

BOOK REVIEWS

N. G. GAYLORD, *Editor*

Compression and Transfer Moulding of Plastics.

J. BUTLER. Interscience, New York; Iliffe, London, 1959. x + 230 pp. \$5.75.

Mr. Butler makes the following statement in his opening sentence of the preface: "This book is intended for students of mould design, for designers and moulding shop executives."

This reviewer is of the opinion that the book is lacking on the following points:

A. More emphasis should be placed on the production and design advantage of the semi-positive mold as shown in Figure 5.

B. The author mentions "splashing" of the powder from flash type molds, but he omits recommending the use of preforms of "pellets" to overcome this problem.

C. The author has omitted a chapter on Preforming. Lacking is a discussion on the geometry of preforms, density of preforms, and the advantages of their use over powder loading.

D. We are not in agreement with his design or recommendation on "Three-Plate Molds." The author's designs are cumbersome and such molds are difficult to de-flash or clean.

E. We believe he has overemphasized oven preheating while he does not mention oven steam preheating except a reference to "moistened pellets" (page 86).

F. The two chapters on Radio Frequency Preheating are very weak for the following reasons.

1. The author makes no mention of the use of a non-conducting plate of glass or fiberglass under the preforms on bottom electrode to prevent overheating of the bottom of the preforms.

2. The author mentions drying the material to reduce moisture content if excessive swelling or condensate is encountered, but he doesn't state that this lower moisture content will also increase the preheat time.

3. The author does not mention the use of rectangular preforms preheated on their sides when non-uniform swelling is encountered. This is standard practice in the U.S.A.

4. In regard to the R.F. preheating of powder, the author recommends the use of cardboard or glass containers. He makes no mention of the use of polyethylene or Teflon containers which are used extensively in the U.S.A.

5. The author makes no mention of the effect of radio frequency cycle on the rate or penetration of preheat. Early generators in this country operated at about 27 megacycles, but most modern generators operate between

65 and 85 megacycles which results in considerably higher efficiency.

6. This reviewer is unable to understand the full meaning of the first three paragraphs of Chapter 16, page 171. Paragraph 16.3.1: Is he referring to compression, transfer or plunger molding? Paragraph 16.3.2: Statements in this paragraph are directly opposed to statement made in first paragraph, page 171.

G. Chapters on Transfer Moldings do not go into sufficient detail on pressures nor does the author discuss sufficiently auxiliary ram plunger molding in detail as follows:

1. Pressure ratios between clamp and injection.

2. He does not discuss plunger cull design or thickness.

3. He does not discuss geometry of runners or "feed channels" as to rectangular, oval half round, or full round in cross section. This subject is very important in plunger molding.

4. There is no mention of runner design as to radial from cull, Y runners, or T runners.

5. The author has under-rated the importance of cavity vents (page 177). Any well built mold should be "tight," therefore vents for the removal of air and/or gas are essential.

6. The author's statement in the third paragraph of Section 16.5.2, page 187, is directly contrary to the accepted practices in plunger molding techniques in the U.S.A. using the proper plasticity of material.

The author's chapters on Split Molds and Tapered Splits are very good, and there is much worthwhile background information contained in the book.

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Identification of Textile Materials, 4th ed. C. E. M. JONES, Ed. (prepared by Technical Committee "C" of the Textile Institute). The Textile Institute, Manchester, 1958. 148 pp.

This book is a very comprehensive treatment of fiber identification using microscopic, chemical, and some staining techniques which can be applied in any laboratory without special equipment. Two excellent features of this book are an introductory chapter on the properties of fibers which gives the reader sufficient background to develop his own tests when given some knowledge of the chemical nature of

new fibers, and a very complete index giving references to page, analytical scheme table, and illustration (where applicable) not only for the fibers but also for the reagents and methods used.

The analytical scheme presented carried the examination of the fibers through: (1) a microscopic examination to determine whether one is dealing with a pure fiber or a blend followed by, in the case of single fibers; (2) a separation according to whether the fiber is thermoplastic or not; (3) microscopic and staining identification of the natural and man-made cellulosic and protein fibers; (4) classification of the thermoplastic fiber on the basis of simple chemical tests for nitrogen and chlorine; (5) specific solvent or staining identification of individual fibers. Fiber blends are separated and identified by a solvent separation scheme. An alternate scheme for the identification of the fibers completely on the basis of solvent behavior, which does not include differentiation of the several natural cellulosic and protein fibers, is also presented. Each identification method is accompanied by one or more confirmatory tests.

