PROTECTING THE ENVIRONMENT AND MANAGING NATURAL RESSOURCES

Mines, the Environment, and Mining Landscapes in Germany

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ABSTRACT

Germany built a large part of its industrial power on the wealth of its underground resources. Coal mining, which played a key role, was key to the Ruhr's becoming Western Europe's largest industrial region. Although the coal mines have since closed, and the Ruhr's environment is much greener than it once was, large quantities of lignite are still being mined from vast surfaces mines (e.g. open-pit mines and strip mines). The disfigured landscapes, as well as the pollution caused by lignite combustion in thermal power plants, have fueled growing opposition and challenges to mining. After mine closings, companies have re-sculpted post-mining landscapes composed of lakes, forests and fields for agricultural crops. This erasure of the marks left by mining has progressed the most in the lignite fields and in the former uranium-mining regions in the new Länder, where most of the mines were closed after reunification.

Illustration 1: Landscape in the heart of the Ruhr coalfield from the top of the Oberhausen gas-storage tank (photo Deshaies, May 2008). The green landscape contrasts sharply with the traditional image of a "black land." In the foreground, we can see the former headframe (or winding tower) of the Osterfeld mine and coking plant, which has been turned into an urban park, and on the horizon, the now-verdant slagheap of the Prosper Haniel mine.

Illustration 2: Lignite mine in Hambach, near Cologne (photo Deshaies, February 2014). The Hambach mine, which goes down more than 400 m. (1,300 ft.), is one of three mines in activity in the Cologne coalfields.

Illustration 3: The former lignite mine in Geiseltal, south of Halle in Saxe-Anhalt (photo Deshaies, October 2019). After operations stopped, in 1994, at one the largest lignite mines in Germany, residual excavation was submerged by a lake that spreads over a surface of 1,900 ha. (4,700 acres) to a maximum depth of 78 m. (256 feet). In 2011, after the lake's level had settled, two marinas, like the one shown here, were established.

Illustration 4: Ronneburg's new landscape (photo Deshaies, May 2013). A butte composed of slagheap rubble used to fill in the excavation now stands at the site of the former open-pit uranium mine. Hardly any visible traces of former

mining operations are now visible, aside, arguably from the miner's-lamp-shaped lookout tower perched at the top of the butte.

As a country with relatively limited agricultural potential, Germany founded its industrial power on its significant mineral resources. The ancient tradition of extracting metals (silver, copper, tin) led to the populating of a part of the *Mittelgebirge*, a low mountain range in southern Germany. From those beginnings, *Bergbau* (mining) grew to an industrial scale in the second half of the 19th century, especially after unification in 1871. At that point, mining's transformation of the landscape reached an unprecedented level. Although mining culture remained strong, the transformations led to a sensitivity to the landscape that resulted in systematic rehabilitation.

The Ruhr Coalfields: from *Kohlenpott* to an Urban Park

While some of the metal deposits, as well as potash mining, experienced a first peak during the 19th century, the most significant development was the extraordinary growth of coal mining, upon which the country's industrial breakthrough was based. Where production had been just 23 million tons in 1871, it reached 80 million in 1895 and peaked at 190 million in 1913. Coal production retained a preeminent place until the early 1960s, when, having exceeded 140 million tons, national production began to decline rapidly in favor of petroleum and imported coal.

Most of the domestic production came from the Ruhr, which became the largest industrial region in Western Europe. The landscape was soon overwhelmed by slagheaps, headframes, blast furnaces, and a multitude of coal-burning-factory chimneys spewing out dark clouds of smoke. The region's environment was so profoundly transformed and subjected to such substantial air and water pollution that it was nicknamed *Kohlenpott* (the coal scuttle). In addition, mining operations caused sinkholes, which could be as large as 20 m. (65 feet) or wider, that affected much of the region. The holes caused damage to homes and created huge water-runoff issues for local waterways, meaning that rising water levels threatened whole neighborhoods, which required dams and pumping systems to be saved.

