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Bastien Cabot

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“Labourocene”, or Making Sense of Labour in a Planetary Age. *The Case of Mining in Contemporary France.*

Introduction: Two different stories.

The photograph below was taken in Salsigne, in the south of France, in January 2024. What we see are the remains of an open-pit gold mine that was active from 1982 to 2004, although mining in the region dates back to the late 19th century¹. The site is supposedly closed to the public: Salsigne is one of the most contaminated places in France and Europe, and restricted access is not only for safety but also for health reasons. The site is therefore shrouded in mystery, and above all in taboo — although walkers and curious visitors are often seen taking advantage of a carefully cut passage in the fence surrounding it.



The open-pit mine in Salsigne, Aude (France) © Bastien Cabot, January 2024.

With the famous Rorschach tests used by some psychologists in mind, the question I ask myself when I see this image is: “What does this photograph symbolize?” For me, it symbolizes two different stories. On the one hand, the story of human action on the environment: a negative story of alteration or destruction. On the other hand, a story of work in the industrial era: a story of wealth extracted from nature; a story of effort, hardship, and suffering at work; but also a story of the power relations between employers and employees, and thus the mythical history of the labor movement, of the emancipation of the working class. On the one hand, the Anthropocene, the domination of nature by humans and the *damages* caused by Modernity; on the other, the *promises* of Modernity in terms of economic and social improvement, extraction

¹ Hervé Pujol (ed.), *Tristes mines. Impacts environnementaux et sanitaires de l'industrie extractive*, Montpellier, Les Études Hospitalières, 2014; Annie Thébaud-Mony, "Travail minier et maladies professionnelles : lutter contre l'effacement des traces", in Annie Thébaud-Mony (ed.), *La science asservie. Santé publique : les collusions mortifères entre industriels et chercheurs*, Paris, La Découverte, 2014; *Id.*, "Science asservie et invisibilité des cancers professionnels : études de cas dans le secteur minier en France," *Relations industrielles / Industrial Relations*, 72 (1), 2017; Fleur Laronze, "Les mines d'or de Salsigne. Mise en lumière d'une catastrophe professionnelle silencieuse," *Revue du Rhin Supérieur*, 1, 2019.

of wealth, and the quest for social emancipation. On the surface, these are two incompatible stories, not only because they are situated at different levels of interpretation, but also because they embody opposing interests—the preservation of nature on the one hand, and the defense of employment on the other. And yet, these are two inseparable stories.

An already significant literature is trying to make sense of this intertwining². My goal here is not to trace its development, although I will recall in the various sections of this article what I consider the main contributions of this subfield of research. Rather, I aim to enrich and complement it by proposing a new and potentially unifying concept: “Labourocene³.” This concept superimposes the concepts of Labour on the one hand, and Anthropocene on the other hand, i.e. the ever-growing human footprint on the global environment and the very conditions of life on Earth since the beginning of industrialization⁴. My aim is to show that the emergence of the Anthropocene as a category of thought for the humanities and social sciences invites us to rethink the historical significance of labour, taking into account its “material” determinants in the strong sense of the term, i.e., its terrestrial determinants.

This concept is in line with the neologisms coined by Christophe Bonneuil and Jean-Baptiste Fressoz in *The Shock of the Anthropocene*, or those forged by Jason W. Moore, Anna Tsing, and Donna Haraway, such as “Capitalocene,” “Plantationocene,” or “Chthulucene⁵.” However, unlike the Capitalocene, for example, the “Labourocene” does not seek to identify the origins of environmental disruption and, on that basis, assign differentiated historical responsibilities. The question here is not whether workers are to blame for the environmental consequences of their activity, or whether they should be held responsible for climate change. Rather, what interests me here is to understand the meaning of “the environment” for workers,

² Gunther Peck, “Fault Lines and Common Ground in Environmental and Labor History,” *Environmental History*, vol. 1, no. 2, pp. 212-238; Chad Montrie, *Making a Living. Work and Environment in the United States*, Chapel Hill, University of North Carolina Press, 2008; Kate Brown, Thomas Klubock (eds.), “Environment and Labor,” special issue *International Labor and Working-Class History*, vol. 85, 2014; Stefania Barca, “Laboring the Earth: Transnational Reflections on the Environmental History of Work,” *Environmental History*, vol. 19, no. 1, 2014, pp. 3-27; Thomas G. Andrews, “Work, Nature, and History: A Single Question, that Once Moved Like Light,” in Andrew C. Isenberg (ed.), *The Oxford Handbook of Environmental History*, Oxford, Oxford University Press, 2014, pp. 425-466; Nora Räthzel, Dimitris Stevis, David Uzzell (eds.), *The Palgrave Handbook of Environmental Labor Studies*, London, Palgrave Macmillan, 2021; Renaud Bécot, “L’histoire environnementale au travail. Repères pour une histoire environnementale des mondes du travail,” in Stéphane Frioux and Renaud Bécot (eds.), *Écrire l’histoire environnementale au XXI^e siècle. Sources, méthodes, pratiques*: Rennes, Presses Universitaires de Rennes, 2022, pp. 27-44; Stefania Barca, *Workers of the Earth. Labor, Ecology, and Reproduction in the Age of Climate Change*, London, Verso Books, 2024.

³ This word was first coined by Mark Hudson in “Working for Health in the Anthropocene: The Environmental Imagination in the Establishment of Occupational Therapy, 1890-1920,” *Histories*, vol. 4, no. 3, 2024, pp. 394-404.

⁴ Paul J. Crutzen, Eugene F. Stoermer, “The ‘Anthropocene’,” *IGBP Newsletter*, no. 41, 2000, pp. 17-18; Susanne Benner et al. (eds.), *Paul J. Crutzen and the Anthropocene: A New Epoch in Earth’s History*, Springer, location, 2021. There is debate about when the Anthropocene begins: was it in 1750, roughly corresponding to the invention of the steam engine, or in 1945, with the start of the “Great Acceleration”? See: John R. McNeill, Peter Engelke, *The Great Acceleration. An Environmental History of the Anthropocene since 1945*, Cambridge (Mass.), Harvard University Press, 2016.

⁵ See: Christophe Bonneuil, Jean-Baptiste Fressoz, *The Shock of the Anthropocene. The Earth, History and Us*, London, Verso, 2016; Jason W. Moore (ed.), *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*, Oakland, PM Press, 2016; Donna Haraway, “Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin,” *Environmental Humanities*, vol. 6, 2015, pp. 159-165; “Reflections on the Plantationocene. A conversation with Donna Haraway and Anna Tsing, moderated by Gregg Mitman,” *Edge Effects Magazine*, June 18, 2020. Online.

both as a social group and in terms of manual labor itself⁶. In other words, I am less in the position of a judge who uses the past to assess the present, but rather that of an ethnologist who, in the same way he would seek to reconstruct the ontology of the Achuar people of the Amazon or understand the cargo cult of the Melanesians, would seek to understand the place that “nature” occupies in the value system of contemporary workers⁷.

But what kind of work and what kind of workers are we talking about? The supposedly universal concept of “work” covers extremely diverse social and historical situations⁸. This is all the more true today, when 45% of human activity consists of reproductive work, and nearly 47% of work is performed outside the wage-earning system⁹. Here, however, I choose to focus on a very specific category of work and workers that are somehow closer to what we understand as “labour”: workers in 19th and 20th centuries French extractive industry. This is a paradoxical category, since it represents a minority of the global workforce, but has nonetheless been elevated—in France as elsewhere—to the embodiment of the working class as a whole, because of the harshness of their occupation and the struggles they led¹⁰. Hence, focusing on French miners allows me to reexamine, in the light of environmental history, both their actual work and the political discourse and myths constructed around Western industrial workers.

To do so, I proceed in three stages. First, I return to the way in which the emergence of the Anthropocene reconfigures the historical meaning of work. Using the example of extraction, I show how the domination of natural elements appears to be the material foundation of the social and political value of work. This redefinition then leads me to question the meaning that workers themselves attributed to the environment. I highlight the difficulty of expressing and recognizing the value of the environmental damage caused by work, since this runs counter to the economic, cultural, and moral attachments that bind workers to industry. Finally, in the last section, I temper the idea of a mismatch between the value of work and that of the environment. Drawing on the work of Joan Martínez Alier and Stefania Barca, I show that work involves a certain ecology (i.e., a certain understanding of human-environment relations), and that this opens up bridges to environmentalism.

