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One hundred years of denialism: banishing asbestos to other's lungs

Marília de Nardin Budó

Federal University of Santa Catarina, Brazil
Email: mariliadb@yahoo.com.br

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Abstract. Despite being "virtually" banned by the Brazilian Supreme court in 2017, asbestos – a mineral fibre already banned from more than 60 countries in the world because of the diseases it can cause to the ones exposed to its dust - is still mined and exported to other global South countries. From the field of the crimes of the powerful, informed by feminist and decolonial epistemologies, I propose in this article a debate over the more recent judicial and political decisions that allowed Brazil to keep its position as the third major asbestos exporter in the world, in the interest of the mining company *Sama*. In the first part of the article, I discuss how scientific discourse about asbestos produced in the last one hundred years mostly in the global North has contributed, even when unconsciously, to denialism. In the second part I analyse specific cases in which biased scientific research circulated from global North straight to the pen of the justices of the Brazilian Supreme federal court. By dialoguing with aspects of the novel One Hundred Years of Solitude, by Gabriel García Marquez, I argue that the magical realism behind these decisions, instead of being explained by some kind of backwardness or irrationality, is actually a didactical fulfilment of the values of modern/colonial science: the war against nature, the hierarchy of knowledge, the insistence of keeping the profits of the industry despite the harms it causes. I argue that the virtual ban has actually performed as an asbestos *banishment* to other's lungs with the approval of a state law for exporting all asbestos extracted. In the losing votes that in this magic reality are actually performing as winner, the white male businessmen who know for a long time about asbestos harms are thought to be victims of treachery, the current mining workers and the local economy are shields against the accusations of harms and the people affected by asbestos are only narrated as side effects, with the bless of technique in the 100º anniversary of denialism.

Keywords: asbestos industry, denialism, coloniality, Brazil.

[*] For a fuller discussion of the arguments presented here, see my forthcoming book *Colonial and Patriarchal Dimensions of State-Corporate Harm: Embodying the Powerful in the Global Asbestos Crisis* (2026, Bristol University Press).

INTRODUCTION

«Things have a life of their own [...] It's simply a matter of waking up their souls». With these words, Melquiades begins his pivotal role as one of the most influential characters in Gabriel García Márquez's masterpiece *One Hundred Years of Solitude*, the novel that would establish «magical realism» for generations to come. By presenting two big magnets as «the eighth wonder of the learned alchemists of Macedonia», Melquiades makes José Arcadio Buendía, the patriarch of Macondo's village, completely captured by something that seemed to be magic, but that Melquiades insisted to be science. This is the first moment in which the desire for nature domination through technique appears as a blinking light in the eyes of the patriarch. It is the moment in which, as Conniff (1990) argues, José Arcadio starts his journey to metamorphose from a type of «model citizen, who is useful to his people, to a type useful to authority» (García Márquez 1998: 14).

As García Márquez affirmed in his lecture for the Nobel prize of literature, the colossal reality of Latin America – at that point marked by the atrocities of military dictatorships – is not something present only in the literature, on the paper, «but it is one that lives within us and determines each instant of our countless daily deaths, and that nourishes a source of insatiable creativity, full of sorrow and beauty» (García Márquez 1982). Magical realism is indeed a way to interpret a reality which seems to be each time more fictional, in such a way that it is difficult to know what is true and what is fiction in the novel.

The reflection arising from the fascination of José Arcadio by science, when he discovers progressively and enthusiastically things that were already known for centuries, brings the disturbing familiarity in Brazil's current scenario with *asbestos*, the so-called "magic mineral". Asbestos is the commercial name of a group of naturally occurring silicate minerals that separate easily into flexible, fire-resistant, and chemically indestructible fibres already banned from more than 60 countries in the world because of the diseases it can cause to the ones exposed to its dust. These properties, combined with low extraction costs, made asbestos a widely exploited industrial raw material throughout the 20th century. The mineral family includes two main geological categories: serpentine minerals, of which white chrysotile represents the most commercially significant variety, and amphibole minerals, encompassing blue crocidolite and brown amosite (Mendes 2001). During the 20th century, studies funded by the global asbestos industry produced theories to postpone the asbestos bans and to avoid compensations, being one of the most known the thesis of *fibre differentiation*, or *the amphibole hypothesis*. According to this theory, diseases caused by exposure to chrysotile asbestos are explained by the contamination with amphibole varieties, leading to the *technical solution* of banning only the last varieties, which represented only 5% of the asbestos used worldwide (Tweedale 2000; McCulloch 2002; Budó 2021).

Despite being banned by the Brazilian Supreme court in 2017, it is still mined and exported to other global South countries, such as India, by a national mining company, *Sama*. The company was founded in 1938 in Brazil and it was initially a subsidiary of the French *Compagnie Pont à Moussoun*, and, from 1967, the Belgian *Eternit* had half of the shares until its total nationalization in the end of the 1990s. The asbestos case in Brazil mirrors García Márquez's magical realism, where time folds upon itself and causality defies logic, presenting a legal reality where prohibition and permission coexist, where ban and banishment become synonyms.

This article presents a deeper analytical emphasis on decolonial epistemological approach to analyse the intersection between scientific knowledge production and legal decision-making in the Brazilian asbestos case from a former grounded theory published in Budó (2021). The theoretical framework draws on Quijano's (2000) «coloniality of knowledge» and Mbembe's (2003) concept of «necropolitics» to understand how scientific discourse operates as a form of power that determines whose lives are deemed worthy of protection. At the same time, I examine how the «virtual ban» creates a legal space where normal juridical order is suspended, allowing simultaneous prohibition and permission of asbestos activities (Agamben 2005; Budó 2026).

