books & ideas

Toxic Urban Land

About: Scott Frickel & James R. Elliott, *Sites Unseen: Uncovering Hidden Hazards in American Cities*, Russell Sage Foundation

by Pascal Marichalar

Urban soil endures ubiquitous and serious pollution from past industrial activities. This pollution is invisible and undifferentiated, which invites us to amend theories of environmental justice.

In *Sites Unseen*, sociologists Scott Frickel and James Elliott welcome us to an "environmental detective story" (p. 15). The evidence lies beneath our feet, and the crime is ongoing: pollution accumulated in urban soil over decades of past industrial activity. It is known as "relic pollution" or "legacy pollution", caused by heavy metals (lead, mercury, arsenic, etc.), hydrocarbons, persistent chemicals (such as polychlorinated biphenyls—PCBs), whose impact on the health of present and future populations is potentially severe.

The book follows in the footsteps of political ecology works that believe we pay too much attention to waste caused by consumption, and not enough to that generated by production. Building their own data set for four cities in the United States, Frickel and Elliott quantitatively demonstrate the pervasiveness of the threat posed by polluted soils, and analyze the reasons for its invisibility. They politely yet firmly condemn the moral bankruptcy of the regulatory agencies responsible for this issue, who focus solely on the tip of the toxic iceberg, i.e. sites where large facilities have operated for long periods of time, while ignoring the multitude of smaller sites with shorter lifespans that are equally polluting nonetheless.

In doing so, the book also develops some interesting theoretical proposals in at least two directions: through a theory of urban change that extends the urban ecology approach of the early Chicago School of sociology by focusing on changes in land use and the displacement of facilities and populations; and through an approach based on environmental justice theory which—without challenging the fact that destabilized, racialized populations

(defined here on the basis of census data) are the most vulnerable to industrial pollution generated by still-active industrial sites—highlights the fact that no class or race can avoid relic pollution.

Methodology: an Archeology of Toxic Knowledge

Frickel and Elliott's approach is both representative and systematic. They choose four major US cities that are sufficiently diverse in terms of their social, racial[1] and industrial history to give a broader scope to their results: New Orleans, Philadelphia, Minneapolis and Portland (Oregon). With their students, the authors set out to build an original database, which they name the Historically Hidden Industrial Database (HHID).

They first select a standard list of industrial sectors identified for their propensity to pollute the lands on which they operate: chemicals, metals, machine tools, transport equipment (chiefly shipbuilding and repair), oil and plastics. They then rely on historical sources—State Directories of Manufacturers—to determine the periods of activity and the location of all establishments operating in these sectors between 1960 and 2008. The list is comprehensive, regardless of the size of the institution, and even includes relatively short periods of activity. The location is then linked to the census tracts, in order to study changes in land use over time and link the map of potentially polluted soils with population shifts.

It is important to note that the approach taken by Frickel and Elliott differs radically from that of US regulatory agencies. Since the environmental laws of the 1970s and 1980s (e.g. the creation of the Environmental Protection Agency (EPA) and the establishment of the Superfund program for the decontamination of large industrial sites), the agencies require a statement of pollutants emitted by firms employing more than ten employees or producing over 25,000 pounds of toxic waste per year. Smaller firms are not compelled to do this. Likewise, any pollution caused before the regulations were established is absent from inventories. With regard to lists of potentially contaminated sites, the agencies tend to focus on major industrial plants and on small commercial sites: former dry-cleaning businesses, gas stations and car repair shops. In contrast, the two sociologists focus on all industrial sites, regardless of their size.

Is past industrial use of a land parcel necessarily an indication of soil pollution from heavy metals, hydrocarbons or PCBs? The authors cannot answer that question because they have not tested the soil they are studying. However, they cite what they believe to be one of the only studies available on the subject. This shows, in a specific urban context, that there is a 75-95% chance that parcels formerly occupied by industrial facilities are indeed

[1] The word "race" and its compounds are used here in reference to their American context of enunciation.

contaminated.[2] The authors also highlight the fact that the laws regulating the production of polluting waste have led manufacturers to bury their toxic waste underground instead of declaring it. Their database is therefore a call to test urban soils. Frickel and Elliott, unlike authorities who refuse to take a look into any "unreported" land for fear of what they might find, and out of despondency as regards the action that will then be required, deliberately decide to bury their head in the sand.

Exposure to Pollution through Urban Renewal

To summarize urban transformation, the two sociologists propose a theory of "socio-environmental succession". This follows on from the theory of ecological succession proposed by Robert Park in 1936, adding the question of soil quality. It aims to account for the way in which the uses of urban territory change over time, and can bring people into contact with the products of former polluting activities.