1. The nature of work

⁶ There is a huge literature on the definition of “the environment”. In this paper, I acknowledge the plasticity of this concept to see how it is defined in various ways accordingly to the historical context and social status of workers. See for example: Sverker Sörlin, Paul Warde (eds.), *Nature's End. History and the Environment*, London, Palgrave Macmillan, 2009; Paul Warde, Libby Robin, Sverker Sörlin, *The Environment. A History of the Idea*, Baltimore, John Hopkins University Press, 2018; Etienne S. Benson, *Surroundings. A History of Environment and Environmentalisms*, Chicago, The University of Chicago Press, 2020.

⁷ Philippe Descola, *Beyond Nature and Culture*, Chicago, The University of Chicago Press, 2013. The reference to cargo cult is a pastiche of the first pages of Edward P. Thompson's famous article, “The Moral Economy of the English Crowd in the Eighteenth Century,” *Past & Present*, no. 50, 1971, pp. 76-136.

⁸ Marcel van der Linden, *Workers of the World. Essays Towards a Global Labor History*, Leiden/Boston, Brill, 2008; *Id.* (ed.), *The Global History of Work: Critical Readings*, Bloomsbury Academic, 4 vols., 2019; *Id.*, *The World Wide Web of Work. A history in the making*, London, UCL Press, 2023; Kareen Hofmeester, Marcel van der Linden (eds.), *Handbook Global History of Work*, De Gruyter, 2017; Christian De Vito, Anne Gerritsen (eds.), *Micro-Spatial Histories of Global Labor*, London, Palgrave MacMillan, 2018.

⁹ Stefania Barca, *Workers of the Earth*, p. 19; “Wage and salaried workers, total (% of total employment, modeled ILO estimate)”, World Bank Group. Online : <https://data.worldbank.org/indicator/SL.EMP.WORK.ZS>

¹⁰ See for example: Marion Fontaine, “Mineurs, classe, contre-société : quels nouveaux questionnements ?” in: Xavier Vigna, Michel Pigenet, Nicolas Hatzfeld (eds.), *Travail, travailleurs et ouvriers d'Europe au XX^e siècle*, Dijon, Éditions Universitaires de Dijon, 2016, pp. 285-296.

What are the foundations of work? According to Karl Marx's definition, work is first and foremost “a process between man and nature¹¹.” However, what distinguishes human from animal work is its conscious and, even more so, social nature. The historical forms of work are the result of relationships between social groups – namely, bourgeoisie and the proletariat. In this way, the definition of work escapes its relationship with “nature” and belongs exclusively to the domain of “culture.” Thus, the historical definition of the working class, both in Marx and his successors, is closely dependent on the economic, social, cultural, and political factors that condition it, and not at all on its environmental determinants¹². However, with the emergence of the Anthropocene, the highlighting of human agency on the planet sheds new light on the history of work and industrialization. In particular, it invites us to reconsider the foundations on which industrial labor was built as a social and political reality, in order to take into account its terrestrial determinants. This is what I will do here, using the example of the coal mining sector in France in the 19th and 20th centuries.

1. Stirring up earth and sky

The Anthropocene is defined as humanity becoming a geological force. In concrete terms, this means that humanity has become capable of altering the fundamental cycles of the Earth system (carbon, nitrogen, and of course the climate) on such a scale that its footprint would be visible in the stratigraphy of the Earth's crust¹³. In this respect, extractive activity is one of the main manifestations of human geological agency. As American historian John R. McNeill showed in his book *Something New Under the Sun*, in the 20th century “humankind came to rival {natural} forces as a geological agent,” mainly through mining activities as diverse as the extraction of coal, gravel, sand, gold, and nickel¹⁴. To illustrate this, he gives the following orders of magnitude: in the 1990s, the average annual movement of rock and earth produced by humanity reached 42 billion tons, while that of oceanic volcanoes was around 30 billion tons and that of glaciers 4.3 billion tons¹⁵.

Coal mining played a major role in humanity's assimilation as a geological force. During the 19th and 20th centuries, global production of this mineral rose from 10 million tons in 1800 to 5 billion in 1995, and demand reached 8.85 billion tons in 2025¹⁶. In France, in the Nord-Pas-de-Calais mining basin alone, 2.3 billion tons of coal were extracted between the start of mining in the 1720s and the closure of the last mine on December 21, 1990¹⁷. In the Lorraine

¹¹ Karl Marx, *Capital Volume 1*, London, Penguin Books, 1976, p. 283.

¹² See, for example: Edward P. Thompson, *The Making of the English Working Class*, London, Victor Gollancz Ltd, 1963.

¹³ The relevance of the concept is disputed by specialists. In March 2024, the Quaternary Stratigraphy Sub-commission of the International Commission on Stratigraphy ruled against recognizing the Anthropocene as a new geological epoch. See: “Joint statement by the IUGS and ICS on the vote by the ICS Sub-commission on Quaternary Stratigraphy,” International Commission on Stratigraphy. Online: <https://stratigraphy.org/news/152>. See also: Håvard Kilhavn, Julie Shipp, Anastasia Bertheussen, “Comment to the ICS Anthropocene decision: From stratigraphy to storytelling,” *Quaternary Environments and Humans*, vol. 2, no. 6, 2024. Online: <https://doi.org/10.1016/j.qeh.2024.100036>

¹⁴ John R. McNeill, *Something New Under the Sun: A History of the Global Environment in the Twentieth Century*, New York, W. W. Norton & Co., 2000, pp. 30-31.

¹⁵ *Ibid.*

¹⁶ *Ibid.*, p. 79; “Coal 2025,” International Energy Agency. Online: <https://www.iea.org/reports/coal-2025/demand>

¹⁷ Francis Meilliez, “Un exemple fructueux de développement non durable : le bassin minier du Nord-Pas-de-Calais,” *Annales des Mines. Responsabilité et environnement*, n°12, 1998, p. 53-60, here p. 56.

iron ore basin, this figure rises up to 3.1 billion tons extracted in an even shorter period of time, between 1818 and 2004¹⁸. Finally, to these already colossal figures must be added the millions of cubic meters of earth moved during drilling, shaft sinking and tunnel excavation operations, as well as the millions of cubic meters of water pumped out to enable underground work without the risk of flooding.

2. The technical foundations of human geological activity

It is undeniable that such orders of magnitude have been achieved through the intensification of labor and productivity, processes specific to industrial capitalism. Indeed, while humans have been digging underground for a very long time to extract rock and metals¹⁹, the Modern era marks a quantitative threshold in terms of the volumes extracted, the capital invested, the labor mobilized, and the duration and intensity of the work—that is, the amount of labor invested²⁰. In France, for example, 700,000 tons of coal were extracted around 1810 by tens of thousands of workers spread across the country; a century later, 200,000 workers were producing 40 million tons.

But the concentration of labor in industrial and mining areas—these “black countries” that are among the many the landscapes of the Anthropocene²¹—does not explain everything : increased productivity also plays a major role. Between 1860 and 1900, the amount of coal extracted annually rose from 140.2 tons to 206.1 tons on average per worker²². This growth was supported by the widespread use of steam engines, the streamlining of underground work organization (achieved by the increasing recruitment of civil engineers to manage operations), the extension of working hours (made possible in particular by the relentless fight against seasonal work) and its corollary, the establishment of a workforce close to the extraction sites²³. Later, in the first half of the 20th century, the reduction working day duration (from 9 hours 15 minutes in 1913 to 7 hours 45 minutes in 1929) was largely offset by the introduction of mechanization (pneumatic jackhammers) and the rationalization of work underground (coal cutting in rows, under the supervision of a timekeeper, replacing autonomous team work). As a result, the average daily output per underground worker rose from 978 to 1,229 kilograms between 1913 and 1938²⁴.

¹⁸ “Synthèse des études et travaux menés dans le contexte du bassin ferrifère lorrain”, rapport d’études INERIS, 25 août 2006. Online: <https://www.ineris.fr/sites/default/files/contribution/Documents/75685R01.pdf>

¹⁹ Silver, lead, and copper mines of Laurion in Greece, or the lead mines of Sardinia have been exploited since prehistoric times. See: L. Pinarelli, "Lead Isotope Characterization of Copper Ingots from Sardinia (Italy): Inferences on their Origins," *Bulletin of the Geological Society of Greece*, vol. 36, no. 3, 2004, pp. 1173-1180; M. Georgakopoulou, *Technology and Organization of Early Cycladic Metallurgy: Copper on Seriphos and Keros, Greece*, Ph.D. dissertation, University of London, 2005.

²⁰ Ad Knotter, “Mining,” in: Kareen Hofmeester, Marcel van der Linden (eds.), *Handbook The Global History of Work*, Berlin/Boston, De Gruyter, 2018, pp. 237-258.

²¹ Peter Goin, Elizabeth Raymond, "Living in Anthracite," *The Public Historian*, 2001; Sara B. Pritchard, "Mining Land and Labor," *Environmental History*, vol. 10, no. 4, 2005, pp. 731-733.

