

An excess of thought, or the thinking materials of research

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Abstract

Researching an elusive material like groundwater means working through intermediaries, patchy data, partial perspectives, and material traces. Each of these leaves its own residue on the product of research, and different modes of access offer different outcomes. In this essay, I consider these residues as moments of excess which sit outside the correlational bond between object and concept. I then apply the methodological concept of “research-assemblage” (Fox and Alldred 2015) to consider how particular episodes from my PhD fieldwork in Chennai belong neither to researcher nor subject but constitute other forms of thinking that affect research.

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Gazing into holes in the ground, Santhome (Chennai), January 2018.

I'm standing in the open courtyard of a school in Santhome in the company of Dr Sekhar Raghavan, a water activist and director of Chennai's Rain Centre. It is late January, not far from the high-water point of the year after the retreating monsoon has passed bringing most of the city's annual rainfall in a few months, and the purpose of the visit is to assess the level and quality of groundwater in a number of shallow open wells within the school grounds.

Less than a kilometre to the east of us is Marina Beach and the Bay of Bengal, into which run the three rivers that brought material down from the central Indian plateau to settle here. These alluvial deposits now form the coastline and the plains further inland. Chennai's geography is highly variegated, but in coastal neighbourhoods in the south of the city a thick mat of sandy alluvium exists above a rocky base and holds fresh water, often only a few metres below ground level. This water is extracted by residents via open wells and replenished during rains via constructed percolation pits, which compensate for the lack of permeability of urban surfaces.

Sekhar Raghavan will advise the school on the design and installation of such structures, meant to improve vertical infiltration of rainwater into the near-surface sandy strata. As we stand in the courtyard, the saline

waters of the bay continue underneath our feet as a wedge of saltwater permeating the alluvial deposits, below the freshwater layer. The saltwater wedge rises and falls with the freshwater table, meaning that when there is not enough fresh water in the ground, either because of lack of recharge, or over-extraction, the saltwater rises to take its place. I know this because I read it in a paper on the hydrogeology of Chennai, and saw and copied sectional diagrams which described the coordination of wedges of pressure. But also because other people I spoke to had described it to me, saying ‘the shallow aquifer is like the river flowing just below the surface of the earth and it is flowing into the sea’. Raghavan warned me about wells being dug too deep and ‘puncturing’ the saline layer.

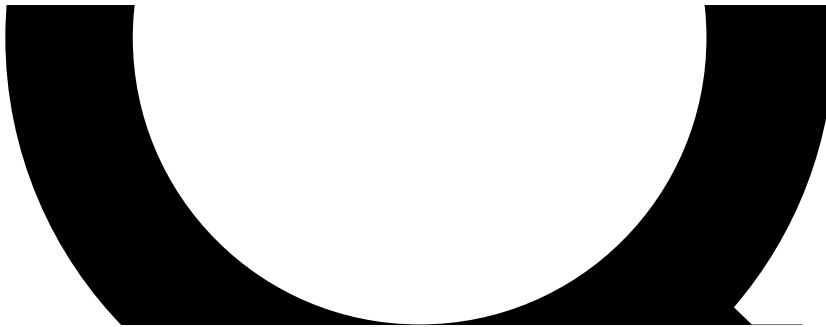


Figure 1: Coastal groundwater section, after Ballukraya and Ravi, 1998, and others. Well a draws no water as the water table is too low, well b is too deep and draws saline water, well c draws fresh water.

Removing the concrete cover from an open well near the edge of the dusty courtyard, we peer into the cylindrical chamber, as two others lower a small copper vessel tied to a heavy rope, determining that the current water level is 4.1 metres below where we are standing. As they tell me this, I am drawing the section in my mind, the information corroborating those curved lines in sections I have seen in diagrams. The next stage is to determine the general quality of the drawn well water by measuring total dissolved solids (TDS) using a handheld meter. TDS refers to the content of mostly dissolved ionised solids (salts) as well as very small suspended particles. Inexpensive, readily available handheld meters are able to measure TDS by determining the electrical conductivity (EC) of a water sample, since EC is a result of the separation of ions of the dissolved solids, meaning that the level of conductivity is proportional to the concentration of dissolved solids.¹ The solids content is derived by equation and expressed in terms of milligrams per litre or parts per million, with 500 ppm being the standard ceiling for fresh water.

