

The plastics' harbinger in Portugal: unveiling past production for celluloid's preservation

Hyatt's Celluloid Manufacturing Company, established in 1871, in Albany (USA), developed an effective business strategy, providing unfabricated celluloid to companies licensed in the making of consumer goods. Celluloid was sold as sheets, rods and tubes to be converted into collars, combs, dolls and several other products. Although the wide array of applications, the licensed companies were specialized with a narrow range of products. In Continental Europe, this technology was set near Paris, in 1875. For many years, the *Compagnie Française du Celluloid* was the only producer of raw celluloid. By 1890, the celluloid industry was well established [1].

According to Callapez [2], it was only in 1935 that the plastics industry was established in Portugal with the production of bakelite by the *Industrial Society of Electrical Products* (translated from *Sociedade Industrial de Produtos Eléctricos*). However, evidences of Celluloid's early influence can be traced back to comb manufacture in the 1890's by the firm *Dias & Irmão* [3]. In the mid-20th century, two known Portuguese companies at the time- *Luso Celulóide* and *Hércules* - kept still importing tons of celluloid, possibly from France, and producing various products, such as balls, toys or hand mirrors [4, 5]. However, a study of celluloid's cultural and technical impact has never been explored.

Indústrias Plásticas (1950) by António Rio de Janeiro, the first Portuguese technical book on plastics' industry, is a fundamental primary source. Presented as the former technical manager of the Portuguese Society of Celluloid, the author's apparent practical knowledge on celluloid stands-out. References to Worden's *Nitrocellulose Industry* (1911) or Böckmaan's *Celluloid* (1907) books express Rio de Janeiro's knowledge and interest in the subject. However, there are no known records, and claims on any Portuguese patent related to celluloid.

In this work, we intend to unravel Rio de Janeiro's professional career, seeking for the objects he might have produced. This search for material culture is the first step in an investigation aiming to value celluloid's significance in the Portuguese context.

Furthermore, it is examined how this research can be complemented by conservation science studies. Production of celluloid through the formulations and techniques described by Rio de Janeiro and other fundamental industrial references, will enable degradation studies directly related with the celluloid commercialized. Nonetheless, it is necessary to proceed by a step-by-step methodology, understanding first the production of cellulose nitrate and all its variables, such as the degree of substitution, stabilizing treatments or formation of impurities, before undergoing the making of cellulose nitrate-camphor systems.

Additionally, the discovery of Portuguese historical objects will enable chemical analysis that give information about degradation but also about manufacturing processes and materials. These insights may lead to specific formulations, patents or manufacturers, as the development of dating methodologies will place the historical objects in their cultural and production contexts.

[1] Friedel, Robert. *Pioneer plastic: the making and selling of celluloid*. Madison: University of Wisconsin Press, 1983.

[2] Callapez, Maria Elvira. *Os plásticos em Portugal: a origem da indústria transformadora*. Vol. 47. Editorial Estampa, 2000.

[3] *Catálogo da Exposição Industrial Portuguesa, no Palácio de Crystal Portuense 1897*. Lisboa: Imprensa Nacional, 1900

[4] Henriques e Irmão Lda. *Fábrica Luso-Celulóide de Henriques e Irmão Lda*. Porto: Litografia Império, 1950

[5] Afonso Henriques. *Tabela de Preços da Fábrica Hércules*. Lisboa: Tipografia Casa Portuguesa, 1951