

**CELLULOID, ITS RAW
MATERIAL,
MANUFACTURE,
PROPERTIES AND USES**

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Celluloid, its raw material, manufacture, properties and uses by Fr. B?ckmann

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FR. BÖCKMANN

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ITS RAW MATERIAL, MANUFACTURE,
PROPERTIES AND USES

BY

DR. FR. BÖCKMANN

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WITH SIXTY-NINE ILLUSTRATIONS

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BY

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PREFACE

CELLULOID is such a well-known product and appears to us in so many forms in everyday life that we are apt to take it for granted without bestowing much attention on it, and yet not many years ago celluloid was quite unknown, and our immediate ancestors had to be content to use the natural products with which it now more than competes.

It would be a difficult problem to enumerate all the purposes to which celluloid has been applied, but it is used in place of ivory, tortoiseshell, bone, and horn for knife-handles, umbrella-handles, combs, boxes, buttons and ornamental trinkets generally. For this reason it has been known as imitation ivory, imitation tortoiseshell and so on, and this application of the word imitation to it has very largely detracted from its value in the view of those who are æsthetically inclined, the word "imitation" being abhorred by artists generally. From a practical point of view, however, celluloid exhibits so many useful properties that it has made for itself a place in industrial and everyday life.

Celluloid is a product of nitro-cellulose, and being allied to gun-cotton, is regarded as highly dangerous and as likely to explode if heated; but this is not the case. Although it is inflammable and will take fire when a flame is applied, it does not readily do so if ordinary care is taken, and under no conditions does it explode.

The history of celluloid is an interesting one, commencing with the discovery of nitro-cellulose by Braconnot in 1832, its conversion into collodion by Maynard in 1847, the use of collodion in photography by Scott Archer in

1850, and the preparation of plastic masses from it by Parkes, Spill, and Hyatt, and the final discovery of the value of camphor in such preparations which resulted in the celluloid of to-day.

In addition to its use for the purposes enumerated above, celluloid is employed in the manufacture of clear, colourless, transparent films for photography which have very largely displaced glass plates, and the roll films which are now so well known in the cinematographic halls all over the world. For the preparation of certain classes of varnishes, quite unaffected by air or moisture, celluloid has no equal, while a very important parallel industry—the artificial silk industry—also depends upon the raw product, nitro-cellulose, and therefore comes within the scope of the present work.

In this book, the raw product, cellulose, and its properties are first described, the preparation of the various nitro-celluloses then follows. Other raw materials, such as camphor, and also the solvents for nitro-cellulose and the methods of rendering it plastic occupy attention. A chapter is included upon the preparation of artificial silk, while subsequent chapters deal with the moulding of celluloid, preparation of celluloid varnishes, and other various applications for which celluloid has been found suitable. The final chapter is devoted to the chemical and physical examination of celluloid.

H. B. STOCKS.

London, May 1921.

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CELLULOID

INTRODUCTION

THE progress of civilization, and the increasing requirements of all branches of trade and industry, have been accompanied by a growing scarcity of many raw materials, the prices of which have risen in consequence. For this reason numerous attempts have been, and are being, made to imitate certain raw materials on the one hand, and on the other to find other materials capable of replacing them for many of the purposes to which they are applied. Thus, endeavours have been made to imitate ivory and caoutchouc and also tortoise-shell, horn, amber, etc., the earliest success in this direction being that obtained by Parkes of Birmingham, who introduced the substance known as Parkesine, used as a substitute for ivory and caoutchouc. This product being as hard as horn, and yet as flexible and supple as leather, and capable of replacing ivory and mother-of-pearl as well as caoutchouc and gutta-percha, was the first of its kind to arouse general interest.

Parkesine is interesting since it is the forerunner of celluloid, and its preparation and application are therefore worthy of close attention. The inventor prepared this product by mixing anhydrous wood naphtha with gun-cotton, and thus obtained a solution suitable, according to its consistency, for purposes ranging from waterproof clothing to the insulation of telegraph wires, manufacture of tubes, etc. To ameliorate the hardness and brittleness, which unfitted it for certain purposes, the product was kneaded with castor oil, cotton-seed oil, or other fatty oils: a mixture of the gun-cotton solution and castor oil, for