But the meter is broken, or the batteries are dead. No problem: stepping in, Raghavan tastes the water in the pot, thinks for a moment, and confidently states: ‘It must be around three hundred to four hundred ppm. I have tasted a lot of water, so I can say from experience. I have calibrated myself!’

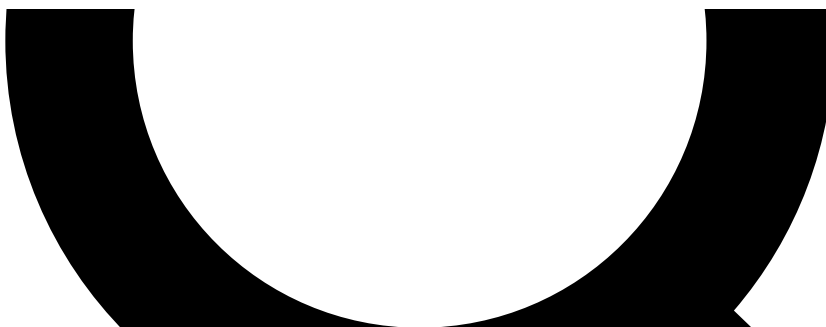


Figure 2: Gazing into holes in the ground, Santhome (Chennai), January 2018.

On another, warmer day – this time in July – I am on my way to Pulicat Lake from the geology department at Anna University. The destination is a trial project to investigate the efficacy of percolation pits in improving groundwater through managed aquifer recharge (Raicy et al. 2012) in rural areas, to raise the water table and reduce salinity. I am following two researchers who, as part of their regular fieldwork, will be undertaking sampling, pumping tests, and recording physical parameters of water from a recharge well. Physical parameters (pH value, EC, TDS, oxidation-reduction potential) will be tested on-site, since the properties may change once the water is drawn from the ground, and over the time taken to get it to a lab. So, the lab goes to the field. The site is suffering from high levels of seawater intrusion, with initial TDS recorded at around 4000 ppm. A percolation pit has been constructed to increase the recharge rates and reduce the salinity of the shallow groundwater.

Field measurements are messy, involve transport of equipment, constraints of access (we initially reach a locked gate, and later there is no road, so we carry the equipment across fields to reach the site), clearing the site of overgrowth, blowing dust out of sensors. There are grapples with electronic devices, batteries to change, calibrations to adjust. A digital Eureka SUB 2 is used for physical parameter tests, whilst chemical testing kits are used to identify carbonate and bicarbonate in the water. Depth is measured by means of a tape with a weight attached and a conductor which beeps as it reaches the water level. A pumping test, involving an electric water pump attached to a diesel generator, measures transmissivity and storativity (direct properties of the aquifer rather than the water itself). Water is pumped out of the recharge well and into buckets for as long as it runs clear. Then recheck the level. The water coming through at the end is dark grey and thick with sediments: the tubes need to be cleaned or ‘surged’ to remove silt. Broken clay and bricks gathered from around the site are added to the wells to reduce silt build up.

There is a great deal of sitting around, and the tests take most of the day. One of the researchers goes off to buy some plastic pipe to extend the piezometers, which are subsiding and now sitting too low to the ground, meaning sand is getting in. There is not enough water in the tubes to take an accurate level. During this time, I make a number of sketches in conversation with the researchers. These sketches help me to understand what is happening, by prompting further conversations, corrections and even disagreements. They help produce a sense of the event beyond what is immediately apparent, moving back and forth between what can and can't be seen. They raise questions about extent: how far should the drawing continue, and where should it be cut off? I make judgements about what gets included.

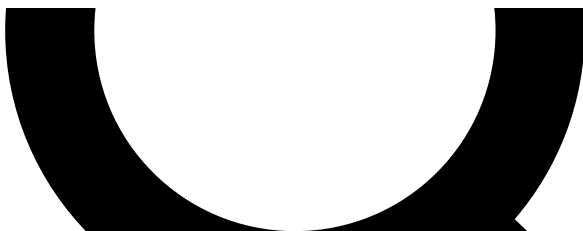


Figure 3: A sketch section made on-site during field measurements.