²² Jean-Louis Escudier, « L’Industrie française du charbon. Annuaire statistique 1814-1988 », Montpellier, *Les Cahiers de l’économie méridionale*, n°16, 1994.

²³ See, for example: Roland Treppe, *Les mineurs de Carmaux, 1848-1914*, Paris, Les Éditions Sociales, 1971.

²⁴ « L’industrie minière français en 1968. Houillères. Renseignements généraux », *Annales des Mines*, juillet-août 1969, p. 91. Cité in : Michel-Pierre Chélini, « Le charbon français de 1914 à 1946, une modernisation limitée », in : Alain Beltran *et alii* (eds.), *État et énergie XIX^e-XX^e siècle*, Vincennes, IGPDE / CHEFF, 2009, p. 109-127.

3. Mines and politics

The concentration of capital and labor explains the scale of geological power achieved by humanity in the modern era. But it also has social consequences that are difficult to separate from these environmental processes. Indeed, groups of tens and hundreds of thousands of workers gradually formed around the extraction pits, developing their own specific identities and aspirations. In the Nord-Pas-de-Calais basin, there were 222,000 mine workers in 1947, at the peak of production²⁵. In South Africa, in the Witwatersrand, 500,000 people came to work in the mines between 1880 and 1985²⁶. These groups were united by a shared professional identity: the extractive industry dominated entire regions, and the profession of miner, or more precisely that of coal cutter, was the pivot around which the social status of the rest of the group was distributed. In coal mines, for example, after the coal cutter came the picker, the timberman, the young assistants in charge of transport (*galibots*), the day laborers, and finally the miners' wives²⁷. Moreover, once the important migratory phases that mark the opening of the mines were over, communities tended to stabilize, encouraging social reproduction and endogamy²⁸.

The unity of the group was shaped by these demographic processes, but also, to a large extent, by mining companies. Companies built entire new towns for their workforce: they provided housing, but also healthcare (hospitals, relief funds, infant care services) and consumer goods (cooperatives), and finally oversaw religious worship (churches) and leisure activities (sports clubs). But in the long run, this unification backfired on those who had encouraged it. The working-class community became aware of its own existence and challenged the all-powerful control that employers exercised over all aspects of life. A fundamentally democratic aspiration swept through mining communities from the 1830s onwards, and this was reinforced with the emergence and affirmation of trade unionism in the 1880s. Mining areas thus became “workers' strongholds” that defended their interests at all levels of political life – municipal, parliamentary, and international. Miners achieved major social advances before any other sector, thanks to their struggles, such as the democratic management of relief funds, the reduction of working hours and, more generally, modern social protection mechanisms²⁹. This is how, from the end of the 19th century, the myth of miners as the “vanguard of the working class³⁰” was created. Later, during the 20th century, this myth was

²⁵ <https://www.bassinminier-patrimoine mondial.org/en/wp-content/uploads/2015/03/Brochure-Bassin-minier-Patrimoine-mondial-français-anglais.pdf>

²⁶ Dunbar Moddie, Vivienne Ndatsche, *Going for Gold. Men, Mines and Migrations*, Berkeley, University of California Press, 1994, p. 1.

²⁷ Excluded from underground work after the laws of 1892, women were partially employed in sorting coal in the day workshops, but more often than not remained confined to the home. On the socio-professional hierarchy in Western coal mining communities, see: Joël Michel, *Le mouvement ouvrier des mineurs en Europe occidentale (Grande-Bretagne, Belgique, France, Allemagne). Étude comparée des années 1880 à 1914*, Ph.D. dissertation, Université Lyon 2, 1987, 7 vols.

²⁸ Philippe Ariès, "Au pays noir. La population minière du Pas-de-Calais", in *Histoire des populations françaises et de leurs attitudes devant la vie depuis le XVIII^e siècle*, Paris, Le Seuil, 1971 {1948}, pp. 69-118.

²⁹ Jean-Louis Escudier, « De la mutualité à la solidarité nationale : la protection sociale et sanitaire des salariés des mines (1773-2006) », in Robert Fonteneau (dir.), *La protection sociale minière du XVIII^e siècle à nos jours*, numéro spécial *Cahiers d'histoire de la Sécurité sociale*, n°5, 2009, p. 21-2000.

³⁰ Évelyne Desbois, Yves Jeanneau, Bruno Mattéi, *La foi des charbonniers. Les mineurs dans la Bataille du charbon 1945-1947*, Paris, Éditions de la FMSH, 1986; Bruno Mattéi, *Rebelle, rebelle ! Révoltes et mythes du mineur 1830-1946*, Seyssel, Champ vallon, 1987.

taken to its peak by the French Communist Party³¹, and in particular by its secretary general, Maurice Thorez, himself the son of a miner. During the “battle for production” of 1945-1947, the reconstruction of post-war France and the regeneration of the working class were placed directly in the hands of miners by Communists. An unprecedented and superhuman productive effort was expected of the miners, which served a broader political interest³². In other words, the work of the miners was *eminently political*, as they came to embody the working class as a whole.

4. The earthly foundations of work

What is described here about the French case can be said of other countries. As Ad Knottter notes, in Great Britain, the *Labour Party* began its parliamentary work at the beginning of the 20th century by relying on the mining regions; in Nigeria and Zambia, miners were at the forefront of national liberation movements; in Spain, miners in Asturias led the 1930 uprising and opposed fascism head-on until the 1970s³³. Everywhere we look, miners occupy a special place in the political history of their respective countries.

The central role played by miners' struggles in political history has led some scholars to think that there was a causal relation between the nature of the mineral extracted—coal, a heavy fuel necessary for industrialization and defense—and the ability to obtain social and political rights. This was the hypothesis put forward by American historian Timothy Mitchell in the first chapter of his book *Carbon Democracy*³⁴. Although Mitchell's thesis is debatable for a number of reasons, it nevertheless highlighted the very close link between the transformation of the environment through labor—the millions of tons of coal extracted from the ground, transported and consumed—and the social significance of this labor—belonging to the community, pride, the emancipatory horizon of union or partisan activism, and the achievement of political reforms. On this point, Marx could not have said it better when he wrote in *Capital* that through labour, the worker “acts upon external nature and changes it, and in this way he simultaneously changes his own nature³⁵.” Indeed, for entire generations of workers, the domination of nature has been the condition of their social existence and political emancipation.

2. The environmental consequences of work

That being said, dominating nature and exploiting and consuming its resources has consequences for the very habitability of the Earth. We experience those effects every day. For example, the consumption of fossil fuels such as coal increases the level of carbon dioxide in the atmosphere, which increases the greenhouse effect and causes global warming—the very climate that has conditioned the development of human civilizations on Earth for 11,700 years—making it difficult to truly appreciate the long-term consequences of this alteration (although they appear potentially catastrophic). Similarly, the ever-increasing consumption of synthetic fertilizers profoundly alters the nitrogen and phosphorus cycles, whose stabilization

³¹ Marc Lazar, « Le mineur de fond : un exemple de l'identité du PCF », *Revue française de science politique*, n°35, vol. 2, 1985, p. 190-205.

³² Evelyne Desbois, Yves Jeanneau, Bruno Mattéi, *La foi des charbonniers*, *op. cit.*

³³ Ad Knottter, "Mining," *op. cit.*, pp. 255-256.

³⁴ Timothy Mitchell, "Machines of Democracy," in *Carbon Democracy: Political Power in the Age of Oil*, London, Verso Books, 2011, pp. 12-42.

³⁵ Karl Marx, *Capital Volume 1*, p. 283.

is just as essential to animal and plant life as the carbon cycle. In themselves, these transformations have no moral significance: it is humans who construct them as true or false, normal or unprecedented, acceptable or catastrophic events. The question I am asking here is therefore: what meaning (or value) do workers attribute to the environmental consequences of their own activity?

1. Environmental values

The history of environmentalism and political ecology shows how, since at least the 18th century, a value system has gradually been constructed that associates localized damage to the environment (or global alterations) with a negative representation that must be corrected in order to maintain the habitability of the world³⁶. These values were constructed mainly by scientists, administrators concerned with the sustainability of European and colonial forestry operations, literary elites, and even interest groups from the urban middle and upper classes. The working classes also contributed to this process, even though the value they attributed to “nature” did not result from an abstract or romanticized conception of the non-human world, but rather from a relationship of dependence on the natural elements from which they derived their livelihood, and to which they sometimes attributed moral or religious dimensions, thus making damage to *their* environment all the more unbearable³⁷.

