

Industrial development of plastics and 20th-century art: new synergies

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Introduction

As in previous centuries, the art of the 20th century has been influenced by technological, scientific and industrial advances. Thus, significant developments in the plastics industry and its huge cultural and historical impact has turned plastic into one of the most relevant materials in modern and contemporary art (Meikle 1997; Keneghan and Egan 2008). Improved accessibility, low cost, more speed in the artistic process (Beerkens 2002), enhanced properties and aesthetic qualities are circumstances that did not go unnoticed by modern and contemporary artists.

Working with plastics: a new experience for artists

The artistic use of plastics in 20th-century art began with some early work by Duchamp with ready-made materials – which incorporated plastics by chance – and continued

with the constructivist sculptures by Naum Gabo (1890–1977), Antoine Pevsner (1886–1962) and Charles Biederman (1906–2004), as well as the Bauhaus artist László Moholy-Nagy (1895–1946).

After World War II – especially in the 1950s and 60s – sculptures incorporating plastics arrived with *éclat*: examples included pop artists such as Andy Warhol (1928–1987), Allen Jones (b. 1937), Robert Rauschenberg (1925–2008), Richard Artschwager (b. 1923), Richard Hamilton (1922–2011), George Segal (1924–2000), Roy Lichtenstein (1923–1997), Claes Oldenburg (b. 1929) and Les Levine (b. 1935), as well as minimal artists such as Donald Judd (1928–1994), Richard Serra (b. 1939), Craig Kauffman (b. 1932), Carl André (b. 1935) and Sol Lewitt (1928–2007), among others.

In the following decades the artistic use of plastic became widespread: the works of César (1921–1998), Niki de Saint Phalle (1930–2002), Christo (b. 1935), Franco Mazzucchelli (b. 1939), Arman (b. 1928), Eva Hesse (1936–1970), Jean Dubuffet (1901–1985), and the hyperrealists John de Andrea (b. 1941) and Duane Hanson (1925–1996) are all relevant examples.



Figure 1 Bruce Beasley and his assistant polishing the monumental cast acrylic sculpture *Apolymon*. Cast Acrylic, 1970, State of California, Sacramento. (© Bruce Beasley. Photo: Joanne Leonard.)

Industrial development of plastics and new synergies

Most research and development of new polymers (both semi-synthetic and synthetic) during the 20th century was performed by three major companies: Du Pont de Nemours (USA), Imperial Chemical Industries (UK) and I.G. Farben (Germany). Figures such as Alexander Parkes (1813–1890), John Wesley Hyatt (1837–1920), Wallace Carothers (1896–1937), Leo H. Baekeland (1863–1944) and Hermann Staudinger (1881–1965) played predominant roles in these important advances.

In the last few decades a new kind of synergy between art and technology has emerged. Several artists have begun to enter into a relationship with technical experts and chemists from the plastics industry in order to become more closely acquainted with these complex materials, their properties, use, and their expressive possibilities. There are several examples of this new kind of teamwork: the constructivist Naum Gabo collaborated with Dr Sisson (chemist in the ICI Plastics Division),

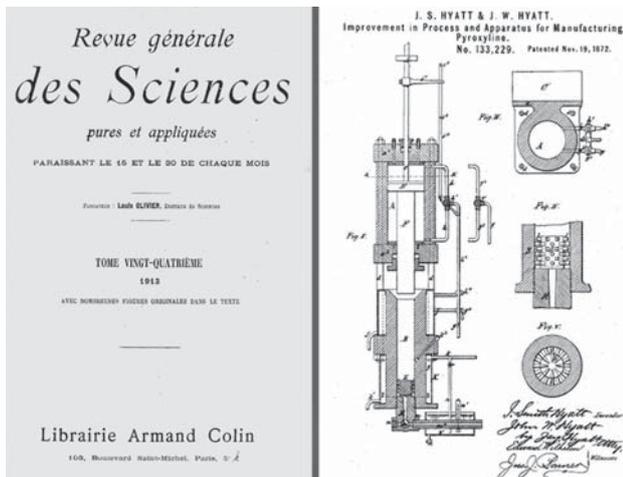


Figure 2 Original scientific literature (left) and patent (right) relating plastic's development.

Abraham Tobias worked with Rohm and Haas (Newman 1969: 19) and Bruce Beasley worked with DuPont to cast *Apolymon*, the largest sculpture ever made in Lucite, a clear polymethylmethacrylate (Fig. 1). The process developed by Beasley and DuPont led to a breakthrough discovery of a new way to cast acrylic resin in any thickness. Following this, the artist was approached by a group of oceanographic engineers who wanted to obtain an all-transparent bathysphere using the same process: this succeeded and some of these bathyspheres are still in use. This is a great example of a mutually beneficial relationship between 20th-century artists and industry.

Another link between plastics technology and contemporary art developed when plastic properties and their moulding processes began to play a predominant role in the artwork. Such is the case of Cesar Baldaccini's *Expansions* (first made in 1965) or the use of vulcanised rubber in *Chunk* and *To Lift*, both by Richard Serra.

Sources

These synergies established between the plastics industry and new art forms can be studied using different sources such as artists' writings, photographs or videos of the creative process etc. Examples include the images of Jean Dubuffet cutting polystyrene foam, Bruce Beasley working on *Apolymon* or Naum Gabo in his atelier in Middlebury, Connecticut, with the model of *Linear Construction in Space No. 3 with Red*.

Other technical sources such as original patents (García Fernández-Villa and San Andrés Moya 2005; San Andrés Moya and García Fernández-Villa 2008) are very useful documents for studying the historical development of plastics and the industrial processes involved in their manufacture.

Such sources provide relevant information about the polymer synthesis, additives or moulding process among others.

Another valuable source is the scientific literature (Fig. 2). Examples of such publications include the *Revue Générale des Sciences Pures et Appliquées* and *L'année Scientifique et Industrielle*, the *Journal of Industrial and Engineering Chemistry*, the *Journal of Physical Chemistry* and the *Journal of Polymer Science*; they all contain concise and technical information about the new polymers. Finally, manufacturers' information or company magazines, for example the *DuPont Magazine*, provide a very interesting overview of the development of plastics technology. Some of these contain original photographs taken at the polymer processing plants that show different methods of processing plastics.

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