Thought and things

These two accounts are prompts for thinking about how the materials of research are co-producers of knowledge: how research emerges not only from a network of collaborators, interviewees, sites, chance encounters, and missed opportunities, but also through a material assemblage of instruments, ions,

standards, bodies. Such accounts are examples of the ways in which my research approaches groundwater through interlocutors of many kinds. In some cases, I use secondary data sourced from scientists, in others I follow them around and record my impressions of their work, methods and results. At other times, I rely on newspaper reports, official documents and whatever I can access. Researching groundwater is working with something which I have no direct access to (being invisible, physically out of my reach and always in movement). So, groundwater is drawn into visibility through a variety of descriptive and representational practices – both my own and those of the people I have been working with. Already in the accounts above, groundwater is made perceptible by a bucket on a string, a sensor, a hydrological section, units of measure, taste, the feeling of pressure, an anecdote, and other instruments and technologies of access.

Recounting these stories offers a different picture of groundwater than one that would emerge out of any one singular form of representation. Both episodes are excessive in that they are full of mixed and contradictory impressions that do not fit the format of question-and-answer research, and which might often be edited out from its reported results. One question I am asking myself here is of how to ‘write up’ such fieldwork in a way that pays attention to the networked and contingent nature of scientific knowledge production. That science is far from exceptional to these kinds of fortuities, a view which has been well established by feminist science studies, particularly in the work of Donna Haraway (1988), Isabelle Stengers (2000) and Karen Barad (2007). Barad’s elaboration of ‘performativity’ (2003) as a critique of representationalism – the idea that representational forms of knowledge are independent of the physical world they represent – is a particularly useful starting point here. It prefigures the problem of ‘correlationism’ defined by the speculative realist philosopher Quentin Meillassoux as ‘the idea according to which we only ever have access to the correlation between thinking and being, and never to either term considered apart from the other’ (2008: 5). That is, thoughts are predicated on the subject-object relationship, and we (the knowing subject) only have access to that relationship (the representation, or knowledge), and not to the object itself. Thought is therefore both something that happens outside of matter, and as an act of perception: we only have access to the correlation between thought and thing, and not to the thing itself. The subject and object are tied, and co-dependent. Objects/things exist to us only by being apprehended or ‘thought’, and they exist to us as-thought, rather than in-themselves.

I introduce this discussion because I think it is useful here to consider where we recognise ‘thought’ in research. This is an ontological question with significant implications for both epistemology and methodology. Stengers reminds us that an important step in the philosopher of science A. N. Whitehead’s method is accepting the thing as an unknown (2014: 17). This is the very opposite of research which attempts to ‘know’ its subject, and Whitehead’s term ‘prehension’ is designed to decentre the human subject (the one who ‘apprehends’ nature) in favour of an ontology of relations (Whitehead 1925: 69). The speculative realists attempt to overcome anthropocentric readings of the world by proposing alternative realisms, doing away with the Kantian settlement whereby ‘everything knowable is radically reduced to the status of phenomena [...] Everything is reduced to a question of [...] human access to the world’ (Harman 2009: 155–56). But Meillassoux’s particular approach is to strip away all thought from matter, suggesting that ‘life is radically discontinuous with mere matter and that thought is radically discontinuous with mere life’ (Shavero 2014: 75). In this, he follows twentieth-century psychologists such as James Gibson (1979), who separated perception (as a conceptual experience) from the ‘objective’ physical space or phenomena itself, its materiality and texture. This schema’s assumption is that matter is inert and outside of meaning-making. This stripping away of being from thought deprives matter of its liveliness and agency: the capacity for

experience and creativity.

This conception of thought offers no means of considering the productive capacities of research materials. I am drawn instead to Steven Shaviro's dramatic inversion of Meillassoux: the proposition that thought is an immanent property of every-thing. Or, that 'thought [...] is everywhere rather than nowhere'; 'thought is always there already' (2014: 82). Shaviro follows Barad and Stengers in describing the will to decouple objects from concepts, which has dominated modern European scientific thought, as totally human-centric and unnecessary: it is still based on the idea that human perception and cognition are somehow special. It refuses to ascribe these possibilities to other matter that is non-human. What if, instead, we allowed human perception to take its place alongside the many ways in which entities prehend each other, as ontologically equal? This would mean also taking seriously the implications of Barad's entanglement of ontology and epistemology (2007) for research methodologies.