In this article, I propose an epistemological debate over the more recent judicial and political decisions, from 2017 to 2025, that allowed Brazil to keep its position as the third major asbestos exporter in the world in the interest of the mining company *Sama*. In the first part of the article, I discuss how the rationality behind scientific discourse about asbestos produced in the last one hundred years mostly in the global North has contributed, even

when unconsciously, to denialism of harm regarding mining and use of asbestos by the industry. In the second part, I analyse specific cases in which biased, and denialist scientific research navigated from global North scientific journals to the decisions of the Justices of the Brazilian Supreme court.

«FOREIGN BODIES»: MODERNIST OBJECTS IN THE GENESIS OF MEDICAL RESEARCH ON ASBESTOS

Asbestos was re-discovered during industrial revolution and became a so important success throughout 20th century, that its use increased from 350,000 tonnes annually in 1950 to 1,410,394 tonnes in 1975 (Roselli 2014). The main use, initially, was to deal with an important type of anxiety that characterised the growing cities from the end of 19th century: the fire (Maines 2005). Asbestos was, then, the perfect companion to the steam machine in the age of burning of fossil fuels. Throughout the 20th century, the mix of asbestos, cement and water to create the «*pietra artificiale*» became the main use of the fibre, used for corrugated roofs, water pipes and tanks among other products, some patented as *Eternit* (Altopiedi, Panelli 2016; Le Roux 2022; Roselli 2014; Ruers 2012).

The mineral's use was promoted as a universal good, but its harms were disproportionately borne by more-than-humans, in the territories where mining enterprises thrived, workers of asbestos mines (many of them children and women in countries of the global south), workers from industries that employed it as a raw material, the families of those workers, especially women who washed the husband's dusty clothes, people who lived around the mines and factories, and marginalized communities where the cheap material dominates the landscape (Tweedale 2000; Mazzeo 2020; Silveira, Budó 2021). As Rose (2022) demonstrates, when examining modernist literature, asbestos is just part of the landscape.

The industrial use of asbestos was meant to be taken for granted, because together with the wonder it caused from its properties and profitability, asbestos-products were discursively constructed to be known as saviours, and not as risky objects (Rose 2022). How would José Arcadio's eyes widen in wonder if Melquiades had presented him with an indestructible, fireproof cloth instead of a magnet? What visions would have consumed his imagination if confronted with such a magical mineral? And what irony if after creating countless objects from this substance, he would feel its microscopic soul awakening within his lungs? Would Melquiades have cautioned him about displacing the white veins from rocks? And would José Arcadio have heeded such warnings before irreversible damage was done?

José Arcadio would probably keep himself in denial, just as it happened when the discovery that the mineral used in more than 3.000 manufactured objects had devastating health and environmental impacts. It revealed the limits of modernity's confidence in technological solutions. And even the change in the perspective did not change a lot the approach towards the new risks discovered. This is why Bruno Latour affirms that asbestos is one of the lasts modernist objects: «once an ideal inert material, it became a nightmarish imbroglio of law, hygiene, and risk» (2004: 23).

Asbestos embodies the end of an era in which uncritical faith in technological progress was – and in some ways it still is – dominant. At the same time, the recurrent logics of finding technical solutions for problems caused by technical rationality is present in many ways during its history. From the anxiety regarding the risk of fire, to the anxiety of discovering an asbestos-related disease, the fact is that the success of asbestos is also a way to deal with these emotions that challenge rationality. And as with fire, which is as natural as asbestos, we are again dealing with the fear of the wild, the fear of nature. This fear also challenges the «modern man», because it is the confirmation of finitude in an already disenchanted world (Federici 2017).

The scientific method constitutes one of the mechanisms through which modern rationality organizes this fear, by controlling what was conceived as mysterious, wild, and risky. It operates as a regime of truth, in *foucauldian* terms, that establishes who can speak authoritatively about risk and which forms of knowledge are deemed legitimate (Foucault 1980). This apparatus simultaneously reduces vulnerability and fragility resulting from the recognition that human beings - even the modern men - remain part of nature. Nature brings to the modern men the

persistent reminder that despite success in business and wealth accumulation, death can be postponed but never avoided (Danowski, Viveiros de Castro 2016; see also Budó 2026).

Merchant's (1980) study about one of the most well-known British pioneers of the scientific method is insightful. Francis Bacon (1561-1626) was not only a philosopher, but also the Attorney general and Lord chancellor of England under king James I. He participated of torture, conviction and murder of several women punished with life for witchery. The courtroom was the main source for the imagery he used to delineate his new scientific objectives and methods, by treating nature as a female to be tortured through mechanical inventions (Merchant 1980: 172). Mies and Shiva (2014) show how the true horror that nature, racialized bodies and women cause to the modern man, making science becoming a monoculture of ideas, and segregating all knowledge that did not come from its realm to be understood as inferior. Coloniality of knowledge is one of the consequences of the scientific method, allowing this hierarchization to become part of the colonial matrix of power (Quijano 2000; Mignolo 2018).

Interestingly, the first records of concerns about the possibility of asbestos producing harmful effects on the health of factory workers did not come from the scientific field, dominated by white men of higher classes who had access to education in the global North. They came from reports by factory inspectors, more specifically, from one of the first lady factory inspectors in England. In 1898, Lucy Deane noted the «evil effects of asbestos dust» after observing particularly dusty working conditions in a poorly ventilated cellar workshop. Deane collaborated with a medical inspector who examined asbestos dust microscopically, revealing its «sharp, glass-like, jagged» particles. She connected these physical properties to observed health impacts, distinguishing asbestos from other industrial dusts (Greenberg 1994; Spurgeon 2012).

Her investigative approach differed significantly from male counterparts. According to Greenberg (1994), Deane spoke confidentially with workers at their workplaces, visited them at home and in hospitals, and consulted with medical staff about cases. This methodology, rooted in direct worker engagement, likely enabled her discovery of asbestos hazards. However, this report wouldn't gain attention at that time. In addition to the fact that their enunciators were women, the numerous daily reports of violations of the Factory acts, exploitation, and abuses made asbestos become just one of the many dangerous objects to which workers were subjected (Greenberg 1994: 502).