On the other hand, in the case of workers (and more particularly industrial workers), it is difficult to find similar values. Admittedly, European industrial workers in the 19th and 20th centuries shared with other social groups a recreational and contemplative use of so-called “natural” spaces such as the countryside and forests. They attributed them soothing moral virtues, sometimes even social and political regeneration goals, in the context of the brutal urbanization that struck Europe between 1850 and 1960³⁸. But when it came to what other social groups consider to be intolerable damage to the living environment caused by industry (air pollution, soil and water contamination), workers would not be heard as loud. They simply appeared silent, or did not appear at all in the archives of industrial contamination.

2. Reasons for workers’ silence

As Geneviève Massard-Guilbaud pointed out in her pioneering work on the history of industrial pollution in nineteenth-century France, in the many cases where pollution was contested by local residents (often rural) who highlighted the threat it posed to their livelihoods, workers preferred to side with their employers in order to defend their livelihoods³⁹. Central to

³⁶ Ramachandra Guha, *Environmentalism: A Global History*, New York, Longman, 2000.

³⁷ See: Ramachandra Guha, Joan Martinez Alier, *Varieties of Environmentalism. Essays North and South*, London, Routledge, 1997; Karl Jacoby, "Class and environmental history: Lessons from the War in the Adirondacks," *Environmental History*, vol. 2, no. 3, 1997, pp. 324-342. On the global history of pollution, see: François Jarrige, Thomas Le Roux, *The Contamination of the Earth: A History of Pollutions in the Industrial Age*, Cambridge (Mass.), MIT Press, 2021.

³⁸ Peter C. Gould, *Early Green Politics: Back to Nature, Back to the Land, and Socialism, 1880-1900*, Denver, Prentice Hall / Harvester Wheastheaf, 1988; Jamie L. Bronstein *The Happiness of the British Working Class*, Stanford, Stanford University Press, 2023; Claire Milon, *Le sens de la marche: la randonnée, institutionnalisation d'un loisir de plein air et d'une pratique sociale dans l'Allemagne du Kaiserreich (années 1870-1914)*, Ph.D. dissertation, University of Strasbourg, 2025.

³⁹ Geneviève Massard-Guilbaud, *Histoire de la pollution industrielle. France, 1789-1914*, Paris, Éditions de l'EHESS, 2010, p. 69, pp. 93-96.

this attitude was what Geneviève Massard-Guilbaud called the “culture of the smoking chimney,” i.e., seeing industry as a symbol of prosperity, but without seeing (or refusing to see) the “unbreathable and destructive fumes and vapors” that escaped from these chimneys⁴⁰. For example, recalling his youth in the industrial district of the Ruhr in Germany, writer Hans Klose (future commissioner for nature conservation in the province of Brandenburg between 1922 and 1945) wrote:

“It never crossed our minds that nature might eventually disappear altogether. We were completely fascinated by the magnitude of industry and the ingenuity and gigantic force of human efforts, and we enjoyed the building of factories, streets, and houses as much as nature's activities in the countryside. With some justification, we were proud of the American-style growth in our hometown and the surrounding area, and we felt we belonged to a purposeful, single-minded community, hardworking and thirsty for action. If poisonous smoke from a coke plant ruined a nearby wood, we accepted this as inevitable; hardly anyone ever complained⁴¹.”

For Klose, the gigantic achievements of the industrial era—factories, chimneys, slag heaps, headframes—embodied the collective power of labor in the eyes of the workers. Industry could not be questioned because it was the concrete representation of the economic, technical, and moral progress to which the workers of the Ruhr aspired. On the other hand, this relationship with industry led to an almost “fatalistic” blindness to its harmful effects. Toxicity had no value: it was a *normal* consequence of production. However, this situation was paradoxical, to say the least. Indeed, the environmental consequences of industrial production have been known, documented, and denounced since the beginning of industrialization, and industrial workers (who often lived close to their workplace) could not ignore them because they suffered the effects probably more than any other social group. Yet it is as if there has been a deliberate ignorance on this subject, a refusal to speak out and to want to know. How can this be explained? In fact, in addition to the factors I highlighted earlier (the satisfaction of material and political interests, the culture of the smoking chimney), it is important to add the set of accommodation measures put in place by companies to make industry acceptable in the long term, of which the mining industry is a good example.

3. The logic of accommodation to industry

Mining is responsible for a whole range of ecological consequences, including land subsidence. This phenomenon generally refers to all surface ground movements caused by underground mineral extraction. These can sometimes reach catastrophic proportions, as in the Datong mining basin in Shanxi Province, China, where 800,000 residents of mining towns had

⁴⁰ Geneviève Massard-Guilbaud, *Histoire de la pollution industrielle*, pp. 8-9: “Although workers suffered more than other social groups from pollution (...) historians of the working world did not mention pollution any more than those of industry. For more than a century, the instrument used to remove unbreathable and destructive fumes and vapors was considered by all to be a symbol of prosperity.” (p. 9).

⁴¹ Hans Klose, *Das westfälische Industriegebiet und die Erhaltung der Natur*, Berlin, 1919, pp. 3-11. Quoted in: Franz-Josef Brüggemeier, “A Nature Fit for Industry: The Environmental History of the Ruhr Basin, 1840-1990,” *Environmental History Review*, vol. 18, no. 1, 1994, pp. 35-54, here p. 45.

to be evacuated and relocated due to the risk of the city collapsing⁴². In France, mining subsidence has been known, documented, and denounced since the early days of the extractive industry⁴³. To obtain compensation for the damage caused, surface owners either turned to the civil courts to obtain financial compensation or to the mining authorities to impose safety perimeters. The first case was the most common: based on Article 1382 of the Civil Code, plaintiffs could obtain from mining companies a sum corresponding to the decrease in value of their land. This was part of a process of “commodification” or “monetization” of environmental damage, which has been highlighted, for example, by William S. Prudham, and Jean-Baptiste Fressoz in the case of the Provençal soda plants⁴⁴.

Companies were well prepared for this eventuality: as shown by the archives of the accounting department of the Bruay mining company in 1900, the company withheld 1.25 francs from each ton of coal extracted to feed a "subsidence" account used to compensate claimants⁴⁵. Furthermore, in order to avoid civil litigation and possible appeals, companies often resorted to out-of-court settlements: payments were made directly to plaintiffs. Companies sometimes even exchanged land of similar value: these exchanges may occurred after the fact, but they may also be preventive. In this case, mining companies protected themselves from any future litigation by imposing a “clause” on the beneficiaries of this system that explicitly stated that they would never owe the beneficiaries, “their heirs or their successors, any guarantee or compensation whatsoever for damage that the company's underground works and neighboring factories and facilities may cause in any way whatsoever to the land it has transferred (or sold) in exchange, and to any buildings they may subsequently erect thereon⁴⁶.” Finally, mining companies proceeded with the preventive purchase of land that they anticipated will be affected by subsidence, in order to protect themselves from any future litigation. Overall, the proliferation of such procedures led to a gradual decline and then a total disappearance of complaints by the beginning of the 20th century in the Pas-de-Calais basin. Companies thus succeeded in shaping an “environmental peace” that was set to last as long as they remained active.

4. Weaknesses of the "territorial compromise"

This type of relationship between companies and their environments is what I propose to call a “territorial compromise.” As we can see, it relies largely on the ability of companies to make the industry acceptable through a whole range of economic and sometimes technical measures (repairing land, dykes, canals, etc.). But it also relies on the ability of companies to

⁴² On this point, see the ongoing work of Judith Audin.

⁴³ On the history of mine subsidence, see: Kevin Troch, *Ne pas grever l'avenir au bénéfice du présent. Une histoire environnementale de l'extraction du charbon de la fin du 18e siècle à l'Entre-deux-guerres : un développement non-soutenable. L'exemple du Couchant de Mons et du Valenciennois*, Ph.D. dissertation, University of Namur, 2018; Brian J. Leech, "Butte Undermined: Complaint Files, Community Activism, and the Slow Violence of Mine Subsidence in Butte, Montana, 1940-1990," *Montana: The Magazine of Western History*, vol. 72, no. 2, 2022, pp. 21-27.

⁴⁴ William S. Prudham, "Commodification," in Noel Castree *et al.* (eds.), *A Companion to Environmental Geography*, Oxford, Wiley-Blackwell, 2009, pp. 123-142; Jean-Baptiste Fressoz, « Payer pour polluer. L'industrie chimique et la compensation des dommages environnementaux, 1800-1850 », *Histoire & mesure*, vol. XXVIII, n°1, 2013, p. 145-186.

⁴⁵ Bastien Cabot, « Un compromis territorial. Fabriquer l'acceptation de la mine et de ses dégâts dans la France du XIX^e siècle », *Entreprises & histoire*, n°120, 2025, pp. 98-112, here p. 107.

