

to the bibliography at the beginning of each chapter and the notes and references which are found on nearly every page; and last and greatest, the equipment and development of the teacher.

The matters discussed under physics are, *mutatis mutandis*, the same as those under chemistry, without following the same order.

While every one will not agree with the authors in all their views, it will be generally admitted that these views are urged with ability, earnestness and moderation, and in their endeavor to show how chemistry and physics can be made of more intellectual benefit in a course of instruction there will be few that will deny that they have succeeded and at the same time made a book that will repay careful study from cover to cover. W. G. BROWN.

THONINDUSTRIE-KALENDER, 1903. WEIHNACHTSBEILAGE DER THONINDUSTRIE-ZEITUNG, BERLIN.

The publishers of the *Thonindustrie-Zeitung* have distributed to their patrons their annual calendar, in two parts, for 1903.

Part I, bound in linen, as is usual with such publications, is largely in diary form, but contains in addition 69 pages of maxims for clayworkers, in very concise form, which apply not only to the technical but also to the management of the administrative and mechanical sides of the clay industries. Although many of the observations are truisms, they are all more or less suggestive and might bring about a decided improvement in the results attained in any of our own clay industries were they translated and put into the hands of managers, superintendents and foremen.

Part II, in paper, 450 pages, opens with instructions as to the proper manner of examining clay deposits by borings and cuts, pointing out the necessity for so doing, and the methods of determining the depth, extent, and character of the material in any deposit before attempting to develop and use it. Apparatus such as calorimeters, that for the examination of flue gases, draft indicators in their various forms, flue thermometers, alarm clocks for the guidance of stokers at the kilns, registering clocks for the control of the firemen and others, are described. The manner of determining the completion of the burning processes from the shrinkage of test-pieces and of the temperature of the kilns, by means of the very useful Seger cones, and by pyrometers of the electric type, with tables showing the temperatures with which cones of various

numbers correspond, are explained. Paragraphs on hygrometers and their uses, the control of temperature in drying chambers, methods of determining soluble salts in clays for the prevention of efflorescence in the finished products, for the water capacity of clays, for their examination for uniformity by elutriation, for the determination of voids or volume weight, and their binding properties follow. Tests for the amount of solid glazing material necessary in glazing, for determining the crushing strength of the finished products, their loss from attrition and their resistance to impact and weathering are noted. The use of the Deville furnace for testing the fire-resisting quality of clays and the determination of their shrinkage or contraction in burning is described. The apparatus for all these determinations or tests and for the control of the burning processes are furnished by the laboratory of the editors. Much of it could no doubt be introduced into the clay-working industries of the United States with success.

The remainder of the contents of the second part of the calendar is of purely local interest in Germany, unless it be a list of books, 475 in number, relating to the various industries in which clay is employed, which are sold by Seger and Cramer, 6 Kruppstrasse, Berlin, N. W. 5.

To all engaged in the clay industries, especially the production of brick and terra cotta, who have a knowledge of the German language, the calendar will be found to be, at least, suggestive, although largely an advertisement of the wares of Seger and Cramer.

CLIFFORD RICHARDSON.

LEAD SMELTING: THE CONSTRUCTION, EQUIPMENT, AND OPERATION OF LEAD BLAST-FURNACES, AND OBSERVATIONS ON THE INFLUENCE OF METALLIC ELEMENTS ON SLAGS, AND THE SCIENTIFIC HANDLING OF SMOKE. BY MALVERN WELLS ILES, PH.D., some time Assistant Instructor Qualitative Laboratory, School of Mines, Columbia University; Chemical Fellow, Johns Hopkins University; Assayer and Chemist, Grant Smelting Works, Leadville, Colo.; Metallurgist, Omaha and Grant Smelting Works, Denver, Colo.; also Holden Smelting Co., Denver, Colo.; Superintendent Globe Smelting and Refining Co., Denver, Colo. John Wiley and Sons. 1902. 228 pp.

This book, in which the author has recorded the experience of many years of actual contact with smelting operations, is a very complete discourse on the subject told in a conversational style without any attempt at literary embellishment, and the student