Almost thirty years after that, it was on the dissected lungs of a working-class woman that the first scientific publication on asbestos related disease appeared. Nellie Kershaw was born in Rochdale, UK, in 1891. When she turned thirteen, she became part of that group of women factory workers about whom Lucy Deane had written her reports as a factory inspector. The girl started working in a cotton factory in 1903, and five months later she started another job in a local asbestos company. In 1917, she moved to work at *Turner brothers asbestos company*. Tweedale (2000: 11) informs that there «she became a rover in the spinning room, working on machines that twisted strands of asbestos. Meanwhile, she had married and had one child». At the age of 31, Nellie visited her doctor complaining of shortness of breath. And it was without air that she died on March 15th, 1924. In the publication where her lungs were macro and microscopically analysed by Cooke (1927), the scientific eye was not focused, however, in the context where the mineral particles found a home.

The many deterritorializations that asbestos have had in the industrial chain - from rock to bodies and to transport, to more bodies, to the mills, and to the bodies of workers and neighbours in these territories – is well conceptualized by Mazzeo (2020) through the notion of «embodiment». Mazzeo developed this concept through her ethnography in Osasco, Brazil, where ex-workers of *Eternit* repeatedly affirmed to live with «dust inside». Amaral's ethnographic work with ex-miners of *Sama* mining company in Brazil also reflects this idea through the expression «having a chest full of dust» (Amaral 2019). In the interviews I conducted or directed in Casale Monferrato, Barcelona, and Osasco, similar expressions emerged: «ce l'ho il polverino» [I have dust inside], «yo comí amianto» [I ate asbestos], «tenho amianto no pulmão» [I have asbestos in my lungs]. This idea appears very concretely in the minds of people who acknowledge that this dust is neither organic nor dissoluble. They embody the microscopic fibres in their present lives, but the fibres will survive them: asbestos existence and human body existence follow different temporalities.

This notion of «embodiment» is well illustrated in the first scientific reports in the Uk, which named a specific disease entity (Rosenberg 2002) called *pulmonary asbestosis*. Simultaneously, however, these reports success-

fully applied a rigorous technical, rational, and efficient approach of *disembodiment*. I am referring here to Cooke's, McDonald's, and Simson's studies, published respectively in 1924, 1927, and 1928 in the *British Medical Journal*. The three studies were conducted by pathologist physicians, with the two first working on Kershaw's *case*, and the third working on *cases* of South African asbestos miners and mill workers.

The word "case" is highlighted because it represents the publications' process of depersonalisation of medical data obtained from patient's bodies. By reducing people's histories and contexts to *cases,* doctors gained objectivity and scientific authority within the modern medical rationality that was, at that point, still consolidating. As Rosenberg (2002) notes, the microscopic images of tissue sections in all three publications exemplify the kind of objectification that this technical approach brought to medical sciences in this period, an entire causal rationality disconnected to the experience of life of particular individuals: they transformed knowledge derived from the «embodiment» of asbestos into «disembodied» knowledge, allowing for broader generalization (Rosenberg 2002: 242-243).

The bodies described in all the three studies are asbestos ones, called «foreign» and «curious» bodies (Cooke 1927: 1025; McDonald 1927: 1025; Simson 1928: 885). The *foreign bodies* found in Nellie Kershaw's lungs, after her premature death, are considered a landmark in medical literature by most authors who write about asbestos health issues (Tweedale 2000: 15). Through a short report made by Cooke in 1924, later published in more detail in 1927, where he invented the disease entity called *pulmonary asbestosis*, Nellie became known. The study of her lungs and how the disease is reported by Cooke also reveal how pathological anatomy, then a new scientific field, was characterised from its inception by narrow conceptualizations. As Braun (2008: 63) explains, diseases were viewed «as specific, isolatable entities produced by physical, chemical and biological agents that slowly and fitfully replaced more fluid and non-specific understandings of disease centred on complex physiological interactions with the environment».

The *cases* studied by Simson (1928) in South Africa involve black indigenous bodies from Southern Rhodesia (now Zimbabwe) who worked under huge pressure within the rule of the British empire. These *bodies*, unnamed in the papers, provided the necessary data for publication in a British journal. As Braun (2008: 73–74) argues, in the colonial context, «knowledge produced by British and South African scientists was never deployed to address the health needs of the black majority – nor was it meant to. Healthcare services were virtually non-existent in South Africa for the majority of South Africans». After describing the nature of the foreign bodies and their probable connection to the leather-like appearance of worker's lung tissue caused by fibrosis, Simson (1928: 885) argues that «at the same time, the history of pneumonia and protracted recovery must be taken into consideration since an unresolved pneumonia with subsequent fibrosis is not an uncommon occurrence amongst natives working on the mines in South Africa». This normalisation of disease and death among workers also explains why little was done even after the publication of these articles.

In analysing these first studies about asbestosis in Britain and South Africa, Braun (2008) exposes the colonial roots of modern science. According to her, these studies failed to generate regulatory action or compensation because of the workers' social context: they were black natives in the structure of a British colony. Later, these same populations would live under the Apartheid regime.

It is now widely known how science has been used to deny asbestos harms to postpone any regulation, compensation policies, and bans (Tweedale 2000; McCulloch 2002). However, there is also «everyday science», the standard scientific process of modern science, which has reproduced problematic assumptions: the absence of liability for companies, the emphasis on individual responsibility for illness, and the disregard for class, gender and racial contexts in which workers were confined to. Moreover, the gender dimension remains ignored, despite women's documented presence in asbestos mining during this period (McCulloch 2002). Indeed, the asbestos research agenda marginalised the social dimensions of disease, being moved by the interests of keeping industry's profits rather than promoting ways of preventing disease and alleviating suffering (Braun 2008: 74).

