

Chemical Kinship: Interdisciplinary Experiments with Pollution

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Abstract

Feminist technoscientific research with chemicals is proliferating. This paper considers how this scholarship extends environmental justice research on pollution. We are concerned with two key questions: How can we do/design ethical research with chemicals? And what methods allow for researching chemicals without resorting to an imagined space of purity? We consider unfolding projects which reorient relations with chemicals from villainous objects with violent effects, to chemical kin. We imagine chemical kinship as a concept, an analytical tool, and a mode of relating. Emerging through feminist and anticolonial work with chemicals, chemical kinship involves a tentativeness towards making normative claims about chemicals because, like kin, these materials are never entirely good nor bad; at once, they can both be enabling and harmful. This paper considers what the unfolding research with chemicals generates and consolidates conceptualizations of chemical kinship; we ultimately articulate an agenda for ethical research with chemicals as an experimental process of invention.

Balayannis, Angeliki, & Garnett, Emma. (2020). Chemical kinship "Keeping them down": Chemical Kinship: Interdisciplinary Experiments with Pollution. *Catalyst: Feminism, Theory, Technoscience*, 6(1), page 1-10.

<http://www.catalystjournal.org> | ISSN: 2380-3312

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Introduction

Feminist technoscientific research with chemicals is proliferating. This paper considers how this scholarship enriches and extends environmental justice research on pollution and its violent effects. We are concerned with two key questions: First, how can we do and design ethical research with chemicals? By this we mean, how can we do research that takes into account effects of living with chemicals and pollution without producing “disaster-based research”—scholarship that reinforces the very infrastructures that we seek to critique (Liboiron, Tironi, & Calvillo, 2018). And second, what methods allow for researching chemicals without resorting to an imagined space of purity? This paper will outline a series of unfolding projects that move beyond representations of chemicals as villainous objects to practices of intervening with chemical kin. Chemical kinship is a concept, an analytical tool, and a mode of relating. Emerging through feminist and anticolonial work with chemicals, this particular notion of kinship involves a tentativeness towards making normative claims about chemicals because, like kin, these materials are never entirely good nor bad; they can be both enabling and harmful (Agard-Jones, 2013, 2014; Lamoreaux, 2020; Liboiron, 2019; Murphy, 2018). The paper has two specific aims: first, to think across different research projects that we have found offer innovative ways of working with chemical relations, and second, to extend conceptualizations of chemical kinship by approaching research and practice as processes of invention (Marres, Guggeinheim, & Wilkie, 2018).

Making Sense of Chemicals

Across the humanities and social sciences, chemicals have hitherto been narrated as a grim spectre that wreak havoc with the natural order of things; they remain focal points for fears of the of the harmful capacities of technological progress (Bensaude-Vincent & Stengers, 1996). Of course, there is much to be concerned about. Industrial chemical production, consumption, and disposal is structured around violent political economies. These processes unfold through, and reinforce, axes of injustice. But to reduce chemicals to their violent effects is to deaden their capacities and overlook their material politics. For the social sciences, chemicals have, up until recently, largely remained within the epistemological purview of environmental justice research. This work has mapped structuring relations of power and developed an important attunement to the unevenness of chemical exposures. But environmental justice research can be quick to reduce chemicals to their violent effects, overlooking the material ways

they participate in the structuring of social and political life. This has repercussions for political action—as Nicholas Shapiro, Nasser Zakariya, and Jody Roberts argue (2017), “quantifying and contextualizing a potential toxicity also works to direct us towards straightforward, but potentially superficial, solutions” (p. 579).

In response to the limits of knowledge practices that quantify and contextualize toxicity, an ontological and epistemological interest in the chemical is unfolding—what is increasingly being articulated as a “chemical turn” (Liboiron et al., 2018; Romero et al., 2018; Shapiro & Kirksey, 2017). Researchers experimenting with modes of sensing and sensing technologies are leading this shift, reimagining exposure, and reframing the (human) body from a site of violence to a site of knowledge with capacities for collective political action (e.g., Calvillo & Garnett, 2019, Gabrys, Pritchard, & Barratt, 2016; Ottinger, 2010; Shapiro, 2015). In geographic research, even the most coherently defined pollutants have been shown to be materially unstable and always in transformation (Liboiron, 2015; Balayannis, 2020). The tendencies of chemicals to overflow the boundaries of toxic sites, and the scientific methods for defining what is harmful or not, remain challenges for research and regulation because they render invisible “the qualitative conditions of toxicity” (Calvillo, 2018 p. 372). Not taking seriously the socio-material relations of chemicals runs the risk of reproducing infrastructures that generate environmentally embedded violence (Liboiron et al., 2018; Murphy, 2012; Shapiro et al., 2017).