⁴⁶ *Ibid.*, p. 109.

bring life and infrastructure to the region. Thus, in the case of the Pas-de-Calais mining basin, this “territorial compromise” was made very noticeable by the fact that all the externalities of production were offset by the provision of housing, hospitals, schools, nurseries, churches, and above all, jobs. This assimilation between a dominant industrial model and its environment thus promoted what Pascal Marichalar has proposed to call a territorialized “moral pact,” which bound workers to the factory and made a number of environmental and, above all, health sacrifices acceptable⁴⁷.

However, what happens when the factory closes its doors and the industry disappears? In the case of the glassworks in Givors (France) studied by Marichalar, it is very clear that deindustrialization leads to a breakdown of this implicit “moral pact,” making sacrifices in terms of health unacceptable. Thus begins the author's investigation, which aims to follow the glassworkers in their quest for recognition of occupational diseases. This case is not isolated, and can be found in other industrial and territorial contexts, such as among metalworkers in Sydney, Canada⁴⁸, around the Metaleurop company in Noyelles-Godault in northern France⁴⁹, and among asbestos workers⁵⁰. But one of the most significant cases in this regard is that of the iron mines in Lorraine, in northeastern France, studied by François Duchêne⁵¹. There, the 3.1 billion tons of ore extracted created a residual void of 500 million cubic meters spread over 40,000 kilometers of tunnels. However, the disappearance of the main company (Lormines) in the early 1990s and the lack of maintenance of the underground tunnels caused major accidents: a total of 500 houses were affected and 2,000 inhabitants were evacuated. In addition, as the sale of housing belonging to the companies' rental stock to private individuals was subject to exemption clauses similar to the one mentioned above, owners affected by the subsidence affecting the region found themselves in a legal vacuum when it came to obtaining compensation. It was not until the adoption of special legislation (law of March 30, 1999) that the State was able to set up a compensation scheme for owners affected by subsidence who were subject to exemption clauses, through a compulsory damage insurance guarantee fund. As in other cases, it was the disappearance of industry that made its stigma (or “negative

⁴⁷ Pascal Marichalar, *Qui a tué les verriers de Givors ? Une enquête de sciences sociales*, Paris, La Découverte, 2017.

⁴⁸ Lachlan McKinnon, "Environmental Justice and Workers' Health: Fighting for Compensation at the Sydney Coke Ovens, 1986-90," in Steven High, Lachlan McKinnon, Andrew Perchard (eds.), *The Deindustrialized World. Confronting Ruination in Postindustrial Places*, Vancouver / Toronto, UBC Press, 2017, pp. 68-86.

⁴⁹ Coralie Dumontier, Judith Rainhorn, « Faire l'histoire d'un conflit manqué. Pollution environnementale et risques sanitaires autour de Metaleurop Nord (1970-2003) », in : Thomas Le Roux (ed.), *Débordements industriels. Environnement, territoire et conflit, XVIII^e-XXI^e siècle*, Rennes, Presses Universitaires de Rennes, 2013, p. 377-397.

⁵⁰ Odette Hardy-Hémery, *Eternit et l'amiante, 1922-2000. Aux sources du profit, une industrie du risque*, Villeneuve-d'Ascq, Presses universitaires du Septentrion, 2005 ; Jean-Claude Devinck, « Amiante : trente ans de luttes institutionnelles, 1945-1977 », in Annie Thébaud-Mony (ed.), *Santé au travail, approches critiques*, Paris, La Découverte, 2012, p. 281-312 Cécile Maire, *Vivre et mourir de l'amiante : une histoire syndicale en Normandie*, Paris, L'Harmattan, 2016 ; Collectif 350 tonnes et des poussières, « Une épidémiologie paritaire ? Outils, savoirs et luttes de définitions relatifs à la santé au travail des fonctionnaires », *Travail et emploi*, n°169-170-171, 2022, p. 97-122. For a more general overview of the environmental history of deindustrialization in France, see: Renaud Bécot, « De 'l'inadéquation des temporalités'. Une historiographie environnementale des désindustrialisations », in Fabien Bartolotti et alii (eds.), *Les mondes de l'économie, XVIII^e-XXI^e siècles. Arpenter l'histoire avec Xavier Daumalin*, Marseille, Presses Universitaires de Provence, 2024, p. 187-198 ; *Id.*, « Une histoire environnementale des ouvrières et ouvriers dans la désindustrialisation », in Fanny Gallot, Pascal Raggi (eds.), *Ouvriers et ouvrières dans la désindustrialisation. Europe occidentale (1960-1999)*, Paris, Atlande, 2025.

⁵¹ François Duchêne, « Les affaissements miniers dans le bassin ferrifère lorrain : quand le territoire re-politise la gestion du risque », *Développement durable et territoires*, dossier 11, 2008. Online.

commons”) more visible, leading to the mobilization of those who had previously accepted to remain silent about it, including local communist mayors and unionists.

3. The ecology of work

Throughout the industrial era, workers have lived in a relationship with industry which, for a whole range of reasons that we have outlined above (material, cultural, moral), tended to encourage acceptance of nuisances and even denial of the effects of work on the living environment. However, I say "tended to" because this pattern was far from true at all times and in all places. Indeed, most of the recent literature on "worker environmentalism" shows that the years 1965-1985 were characterized globally by a convergence between trade unionism and ecology, linking the denunciation of the effects of industrial work on workers' health to that of its effects on the environment⁵².

However, focusing on social movements and workers' representative organizations in very specific political contexts only provides an incomplete definition of what we mean when we talk about "labour environmentalism." Taking up the distinction made by Stefania Barca and Emanuele Leonardi between "labour environmentalism" and "labor ecology," it seems more relevant to focus on the second category, as it allows us to embrace a broader chronological period and social situations⁵³. Indeed, rather than conceiving of the relationship between work and the environment solely in the categories of the environmental movement after 1945, it is probably more fruitful to conceive of work more broadly "as a way of knowing nature" to quote the American historian Richard White⁵⁴—that is, as a certain way of understanding human-environment relations. In other words, this involves grasping the literally *ecological* dimension of work, for example by observing how certain professions produce environmental knowledge⁵⁵.

⁵² For the United States, see: Scott Dewey, "Working for the Environment: Organized Labor and the Origins of Environmentalism in the United States, 1948-1970," *Environmental History*, vol. 3, no. 1, 1998, pp. 45-63; Robert Gordon, "'Shell No' : OCAW and the Labor-Environmental Alliance," *Environmental History*, vol. 3, no. 4, 1998, pp. 460-487; *Id.*, "Poisons in the Fields: The United Farm Workers, Pesticides and Environmental Politics," *Pacific Historical Review*, vol. 68, no. 1, 1999, pp. 51-77; Brian K. Obach, *Labor and the Environmental Movement. The Quest for Common Ground*, Cambridge, MIT Press, 2004; Chad Montrie, *To Save the Land and People. A History of Opposition to Surface Coal Mining in Appalachia*, Chapel Hill, University of North Carolina Press, 2003. For Italy, see: Wilko Graf von Hardenberg, Paolo Pelizzari, "The Environmental Question, Employment, and Development in Italy's Left, 1945-1990," *Left History*, vol. 13, no. 1, 2008, pp. 77-105; Stefania Barca, "Bread and poison. The story of labor environmentalism in Italy, 1968-1998," in: Christopher Sellers, Joseph Melling (eds.), *Dangerous Trades. Histories of Industrial Hazards Across a Globalized World*, Philadelphia, Temple University Press, 2012, pp. 126-139. For other national contexts such as France, Switzerland, Spain, and Japan, see: Paul Jobin, *Maladies industrielles et renouveau syndical au Japon*, Paris, Éditions de l'EHESS, 2005; Renaud Bécot, *Syndicalisme et environnement de 1944 aux années quatre-vingt*, Ph.D. dissertation, EHESS, 2015; Pablo Corral-Broto, "Une société environnementale et ouvrière ? Histoire de la lutte du mouvement ouvrier pour défendre l'environnement sous Franco (1964-1979)," *Écologie & Politique*, no. 50, vol. 1, 2015, pp. 41-55; Alexandre Elsig, Marianne Enckel, Magali Pittet (eds.), *Pour une histoire ouvrière de l'environnement*, special issue *Cahiers d'histoire du mouvement ouvrier*, no. 35, 2019.

⁵³ See: Stefania Barca, Emanuele Leonardi, "Working-class ecology and union politics: a conceptual topology," *Globalizations*, vol. 15, no. 4, 2018, pp. 487-503.