Reflecting on the paradoxes of «disease specificity» arising from the conception of diseases as «abstract entities as ever more precise mirrors of nature», Rosenberg (2002: 251) explains how intractable are the social dilemmas that emerge from this technique. First, how the use of disease categories performs cultural work by enforcing norms and defining deviance when actors fail to comply with the rules. This pattern extended to co-factors in lung diseases, where workers could be labelled «deviant» for smoking, poor nutrition, or continuing to work while

ill. The second social dilemma connects to this first one but focuses on what Rosenberg (2002: 251) terms «the bureaucratic imperative».

The main theory created to avoid compensating workers and to postpone public awareness emerged in these first three decades of the 20th century and remains active: the idea of *safe controlled use of asbestos* through technical solutions spanning medicine and engineering. It can be seen in a publication from 1930 in the Uk, where E.R.A. Merewether, the medical inspector of factories, and C.W. Price, the engineering inspector of factories, published a report divided into two parts: medical knowledge would reveal «the facts that the inhalation of asbestos dust over a period of years results in the development of a serious type of fibrosis of the lungs», while the engineering knowledge would provide «the remedy for these conditions in the suppression of dust» (Merewether, Price 1930). According to Menéndez Navarro (2002: 64), this document was not only the turning point of asbestos regulation in the Uk, but it also shaped «the perception of asbestos health hazards as being potentially controllable in the Uk during the interwar years. This perception rested to a high degree on a narrow definition of asbestos-related health problems and on an increasing reliance on technological solutions».

The separation of knowledge into medical and engineering domains serves to compartmentalise the issue and to reassure policymakers and industries that asbestos use could continue safely under regulated conditions, postponing a deeper reckoning with its risks. At the same time, it outsources the responsibility to the state to control trough vigilance the accomplishment of the regulations and keeps the stakeholders apart from information and decisions. Trough the hierarchy of knowledge, it is not the real experience of exposure by workers, their families and other people exposed to asbestos who finally influence the official discourses on asbestos risks, but the conclusions appearing within the language of the «mind» and supposed objectivity of modern/colonial science, that bring credibility for scientists to be able to say the truth. The hierarchy of knowledge that separates the workers' approach from the scientific approach detaches the voices of the people directly exposed to the risks of illnesses and death – who are seen as «body» by modern science, and the use of modernist tools to create an environment in which suffering can be denied, connected with the «mind» (Harding 1991).

THE CONCRETE EFFECTS OF THE SUPREME FEDERAL COURT'S ASBESTOS «VIRTUAL» BAN BETWEEN CONSENSUS AND CONTROVERSY

The judicial saga that resulted in the virtual ban of the use of asbestos in Brazil began long before, when *Abrea* (Brazilian Association of People Exposed to Asbestos) was still taking its first steps in the art of organized resistance or counter-powers (Scavone et al. 1999). By intertwining testimonies of illness, suffering and death with constitutional articles, the asbestos victim's movement, created and influenced the ban laws that would eventually cover various Brazilian states. Each state ban law carried different nuances: some abruptly banned asbestos, others designed a gradual transition. However, one by one each of the ban laws had their constitutionality challenged before the Supreme court. The laws involved the states of Rio Grande do Sul (ADI 3357/RS), Pernambuco (ADI 3356/PE), São Paulo (ADI 2656/SP; ADI 3937/SP), Rio de Janeiro (ADI 3406/RJ; ADI 3470/RJ), Mato Grosso do Sul ADI (2396/MS), and the municipality of São Paulo (ADPF 234/SP) (Budó 2021).

At center stage, the National Confederation of Industrial Workers (*Cnti*) wielded two arguments: the union's legislative competence and the principle of free enterprise. The first argument was a federative debate about who can legislate about what. The second, an almost religious invocation of the free market. Curiously, the association that proposes continuing to use asbestos in all these states is one of workers, which is, however, inclined to the interests of the businesses[1].

[1] According to Giannasi (1995: 135), *Cnti* is a «bureaucratic structure of the official Brazilian unionism, inherited from Getúlio Vargas's dictatorship in the 1940s, represents the majority of workers in the Civil Construction industry, a sector where worker organization is still incipient».

At the beginning of the 21st century, these arguments proved effective, and the Supreme court declared the unconstitutionality of the first state ban laws. But jurisprudence began to meander through new paths after the National Association of Labour Magistrates (*Anamatra*) and the National Association of Labour Prosecutors (*Anpt*) filed in April 2008 the Direct action of unconstitutionality n. 4066 to declare unconstitutional the entire article 2 of the federal law that regulates asbestos use in Brazil (9055/1995). It was no longer just a dispute about legislative competencies - now the debate has reached the heights of fundamental rights: human dignity, health, environment.

Within this new judicial action, other voices started to be heard. In 2012, Justice Marco Aurélio Mello, rapporteur of ADI 3937/SP called a public hearing before the Supreme court to debate asbestos-related diseases and the need for the ban. Foreign and national experts, people organized within social movements, politicians and other sanitary, health and labour authorities participated in this moment.

Five years after that, the Supreme court not only declared São Paulo's ban law constitutional but went further: the decision should overthrow article 2 of Law 9055/95 itself, which still allowed the use of chrysotile asbestos in Brazil. The decision was made by five votes against four. Notwithstanding, the Supreme court's decision unfolded into a labyrinth of appeals, deadlines, and interpretations in the last seven years. The virtual ban on asbestos materialized in a paradoxical reality: from 2019, the fibre was simultaneously prohibited and permitted, banned and exported, condemned and profitable.

