EAA celebrates the 125th anniversary of the Hall-Héroult Process

The Legacy of the Aluminium Twins

In 1886, two young 23-year old inventors simultaneously and independently filed their patents for the production of aluminium: the French Paul Héroult and the American Charles Martin Hall.

Known as the « Hall-Héroult Process », the invention was based on the fused-salt electrolysis of alumina dissolved in a molten cryolite bath. It gave way to the modern aluminium industry. 125 years later, the process is still used but has been dramatically improved to meet economic, energy and environmental challenges. Consumption jumped from a few thousand tons in 1900 to 50 million tons worldwide nowadays. A third of this metal is produced from recycling.


175.711 29 Avril 86.

MÉMOIRE DESCRIPTIF

déposé à l'appui d'une demande de

Brevet d'Invention de Quinze Ans

Pour Procédé électrolytique pour la préparation de l'aluminium

Par Monsieur Paul Louis Toussaint Héroult,

Représenté par LÉTRY FRÈRES, Ingénieurs Civils.

Original

Aluminium & innovation • 1890 **Switzerland** *Zéphir*, first aluminium craft • 1893 **UK** Eros Sculpture at Piccadilly Circus in London • 1895 **USA** Defender, first boat made from aluminium, wins the America's Cup • 1898 **Italy** Aluminium dome of San Gioacchino church in Roma • 1899 **France** 100 km/h record by *La Jamais Contente*, an electric car with an aluminium body •••

Combining Utility and Beauty…

Aluminium has the elegance of an immaterial force. It is the formalisation of our dreams.

Olivier Debré, painter (1920-1999)

The aluminium industry has been passionate about innovation for 125 years. Since the middle of the 19th century, the light metal has never ceased to excite the imagination. From a wide diversity of applications, three stand above the rest in allowing aluminium to combine a passion to serve with a gift for beauty: transportation, packaging and building.

Even before the invention of the Hall-Héroult Process, writers such as Jules Verne and the inventors of the day dreamed up aluminium vehicles that were able to fly, float or roll. For more than half a century the biggest end-use market for aluminium has been the **transport sector**, thanks to its strength and lightness, corrosion resistance, recyclability, improved safety and design flexibility. Today, it is widely used in cars, trucks, buses, coaches, trains, metros, ships, ferries, aircraft and bicycles.

Aluminium & innovation • 1900 **Germany** the *Zeppelin*, aluminium rigid airship • 1902 **Austria** Aluminium facade for *Die Zeit* in Vienna • 1907 **UK** The Rolls-Royce *Silver Ghost* with a polished aluminium body • 1916 **France - Germany** Aluminium-structure planes prototypes : Breguet XIV, and F13 Junkers • 1925 **USA** Pierce Arrow's "all-aluminium" car • 1931 **USA** The Art Deco-inspired Empire State Building with anodised aluminium in New York • 1932 **Germany** The Bauhaus designer Breuer's deckchair 313 • 1933 **Italy** Bialetti's aluminium Moka Express •••

european aluminium association
www.eaa.net

IHA | institute for the history of aluminium
institut pour l'histoire de l'aluminium

. . . A Passion for Innovation

Aluminium containers and foil appeared as early as the end of the 19th century. After World War II, **packaging** came to the forefront in response to consumer demand for choice and convenience that led to changes in production and distribution conditions and systems. Since the 1960's, consumer and industrial packaging have benefited from the unique combination of properties of aluminium: it is impermeable, odourless and non-toxic.

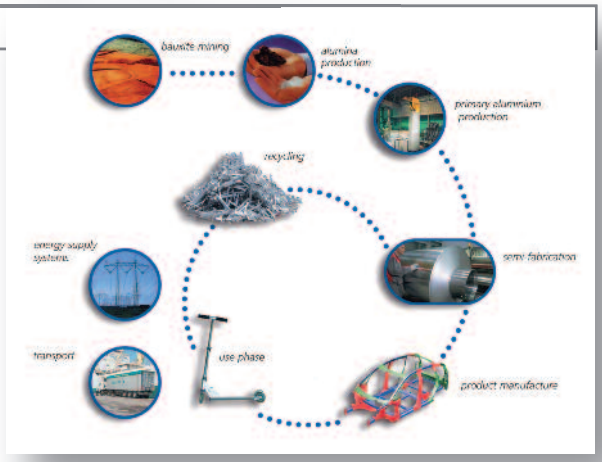
Since its discovery, aluminium has been a highly valued material for the expression of modernity in prestigious **buildings**. Furthermore, when construction became industrialised, aluminium became one of the leading materials. It is used for roller shutters, doors, exterior cladding and roofing, suspended ceilings, wall panels and partitions, heating and ventilation equipment, sun protection, light reflectors and even complete prefabricated buildings.

• A clear asset: adaptability

One of the best qualities of aluminium is the fact that its intrinsic properties can be enhanced: light weight, strength, corrosion resistance, ductility, formability and conductivity. More than 400 different alloys are in use today.

• Recyclability

Aluminium can be recycled time and again, helping conserve natural resources. Indeed, recycling aluminium takes as little as 5 % of the energy that is needed to produce primary metal. More than 30% of all the aluminium consumed globally is obtained from recycling.



Aluminium life cycle

Aluminium & innovation • 1946 **UK** Ernest Race's moulded recycled aluminium BA3 chair • 1957 **Russia** *Sputnik-1*, a 84 kg aluminium ball launched the space race • 1958 **Belgium** The Atomium in Brussels had 9 aluminium-covered spheres • 1966 **France** Aluminium dress by Paco Rabanne • 1967 **USA** The Wilson T 2000 aluminium racquet • 1969 **France - UK** Concorde, first supersonic passenger aircraft with aluminium alloy sheet •••

european aluminium association
www.eaa.net

IHA | institute for the history of aluminium
institut pour l'histoire de l'aluminium

A Gift for Sustainability

Over the past 25 years, sustainable development has become a key issue worldwide. With its inherent properties, aluminium can help achieve sustainability objectives and is very much a material of the future.

• Lightweight

Soon after its discovery, aluminium was called the 'light metal'. Its low density has made it the must-have material for many applications, especially in transport.

With weight reduction playing a key role in lowering transport emissions, aluminium is increasingly used as an integral part of lightweight vehicle design. The potential is significant as the transport sector accounts for about one quarter of overall EU emissions of carbon dioxide.

Furthermore, aluminium is also the material of choice for electronics and solar panels.

european aluminium association
www.eaa.net

Aluminium & innovation • 1990 **Italy** Starck Juicy Salif for Alessi • 1994 **Germany** Audi A8 all-aluminium structure • 1998 The laboratory of the International Space Station (ISS) contained many aluminium components • 2010 **France** Starting of the construction of Jean Nouvel's « Aluminium Hill », the future Paris Philharmonic Hall •••

(... to be continued...)

Further information is available in Ivan Grinberg's book *Aluminium Light at heart* and on the IHA Websites, *www.histalu.org* and *www.culturalu.org*. See also the *Journal for the History of Aluminium* published by IHA.

IHA | institute for the history of aluminium
institut pour l'histoire de l'aluminium