The key concept put forward by Frickel and Elliot is that of churning. "Industrial churning" takes place in a specific location: it is the tendency for the same parcel of land to be used over time for various industrial (and non-industrial) uses. This idea of churning should also be understood in a spatial sense. Like a game of musical chairs, industries move from parcel to parcel over time, leaving their potential footprint on ever-larger land sites.

The quantitative and geo-localized study of industrial churning, as enabled by the authors' database, leads them to question many observations that once seemed self-evident. Frickel and Elliott show that the average lifespan of an industrial facility on a given parcel is relatively short, almost always less than ten years. They highlight the fact that deindustrialization has not reduced the rate of industrial churning, i.e. the number of successive industrial uses of the same parcel over a given period: because American industry employs less, but produces more than before; and industrial sites have diminished in size, but not in number. As for spatial churning, it is not really contained by municipal zoning policies, which are supposed to define and separate areas of residential, commercial and industrial use. The reallocation of an industrial parcel to a new industrial use is the exception rather than the rule.

On the map of the four cities studied, the number of dots corresponding to potentially polluting industrial sites doubles every twelve years or so. The number of potentially polluted parcels increased six-fold between 1960 and 2008. In 2008, around 70% of parcels in New

[2] Frank Noonan, Charles A. Vidich, "Decision Analysis for Utilizing Hazardous Waste Site Assessments in Real Estate Acquisition", *Risk Analysis*, 12(2), 1992, pp. 245-251, https://doi.org/10.1111/j.1539-6924.1992.tb00672.x

Orleans—the least industrial city of the four—had been the site of one potentially polluting activity; in Philadelphia, this was the case for 100% of parcels.

The authors also study changes in the populations of these cities. Residential churning rates are calculated on the basis of the race or level of income stated in the census. By observing the rate of predominantly black neighborhoods that become white, the rate of wealthy neighborhoods that become poor, and vice versa—as well as the speed of these transitions—it becomes possible to estimate the scale of the population change that is occurring.

Behind these calculations, the question raised by the authors is this: how many people have been in contact, at some point in their residential trajectory, with potentially polluted soil? The churning rates calculated are inevitably imprecise, as they are unable to account for any population changes within the same category (for example when a white family moves and is replaced by another white family), or for any changes in income within households that do not relocate. However, they do give an approximation that makes it possible to gauge the co-presence of inhabitants and potentially polluted soil. The authors' chief discovery is that residential churning is the norm, rather than the exception. Only a few neighborhoods at the two extremes of the income distribution scale tend to retain the same inhabitants on a long-term basis.

Everyone Is Affected

By cross-referencing the description of the industrial churning of land parcels with that of residential churning, Frickel and Elliott add an important nuance to those approaches generally included under the label of "environmental justice". Since the 1980s, these works have shown that precarious and racialized populations are more likely to live near polluting sites.[3]

For Frickel and Elliott, this is indisputable when large, active sites are taken into account whose industrial activity is visible and which are controlled (nominally if not actually) by regulatory agencies. However, as soon as small, inactive sites—absent from official inventories—are included, whose parcels have usually been converted for non-industrial purposes, the situation becomes more complex. On the one hand, the growing number of potentially polluted parcels broadens the spectrum of populations involved. On the other hand, the maps show that the areas with the largest number of relic sites are located in city centers, which, through gentrification, are now being invested in by whiter and more affluent populations. The authors list different neighborhoods that illustrate this conversion of former

[3] For examples of works inspired by this approach, please refer to the *Environmental Justice* journal, https://home.liebertpub.com/publications/environmental-justice/259/editorial-board.

heavily industrial sites: Northern Liberties in Philadelphia, the Pearl District in Portland, the Mill District in Minneapolis and the Bywater district of New Orleans. Unsurprisingly, the logistic regressions undertaken by the authors do not show any effects of race or income level on proximity to potentially polluted soils. Their work does not set out to challenge the idea of environmental injustice but rather to add a codicil to this notion, to specify that inherited pollution also affects populations of higher social status, more than one might think.

Forgotten and Invisible Pollution

In the past, Scott Frickel has carried out research in areas of undone science as part of a broader questioning of the creation of ignorance and doubt surrounding the toxic effects of certain chemicals.[4] It is therefore not surprising to find this theme recurring in his latest book, one of whose nagging questions is: what is the proportion of potentially polluted sites that remain unknown and invisible? And how can this invisibility be explained?