Take air pollution, for instance. Government monitoring stations often measure fine particulate matter, or PM_{2.5}, as weighed mass to determine whether safe limits have been reached. However, it is increasingly recognized that smaller particles are the most harmful to human health. Furthermore, these particles also have unruly interactions with other airborne pollutants. Measurements and legal standards in chemical worlds co-construct each other in ways that enable certain kinds of responses whilst always producing blind spots and therefore inaction (Hepler-Smith, 2019). Codes, categories, and molecular models render chemicals analyzable and manageable (Balayannis, 2020). However, these representations “don’t just depict a world “out there”; they also have the recursive power to condition and sediment how people come to see the world” (Myers, 2015, p. 129). Approaching chemicals in terms of their relations is a way to move beyond the molecular and to open up new possibilities for research and action.

To continue to develop this work, we argue that research with chemicals requires methods that are more inventive—methods that are participatory and experimental. Drawing from Marres, Guggeinheim, and Wilkie (2018), we imagine

invention as “an active search for alternative ways of combining representation of, and intervention in, social life” (p. 18). Like other critical researchers we find data practices a practical starting point for building chemical kinships because chemicals are often quantified as data. By critically examining how data are made and used we can intervene in the actions they enable and foreclose. This is a response to the call from Shapiro, Zakariya, and Roberts (2017), for a wariness to the collaborations social science and humanities researchers make with science in the name of environmental justice.

Chemical Interventions

Three ongoing collaborative research projects are outlined here to consider how multiple voices around chemicals can be facilitated in ways that allow for other forms of engagement and imagination to take place. These different interdisciplinary projects involve research practices that facilitate new social formations around chemicals. These examples are in no way a representative sample; nor do we aim to provide a comprehensive analysis that the richness of these ongoing projects demand. Rather, we are interested in the specific ways each of these projects work with chemicals as data in order to materialize chemical relations through social, ethical, and politically meaningful forms of engagement.

The first project is Air South Asia,¹ a platform set up by air quality scientist Pallavi Pant and environmental health scientist Anobha Gurung. Air South Asia disseminates and catalogues information on various aspects of air pollution, and its impacts on health; environment/climate; and the economy. This platform facilitates users to connect with policy, research, and public engagement initiatives around air pollution. As well as providing easy access to different sources of pollution and emissions data, the platform also shares critical discussions and everyday stories about air pollution and place-based actions to improve air quality. Along with a range of numerical data sets, interviews with different “stakeholders” provide multiple viewpoints and experiences on this complex issue. The platform is a space where data practices (from making measurements to telling stories) creatively support knowledge translation in ways that are actionable and relevant to affected publics. Although there are epistemological challenges in drawing connections between environment and health data, or making claims based on anecdotal evidence, the strength of collating different knowledges is that these practices begin to make lines of responsibility visible.

Data are not only used to plug evidence gaps, they can also materialize responsibility and offer new pathways for action that regulatory data in isolation often erase or close down. This is something to which the second project—The Asthma Files (TAF)²—is particularly attentive. TAF is a collaborative ethnographic research project that supports the sharing of diverse kinds of data and analysis (see Fortun et al., 2014). Like Air South Asia, this bringing together of different data as an interpretive practice creates discussions beyond the dominant narratives of scientific uncertainty and the call for more data (Shapiro et al., 2017). TAF starts with asthma and its complex relationship to air pollution, and the challenge this relationship poses to environmental public health. Asthma demands an attunement to chemical kinships. The data archived in TAF takes many forms, including the analysis of scientific publications; interviews with scientists and practitioners involved in policy and activism; media coverage; and photo essays. Through this research, the project empirically and analytically fleshes out ways to imagine new connections for collaborating with governance regimes.

TAF also harnesses the complex gene-environment interactions that are shaping contemporary scientific understandings of asthma (Fortun et al., 2014b). In a practice like exposomics (Vineis et al. 2017), for instance, the search for environmental exposures and universal molecular features is reconfiguring disease risk, including asthma. Yet it is unlikely that this 'holistic' and dynamic view of chemical exposure will be sufficient for identifying complex causal mechanisms that can enable political responses (Garnett, 2020). For TAF, the challenge of making sense of the relations between disease and lived environments is a starting point for multiplying understandings of exposure and generating cross-disciplinary dialogue.

