a *law*, which it was very difficult, if possible, to get away from.

This volume will find a place, which it will worthily fill, in the libraries of all who are interested in the scientific aspects of photography, because it contains the record of a series of carefully conducted experiments under stated conditions, and gives copious references to the literature of the subject. C. J.

OUR BOOK SHELF.

Surgical Instruments in Greek and Roman Times. By Dr. John Stewart Milne. Pp. xii+187; illustrated. (Oxford: The Clarendon Press, 1907.) Price 14s. net.

BOTH the author and the Clarendon Press are to be congratulated on the issue of this very valuable work—Dr. Milne because it represents work well done, and the Press on account of the successful manner in which