

AN IMPRESSIONIST TEXT-BOOK OF PAPER MAKING.

Chapters on Papermaking. Vol. i. By Clayton Beadle. Pp. 151. (London: H. H. Grattan, 1904.)

THERE is a "mission" for science in relation to industry which is to re-infuse into its reiterated routine operations that measure or kind of interest which we know as "intelligent." Our factory workers are not the craftsmen of the past centuries; division of labour makes this difficult, and in many cases impossible. But though shut out from the "joy" of the craftsman, and far removed from that higher order of appreciation which makes the craft of the Oriental a part of his religion, our workers can cultivate an intelligent interest in their work. The book before us is directed to this particular aim, and is especially justified in regard to the art of papermaking, not only because modern papermaking is in all essential respects based on the ancient craft, but the various operations are interdependent on such obvious lines that whatever particular section of the work a man may be engaged in, he can easily acquire and keep an intelligent grasp of the whole.

The book may be described as a series of studies of special points, largely and evidently such special points as have from time to time challenged the interest of the author in the course of his occupation as chemist to one of our oldest and most important paper mills. There is no essentially logical sequence in these studies, but we agree with the author that there is no occasion to multiply routine text-books. It is obvious, therefore, that there is no call to read the chapters in any particular order. The subjects treated may be briefly summarised as follows:—Raw fibrous materials and cellulose; bleaching and general view of the chemistry of the operations; the whole question of the function of water in relation to the manufacturing operations, as well as the physical and chemical points involved in the relation of water to the celluloses; paper in relation to the entire range of its applications, and the destructive agencies which it is required to resist and survive.

In dealing with these subjects the author follows the original method, that is, he develops his theme largely by original observations and investigations, trusting to the particular perspective of his own experience to give the subject-matter its cohesion. The result is quite satisfactory. There is room for contributions of this kind.

As a particular illustration of the author's methods, we may mention the statistical discussion on pp. 90–93 of the total contribution of basic matters in working up a rag pulp, both engine sized (resin) and tub sized (gelatin and soap), in relation to the sulphate of alumina required to be used. This subject might be very much extended to involve many of the most interesting developments of modern chemical science, e.g. the ionisation of salts and the peculiar functions of the organic colloids in relation to electrolytes in solution. There is no doubt that the reactions in the beater will not be understood until studied in relation to these questions.

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In a discussion of the theory of the bleaching process, the author returns to some questions arising in the study of one of the systems of electrolytic bleaching, which was based upon the circulation continuously of the electrolysed ($MgCl_2$) solution between the electrolyser and the potcher. There is no doubt that this condition gives an unexpected maximum of bleaching efficiency, possibly because energy may be carried in some particular forms not necessarily expressed in the simple oxidising actions of the solution, as, e.g., on HI or As_2O_3 . In this connection it is to be noted that Brunck advances a similar hypothesis in relation to ozone and its oxidising reactions (*Zeitsch. angew. Chem.*, 1903, p. 894).

Further, according to the specification of recent patents (Schuckert), the addition of certain organic compounds, more particularly resin (soda resin), to a solution of an alkali chloride to be electrolysed enables a very much higher concentration of "bleaching chlorine" to be economically worked. Certainly there are points here which should attract investigators to a re-examination of the phenomena.

On the general question of bleaching actions, the author is somewhat discursive, and there are one or two inaccuracies and omissions in small but not less essential points. Thus, on p. 90, the reaction of sodium sulphite as an "antichlor" is stated to add to the alkalinity of the pulp. The normal sulphites in oxidising to the normal sulphates do not affect the balance of alkalinity. In cases where potassium iodide is decomposed by a paper, i.e. by a constituent of the paper, with liberation of iodine, the methods of Wurster should certainly have been imported into the investigation. The investigations of Russell should have been noticed, and the subject connected with the general question of autoxidation.

We mention such points to show that the methods of the author are suggestive rather than exhaustive, and paper mill chemists especially will find these lectures full of matter to set them thinking, observing, and in turn investigating a number of phenomena which they might otherwise neglect or pass over.

We apply in conclusion the text which opened this brief review:—There is the human side even to the highly competitive production of modern times, and authors who contribute to this aspect of industry, and notably to the pleasure of the worker, are deserving of the particular encouragement of a large circulation.

THE DEVELOPMENT OF THE HUMAN BRAIN.

Die Entwicklung des menschlichen Gehirns während der ersten Monate. Untersuchungsergebnisse von Wilhelm His. Pp. iv+176. (Leipzig: S. Herzl, 1904.) Price 12 marks.

THIS work, as its title indicates, deals with the development of the human brain during the first four months. Half of the book, on the development of the cerebral hemispheres and the origin of the intramedullary tracts, is original matter, and continues the work already commenced in 1890 by the author's paper on the organisation of the medulla. The re-