

The Chemistry and Technology of Rubber Latex.

[By C. Falconer Flint (Chapman & Hall, Ltd., London) 1938 Pp xx + 715. Price 42s.]

DURING the past ten years, literature on the production and use of the *latex* of *Hevea brasiliensis*, or milk of the rubber tree, has increased as a result of the post War trend to use it directly for the manufacture of rubber and rubberised goods. Hauser's classical monograph on the subject, first published in German in 1927 and later translated into English in 1930, dealt with the occurrence, collection, properties and technical application of this raw material and also gave, as an appendix, a very brief resume of the important patents in Germany, the United States of America and Great Britain. H. P. and W. H. Stevens prepared a pamphlet on Rubber Latex, issued by the Rubber Growers' Association in 1928, in which short abstracts from selected recent patents were included. A critical and technical study of the subject on the one hand, and a compilation of abstracts of papers and patents relating to *latex* on the other, were both necessary for the use of the technologists and could not be dealt with in one book. The bifurcation was achieved by the publication, recently, of *Chimie et Technologie du Latex de Caoutchouc* by Georges Genin and of *Latex and its Industrial Applications* by Frederick Marchionna.

The treatise under review is based on the book by Genin. Though there has been extensive increase of our knowledge of the technology of *latex* during the short period of four years since 1934, when Genin's book was published, the fact that Flint's book is nearly twice the size of the original is, in itself, an indication that the present work is not a mere translation. It is essentially a new book. Unlike Marchionna's book, which is a masterly compilation of nearly two thousand abstracts of patents and other literature, Dr. Flint has presented us with an exhaustive review of the trend, growth and development of *latex* technology. The manufacturing processes are examined critically, yet without bias. The author stimulates enquiry and refrains from aggressive criticism.

Thoroughness leads to verbiage. When an author has to wade through voluminous and intricate patent literature, the tempta-

tion to pad the text for the sake of erudition is difficult to resist. The author's experience, formerly, as a member of the Staff of the Rubber Research Institute of Malaya and, later, of the Staff of the Rubber Research Laboratories of the Imperial Chemical Industries, gave him first hand opportunities to acquaint himself with the diverse requirements of the progressive planter who has to stabilise *latex* against coagulation, the technologist, who is responsible for evolving and operating new processes, the chemical manufacturer, who must supply the ingredients for the proper compounding of *latex*, the research worker, who not only wants an answer to his enquiry but seeks inspiration for further effort, and the manufacturer who is sufficiently far sighted to exploit new possibilities. He took as his motto the advice of the King of Hearts in *Alice in Wonderland* — "Begin at the beginning and go on till you come to the end, then stop." The result is a comprehensive yet a very readable treatise.

The book may be said to consist of three parts, namely, the history of *latex* technology, the applications of natural *latex*, and *latex* substitutes. As the title of the book would demand, the first two topics are dealt with in great detail. The manufacture of rubber goods has developed mostly in Europe and America, at considerable distances from the source of *latex*. Stabilisation of *latex* costs money and it requires costly containers for transport, therefore, it fetches a higher price than an equivalent amount of raw rubber. Its use is nevertheless spreading because of the better quality of the finished goods and greater ease of processing. It also opens out possibilities for rubber industry to be established in tropical countries where rubber is grown. The quota imposed on the producers under the existing arrangement of export control is responsible for a considerable quantity of rubber remaining untapped. This could be tapped and utilised locally for purposes for which, otherwise, material have to be imported. The development of *latex* technology lessens the odds against the development of manufacture of rubber goods in the countries of production.

The last chapter deals briefly with artificial suspensions which may be used as *latex* substitutes. These may either be obtained by redispersion of raw rubber, or by the emulsification of the starting materials of synthetic rubber. In any case, emulsion polymerisation is a necessary stage in all processes for synthesising rubber. Formerly the resulting solid was plasticised for the manufacture of rubber goods, while, now, by adopting the *latex* technique, the emulsion could be processed directly. This would reduce the handicap from which synthetic rubber suffers in its competition with natural rubber. In this respect, *latex* technology may in directly affect adversely the interests of the rubber growing countries, but it is made obvious that, contrary to the impressions which trade restrictions and self denying

agreements among the rubber growers would create, there is great scope for the extension of the applications of *latex*.

The author has something to say about the nature of patents on this subject. There are so many among them which serve no other purpose than that of blocking others. The position is perplexing. Dr Falconer does not say so in words, but reading between the lines, one would come to the conclusion that many of the patents may not stand the test of litigation and should not deter fresh investigation in the 'fenced off' territory. The book contains 146 illustrations and a number of recipes and formulas. No one who is interested in rubber, whether as a planter, manufacturer, technologist or research worker should be without it.

K L MOUDGILL

CENTENARIES

By S R Ranganathan, M A , L T , F L A
University Librarian, Madras

Bernard, Edward (1638-1696)

EDWARD BERNARD, a mathematician and orientalist of England, was born at Perry St Paul in Northamptonshire, May 2, 1638. His father, a curate, having died in 1644, Bernard was brought up by his uncle living in London. He had his education at Merchant Taylors School and at St John's College, Oxford. He was a student of Thomas Wyatt. Having acquired great proficiency in many oriental languages and having been attracted by the numerous mathematical treatises in Arabic contained in the Bodleian Library, he studied mathematics under the famous Dr Wallis and became an M A in 1662.

HIS CAREER

In 1669, he became the deputy of Sir Christopher Wren, the Savilian Professor of Astronomy at Oxford and finally succeeded him in 1673. In the same year he was elected F R S. He continued to hold the chair till 1691, except for a year's break in 1676 when he was deputed to Paris as private tutor to the sons of Charles II by the Duchess of Cleveland. But his simplicity of manners and erudite pursuits rendered him an object of ridicule in gay

society and he reverted to Oxford in 1674. After his retirement from the professorship, he was presented to the rich living of Brightwell in Berkshire, which he retained till his death.

HIS CONTRIBUTIONS

The *Philosophical transactions* contain only three papers of Bernard. Even they are not of considerable importance. One of them was of a routine nature entitled *Observations of the solar eclipse, July 2, 1684, at Oxford*. Another was of a historical nature, entitled *Observations of the ancients concerning the obliquity of the zodiac*. In this paper he compared the various values determined between 230 B C (by Eratosthenes) to 1437 A D (by Ulughbeg) and reached the conclusion (now known to be erroneous) that the obliquity of the ecliptic has been always the same from the beginning of the world. The third paper on the *Places of stars* is also a compilation of no permanent interest.

ARABIC MANUSCRIPTS

But his contributions of value lay on the bibliographical side. He employed his talents and his linguistic attainments in collecting together the mathematical writing