Amid this legal theater of the absurd, Latin America's only asbestos mine, operated by *Sama* in the heart of the state of Goiás, performed its own movements: between "hibernation" and operation, and, within the state-corporate symbiosis (Tombs 2012; Barak 2015), influenced the declaration of state of emergency for mass unemployment. The asbestos industry found ways to use the structures of political power to keep going their profits through bureaucracy's interstices. Under the baton of Governor Ronaldo Caiado, the Legislative assembly of Goiás approved in 2019 a law allowing asbestos extraction only for exportation. The constitutionality of this law has been challenged since then through ADI No. 6200 (Brasil 2020), while the Legislative Assembly of Goiás moves its own pieces on the board to arrive to a new law in 2024, proposing a five-year deadline for the mine's closure. Within the ADI 6200, two Supreme Court Justices have already manifested in favour to the idea of giving more time to the mining company to close the doors.

Losing votes, winning effects

The five Supreme federal courts' (Sfc) winning votes in the decision for the asbestos ban in 2017 were based on documents, national and international norms, and scientific experts' statements about the impossibility of existing a safe controlled use of asbestos, the reality of the mines and factories not only in Brazil, and in juridical arguments, such as the precautionary principle.

Even if the official decision for majority finished being for the ban, by analyzing the movements of the court in the last seven years, I argue that the real decision, the one that has had concrete consequences relies elsewhere. And here, magical realism comes to describe how the bureaucratic organization of the Sfc resulted that the Justices who voted against the ban have been exactly the ones who are deciding in all the incidental lawsuits allowing the company to keep extraction, beneficiation, transportation and exportation of asbestos.

Four different issues have been discussed in different lawsuits regarding the enforcement of Sfc's decision, having three important characters as protagonists. The first protagonist is Justice Alexandre de Moraes, who is the rapporteur of ADI 6400, regarding the unconstitutionality of the state law of Goiás; Moraes is also the rapporteur in the case of a class action by the Federal prosecutors from Goiás, who demanded the closure of the mining company after the Sfc decision. The second character is Justice Gilmar Mendes, who is the rapporteur of a constitutional reclamation proposed by the *Brazilian chrysotile institute* regarding the flow of production through the Port of Santos, where São Paulo's law (which was declared constitutional by the Supreme federal court) is in effect. The third character is Justice Marco Aurélio Mello, who was the rapporteur of another case in which the possibility of terrestrial transportation of asbestos throughout São Paulo's territory is being discussed.

In each of these cases the monocratic and provisional decisions made by the three justices were of benefit to the mining company. The arguments used in these last decisions are mostly formal, not connected to the arguments used by the same actors against the ban. However, I argue here that they are actually enforcing their own perspectives against the asbestos ban. This is why analyzing the rationality behind their losing votes in the ADIs 3937 and 4066 is important.

The main argument used by the justices in their losing votes in 2017 regards the attributions of the different powers. According to the three of them, the decision about the ban should be done by the Legislative. Justice Alexandre de Moraes, for example, argues that the same evidences of asbestos carcinogenesis existent in 2017 were already existent in 1995, when Law 9055 which prohibit amphibole asbestos and regulated chrysotile asbestos was approved in the parliament. According to him, «there was no creation of a regulation here that ignored the technical-scientific studies informing the need for protection of health and a balanced environment. What seems to have happened was a consideration by the legislator, evaluating all the issues that the legislator should evaluate, but always focused on the protective idea» (Brasil 2017: 98). This rhetoric, however, ignored the fact that in Brazil amphibole asbestos existed only in a few deposits, and that the biggest mine produces only chrysotile.

Justice Marco Aurelio Mello, who was the rapporteur of the ADI 3937/SP, brought a visible relativization of asbestos risks by comparing it with other substances:

> Paracelsus, the Swiss physician from the Renaissance – whose occupations included medicine, alchemy, physics, and astrology, and whose pseudonym means «superior to Celsus» (a Roman physician) – used to say that the difference between poison and medicine is only in the dose [...] The presenters at the hearing emphasized that even water, when ingested in excess, can lead to death – a disease called hyponatremia. The same applies to any other chemical substance, no matter how healthy it may initially appear. (Brasil 2017: 189).

His rhetoric reaches another level of comparison, when he cites some of the experts of the public hearings who denounce the absence of effectiveness of the regulation, considering that the companies conceal with the results of medical examinations of the workers, and communities have denounced the disposition of asbestos tales around the factories. He states that: «If asbestos should be prohibited because of the risks it poses to the community due to improper use, perhaps one should ban, with greater reason, sharp knives, firearms, motor vehicles, and ultimately everything that, outside of normal use, is capable of causing harm to people» (Brasil 2017: 191).

The bodies affected by diseases caused by asbestos exposure are completely away from the debate, showing how denial can come from rationalizations of harm (Cohen 2001), which is exactly performed by the safe controlled use of asbestos thesis. Even if the Brazilian Association of Exposed to Asbestos (*Abrea*) named experts to talk on their behalf, it is fact that their living experiences became out of the votes of these justices. The hierarchy of knowledge within the Sfc's decision is evident when we see who the most cited experts in the losing votes are.

The independent scientist and the international division of scientific labour

In a previous work, I studied six cases of publications about asbestos risks in which scientists and editors of medical journals were engaged to express and recognize concerns about possible undeclared conflicts of interests; to challenge methodologically or argumentatively these studies; or to employ their credibility and status to support the authors (Budó 2021). The research corpus was composed of documents found through the search tool PubMed, using the expressions «chrysotile» AND «amphibole hypothesis» OR «chrysotile biopersistence. » From the 80 results, I selected only those which had comments, letters to the editor, *corrigenda* or *errata*, resulting in 23 texts (articles and comments), two *errata* and one *corrigendum*, organized in six cases. In that study, I employed grounded theory to comprehend, among other issues, what is the image that these researchers and editor construct as the ideal-type of the *independent scientist*, and what language they use to approximate (themselves or their allies) or to distance from it (the others and their allies), depending on the political position occupied in a dispute for truth. By recognising the values attached to the dispute for truth, I was able to find some strategies – research misconducts included – adopted by authors to prevent having their papers accused of bias.