⁵⁴ "'Are You an Environmentalist or Do You Work for a Living'? Work and Nature," in: William Cronon (ed.), *Uncommon Ground. Rethinking the Human Place in Nature*, New York/London, W. W. Norton & Co., 1996, pp. 171-185.

⁵⁵ See also: Daniel Schneider, "Local Knowledge, Environmental Politics, and the Founding of Ecology in the United States: Stephen Forbes and the 'Lake as a Microcosm' (1887)," *Isis*, vol. 91, no. 4, 2000, pp. 681-705; Matthew McKenzie, *Clearing the Coastline: The Nineteenth-Century Ecological and Cultural Transformation of*

1. An ecological approach to work

Ecology can be defined as the science of the relationships between living organisms and their biological and physical environment. It is a science that originated in the 18th century with Lamarck, continued in the 19th century with Alexander von Humboldt and Charles Darwin, and was formalized for the first time in 1866 by the German biologist Ernst Haeckel⁵⁶. Initially, ecological science concerned only the non-human world, and it was only gradually that it became a tool of analysis for the humanities and social sciences. For example, in the late 1970s, ecology was clearly claimed as a way of understanding labour-environment relations by Italian doctor and communist activist Laura Conti⁵⁷.

In the field of labor history, one of the most innovative proposals for integrating an ecological dimension into analysis came from American historian Arthur F. McEvoy, who initially specialized in the history of environmental law and Californian fisheries⁵⁸. In an article entitled “Working Environments: An Ecological Approach to Health and Safety,” McEvoy defined his ecological conception of work as a way of paying attention to the relationships between the technologies that constitute the working environment and the biological dimension of working bodies. He wrote:

“Workers' bodies are, after all, biological entities no less than trees or fish or wildlife. (...) As a method, ecology points to an analysis of industrial health and safety in terms of the interactions between a number of systems: the worker's body and its maintenance, the productive processes that draw on the worker's energy, and the law and ideology that guides them. (...) The key to the approach is to treat the workplace as an ecological system, of which the worker's body is the biological core⁵⁹.”

This reflection on the place of working bodies in the ecology of work was taken even further by Linda Nash in her work on the multiple chemical pollutants in California's *Central Valley*. According to her, focusing on the human body blurs the boundary between the human and non-human worlds. “Where does the body end and 'non-human nature' begin?” she asked. The answer was twofold: “When we recognize that human bodies are directly affected by their environments, we are forced to acknowledge that humans are not simply agents of environmental change but also objects of that change. Conversely, the environment is more than an object upon which change is enacted; it is also an agent of sorts that acts upon the bodies

Cape Cod, Hanover, University Press of New England, 2010; Molly A. Warsh, "A Political Ecology in the Early Spanish Caribbean," *The William and Mary Quarterly*, vol. 71, no. 4, 2014, pp. 517-548; Lydia Barnett, "Showing and hiding: The Flickering visibility of earth workers in the archives of earth science," *History of Science*, vol. 58, no. 3, 2020, pp. 245-274.

⁵⁶ See, for example: Jean-Paul Deléage, *Histoire de l'écologie*, Paris, Le Seuil, 1992.

⁵⁷ Laura Conti, *Que cos'è l'ecologia? Capitale, lavoro e ambiente*, Milan, Mazzotta, 1977. On Conti, see the work of Stefania Barca.

⁵⁸ Arthur F. McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1895-1980*, Cambridge, Cambridge University Press, 1986.

⁵⁹ Arthur F. McEvoy, “Working Environments: An Ecological Approach to Industrial Health and Safety,” *Technology and Culture*, vol. 36, no. 2, 1995, pp. S145-S173, here pp. S148-S149.

inhabiting it⁶⁰.” Therefore, just as landscapes can be studied to reveal the effects of certain human actions, working bodies—their symptoms and diseases—become places to investigate the quality and effects of certain landscapes⁶¹. Consequently, while the history of science and technology helps us understand what a working environment is, it is particularly the history of medicine and industrial hygiene that forms the basis of this ecological approach to work⁶².

2. The ecology of mining

However, drawing on sources from engineers, doctors, and hygienists poses a problem when it comes to understanding workers’ perspectives on the working environment, as these disciplines were built precisely on criticism—and sometimes denial—of workers’ knowledge and experience, accusing them of a certain lack of awareness of occupational risks⁶³. In order to get as close as possible to the “ecological” experience of work by workers themselves, and to understand the ecological knowledge involved in this experience, we must instead turn to the employee representation and worker safety and health control institutions that were set up in industrialized countries from the end of the 19th century onwards⁶⁴. I will focus here on a particular institution: that of miners’ safety delegates in France⁶⁵. Miners’ safety delegates were an institution created in France by the law of July 8, 1890. They were responsible for inspecting and monitoring work, which took two forms: on the one hand, regular visits carried out “for the sole purpose of examining the safety conditions for the personnel working there” and, on the other hand, visits following accidents at work to determine “the conditions under which the accident occurred.” Visits’ reports were recorded in registers intended for the operator, verified by the district mining engineer, accessible to all employees in a mining district, and sometimes made public through the labor press. They formed a kind of “mine diary” that provide insight into the relationship between workers and their working environment.

For example, analysis of the visit records of miners’ delegates in the Loire coal basin between 1890 and 1914 reveals three layers of “ecological” knowledge. The first is what we

⁶⁰ Linda Nash, *Inescapable Ecologies. A History of Environment, Disease and Knowledge*, Berkeley, University of California Press, 2006, p. 8.

⁶¹ *Ibid.*

⁶² Among the many works on this subject, see: Christopher Sellers, *Hazards of the Job. From Industrial Disease to Environmental Health Science*, Chapel Hill, University of North Carolina Press, 1999; Caroline Moriceau, *Les douleurs de l'industrie. L'hygiénisme industriel en France, 1860-1914*, Paris, Éditions de l'EHESS, 2009; Christopher Sellers, Joseph Melling (eds.), *Dangerous Trade. Histories of Industrial Hazards across a Globalizing World*, Philadelphia, Temple University Press, 2012; Judith Rainhorn, Lars Bluma (eds.), *A History of the Workplace: Environment and Health at Stake*, London, Routledge, 2015; Judith Rainhorn, *Blanc de plomb. Histoire d'un poison légal*, Paris, Presses de Sciences Po, 2019.

⁶³ See, for example: Caroline Moriceau, "La perception des risques au travail dans la seconde moitié du XIX^e siècle : entre connaissance, déni et prévention", *Revue d'histoire moderne et contemporaine*, no. 56, vol. 1, 2009, pp. 11-27; Catherine Omnès, Laure Pitti (eds.), *Cultures du risque au travail et pratiques de prévention au XX^e siècle. La France au regard des pays voisins*, Rennes, Presses Universitaires de Rennes, 2009.

⁶⁴ Among recent research in this area, see: Léo Collinet, *Le comité d'hygiène et de sécurité de l'usine Peñarroya Noyelles-Godault. Étude de la situation d'hygiène et de sécurité à travers son fonctionnement original et sa production exceptionnelle, 1945-1984*, Master's thesis, Université Paris 1 Panthéon Sorbonne, 2024.

⁶⁵ Bastien Cabot, *La Sécurisation des mines au XIX^e siècle. Savoirs, pouvoirs et contre-pouvoirs*, Paris, Classiques Garnier, 2025 (chap. 4: "Conflits d'expertise et lutte des classes", pp. 243-336). On mine delegates, see also: Philippe-Jean Hesse, "Les délégués à la sécurité des ouvriers mineurs dans quelques mines de l'Ouest (1890-1940)", *Annales de Bretagne et des Pays de l'Ouest*, vol. 104, no. 3, 1997, pp. 213-225; François-Xavier Debrabant, *Le droit social dans les houillères françaises (1810-1939)*, Ph.D. dissertation, University of Strasbourg III, 2001.

might call “profane” or “embodied” knowledge⁶⁶. It stemmed from the physical experience of the workplace by workers and mining delegates. The language was sometimes crude. For example, in a report dated April 28, 1891, miners’ delegate Gilbert Cotte wrote about the Loire company: “The workers who work there have to economize on food because they eat enough smoke all day to do without eating in the evening, but on the other hand they must find the day long⁶⁷.” Elsewhere, the reduction of workers to mere biological entities was made clear by the proliferation of animal comparisons. Miners’ delegate Exbrayat complained that “nothing has been done for the safety and hygiene of the workers, they get wet like rats⁶⁸,” while Mottaz, describing the Devillaine shaft, explained that there was “a real lack of hygiene, which has been going on for a long time, the workers suffer from the sweat they have to pour out, working naked like earthworms in this low section⁶⁹.”