The cross-referencing between the HHID database and that of regulatory environmental agencies is striking. In the worst case (New Orleans), only 1% of the potentially polluted parcels identified by Frickel and Elliott appear on the agency's inventory; in the best case (Portland), the figure stands at just 10%. These differences are primarily due to the voluntarism of cities when it comes to pollution control. A city like New Orleans, which spends limited resources on this issue, has identified just 24 potentially polluted sites, unlike the environmentally-aware city of Portland, which has counted thousands. Overall, however, the overwhelming finding is that of the under-recognition of potentially polluted sites.

How can agencies' lack of knowledge of the field be explained? The authors believe that they focus on risk containment rather than systematic control and prevention. Working on tight budgets and with a reduced number of staff, it is in their interests to focus only on the most important and visible sites, whose size also offers the greatest potential for real estate development.

If agencies do not see this potential pollution, can the same be said of residents? To answer this question, the two sociologists randomly selected 100 potentially polluted parcels for each of the four cities studied, then sent their team to find out what they were currently being used for. This second part of the study reports that at least 75% of parcels that have had an industrial use in the past are now given a different use. In other words, they no longer show any signs—wasteland, disused warehouses—that might warn people of the potential

[4] Frickel, S., Gibbon, S., Howard, J., Kempner, J., Ottinger, G., & Hess, D. J. (2010). Undone Science: Charting Social Movement and Civil Society Challenges to Research Agenda Setting. *Science, Technology, & Human Values*, 35(4), 444–473. https://doi.org/10.1177/0162243909345836

hazards of the soil. Moreover, 16-30% of potentially polluted parcels are now given residential or "public" (civic) use, for example as a park. If the site does not look how it used to, do the oldest residents not remember it as it was? This is where the observation of high residential churning takes on its full significance. As the former inhabitants move away, recollections of soil pollution fade.

What about France?

At the end of the book, readers are urged to continue the authors' approach using a proposed method for reproducing the database in the American city of their choice. Can this call be extended to French readers? France need not be ashamed of its intellectual engagement on this issue. As early as the 1980s, the French geographer Frédéric Ogé, unquestionably a pioneer in the field, stressed the need to develop a systematic inventory of "potentially polluted sites" (an expression he popularized, partly to avoid legal problems). He surmised that they could number in the hundreds of thousands. France began to tackle the issue in 1994. An inventory was developed at departmental level, based on archive consultations. The database contains industrial sites, whether in use or not, that are likely to cause environmental pollution. The results can be found in the geolocalized database BASIAS (database of relic industrial sites and service activities, www.georisques.gouv.fr). This inventory differs from that of polluted sites (BASOL), which was also started in 1994 (https://basol.developpement-durable.gouv.fr/), and is the French equivalent of the inventory of land parcels monitored by American regulatory agencies. These inventories have a national scope that the Frickel-Elliott database lacks. On the other hand, one obvious limitation of these databases is that they are compiled under state authority, according to logics that do not correspond entirely with those of scientific research. Nonetheless, there has been a recent renewal of research into these issues, as shown by the recent work on the pollution of the Marseille calanques (rocky coves)[5] or the Revisols project being undertaken in the Lyon area.[6]

Another limitation, common to both the book discussed here and the French approach, lies in the limited time depth. Frickel and Elliott started their inventories in the 1960s, not because there was any lack of previous industrial inventories, but so as to use roughly equivalent census and spatial categories throughout the period studied. In France, the previous industrial uses of parcels showing no signs of current or past industrial activity (wastelands) are generally not included in the BASIAS database, unless expressly reported.

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5 Xavier Daumalin, Isabelle Laffont-Schwob (ed.), *Les calanques de Marseille et leurs pollutions. Une histoire au présent*, Aix-en-Provence, REF.2C Éditions, 2016.

6 Revisols, Renouvellement de la ville et sols pollués ou potentiellement pollués, 2015-2018, coordinated by Stéphane Frioux. This project has received funding through a thesis on this subject, currently being written by Marine Canavese.

In a country with a long industrial history, the question of time depth takes on a particular significance. Due to the non-degradability of these pollutants, a lead smelter from the Middle Ages will cause the pollution of a land site today to the same extent as a more recent industrial facility.

Ultimately, the undeniable contribution of Frickel and Elliott's book lies in its parcel-by-parcel approach and the concept of churning rates. This systematic approach makes it possible to objectify the way in which the invisibility of pollution has been constructed over time, without assuming any intention, purely by the dynamics of cities and land capitalism. Another noteworthy contribution is the nuance added to analyses of environmental justice, which, far from reducing the political scope of past work, should serve to convince a wider audience that we are all affected by these issues.

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