A fine series of photomicrographs of the common fibers accompanies the text as ready reference for the microscopic identification of the fibers.

A section of notes gives suggestions for the removal of dyes and finishes, identification of nitrogeous finishes, preparation and examination of longitudinal and cross-sectional views of the fibers under the microscope, measurement of fiber density, and the heat shrinkage and melting points of the fibers using simple equipment.

This is a fine book and worthy of recommendation to anyone who finds it necessary to deal with and identify the host of textile fibers with which we are now confronted. It is unfortunate that the book does not include identification procedures for several of the very newest fibers.

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Die Kunststoffe: Eine Einführung in ihre Chemie und Technologie. G. SCHULZ. Carl Hanser Verlag, Munich, 1959. 536 pp. DM 49.

The author set as his goal the presentation in concise form of the whole, rapidly growing field of commercial polymer products (Kunststoffe), all the way from raw materials to the methods of fabricating polymer compositions. (The latter unfortunately are called "compounds," carrying over into German a poor American word usage.) Schulz has accomplished his aim in admirable fashion with the technology of German, American, and British products. The elementary chemistry of polymerization and polymers is presented clearly and briefly; not included are quantitative aspects, such as copolymerization reactivity ratios and chain transfer constants, which are essential to synthetic research workers. The book can be recommended as one of the best encyclopedic books on polymer technology. It is especially valuable as a key to German tradenames, technology, and test methods. Its skillful organization and clear style make it one of the best books in German for young English and American polymer technologists.

Schulz's book includes 57 pages on organic raw materials; 36 pages on polymerization processes; 139 pages describing different chemical types of commercial polymers; more than 15 pages giving tradenames, identity of products, and manufacturers; 22 pages on plasticizers and other auxiliary agents; 107 pages on fabrication methods; and 69 pages on testing methods for polymer products. Specific numbered footnotes are not given, but at the end of each topic discussed there is a valuable list of selected journal articles and books (largely in German and English). Patent references are not given. Subject and author indices are adequate. There are only a few typographical errors such as economy with Dr. Trommsdorff's name.

The book reflects some interesting differences between industrial polymer development in Germany and America. Copolymerization technology, especially graft copolymerization, has made greater industrial progress here. A number of tradenamed products which the book indicates as homopolymers are actually copolymers at present. In contrast to Germany, many more monomers are freely available in the United States along with valuable company booklets on their polymerization and copolymerization.

The discussions of vinyl chloride and vinyl acetate polymers, including emulsion polymerization, are good. The book, however, gives less information than might be expected about injection molded acrylics, reinforced thermosetting resins, thermosetting vinyl pastes, and fluororubbers. Although ethyl cellulose and benzyl cellulose are discussed, the more important water-soluble derivatives of cellulose are hardly mentioned. A good many aspects of paint and rubber technology are not included. Numerous recent products are well described including Delrin, Penton, and polypropylenes.

By and large, Dr. Schulz and Hanser have produced an outstanding book on applied polymer science.

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Polyisobutylene und Isobutylene-Mischpolymerisate. HERMANN GUETERBOCK. Springer, Berlin/Goettingen/Heidelberg, 1959. x + 263 pp. \$10.00.

This book belonging to the Springer series, *Chemische Technologie der Kunststoffe in Einzeldarstellungen*, is primarily a literature review of the polymerization and copolymerization of isobutylene, and of applications suggested for isobutylene polymers. Gueterbock, as research leader with Badische Anilin and co-worker with Michael Otto, has known this field intimately and it is not surprising that the areas covered are well done. Valuable detailed tables of German, U. S., and other patents on the preparation and polymerizations of isobutylene are given, but relatively few of the patents since 1952 are included. Preparations of liquid low polymers as well as solid high polymers are given.

It is surprising that a book so titled gives so little about the fundamental physical chemistry and properties of polyisobutylenes and of butyl rubbers. For example, no x-ray patterns are shown and no mention is made of the work of Brill, Fuller, and co-workers. The rheological and rubber characteristics of commercial isobutylene polymers are not