Why I think Shaviro's inversion is useful is that if thought is something common, ordinary, this backs up the view that something (as in a state of matter) cannot be 'gotten at' by observation and reduced to knowledge, but needs to be thought with in specific moments and understood in those contexts. It might be helpful to approach this question from the other side, thinking about an excess of thought. Where does the non-correlated part of thought, the 'out there', go?

Research-assemblage

The implication of this is that the focus of my research is not the thing (groundwater) in the sense of what it is, but the relational assemblage, following Deleuze and Guattari's (1987) ontological emphasis on processes of becoming over states of being, and on interactions over objects. Drawing on this framework, Nick Fox and Pam Alldred propose the methodological concept of 'research-assemblage', comprising 'the bodies, things, and abstractions [...] including the events that are studied, the tools, models and precepts of research, and the researchers' (2015: 40). This framing attempts to account methodologically for the new materialist understanding that both events and knowledges are produced by relational assemblages, and that researchers are material individuals within a world of objects and agencies (Coole and Frost 2010: 27). New materialism – the attempt to position human agency within a network of non-human and more-than-human agencies – of course owes a debt also to Karen Barad's reading of physicist Nils Bohr, where she notes in his approach the understanding that 'neither the subjects nor objects of knowledge practice can be taken for granted' (2007: 27):

we are part of that nature that we seek to understand [...] Scientific practices must be understood as interactions among component parts of nature and [...] our ability to understand the world hinges on our taking account of the fact that our knowledge-making practices are social-material enactments that contribute to, and are part of, the phenomena we describe (2007: 26, emphasis added).

This is to say, research-assemblages are productive, they do something, produce knowledge. They do not go out and find it. Assemblage does away with subject and object (states), in favour of affect and becoming (change), so neither can come before the other. Fox and Alldred describe this as a shift from agency to affect, i.e. from properties to relations: 'we begin to recognise research as a territorialisation that shapes the knowledge it produces according to the particular flows of affect' (2015: 403).

The accounts I started this essay with are only two of many encounters I have had with researchers from disciplines which approach groundwater in different ways. Representational practices are important stages in this: they include the self-conscious or unselfconscious descriptive/interpretive processes (Barad 1996: 174). Sekhar Raghavan's comment, 'I have calibrated myself' made me think of Natasha Myers asking whether it was, in the case of plant science, 'possible that practitioners' sensoria get "vegetalized" over the long duration of their experimental inquiry' (2015: 42). Where in Raghavan's training as a physicist, decades of inspecting wells, a lifetime of tasting water, did he 'calibrate himself' to this particular sensorial method and mechanical scale? How does this affect his ongoing work with groundwater and how might he perceive differently to other bodies, machines and registers? These questions do not refer only to established criteria but to 'an immanent process requiring the action of something which has the power to dissolve' (Stengers 2009: 29). That is, all interlocutors within the research process, human or otherwise, are being transformed by its action. It is explicitly apparent in my second account that groundwater requires its own and other material transformations to come into view, whether by the pumping of water from an already constructed site, or the mixing with other chemicals in a taxonomic experiment.

This is real, material thinking through things which demands a 'concrete operation' (Stengers 2009: 28) to perform it: 'testing, not judging', not merely observation and inference but intra-active research. This is thought that has to be taken in, experimented with and put into action. Materially engaged research becomes essential for ways of thinking rather than ways of knowing.

My PhD project is about integrating ways of thinking a world before, after and outside of human perception – ways of making the non-human world thinkable – within design. This is an interdisciplinary effort, part of an emerging mode of doing research which includes directly interlocuting with scientists but also with philosophers and sociologists of science, as well as applying both anthropological and design research methods, in hybrid forms and significantly altered through the prism of new materialism. As researchers, we are not talking about access to static objects, but of our position within ongoing processes of change: 'things move us, or force us to feel them, and by this very fact they elude the correlational schema' (Shaviro 2014: 8). This essay is about attempts to think through the creativity, originality and experience of things beyond the human – a metaphysics which immediately decentres the human mind as the locus of all thought. Feeling and being are not something that only humans do. This also means that thinking is not something humans have exclusive access to either. Attending to the research-assemblage, therefore – not only the subject of research but the whole bundle of affective, historical, disciplinary and other relations within the process of knowledge-production – is critical.

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Footnotes

¹ Hence, this method does not account for things in the water which do not have an electrical charge: pollutants like motor oil, pharmaceuticals and pesticides, or microorganisms including bacterial contamination.

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