

DFG Research Group "Thinking with Wetlands"

Research Project "Swamp Air: Analysing an Uncanny Atmosphere, 1700–1866"

Wetland smells vary depending on the season, on the type of vegetation, the presence (or absence) of stagnant water, and the surrounding environment. Additionally, peat fires can add a particular smoky scent to the landscape, today known mainly as an aroma that "refines" some kinds of whiskey. Over centuries, 'swamp air' has been central to the negative image of fens and bogs as uncanny, eerie, unhealthy, and even dangerous places. For centuries, folklore has described ephemeral fires occurring in these airs as will-o'-the-wisps, ghostly natural lights whose purpose was to cause nightly travelers to stray from their chosen paths and lure them into the dangerous parts of the swamp. Physicians in the eighteenth century warned that the air not only of swamps, but also of any stagnant water may cause pestilence.

A reassessment and conceptual reframing of swamp air—and with it, wetlands as such—occurred in the late eighteenth century. Experimenting with gases around Lake Maggiore in 1776, the Italian naturalist Alessandro Volta (1745–1827) demonstrated how the foul-smelling gases contained a new kind of air (Italian: aria infiammabile native delle paludi; French: air inflammable des marais; English: marsh gas, swamp air; German: natürlich entstehende entzündbare Sumpfluft, re-termed methane, CH₄, in 1866). Excitingly for scientists of the time, this air was flammable. The observations published by Volta and also later experimental studies, for example by the British scientist Joseph Priestley or the German physicist and writer Georg Christoph Lichtenberg, opened up a new field of research on combustible gases and methanogenesis taking shape in the late 18th and 19th centuries and continuing into the 20th century. Volta's experiments have thus far primarily been analyzed from a history of chemistry perspective. The isolation of a new chemical compound, methane, stands in the foreground. Between 1776 and 1866 there were two meanings of 'swamp air' existing side by side, the older one referring to the air above swamps filled with exhalations of the rotting matter of the swamp, and the more restricted designation of a newly discovered gas that had certain properties, among them, that it could be encountered and isolated in swamps or in swampy ponds.

Alexander von Humboldt found that the newly discovered swamp air was the agent that caused spectacular explosions and other health hazards in mine tunnels. He recommended the use of special lamps and breathing apparatus to save miner's lives or improve miners' health, as this bad air was not only found in and above swamps but was also present in many mines. Bad air in mines had been a topic in medicine since Paracelsus' pathbreaking work on mining diseases. In the language of miners, a distinction was made between suffocating fumes and explosive gases. Explosive gases were (and still are today) a major hazard for miners. Even sparks, which are a common occurrence in mining work, are enough to ignite these gases, if they are not already ignited by the ordinary lamps and torches that were

commonly used until the 19th century. Such explosive gases were observed particularly in coal mines, but they also occurred in salt mines. The formation of the gas was often audible as a scratching or hissing sound. These phenomena were discussed almost exclusively in publications on mining. It was Alexander von Humboldt who connected these two strands of discussion after he had been informed about the newly discovered types of air in Göttingen by Georg Christoph Lichtenberg, a friend of Volta's. The newly discovered gases, especially methane, served as the connecting link. This connection is not just a coincidence, but part of a more comprehensive reinterpretation. As there is a continuum that links turf to lignite and hard coal, it is hardly surprising that the gases occurring in swamps and in coal mines should be identical. The famous *sylva subterranea* proved to be a *palus subterranea*, a subterranean swamp that had been compressed and fossilized. On this background, the project will try to answer the following questions:

- (1) How did the discovery of inflammable swamp air (methane) change the interpretation of, and the practical relation to, the air of swamps and swamps in general? How did the discovery of a combustible gas specifically emitted from swamps transform the overall interpretation of swamp air and swamps? It would be legitimate to speak of a horizontal link established by the discovery of methane in fens, bogs, marshes, and swamps of all kinds. The discovery led to a conceptual reinterpretation of the health effects of swamps and swampy landscapes on humans and of certain strange meteorological phenomena like the will-o'-the-wisp (that Volta had already been interpreted as inflamed swamp air).
- (2) How did the discovery of methane establish a new vertical link between the world of the swamps, fens, and bogs on the surface of the earth and the underground world of coal and salt mines. In all these environments, methane occurred, and this indicated that the two worlds had more in common than was apparent at first sight. Fossilized coals now stood revealed as remnants of swamps rather than of forests.