It was not until the 1960s and the beginning of the decline in mining that people began to seriously consider environmental issues, which were expressed most notably in Willy Brandt's 1961 campaign slogan, "Blue skies over the Ruhr once again." As mines closed and coal was used less and less, Willy Brandt's dream finally came true in the 1980s. IBA Emscher Park, a huge program of rehabilitating and planting grass and trees on former mines, industrial sites, and slagheaps, was undertaken. It transformed the landscapes of the Ruhr (photo 1). Since 2018, when the last mine was closed, the urban region's green and verdant landscape has rendered the old *Kohlenpott* nickname obsolete. Former mining and industrial landscapes have even been turned into tourist attractions, which are linked in what is known as *Die Route Industriekultur* (the Industrial Heritage Trail).

Highly Disfiguring Lignite Mining

Since the decline in coal-mining operations, the largest current mining activity in Germany is surface mining for lignite, a low-heat-content form of coal of which Germany has substantial reserves. The single largest deposit is in the Cologne-Aachen region. Four other deposits do also exist in the new Länder, most significantly in Lower Lusatia, near the cities of Leipzig and Halle.

Despite lignite's relatively low quality as a fuel, its production rose greatly after World War I and in the period between the two world wars. That was because it filled a need for a sort of ersatz coal, once Germany could no longer produce enough coal for its own needs, especially after the loss of the Silesian Coal Basin. Lignite production grew thanks to self-sufficiency policies, particularly during the Third Reich and in East Germany after World War II, when it peaked at over 300 million tons in 1988.

Surface mining is highly mechanized, using gigantic diggers and excavators, so it allows for high productivity. That's why, unlike coal mining, lignite mining is still cost-effective. Its output is burned in huge thermal power plants that supply about a quarter of Germany's electricity. But above all, it is devastating to the landscape. The huge surface mines that can go down several hundred meters (1,000 feet and more) into the countryside around Cologne (ill. 2) and in Lower Lusatia, have led to the destruction of dozens of villages and small towns, and forced over 100,000 habitants to move, principally between 1950 and 1989. But village displacement is still taking place, particularly in the area around Cologne.

After operations have been completed, mining companies are required to do *Rekultivierung*, or reclaiming, i.e. restoring mining rubble and modeling a new landscape with forests, fields for agriculture, and lakes where the excavating took place. In the new Länder, where most of the mines were closed after reunification, the lignite basins have largely been restored, with dozens of large lakes used for leisure activities, like the ones south of Halle and Leipzig (ill. 3). The creation of these post-mining landscapes is aimed at maintaining public approval of mining, which is being challenged more and more often. There are two main reasons for that: the devastation wrought by the mining process itself, and the greenhouse-gas emissions produced by thermal power plants. That's why proposals to extend mining permits have run into stiff opposition from environmental activists, including temporary occupations, like at the Hambach mine near Cologne. Since 2019, the end of coal and lignite mining has been planned for 2038, in order to significantly reduce the country's greenhouse-gas emissions.

Post-Mining Landscapes in Areas with Metal Deposits

Lignite-mine landscapes will then be added to the already long list of post-mining landscapes that have increased exponentially since German reunification, when all of the metal mines in former East Germany were closed. Both the Ore Mountain tin mines and the Harz copper mines were closed at that time, either because they had been mined out or because they were not cost-effective. They left behind a wasteland dominated by huge slagheaps. But they also left the exceptional Ore Mountain industrial-heritage landscape that was inscribed as a UNESCO World Heritage Site in 2019. While those landscapes have changed relatively little since mining was ended there, it is an entirely different story for the former uranium mines in Saxony and Thuringia. Subjected to intensive mining from 1945 to the end of East Germany, landscapes that had deposits of uraninite or pitchblende (the most-common uranium-rich mineral) were disfigured. Oberschlema, a famous spa in the Ore Mountains, for example, was buried under hundreds of millions of cubic meters of rubble.

When those mines were closed, in 1991, the largest European mining-rehabilitation project ever was launched. It decontaminated those highly polluted regions and eliminated the dark Oberschlema slagheaps, turning them into grass and tree-covered hills: a bucolic setting for the newly rebuilt spa. The only traces left of the mining operations that used to dominate the landscape are confined to museums now.

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