

Underground coal mining in Central Europe in the mid. 19th century: a literary documentation by Zola's "Germinal"

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Germinal is considered to be one of the ten greatest novels in the French language and is a story of a miner's strike, taking place in a coal mining area in northern France in the mid. 1800's (Zola, 2004). The novelist, Emile Zola, lived himself for several months in this area, thus providing accurate descriptions of the miners' life. This literary work provides indeed important information on the history of coal mining in Central Europe during the 19th century. Zola, being a naturalist novelist, addresses in an explicable way all aspects of coal mining (legislation, labour types, health and safety issues, environmental problems, mining conditions, mineral processing etc.), which could be very useful for educational purposes. All the information mentioned above is emphasized in our study.

The contribution of coal utilization in the so-called industrial revolution is indisputable. The **industrialization** of a coal mining area is evenly described in the following parts, comprising sugar refineries, flour mills, blast furnaces, construction and cable works, glass factories and coke-ovens: *Over in Montsou the Fauvelle sugar refinery was still working; the Dutilleul flour mill and the factory at Bleuze that made cables for the mines were managing to keep going; the Sonnevill construction works had received only a third of its usual number of orders; of the three blast-furnaces the ironworks in Machiennes only two were lit; at the Gagebois glass factory there was a threat of a strike; only two batteries of coke-ovens still going; ...the blast furnaces and the coke-ovens. These last, batteries of a hundred slanting chimneys, stood all in a line like ramps of red flame; nineteen pits they have, with thirteen producing coal and six for drainage or ventilation. Ten thousand workers, concessions stretching over sixty-seven communes, a production level of five thousand tons a day, a railway linking all the pits, and workshops and factories.*

Founding and Management of coal mines resemble the modern ones as seen in Zola's descriptions: *concession-holders were to found the Anzin Mining Company; people were busy taking soil samples; companies were set up and concessions were materialized overnight; the new mines that he had to be abandoned after long months of toil, mine-shafts closed by rock-falls, miners drowned by sudden floods, hundreds of thousands of francs draining away down a few holes in the ground; problems of managing the business, the panicking shareholders, the tussles with the hereditary landowners of ancient estate; After establishing the company, the pits were beginning to yield meagre returns; almost ruined with the ferocity of the competition of other Companies; A settlement had been reached between the three concessions and they were amalgamated; a distribution of shares; the total capital value represented a sum of nearly three million francs; faced with the crisis, the Company had been forced to reduce its costs, naturally the workers were the ones to tighten their belts; the Company would gradually whittle their wages down; Coal had been piling up at the pit-heads for two months now, since all factories were idle; the Company didn't lay off its workers because it would be ruinous not to maintain its plants; a strike would bring its workforce to heel and leave it less well paid than before.*

Different types of colliers are illustrated in several parts of the book (Figure 1): *the hewers were wedged between the face and the ceiling and kept grazing their elbows as they extracted the coal; Each afternoon the shifters came and fetched the rubble left at the end of each tunnel by the hewers and then disposed of it in the cavities where the seam had already been mined; Simple pit-boy to start with, then putter once I was strong enough to push the tubs, and then hewer for eighteen years; Banksmen of each deck would drag the tubs out and replace them with others; The onsetters were busy wheeling the full tubs roughly across the cast-iron flooring; After that they put me on maintenance work, filling in seams, repairing the roads; they had to bring me up and give me surface job...they made me a driver; The engineman standing by the operating lever was listening out for the signal bells; a large white horse, pulling a train of coal tubs; Each full tub reached the surface marked with a special token so that the checkweighman could credit it to the appropriate team of miners; The haulage roadway had not yet been widened by the stonemen; a full tub could only just pass underneath, with the putters having to get down on their knees and push so as not to crack their skulls open; The tubs of coal came directly from the pit-head and were then emptied out by trippers on to the screens; To the right and left from these chutes, the women and girls who did the screening; a deputy shining his lamp in their faces; A stoker shovelling coal into one of the boilers that powered the drainage-pump; which the engineers had had no inkling of despite their extensive knowledge of the terrain. All these categories of mine workers are clearly elucidated by Bulman and Redmayne (1906).*

The **mine machinery** on the surface along with **coal processing** plant are also illustrated in the following novel fragments (Figure 2): *The screening-shed with its asphalt roof; the headgear over the pit-shaft; the huge engine house and the square tower containing the drainage pump; The winding-engine was setback some twenty-five metres from the shaft and housed at a higher level; working at full steam and producing every one of its four-hundred horse power; The engine would start up each time a cage departed and the spools-two enormous wheels measuring ten metres in diameter, around the hubs of which two steel cables wound unwound in opposite directions; did the screening equipped with a rake and shovel; the clean coal fell through funnels down into the railway wagons standing on the line beneath the shed.*