The analysis of biased scientific research followed specific criteria for identifying conflicts of interest, which are detailed in the former publication (Budó 2021). I systematically examined: (1) funding sources disclosed in scientific publications; (2) institutional affiliations of authors; (3) subsequent revelations of undisclosed conflicts through corrigenda and editorial notices; (4) citation patterns in legal documents and policy debates. Scientific articles were categorized according to their stance on asbestos regulation, funding sources, and methodological approaches. Legal documents were analyzed for direct citations of scientific literature, with particular attention to how international scientific discourse circulates within Brazilian judicial reasoning. This systematic approach revealed patterns of knowledge circulation from conflicted global North scientific publications to Brazilian legal decisions.

First, they try hiding conflicts of interests (*Cois*). There is a pattern where the revelation of *Cois* appears years later, only after being denounced to the editor. However, when this happens, *Cois* appear in a different link, making it more difficult for the reader to see it. I then called this «a strategy of detaching the conflict timeline from the article timeline» (Budó 2021: 86). This pattern reveals a structural problem with *Coi* disclosures post-publication, where critical information about potential bias remains effectively segregated from the primary content that can continue to influence scientific discourse.

This is the case of some papers in which one specific name called my attention, since I read it in all public hearings held in Brazil about asbestos in the last 30 years. David Bernstein, a Swiss expert consultant is one of the authors accused of hiding conflicts of interests, and he is also one of the experts cited by Justices Luiz Fux and Marco Aurelio Mello who positioned themselves against the asbestos ban in Brazil. In the public hearing where he appeared in 2012, he does not disclose his ties with the *Brazilian institute of chrysotile*, and the payments he received from *Sama*.

One of the *corrigenda* (2012) I studied in 2021 was about four articles this scientist co-authored. The *corrigendum* appeared years after the publication of the original papers in the Journal *Inhalation Toxicology*, making that even the people who read the article after the publication of the corrigenda will not necessarily see the disclosure of *Cois*, because it only appears if the reader clicks a link. This detachment can be revealed in the metrics of the pieces, according to Table 1 below:

Table 1. Visibility disparity between the corrigenda and the original papers.

	Views	Citations	Altmetrics
Corrigenda (2012)	1050	4	21
Article 1 (2008)	1958	33	7
Article 2 (2008)	2135	33	7
Article 3 (2010)	1512	32	10
Article 4 (2011)	954	20	0

Source: The author.

The visibility disparity between the original articles and their *Cois* disclosure present a concerning pattern. Looking at individual comparisons, each of the original articles received substantial attention: Article 1 (1,958 views, 33 citations), Article 2 (2,135 views, 33 citations), Article 3 (1,512 views, 32 citations), and Article 4 (954 views, 20 citations). In contrast, the corrigenda revealing conflicts of interest for all four articles received only 1,050 views and 4 citations.

The way these authors that practice research misconducts so easily navigate the structures of power behind the scientific publications make that they can be cited in lawsuits and in political reports in Brazil without being recognized as having these ties. Engaging with Connell et al. (2018), I employed in that study the term «international division of scientific labour» to mean that «'truth' is produced by scientists from the global metropole who accumulate methods and theories, leaving for peripheral regions the role of being sources of data and reproducers of those methodologies and theories» (Budó 2021). With Quijano (2000), I affirmed that «science produced in the

global North can travel in time and distance, as universal knowledge; science made in the global South is seen as local, specific, and exotic knowledge» (Budó 2021).

In this sense, the international division of scientific labor organizes the characters who can internationally dispute truth within a colonial structure, and it has been the way through which *Coi* concealment and support of harmful decisions assume this concreteness. With Castleman (1995), I also argued that this is one layer more in the traditional route that makes the toxic industries move to the global South together with the migration of ways of thinking and speaking about the health risks of asbestos. Therefore, «the migration of harms in this context is not only about exploring an *abstract* place of production of truth, that is science, but mainly exploring the *concrete* place of exercise of power occupied by *science produced and published in the global North*, within an international division of labor» (Budó 2021: 93).

Within this framework, the concrete consequences of research misconduct can be found in terms of temporalities. «When talking about the impact on political decisions of banning or not banning the fiber, the actors are representing consequences of projecting harm to the future. When talking about judicial decisions that can be made within litigation for injured workers, they are representing consequences of denying harm produced in the past» (Budó 2021: 89).

The main objective of these publications appears to be to create controversy (Michaels 2008) about asbestos risks by using different strategies: controlling the discourse of risk by activating the tool of temporalities and differences in the exposure patterns; differentiating the types of asbestos to support the argument that Brazilian chrysotile fibers can be safely used; separating state regulation and state control, by absolving the companies and implicating the State as the one responsible for the illegal exposures.

The international division of scientific labor produces prestige for Northern authors, even when they are «defending the indefensable» (Mcculloch, Tweedale 2008). The method is the migration of ways of thinking and denying the health risks of asbestos, the same one that postponed for decades asbestos regulations and bans in the global North.

The activation of the notions of progress, innovation and technology appears as a strategy of using a sense of temporality and historicity to frame controversy and risk in the past. This idea appears in Bernstein's papers, such as, for example: «although today chrysotile is the only type used commercially, the legacy of past use of amphibole asbestos remains» (Bernstein 2014: 366). The author also associates chrysotile to risk with verbs conjugated in the past tense, sustaining that they are out of date, as in the following sequence: «Although early studies correlated severity of illness in 'asbestos'-exposed workers with the dustier jobs [...]» (Bernstein 2014: 366). By saying that controversy is something from past exposures they produce doubt. This finding connects to the literature that shows how industry funding to science leads to a process called «manufacturing doubt» (Michaels, Monforton 2005; Michaels 2008).

