

quite sincere, it must be admitted that every detail in respect to electrical developments is an evolution. It is in this way that electricity has progressed and will continue to progress, that is to say, on the bare data propounded by one man another will proceed. The one will modify experiment; will get an advanced result, and from his result the next man will take up the parable and will progress. Thus, though there may be a thousand discoveries in electricity, there will never be one prophecy; and if Dr. Benjamin's book exposes this startling truth, it has performed a duty which probably its author did not expect of it, and for which the world will be grateful.

ARTIFICIAL COLOURING MATTERS.

Traité des Matières Colorantes organiques artificielles, de leur préparation industrielle et de leurs applications.

Par Léon Lefèvre. Two vols. Pp. xx + 1648. (Paris : G. Masson, 1896.)

IN the early days of the coal-tar colour industry the French chemists, Coupier, Lauth, Girard and De Laire, and others did good work in the way of investigation, and certain standard books of reference which were indispensable in their time bore the names of French authors. Then the centre of activity in this field seems to have been shifted to Germany, and for some years we have been accustomed to look to that country for new discoveries and authoritative treatises. The author of the work now under consideration, M. Léon Lefèvre, who is "Préparateur de Chimie" in the École Polytechnique, has once again set the current of coal-tar literature flowing in France, and he is to be congratulated on having produced a treatise which may, without exaggeration, be described as the most comprehensive that we have at present in any language. The two bulky volumes under notice cover the ground occupied by several distinct German works; for not only is the subject dealt with in its purely chemical aspect, but the methods of production on the large scale, and the modes of application of the various colouring matters are likewise given in detail. It is impossible in these columns to give a critical review of a technical work of this magnitude, but a general statement of the method of treatment will enable those who are interested in the subject to form an idea of the extent to which they are indebted to M. Lefèvre.

The colouring matters are classified into groups in accordance with the scheme originally adopted by Nietzki, and now familiar to all chemists who are acquainted with this branch of their science. Each group commences with a preliminary statement setting forth the history, general characters and constitutional formulæ of the compounds dealt with; then follows the description of the individual colouring matters, and afterwards a tabular summary of the whole group, from which can be seen at one glance the mode of preparation, the formula, the commercial name, the appearance and properties, and the references to the literature, patent or otherwise. Following these extremely valuable tables, there is a section on the technique, *i.e.* the method of manufacture, the processes being described in sufficient detail to be of value to technologists, and the plant being figured by well-executed cuts. The reader having thus been led

up from the history of the discovery of the colouring matters to their production on the large scale by the latest and most approved methods, is then let into the mystery of the dyer's art, and is given explicit directions how each colouring matter should be applied as a tinctorial agent. With each group there is also associated a tabular scheme of the diagnostic reactions of the colouring matters on the fibre, a list of bibliographical references, and lists of patents.

It does not often fall to the lot of the reviewer of a technical work to be raised to an enthusiastic state of mind by the treatise which has been submitted to his judgment; but in the present case, it was certainly with something akin to enthusiasm that we turned over the pages of M. Lefèvre's luxurious volumes. The synopsis of the mode of treatment which we have attempted to give will show that in one work we now have the chemistry of the coal-tar colouring matters on the lines adopted by Schultz in his well-known treatise of 1887-90, the tabular synopses made familiar by the tables of Schultz and Julius, edited by Green in 1894, the technique of manufacture for which we have had to refer to such works as that by Mühlhäuser, the tinctorial characters and modes of application for which we have been in the habit of consulting special treatises on dyeing and printing, and lastly, the diagnostic reactions which are generally looked up in some work on proximate organic analysis. To say that the author has covered all this ground in a perfectly faultless manner would be to attribute to him superhuman faculties; but, with the exception of a few doubtful statements of history, we are bound to say that no serious flaw is to be found in the 1648 pages composing the work. The dyed and printed patterns on wool, silk, leather and paper, of which there are over 260 specimens, make the volumes somewhat ungainly, and would perhaps have been better collected together into a distinct supplementary volume. The thirty-one illustrations of plant are executed with that clearness for which our French colleagues are so justly celebrated, but, as is so generally the case, they suffer from the defect of having no scale of size attached. The structural formulæ occupy a very much larger amount of space than we are accustomed to here, owing to the free use of the benzene hexagon, but this is a matter of luxury and not a point for critical complaint; it must, however, have added considerably to the cost of printing.

The work is introduced to the public by a preface from the pen of M. Edouard Grimaux, Membre de l'Institut, who at the close of his remarks says:—

"En raison de l'intérêt que je porte à l'auteur, mon fidèle compagnon de laboratoire depuis dix années, il me serait difficile de faire l'éloge de son livre et de dire tout le bien que j'en pense; mais j'ai vu naître et continuer cet ouvrage sous mes yeux, et je puis témoigner de la conscience avec laquelle il a été fait; j'ai tout lieu d'espérer qu'il recevra du public savant l'accueil qu'il mérite."

The commendation which M. Grimaux modestly withholds may be supplied by this notice; and in directing the attention of English chemists to M. Lefèvre's treatise, we have not the least hesitation in stating that the author has succeeded in producing a coal-tar classic which must take precedence over every other work on the subject.

R. MELDOLA.