

The History of Plastic

Plastics have saved the elephant from extinction – that was the proud boast of David Girdler, the speaker at last month's Local History Group meeting.

David is a founder member of the Plastics Historical Society who has spent his life working in the plastic industry and (latterly) academia. He started by explaining that not all plastics are artificial. One of the earliest plastics to be discovered was shellac, which is secreted by insects that live in the bark of trees in India, and was used to mould 78rpm gramophone records until the introduction of vinyl in the 1950s.

The first artificial plastic was developed in the 1850s by Alexander Parkes, using nitrocellulose (or guncotton) treated with various solvents. He called his new product Parkesine but it was not a commercial success. That was for others, who licensed it, developed it, and re-named it as celluloid.

Fifty years passed before the next significant commercial development by the Belgian chemist Leo Baekeland. He found that if he mixed phenol with formaldehyde at the right temperature and pressure he made a mouldable plastic thermoset that he called Bakelite. He patented it in 1909, and made his fortune by franchising the manufacture worldwide.

The next wave of development started in the late 1920s, characterised by chemists experimenting with polymers in their laboratories without seeing the commercial potential for their discoveries. In this period polyethylene, PVC and PTFE all moved slowly from the laboratory to mass production.

The outbreak of World War II speeded things up. In the UK the chemists at ICI discovered that polyethylene was an effective insulator, and particularly useful in radar sets: radar was considered so important the Official Secrets Act was quickly applied and all commercial production stopped.

After the war the chemical giants made huge strides in the mass production of low-cost plastics – polyethylene, polystyrene, PVC and PTFE. Whilst lots of technical problems were being solved by production engineers in Europe and the USA, little thought was being given to the challenges of recycling.

David went on to talk about the problems so effectively highlighted in recent television programmes. He believes that the seven-triangle system that was introduced in 1988 is quite inadequate, and that all governments worldwide must introduce a comprehensive numbering system to identify every single plastic product. That, David believes, is the essential first step toward a fully sustainable plastic world.

Ultimately, David said, all plastics can be recycled. Most are thermoplastics which don't undergo chemical change when heated: and most of these are not difficult to recycle. Thermosets (which do undergo chemical change) are more difficult, but costs are coming down as new methods are developed.

And how were the elephants saved? It was an American called John Hyatt who worked out how to use celluloid to make billiard balls. This led to other products that were fuelling the demand for ivory in the 19th century: cutlery handles, piano keys and buttons. Without "synthetic ivory" David imagines that the elephant would have been killed off long ago.

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