Bernstein's ideas appear to be the main basis for some of the losing votes of the Brazilian Justices cited above. For example, Luiz Fux:

> It is also important to emphasize that there are no precise current statistical data regarding diseases related to asbestos. As well emphasized in the Public Hearing, the records in this regard date from more than 30 years ago, at a time when protective legislation for workers was incipient and asbestos exploitation was carried out mainly with the amphibole type, which is extremely harmful, even by contemporary safety standards (Brasil 2017: 166).

Within this framework, the discourse of safe controlled use, inaugurated in the first papers on pulmonary asbestosis one hundred years ago continues to be the main thesis used by the asbestos industry though with more complex features. At the end of the day, they are all connected to values of modernity, circulating through colonial structures of power, polemizing, however, with the real experiences of the people affected. It operates as what Foucault (1999) would term a technology of biopower - a mechanism that manages populations by determining which lives are worthy of protection and which can be exposed to risk. However, Achille Mbembe's (2003) concept of «necropolitics» provides a more precise analytical framework for understanding how the Brazilian state operates

in the asbestos case. While Foucault's «biopower» focuses on the administration of life, Mbembe's «necropolitics» reveals how sovereign power exercises the right to kill – or to expose certain populations to death – through seemingly rational governmental mechanisms (Budó 2026).

The most recent decisions in the incidental lawsuits that have prevented the ban from being enacted are probably the best materializations of necrocapitalist logic (Banerjee 2008). Until July 2025, four justices have voted on the merits of ADI 6200, the constitutional action that challenges the 2019 Goiás state law allowing asbestos extraction for export. All of them favour the declaration of unconstitutionality. However, two of them, Justices Alexandre de Moraes and Gilmar Mendes voted to give more time to the city of Minaçu's mayor and to Goiás state's governor to create economic alternatives. Regarding the issue of extracting asbestos exclusively for export, both recognise that it «has a highly harmful character to the ecologically balanced environment and the health of people who come into contact with the mineral, if not locally, at least in the global context» (Brasil 2019). The problem with the contamination through the production chain of asbestos appears in their reasoning, which concludes with an astonishing quotation of one of the most cited articles about the global asbestos disaster by Furuya et al. (2018), estimating that «every 20 tons of asbestos produced and consumed kills one person somewhere in the world». These numbers, however, did not change the minds of the Justices, whose votes continued to be for postponing the ban enactment.

Using Furuya et al. (2018)'s mortality estimates and *Sama*'s export data, each life lost to asbestos exposure was effectively valued at approximately US$ 1,642 - a price determined not by abstract market forces, but by the concrete decisions (Budó 2026)[2]. This necropolitical calculation reveals how modern legal rationality naturalizes the intolerable, transforming the unacceptable into normal through juridical mechanisms of «legal certainty» and «exceptional public interest». These planned deaths, among Brazilian miners or Indian factory workers to which most of Brazilian chrysotile asbestos is exported, can reach approximately 10 thousand/year, considering Furuya's et al. projection and *Sama*'s production (Budó 2026).

Beyond the notion of technique to control dust exposure, there is another strategy which is the attempt to refer to asbestos with the modern Manichaean way of seeing the world, by separating it in two categories of good and bad: serpentines, or chrysotile asbestos would prove to be the good asbestos; while amphibole asbestos would be the bad one. This elevation of white asbestos or chrysotile was so well accepted in the political world that a convention of OIT (162) included it to the point that only the amphiboles were recommended to be immediately banned. For chrysotile asbestos there was only a recommendation for its gradual replacement for other fibres in the industry. At this point, the word *asbestos* started to disappear from the vocabulary of the industry and of the lobby as a marketing strategy, replacing it for chrysotile in order to disassociate the continuity of fibre exploration from the harms already known and repercussed by the mass media in the global North (McCulloch 2002; Mcculloch, Tweedale 2008; Ruff 2008).

These strategies navigated worldwide in the direction North-South wherever asbestos industry has continued existing. Together with these strategies, other features that magic realism can help to narrate are the assumed notion that: *first*, the victims of this huge public health crisis are exactly the asbestos companies, formed by entrepreneurs who were ignorant about the risks caused by the mineral. The people directly affected, who got ill and died of asbestos-related diseases appear to be kind of collateral harms in these discourses, the same way they are treated by conventional scientific "objective" rationality when their lungs have been studied for the last one hundred years. It is by hiding and objectifying the actual victims, within a racialized and genderized hierarchy of knowledge that science has also contributed to denialism. Second, that asbestos itself appears as the bad guy in the whole centenary history. The discourse against nature operates through rational argumentation that legally absolves corporate owners who possessed knowledge of risks while concealing such information to maintain economic interests; and, at the same time, it prevents that the people considered «collateral harms» to be compensat-

[2] Based on Furuya et al.'s (2018) mortality ratio of 1 death per 20 tons of asbestos, *Sama*'s 2023 exports generating 427 BRL (US$82) per ton revenue are projected to cause 9,500 global deaths, yielding an implicit economic valuation of US$1,642 per life lost (total export value US$15.6 million ÷ 9,500 deaths).

ed and to achieve any kind of justice when they suit the companies. Organized resistance by international networks of asbestos-affected communities provides counter-narratives to these necropolitical arrangements (Silveira 2018; Budó 2019; Mazzeo 2020), challenging not only the monoculture of ideas of modern/colonial hierarchy of knowledge, but also the necrocapitalist logic that transforms suffering bodies into acceptable costs of economic development. These movements reveal the possibility of alternative epistemologies that center the voices of those most affected by industrial hazards, refusing the designation of their lives as expendable (Budó 2026).