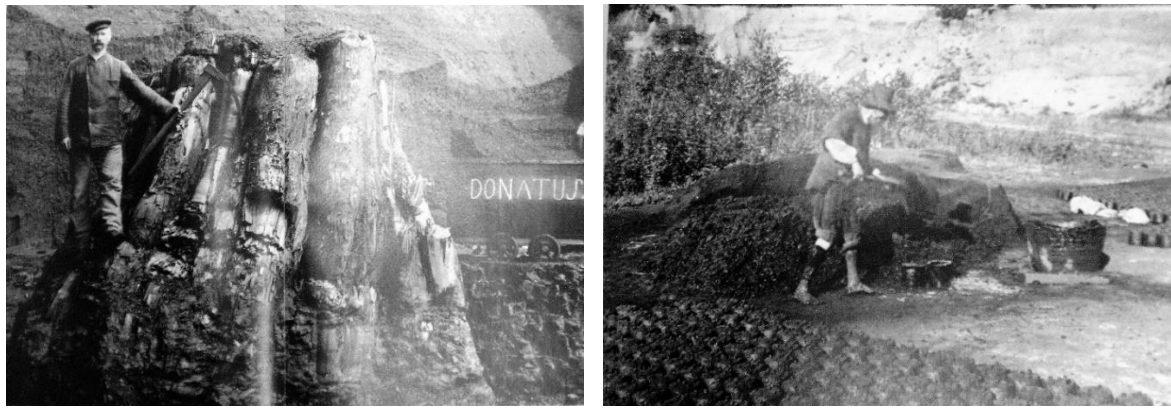


Figure 1. A collier standing next to a mega xylite trunk (left) and hand-made manufacturing of briquettes (right).

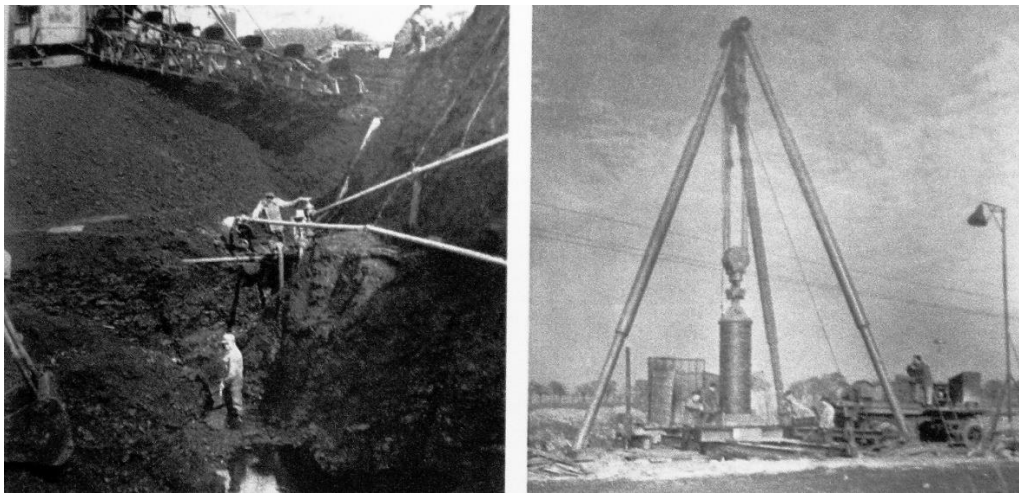


Figure 2. Coal mine with primitive excavators and drainage problems (left) and a drainage pump (right).

The **mining techniques** and the **working conditions** in the underground coal mine are described as follows: *Five hundred and fifty-four metres deep, but there are four loading-bays on the way down; The shaft itself is divided vertically into three sections by wooden planks. In the middle are the cages, on the left is the emergency shaft where there are ladders; the miners crossed pit-bottom, a cavity hewn out of the rock, which was reinforced with masonry vaults; oak props supported the roof and retained the crumbling rock behind a wooden framework; Ventilation doors open with a bang and then slowly closed again; the temperature reached thirty-five degrees; there was no circulation of air, and the suffocating atmosphere was potentially fatal; Each man hacked into the shale bedrock, digging it out with his pick; they had to drag themselves forward on their elbows and knees and were quite unable to turn round without banging their shoulders; the atmosphere became even more poisonous from the asphyxiating firedamp.*

Health problems and accidents of the miners and their families connected to coal exploitation are often emphasized by Zola: *The old man spat black phlegm; It's the water that's got under my skin, what with getting soaked all the time down at the coal-face; with his frail limbs and huge joints, swollen from scrofula; soaked to the skin and shivering, their lungs a prey to the pneumonia; the anaemia that was gradually eating away at them; They've dragged me out of there three times now, barely in one piece. Once with my hair all signed, once full to the gills with earth, and once with my belly full of water, all swollen like a frog's; a rock-fall it was, completely flattened him, swallowed him whole, bones, flesh, blood, the lot. Two of his uncles and then, later on, his own three brothers had all lost their lives down there.*

Environmental pollution caused by coal exploitation is depicted in quite a few parts of *Germinal*: *The spoil-heap was already covered in grass, while at the other end it was being eaten away by an internal fire, which had been smouldering for a year now and gave off a thick pall of smoke; beneath a dun-coloured sky; the road were coated in mud, the thick, glutinous mud of coal-mining regions that looks as black as liquid soot; factory buildings with tall chimneys that belched out soot and filthied what remained of the countryside.*

Overall, it is evident that substantial information is inherited from this literary work, Zola's *Germinal*, regarding coal mining in the mid. 19th century in Central Europe. The latter is not only important for comprehending the history of coal mining, but may be useful for teaching mining subjects in educational institutes.

References

- Bulman, H.F., Redmayne, R.A.S., 1906. *Colliery Working and Management*, 2nd Ed. London (first published in 1896).
 Zola, E., 2004. *Germinal*, Penguin Books Ltd (first published in 1885).