Our third example of research that facilitates new social formations around chemicals is the Mexican Exposures (MEXPOS) project.³ Led by anthropologist Elizabeth Roberts in collaboration with environmental health scientists, MEXPOS works with chemical data and chemical knowledges through the relations they mobilize and (re)produce. Like TAF and Air South Asia, attention is focused on data's analytical and inventive potential and is similarly realized through a research platform that is open to different kinds of data and expertise. Roberts collaborates with scientists who are undertaking longitudinal environmental health research on early life exposures to environmental toxicants in Mexico through molecular analysis of chemicals in bodies. She performs ethnographic research with the families involved in this study to produce data on "household and neighbourhood environments and geopolitical processes relevant to the

production of bodily states” (MEXPOS, n.d.). The resulting “bioethnographic” research platform includes a coding lab where new scientific methods merge with inventive ethnographic practices (E. Roberts 2017; 2019). By joining ethnographic observation with biochemical sampling, this project generates new understandings of how body-environment interactions shape health and inequality.

Chemical Kinship

These three projects refuse to start with overdetermined objects of concern. Through their expansive approach to data practices they instead facilitate modes of analyzing chemical relations that keep lines of inquiry open, and multiply possibilities for action. Chemical kinship in this context is a form of inventing the social (see Marres et al., 2018). We invoke the concept of invention to queer the notion of kinship as lines of ancestry. This is also, in part, a response to the call to make multi-species kin as a matter of survival (Clarke & Haraway, 2018). In doing this, we move beyond enduring concerns with life and the biopolitical (see Povinelli, 2016) to bring materials into the more-than-human fold. This expands relations of care and responsibility to the stuff routinely reduced to hazards and harm. Our entanglements with these chemicals are of course intensely fraught (J. A. Roberts, 2010), demanding approaches that inquire more creatively into what a kinship with plastics or pesticides, for instance, might look like. The collaborative and participatory ways of working with data considered here help us imagine what making good kinship with “bad” kin might look like. They assemble alliances through the careful curation of data in ways that have new analytical and political potential.

Returning to our opening questions, these projects are examples of ethical research with chemicals because they intervene in how chemical relations are materialized in ways that reject an imagined space of purity. There are three key dimensions to good chemical research present in each example that we would like to highlight as we conclude this paper: first, these projects have extended temporal relations of care—a sense of obligation to the material over time, sustained through the involvement of different actors. In highlighting this expanded temporal engagement, we recognize that the political economy of research often resists this form of work; the neoliberal university’s demand of “high productivity in compressed time frames” (Mountz et al., 2015, p. 1236) places boundaries on our ability to develop chemical kinships in research. Second, these extended and slow relations are made through infrastructures—platforms, archives, coding labs—as spaces for participation and collaborative analysis.

Infrastructures that allow for and anticipate the involvement of different voices expand what counts as a data practice and open up possibilities for different chemical relations. And third, by variously involving citizens, comparing “expert” knowledges, and combining methods, each of these projects are fundamentally interdisciplinary. They refuse to smooth over ontological and epistemological differences in data and instead use them as starting points for making in(ter)ventions⁴.

Acknowledgements

We would like to thank Fay Dennis, Emily Jay Nicholls, and Jade Henry for the opportunity to present an iteration of this paper in the Centre for Invention and Social Process (CISP) at Goldsmiths College, University of London in December 2019. This work has developed in conversation with many others over the past year, and we would particularly like to thank Andrew Barry, Véra Ehrenstein, and the contributors to our “Chemical Kinship” session at the 2019 Royal Geographical Society (with IBG) Annual International Conference in London. Emma Garnett would also like to acknowledge financial support from the Economic and Social Research Council ES/R008612/1.

Notes

1 Air South Asia, <https://airsouthasia.org>.

2 The Asthma Files, <https://theasthmafiles.org>.

3 Mexican Exposures (MEXPOS), <https://sites.lsa.umich.edu/mexican-exposures/>.

4 We borrow the term *in(ter)ventions* from the 2019/20 CISP Salon Series on “Care In(ter)ventions,” organized by Fay Dennis, Emily Jay Nicholls, and Jade Henry at Goldsmiths College, University of London.

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