CONCLUSION: THE MINERAL EXILE AND THE COLONIAL HIERARCHY OF BREATHING

The labyrinthine trajectory chosen by Brazilian institutions to decide on the status of asbestos in Brazil has indeed revealed itself to be a magical realism novel, where in the search for change, everything tragically repeats itself, like a self-fulfilling prophecy. If initially the constitutional battle had begun through reciprocal attacks on articles of norms of different hierarchical levels in the Brazilian legal system to become something like a judgment on the harmfulness of chrysotile asbestos, what the "virtual" ban really meant, in the combination between Judiciary power (Supreme Court), Legislative power (Legislative assembly of the state of Goiás) and Executive power (the governor of Goiás), was another type of ban.

In 2020, when Sama announced the restart of its operations in Minaçu, a subtle metamorphosis occurred: what was witnessed was not a ban, but a *banishment*. As in a perverse historical mirror, the mineral now followed the old colonial routes, but in reverse: expelled from national territory, it found refuge in foreign lungs. The semantics here is not mere wordplay. In Portuguese, "banir" carries in its etymological entrails the double meaning of *prohibition* and *banishment*. And it is precisely in this duplicity that we find the key to understanding how an object can be simultaneously prohibited and exported, condemned and commercialized. The vacuum left by the Supreme Court's decision was filled not only by a new state law in Goiás but by an old and familiar logic: that of exile as a solution.

In Portuguese ordinances, banishment was more than punishment - it was an instrument of colonization. It was a combination of punishment and utility (Toma 2009). The banished, these bodies unwanted by the metropolis, transformed into useful pieces of the colonial project. The British empire, in its time, perfected this art of useful banishment. According to Rushton and Morgan (2013), the banished bodies of the UK were not just removed - they were transformed into labor force in the colonies, into instruments of the imperial project. Today, when Brazil allows asbestos extraction 'exclusively for export,' this historical pattern repeats itself: peripheral territories continue to be receptacles of the undesirable, now under the euphemism of development, and hiding the practice of environmental racism (Ferdinand 2022).

These territories, which Zaffaroni (1991) appropriately called «continental concentration camps», no longer receive just enslaved bodies or white exiles to «occupy» «empty» spaces. Now, they receive the toxic inheritances of industrial capitalism and modern rationality. The World Bank and other international agencies, in their project to 'industrialize underdevelopment,' created the perfect conditions for asbestos, this industrial exile, to find new lungs to inhabit (Frey 2013).

Thus, when we observe Brazil's current stance, so criticized by the global North, we see that it is less an anomaly and more a predictable chapter in the global history of the asbestos industry. A history where banning in one territory often means merely redistributing risk to other bodies, other lungs, other territories - following the old colonial routes and always respecting the global hierarchy of breathing.

This pattern of selective denialism of the asbestos industry and other industrial hazards must also be understood in their original context, since they were created for and successfully achieved the goal of postponing the bans in the global North. As Robert Proctor (1999) demonstrates in his analysis of governmental regimes and public health, states have historically engaged in selective protection and sacrifice of social bodies. The asbestos case reveals how scientific knowledge can be mobilized both to protect certain populations while exposing others to risk. Within the global North itself, marginalized communities - working-class populations, racialized groups, and

peripheral regions - faced disproportionate exposure to asbestos when other parts of Europe were already fighting the industry and claiming for the ban (Petrillo 2015).

In the narrative that emerges from the judicial process concerning asbestos in Brazil, a discursive structure is revealed which, when analyzed through the lens of magical realism, exposes disturbing parallels. Just as in García Márquez's *One Hundred Years of Solitude*, where time folds upon itself and causality defies conventional logic, the asbestos case presents a legal reality where a mineral is simultaneously banned and permitted, villain and victim, in a century-long saga of scientific denialism that evokes Melquiades' encrypted manuscripts. As Conniff (1990) argues, José Arcadio's amazement with the objects and scientific knowledge, makes him to believe that « [....] science, like all uplifting things, must come from elsewhere [...]. Then, imperialism becomes much easier to justify (Conniff 1990: 174).

The displacement of blame – from human agents to the natural element – connects to the displacement of victimhood – from the people affected to the businessmen who will be forced to deal with the end of their economic operations. Both the workers and the ex-workers, now or in the future surviving deadly diseases are seen only as collateral effects, which can be read in Justice Marco Aurélio Mello's affirmation: «When speaking of «controlled use of asbestos» - or «safe use» - «zero risk» is not presumed. There is no public policy without *side effects*, without people and interests being affected. *Government action, in any case, creates winners and losers*» (Brasil 2017: 192).

For more than a hundred years, the asbestos saga has been sustained by a scientific apparatus deeply rooted in colonial and patriarchal epistemology. The doctrine of «controlled use, » which still legally supports the extraction of the mineral in Brazil, emerges as a chapter of scientific magical realism – the almost supernatural belief that a recognized carcinogenic element can be tamed, domesticated, controlled. Like Melquiades' magical objects that José Arcadio Buendía believed he could completely decipher, asbestos was treated as an enigma that modern science could solve through its instrumental rationality moving towards the interests of capital. How would that be if instead of learning from a modern/colonial science, José Arcadio challenged the need for nature domination to collectively construct knowledge useful for the good of Macondo? What if differently of discovering and rediscovering notions already known within modern science, José Arcadio understood that, as Harding (2016: 1068) argues, «the European scientists again and again «discovered» what the indigens already knew about the natural world of the Americas by simply asking the latter what they knew».

Yet, even as this modern magical realism unfolds, resistance persists—in the voices of affected communities, in decolonial knowledge practices, and in collective movements that challenge the colonial logic of expendable territories and bodies—suggesting that unlike the Buendías' predetermined fate, the movements of victims are already rewriting the ending of the asbestos saga toward justice to stop the colonial hierarchy of breathing.

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