The second type of knowledge was closely linked to the dissemination of the hygienist message among the working classes from the last third of the 19th century onwards, and more particularly to the development of industrial hygiene. Miners’ delegates made numerous explicit or implicit references to the regulatory texts issued by the mining administration. This was the case, for example, with miners’ delegate Mottaz, who wrote on March 25, 1913:

“In the new 636 shaft at Ondaine, which is being drilled into hard rock using mechanical hammer drills, there is a lack of hygiene, and the health of the workers is seriously and undeniably compromised. I say this frankly, and I will not tire of repeating it: if we do not manage to capture the dust produced by these jackhammers, which the workers breathe in throughout their working day, I call on the engineers of the Montrambert companies, and in particular the engineers of the Corps des Mines, to realize how exhausting this work is, especially when two jackhammers are operating at this level, filling the atmosphere with so much dust that it is difficult to see more than three or four meters away, which hinders the breathing of the workers carrying out this work. In such mechanical drilling sites, the work is carried out but on condition that the measures are set as indicated in Article 109 of the General Regulations, without which illness is to be expected for most of the workers⁷⁰.”

The article of *the General Regulations for the Operation of Fuel Mines* to which reference was made stated that “in mechanical drilling sites in hard rock, measures must be taken to protect workers from the danger of dust,” but it did not specify what these measures should be or the

⁶⁶ See, for example: Scarlett Salman, Sezin Topçu, "Expertise profane," in Emmanuel Henry *et al.*, *Dictionnaire critique de l'expertise. Santé, travail, environnement*, Paris, Presses de Sciences Po, 2015, pp. 164-172

⁶⁷ Loire Departmental Archives, 8 S 286: Mine delegates. Société anonyme des mines de la Loire (1891-1896). Loire district. Report by delegate Gilbert Cotte on April 28, 1891.

⁶⁸ Loire Departmental Archives, 1 ETP 2954. Société anonyme des Mines de la Loire collection. Reports by miners' representatives from the Villars district, September 15, 1913 to October 29, 1915. Report by miners' representative Théophile Exbrayat on January 7, 1914.

⁶⁹ Loire Departmental Archives, 1 ETP 4577. Collection of the Montrambert-La Béraudière Coal Mines. Reports of mining delegates, Montrambert-La Ricamarie division. Register of visits from December 7, 1912, to June 26, 1914. Visit report by mining delegate Mottaz, January 21, 1914.

⁷⁰ Loire Departmental Archives, 1 ETP 4577. Montrambert-La Béraudière Coal Mines Collection. Reports by miners' representatives, Montrambert-La Ricamarie division. Register of visits from December 7, 1912, to June 26, 1914. Visit report by miners' representative Mottaz, March 25, 1913.

type of dangers to which miners were exposed⁷¹, thus letting room for miners' interpretation. Fueling this interpretation of law, a third and more controversial level of knowledge came from trade unions. From the 1890s onwards, the French labour movement politicized issues of occupational health⁷². In this context, the National Miners' Federation included in its agenda the fight against various occupational diseases such as “hookworm disease, miners' asthma, loss of sight resulting from nystagmus, anemia, rheumatism (...), and poisoning resulting from unhealthy heat, dust, and powder fumes⁷³.” In 1912, at the Angers Congress, the Federation added coal miners' anthracosis and slate workers' schistosomiasis to this list⁷⁴. It is therefore understandable that references to dust in the reports of mining delegates did not only refer to coal dust as a cause of explosions (as had been the case since the 1906 Courrières' disaster), but also as a factor in respiratory diseases. The aim was to provide operators and engineers with empirical evidence of the harmful effects of this dust, in a context when research on silicosis progressed and the condition was recognized as an occupational disease in South Africa from 1912 onwards⁷⁵.

3. Monitoring spillovers

As can be seen from the reports of miner safety delegates, work appeared to be a way of “knowing nature”. This knowledge was not based on a unifying category (“the environment”), but on a multiplicity of mediations: technology, hygiene, administrative standards, but also class relations—for safety and health were, so to speak, embedded in the unequal social relations of the mine. However, one criticism that can be levelled at this source (and more generally at this approach to treating “workplace ecology” primarily through the lens of occupational safety and health) is that it inadvertently confines the analysis to the *working* environment. In doing so, this approach perpetuates the legal and judicial distinction between occupational health and public health⁷⁶, which artificially isolates the protection of workers from that of local residents, even though they often have a same and single source.

It is against this administrative and technical legacy that a whole body of recent literature proposes to think beyond this arbitrary division. The aim is to “scientifically decompartmentalize occupational health and environmental health,” as proposed by Renaud Bécot, Marie Ghis Malfilatre, and Anne Marchand, by focusing, for example, on the

⁷¹ Comité central des houillères de France, *Règlement général sur les exploitations des mines de combustibles*, Paris, 1931 {1911}, p. 41.

⁷² Jean-Claude Devinck, « La lutte contre les poisons industriels et l'élaboration de la loi sur les maladies professionnelles », *Sciences Sociales et Santé*, n°28, vol. 2, 2010, p. 65-93.

⁷³ Musée Social, C 19.905 C 37 : *Fédération nationale de l'industrie des mines, minières et carrières de France (section française de l'internationale minière), Compte rendu officiel des travaux du congrès national des mineurs tenu les 9, 10, 11, 12 et 13 mars à Albi (Tarn)*, Carmaux, Imprimerie des travailleurs réunis, 1910, p. 76-83

⁷⁴ Musée Social, C 19.905 C 37 : *Fédération nationale de l'industrie des mines, minières et carrières de France (section française de l'internationale minière), Compte rendu officiel des travaux du XXIIIe congrès national des mineurs et IIIe de la Fédération nationale des mines, minières et carrières (mineurs et ardoisiers réunis) tenu les 12, 13, 14, 15, 17 & 17 février 1912 à la Bourse du travail d'Angers (Maine-et-Loire)*, Carmaux, Imprimerie des travailleurs réunis, 1912, p. 26-27

⁷⁵ Paul-André Rosental (ed.), *Silicosis: A World History*, Baltimore, John Hopkins University Press, 2017.

⁷⁶ Vincent Viet, "Hygiène et intérieure et salubrité extérieure : un point aveugle de l'action publique ? Chronique de deux domaines séparés en France (1810-1917) », *Travail & emploi*, n°148, vol. 4, 2016, pp. 81-101.

convergence of causes between social groups⁷⁷. Michel Letté and Thomas Le Roux, meanwhile, propose to consider crossing the boundary between these two spheres based on the notion of “industrial spillover⁷⁸.” The question that then arises is: to what extent could worker’s perspective break free from this distinction between internal hygiene and external sanitation, and perceive industrial spillovers *from within the production process*?

Once again, the archives of miners’ delegates provide a number of answers. In 1946, French legislation introduced a new feature to this institution by creating the role of surface miners’ delegates (or “day delegates”), responsible for inspecting the processing units for extracted minerals. While these staff representatives were responsible for ensuring the safety and hygiene of their peers, they also focused their attention on the spillovers of these production units, particularly when they were polluting. This was the case, for example, in the Salsigne mining basin, where one of the main by-products of gold extraction was arsenic: the production of this pesticide led to the proliferation of sulphur and arsenic fumes that harmed crops and livestock in the surrounding area—a situation denounced since the beginning of the 20th century⁷⁹. In 1935, in order to calm tensions between the company and local residents, the administration imposed a decree aimed at containing and controlling these fumes. But in the 1960s and 1970s, as the company faced a series of financial difficulties and significantly cut back on its safety investments, the then miners’ delegate René Escobédo repeatedly highlighted breaches of the law. For example, on September 26, 1968, he noted: “During my visit, I noticed and smelled a significant loss of SO₂ gas {*sulphur dioxide*}, which was due to the poor working condition of the fan in the large chimney. I therefore request that this be remedied as soon as possible, as it may cause discomfort to the workers there and to the residents of the workers’ housing estate⁸⁰.” On December 1, 1969, after visiting the staff showers and changing rooms, he wrote: “During my visit, I found that the showers are clean and well maintained, but I would like to point out that the water supply should be analysed, as it comes from a reservoir where the water is often polluted. I can give an example: very recently, there were fish in this reservoir, and they have all died. I think we need to find out where this is coming from and avoid supplying the showers with such water so that workers can shower without risk of contagion⁸¹.” Finally, on April 3, 1973, his visit of the arsenic factory led him to report that “cleaning is done with large amounts of water, which risks polluting the Orbiel river” that flowed below the factory⁸². In another context, that of the potash mines of Alsace in

⁷⁷ Renaud Bécot, Marie Ghis Malfilatre, Anne Marchand (eds.), *Santé au travail et santé environnementale : une cause commune ?*, special issue of *Sociétés contemporaines*, no. 121, vol. 1, 2021.

