Environmental risks

Industrial pollution in Europe

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ABSTRACT

Europe was the cradle of the industrial pollution of the modern world. The current model for pollution grew out of the European industrialization that began in the late eighteenth century. This provided modern societies with technological systems, sectorial and spatial dynamics, and a legal framework that were later extended to the whole world.

Fog in Stretford, Greater Manchester, 24 November 1958. Source : Guardian

Poster for the fungicide Cupra, created in 1946 by Samuel Henchoz for the Société des produits chimiques SA in Renens. Source : Musée du design de Zurich, Collection d'affiches, Haute école des arts de Zurich.

The black beach at Langoustier in Porquerolles owes its black sand and gravel to slag discharged in the nineteenth century by the former soda works. Source : office de tourisme Hyères

Photograph of the village of Bournville south of Birmingham, 1926. The Cadbury company established its factories there in 1879. Source : Wellcome Collection

Europe was the cradle of the industrial pollution of the modern world. It is indisputable that the current model for pollution can be explained by the European industrialization that began in the late eighteenth century. This provided modern societies with technological

systems, sectorial and spatial dynamics, and a legal framework that were later extended to the whole world.

Models

The first massive pollution appeared with the adoption of coal as a fuel for industrial furnaces and motors. It was in Great Britain, from the seventeenth century onward, that coal was first used routinely in the domestic space and later in furnaces to manufacture glass, tiles, bricks, and lime. After 1770, improved coal refining (stripped of its sulfur) expanded possibilities for its use in metallurgy, while steam engines were adapted for new industrial uses with James Watt's condenser system. The smoke from coal was dense and high in sulfur, hydrocarbons, bitumen, and heavy metals, not to mention CO2, whose disruptive environmental effect as a greenhouse gas was revealed only in the twentieth century. This smoke gradually saturated British cities, with fine particle levels being as high in London at the time as they are in contemporary Asian cities. The adoption of coal in continental Europe after 1800 as well as the industrialization of cities—enabled especially by steam engines, an energy converter that no longer depended on rural resources—extended this phenomenon to the largest nineteenth-century European cities. This pollution was reinforced with the birth of the gas lighting industry (1815 in London) through the distillation of coal. This activity, which was necessarily urban, became the primary method of lighting for European cities before electricity, with its plumes of smoke, bituminous and ammoniac emissions, and heavy metals in urban soils.

The concomitant rise of applied chemistry led to new pollution. The two motors of industrialization—metallurgy and the textile industry—required the use of various chemical products (sal ammoniac, acids, metallurgy, antimony, alum, etc.) whose demand rose sharply in the late eighteenth century. Sulfuric acid, a key product, was successfully manufactured on an industrial scale in the 1760s after the development of the technique of gas condensation using large chambers of laminated lead. In London, Rouen, and Paris—the three leading production sites before 1780—legal trials attest to the scope of the nuisance created by this industrial activity, as the corrosive gases emanating from factories harmed the health of inhabitants and destroyed surrounding vegetation. After 1800, sulfuric acid enabled the production of artificial soda from sea salt for glassworks and soap factories. However, this production technique, which was at first specifically French, released considerable volumes of hydrochloric acid without condensation. Fields were devastated around Paris and Marseille, and later Liverpool and Liège, with soda works becoming, until the Solvay process (around 1880), Europe's most devastating source of environmental pollution.

Accelerations

The progression of industrialization, demographic growth, and increased per capita consumption sparked a rise in pollution. In the mid-nineteenth century, the urban atmosphere was saturated with industrial dust, while rivers were transformed into drains, and sometimes even into urban sewers. The construction of railroads initiated a new stage, sparking another rise in industrial production, and redistributing the geography of pollution. New transportation options made it possible to locate industrial installations near railway hubs and lines in the urban periphery or mining regions, such as the Ruhr. A polarization of polluted spaces ensued, one that was further away from inhabited areas, although this new distribution was entirely relative, for numerous sources of pollution remained in cities. After 1860, the birth of carbochemistry led to a new type of pollution connected to the production of synthetic products. Germany became the primary manufacturing country for artificial dyes used in the textile industry. Between 1870 and 1900, the pollution of the Rhine caused by the high density of upstream chemical factories (in Basel for example) reached dramatic levels.

After 1900, the mastery of electricity reconfigured production systems, leading to the gradual disappearance (over long decades) of the gas lighting industry, locomotives, steam engines, and coal-based heating. Coal-related pollution was relocated to power plants. However, this apparent decrease in urban pollution was offset by the birth of petrochemistry at highly polarized sites with their subsequent consequences, namely the increased motorization of industry and transportation, and new synthetic products such as the plastics behind the endless contamination of bodies and environments. Consequently, while the renewal of technological systems was incessantly touted in the twentieth century as a way of solving earlier pollution, innovation emerged in increasingly complex and contaminating cycles.

Expertise and fatalism

Since the 1800s the regulation of pollution has been based on a technical and administrative approach to the issue. During the nineteenth century, the earlier word "*nuisance*" (nuisance), which had legal effect and included a social dimension, was replaced by "pollution," which is more related to scientific expertise. The central objective was increasingly to identify acceptable thresholds and doses, whereas regulation under nuisance law previously allowed for banning or destroying polluting installations. The first law on polluting factories was adopted in 1810 in France, and subsequently extended to the rest of continental Europe. Great Britain ultimately adopted the spirit after 1863 (Alkali Act). This new law gave administrations the power to authorize, control, and monitor, but also prevented initiating criminal justice proceedings against polluters, which was possible before 1810. At the same time, the industrial age asserted an unprecedented confidence in technological improvement, which was always supposed to make industry inoffensive in the short term. While it was regularly reformed and clarified, this pollution law endured throughout the twentieth century, including in the European Union's Seveso classifications (1982, 1996, and 2015). While the EU launched numerous programs to combat pollution after 1960, it has not challenged the model implemented in the nineteenth century, which prevents addressing pollution at the source. Two hundred years of regulation based on technical change has proven unable to thwart the effects of sharply rising consumption and the general contamination of the environment. The perception of industrial pollution is also biased by the fact that many productions linked to European consumption were offshored to Asia, which bears the burden of the new pollution created by European lifestyles, with increasingly serious effects on the environment.

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