The “Age of Aluminium”

In this new series, historian Dr Andrew Percharde* provides an overview of the development of the global aluminium industry within its context, showing how from modest beginnings aluminium became ubiquitous and the industry global giant.

Aluminium was inextricably linked to the modern age, and modernism. This was both because of the science and technology PCA, that would firmly establish aluminium. These conflicts, the subject of the second article in the series - Le Déguisage of others, as well as demonstrating the versatile properties and potential applications of the metal, opening up new and growing markets. In mature industrial economies, the postwar growth of 1950-1975 - the golden years or les trentes glorieuses - created a boom time for aluminium, as for other metals. The 1940s and 1950s also saw some ripples in the industry, with challenges to its early 'first movers' and leaders. President Richard Nixon's devaluation of the US dollar in 1971 followed by the OPEC crisis of 1973, created challenging political and economic conditions for the global aluminium industry. Aluminium's exponential growth and US were more fortunate in finding a receptive market for aluminium in the growing automotive sector and the electricity industries. Coupled with a limited market for the metal were the high sunk capital costs involved (then, as now). No producer was self-sufficient in the necessary raw materials, although some (French producers) were better placed than others. In an energy-intensive industry, advances in electrical (and civil) engineering, coupled with the natural capital of water resources, provided the modern industry with its only commercially feasible source of power for the time - hydro-electricity. Nevertheless, in the early 20th century, it required around 30,000 kilowatt hours of electricity to make one tonne of aluminium. With some notable exceptions, for much of the 20th century, aluminium production would continue to be supplied by hydro-electricity; nearly 60% as late as the 1990s. The aluminium ‘first movers’, AIG Nuheimaus (Swiss-German), the Pittsburgh Company Ltd (subsequently Alcoa), BACo, the French Société Electro-Métallurgique du Sud-Est (SEM), and the Aluminium Corporation Ltd all relied chiefly on hydro-electric power. This often required them to locate reduction plants in remote locations (for example the Scottish Highlands, Vallée de la Maurienne (France), adding to transportation and habitation costs. The costs are illustrated by BACo’s Highland hydro schemes and reduction works: Foyers, which opened 1896 and closed in 1967, Kirchhöfen (opened in 1907, finally closing in 2000) and Fort William (the Lochaber smelter, which opened in 1929 and is still operating, although the smelter has been reconstructed and the power house modernised). By 1898, the construction and modernisation of Foyers had cost BACo £191,000 (£14.2M in 2015 prices). Even before the delays in completing Foyers, Kirchhöfen was projected to cost the Company £500,000 in 1904 (£48.6M), and by its opening in 1929 (but not the completion of the scheme) Lochaber had cost £2.5M (£137.1M). Construction of these schemes was also labour intensive - with hydro-electric schemes being hewn by rock and explosives out of rugged landscapes – and the human cost of construction was appalling (the tunnel development for BACo’s Lochaber scheme claimed the lives of 48 navvies alone). Accompanying the development of hydro power were also some of the first environmental battles. BACo (founded in 1884 with the British and Colonial rights to the Hall-Héroult process), tried to build their aluminium reduction works in the out of acorns grow big trees
Scottish Highlands. The choice of their first plant at Foyers, on the shores of Loch Ness, harnessing the nearby falls made famous in the poetry of Robert Burns and Samuel Coleridge (and a popular tourist spot for wealthy Victorians), was immensely controversial bringing BACo into conflict with a powerful group of opponents, including the then Duke of Westminster, John Ruskin, and the newly formed National Trust.

The high costs and low return on investment in the early years of the modern industry claimed its victims; BACo and the Aluminium Corporation (a much smaller British company based at Dalgarrog in North Wales) were forced to recapitalise, and ASO and EMSE went to the wall. Two of BACo’s founding directors, Emmanuel Ristori and Roger Wallace, were bankrupted.

This instability in global markets prompted the first two of a series of international aluminium cartels (1901-1908, 1912-1914) controlling production quotas and prices. For much of the industry’s history, the high sunk capital costs, as well as a high degree of oligopolisation within the industry, eliminated new entrants. In 1913, seven companies controlled 94% of global aluminium production; and 62% of primary alumina production; and 62% of primary aluminium production.

From a precarious start, and great risk, on the outbreak of the Great War, aluminium was established as a transnational industry. Many of the first movers in the industry, established in the 1880s and 1890s – Alcoa (and its Canadian, the Northern Aluminium Company, Ltd; after 1925, Alcan), Alumins, BACo, PCAC and SEMF, the most prominent – would dominate the industry for much of the twentieth century.

The outbreak of the First World War would dramatically change the global aluminium industry; as in so many other aspects of economic and social life, it represented a watershed. A metal that was still an expensive commodity in 1913 ($9,000/mt; $222,000/mt at 2016 prices) would become recognised as crucial for the conduct of modern warfare and subsequently demonstrate its utility in other areas.

The scarcity of supply of other important non-ferrous metals (such as copper, tin, and nickel) further underlined aluminium importance as a strategic raw material. This was also to transform the industry’s relationship with the state in all of the combatant nations for much of the 20th century.

Biography
Dr Andrew Perchard is the author of Aluminiumville: Government, Global Business and the Scottish Highlands (Crucible, 2012).

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