⁷⁸ Michel Letté, « L’histoire des débordements industriels aux origines des conflits environnementaux », *Annales des Mines. Responsabilité et environnement*, n°62, vol. 2, 2011, pp. 43-50 ; Michel Letté, Thomas Le Roux (eds.), *Débordements industriels. Environnement, territoire et conflit (XVIII^e-XX^e siècles)*, Rennes, Presses Universitaires de Rennes, 2013.

⁷⁹ Hervé Pujol, *Tristes mines...*, *op. cit.*

⁸⁰ Archives départementales de l’Aude, 99 J 74 : Fonds des délégués mineurs de la mine d’or de Salsigne. Sécurité et hygiène. Visites d’inspection et de contrôle des délégués mineurs de surface. Registre du 9 août 1968 au 11 mars 1969. Rapport du 26 septembre 1968.

⁸¹ Archives départementales de l’Aude, 99 J 75 : Fonds des délégués mineurs de la mine d’or de Salsigne. Sécurité et hygiène. Visites d’inspection et de contrôle des délégués mineurs de surface. Registre du 18 novembre 1969 au 23 juillet 1970. Rapport du 1er décembre 1969.

⁸² Archives départementales de l’Aude, 99 J 79 : Fonds des délégués mineurs de la mine d’or de Salsigne. Sécurité et hygiène. Visites d’inspection et de contrôle des délégués mineurs de surface. Registre du 10 août 1972 au 19 juin 1973. Rapports du 3 avril 1973.

Wittersheim, delegate Georges Stauff repeatedly expressed concern that bromine residues (a by-product of sylvinite processing, used in particular for the manufacture of halogen lamps) were being dumped in a hole behind the factory, which he believed “did not comply with basic environmental principles⁸³.” At the coal mines in La Mure, Isère, a miner’s delegate repeatedly condemned the dumping of black water from a slurry basin (a mixture of coal dust and water used mainly for boilers) into the adjacent Jonche river, considering that “this is unacceptable” and demanding that “measures be taken to put an end to this situation⁸⁴.”

4. Workers' environment

Should we conclude from these few examples that workers have always, like Monsieur Jourdain in Molière’s *Le Bourgeois Gentilhomme*, practiced ecology without knowing it? This version of events is defended by former workers such as Robert Montané, the last miner’s delegate in Salsigne, who told journalist Alexandra Saviana in 2021: “Workers at Salsigne were the first to cry out for good working conditions (...). If we had been listened to, our stubbornness would have meant less crap being dumped into the atmosphere. In a way, we were practicing environmentalism without knowing it⁸⁵!”

In fact, analysis of the reports submitted by miners’ delegates reveals two things. First, workers’ perspectives on industrial spillovers were limited in scope. They focused primarily on the immediate surroundings, particularly the natural elements with which workers interacted, such as workers’ housing estates and waterways. Second, it is true that the concern of miners’ delegates for the environment seemed particularly strong between the late 1960s and early 1970s, i.e., when the politicization of this concept reached its peak, in the context of the creation of the Ministry of Environment in 1971 and the publication of *Limits to Growth* in 1972. But beyond the second half of the 1970s, the effects of the oil crises and the onset of deindustrialization clearly pushed health and environmental concerns into the background. In Alsace, the reports of miner delegates refocused on issues of wages, safety, and subcontracting. In Salsigne, repeated threats of closure led miners to engage in a power struggle with successive contractors and the state for the survival of the basin. Ultimately, the ecology of work always existed as a potentiality but it was only publicized in specific contexts and always runs the risk of being subordinated to other imperatives.

Conclusion. The Meaning of Work in a Planetary Age.

We are witnessing a redefinition of the meaning of work in the age of climate change. Indeed, the inclusion of the environmental crisis on the global political agenda since the aftermath of World War II has changed the social and political significance of work. In academic literature, the positive view of work and workers inherited from 1960s Marxism has given way to a narrative focused on the negative consequences of work on health and the environment. So what story are we talking about when we talk about industrialization? In the same way that

⁸³ Archives départementales du Bas-Rhin, 1036 J 65 : Fonds de la CFTC des Mines de Potasse d’Alsace section Mine Amélie Jour. Rapports des délégués mineurs : registres (1949-1985). Amélie 1 Surface (1950-1985). Registre du 23 décembre 1974 au 12 février 1976. Rapport du délégué Georges Stauff le 10 octobre 1975.

⁸⁴ Institut d’histoire sociale de l’Isère. Fonds des Houillères du Dauphiné. Registres de délégués mineurs (non cotés). Visites du 14 novembre 1973, 3 décembre 1973 et 7 mars 1974.

⁸⁵ Alexandra Saviana, *L’or de la Montagne Noire. Un scandale sanitaire français*, Paris, Éditions JC Lattès, 2021, p. 77.

Dipesh Chakrabarty wondered whether modernity was the time of the Anthropocene or that of the Enlightenment⁸⁶, is the modern history of work one of techno-economic progress and class struggle, or one of environmental degradation? At the end of this article, it seems to me that three points can be discussed.

1. The history of labour can no longer be understood independently of the *terrestrial* conditions in which it unfolds. As Dipesh Chakrabarty wrote, “the mansion of modern freedoms stands on an ever-expanding base of fossil-fuel use,” so that until now, “most of our freedoms so far have been energy-intensive⁸⁷.” This general observation applies particularly well to the history of workers, and even more so to industrial workers in the Western world. Not only did they emerge from the industrial production system, but the promise of emancipation for the working class itself was also based on the prospect of the continued deployment of productive forces (the only major difference being ownership of the means of production), energy consumption (fossil fuel or otherwise), and technical development.

2. That being said, the environmental history of industrial modernity cannot, either, ignore the social relationships that shaped it. While human activity on the planet has intensified since the 1750s, probably ushering in a new geological age (the Anthropocene), this intensification also corresponds to that of global labour and the multiple forms of resistance that workers around the world have opposed in various ways⁸⁸. Just as, according to Marx, products of labour are “merely the material expressions of the human labour expended to produce them” and concentrates the social relations that pre-exist its production⁸⁹, every human alteration of the ecological conditions of life on Earth is an expression of the human labour expended in that alteration, and of the social relations that made it possible. Thus, the concept of “Labourocene” implies that every time we encounter a trace of human impact on the global environment, we are actually encountering labour. In a somewhat metaphorical way, every piece of microplastic we encounter in our oceans, every molecule of carbon dioxide we find in the atmosphere, and every particle of lead that contaminates our soil is no less than a table or a chair the product of labour—and therefore *also* contains a social history of its production and consumption.

3. The “Labourocene” gives centre stage to those who have been the *real* agents of global environmental change since the mid-18th century: workers. Indeed, it was the miners who, underground—with the help of riveting tools, dynamite, and jackhammers—have helped to make humanity a force of erosion comparable to that of rivers and oceanic volcanoes. It was chemical industry workers who, in coal distillation workshops producing artificial fertilizers, or bagging arsenic dust used as a pesticide against Colorado potato beetles, turned humanity into a major force in altering the chemical composition of soils. Finally, it was the workers in the coal and petrochemical industries who, by exploiting and transforming fossil fuels, have made it possible for humanity to become a climatic force. Thus, redefining human planetary action through the prism of work allows us to go beyond observing this phenomenon on a “global” scale. On the contrary, since work is measured globally and collectively but is also

⁸⁶ Dipesh Chakrabarty, “The Climate of History: Four Theses”, *Critical Inquiry*, vol. 35, n°2, 2009, p. 197-222.

⁸⁷ *Ibid.*, p. 208.

⁸⁸ Hans-Joachim Voth, *Time and Work in England, 1750-1830*, Oxford, Clarendon Press, 2000; Corinne Maitte, Didier Terrier, *Les rythmes du labeur. Enquête sur le temps de travail en Europe occidentale, XIV^e-XIX^e siècle*, Paris, La Dispute, 2020.

⁸⁹ Marx, *Capital Volume 1*, p. 167.

embodied locally and individually, it allows us to reterritorialize our histories of the Anthropocene and re-embed them in social relations⁹⁰. Nevertheless, the “Labourocene” cannot be satisfied with an analysis of work focused solely on Western industrial modernity because, as I have said, the very notion of “global work” is a fiction that covers a wide variety of situations and statuses. The entry point of extractive labour in France in the 19th and 20th centuries proposed here is thus only a microscopic and specific fragment of the totality of situations that the concept of “Labourocene” can cover, calling for an almost unlimited multiplication of studies in this direction.

⁹⁰ Anna L. Tsing *et al.*, *Field Guide to the Patchy Anthropocene : The New Nature*, Stanford, Stanford University Press, 2024.