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Limits of Localism: The Scale of Sight

Abstract: The immense productivity of local history is something to celebrate—its particularity, its texture, its fluid back-and-forth between social, ethical, and intellectual developments. At the same time, the supposition that local histories exhaust what we want to know can be very dangerous: history unfolds on a myriad of scales that do not collapse only to the micro. Look only at the local and you can miss the effects of mass actions of communication, transport, and societal mobilization.

1 Local Charm

Over the last thirty years, the single greatest contribution to our understanding of the development of science has been the turn toward the local. Local studies pushed us to consider science away from grand laws and abstract method—and toward the laboratory in its concrete historical embedding. It has meant taking instruments seriously, addressing the real interactions of experimenters, the techniques of theorists, those workaday patterns of fieldwork, lab work, collaboration, note taking, teaching, observing, writing-up, and publishing. It has allowed a near-action contextualization of science within its time and place.

Localism opposed the dead letter of *Zeitgeist* explanations, the old intellectual history that featured ideas leaping by themselves from book to book, across languages, centuries, and fields. Those *Zeitgeist* accounts, then and still, cling to such treasures as “freedom (or atomism or materialism) was in the air.” If I never again read such historiographical airware it will be too soon: let the Time-Spirit go to its historiographic grave and rest forever with the “restive working class,” the “rising bourgeoisie,” and the “decadent aristocracy.”

Localism also offered a meeting ground for anthropology and history; it was the condition of possibility for focusing in on a sufficiently restricted field of action for characteristically anthropological questions to be asked within history. By attending to microhistory, to the interaction of people with names and addresses, questions of culture could become topics of inquiry for times long past. Gifts, memorialization, carnivals—these and more could be probed with a new understanding of the relation of the play of displacement on daily life. Natalie Davis used her *Return of Martin Guerre* (in both film and print) to probe questions of identity. Emmanuel Le Roy Ladurie's *Montaillou* and Carlo Ginzburg's *Cheese and the Worms* both used Inquisition records to explore the meanings, values,

and symbols that constituted “popular,” village-scale stances toward nature and religion. E. P. Thompson’s *Making of the English Working Class* fastened on popular village games to make working-class culture into something far more than what many British historians of the era considered to be an oxymoron.¹

In the 1980s, localism made it possible to reclaim and reframe questions about scientific methodology. Back in World War II, James Conant, president of Harvard, chaired the National Defense Research Committee; from that perch he helped launch the Manhattan Project. After the war, he, along with J. Robert Oppenheimer, opposed the development of thermonuclear weapons. At the highest level of Atomic Energy Commission advisors, the Oppenheimer-led General Advisor Committee called these “superbombs” instruments of genocide; since they were so powerful, the only meaningful targets was a city the size of Moscow, London, or New York. Conant helped lead opposition to the thermonuclear program, arguing passionately against building the H-bomb—at one point, according to various accounts, saying the government would build the weapon “over my dead body.” In my view *The Harvard Case Histories in Experimental Science* were, in part, Conant’s pedagogical inoculation against a helter-skelter expansion of the role that scientific-technical affairs would play in the political-moral affairs in the world. In order to avoid annihilation, Conant believed, citizens—both scientists and non-scientists—must learn enough at the intersection of the human and natural sciences to navigate these shoals.

More specifically, Conant’s idea was this: science is science; the then-current crucial science and technology (unsaid: the accompanying nuclear weapons, rockets and radar) were inaccessible to starting students; so they would study “classic” scientific cases instead (Boyle’s vacuum, Lavoisier’s oxygen, Dalton’s atom). But since the methods of science were constant (so Conant argued), digging anywhere, properly, would reveal the nature of the stratigraphy. So why not get at the problem in simpler, older and open domains?

1 Natalie Zemon Davis, *The Return of Martin Guerre* (Cambridge, MA: Harvard University Press, 1983); Emmanuel Le Roy Ladurie, *Montaillou: The Promised Land of Error*, trans. Barbara Bray (New York: G. Braziller, 1978); Carlo Ginzburg, *The Cheese and the Worms: The Cosmos of a Sixteenth-Century Miller*, trans. John and Anne Tedeschi (Baltimore, MD: Johns Hopkins University Press, 1980); E.P. Thompson, *The Making of the English Working Class* (New York: Pantheon Books, 1964, 1963). Conversely, that same encounter of historians and anthropologists helped inaugurate what is now several generations of anthropological work that extends its inquiry from the present back into the past. One thinks not only of Greg Dening’s *Islands and Beaches* (Carlton, Vic.: Melbourne University Press, 1980) that situates the inhabitants of the Marqueses Islands in their present state and in the historical cross-fire of traders and whalers. Or Clifford Geertz’s *The Interpretation of Cultures* (New York: Basic Books, 1973).

Science, at least good laboratory-based science, was predicated on repetition—isn’t that Methodological Precept number One, Two or Three? But as Harry Collins and others showed, repetition turns out to be a remarkably difficult affair. Getting a new form of laser to work involved more than merely the reading and following distributed instructions. It often meant moving people with their “tacit knowledge” to the new site of construction. This was the kind of insight that propelled Steven Shapin and Simon Schaffer in *Leviathan and the Air-Pump* (1985) to use their case study of the vacuum pump to show that moving Boyle’s instrument required transplanting his whole laboratory world, materiel and people. In other words, experimental repetition was not automatic, not a purely protocol-driven affair. Science was, case after case argued, tied, powerfully to the site, materials, and tacit knowledge surrounding it.²

Much of my own work is bolted right to the drive toward the local: *How Experiments End* (1987) aimed to get at the ways closure occurred in physical experiments; using three clusters of experiments, I wanted to get at table-top individual experiments, small group experiments, and large-scale particle physics collaborations. In fact, out of that work on the non-aligned periodization of scientific subcultures came my interest in *more* local accounts that would require local language and exchange relations, not just local practice.³

At the bottom of all these laboratory case studies was the view that something permanent, something universal, could be uncovered in specificity. All the various accounts of the rise of experiment in the seventeenth-century disagree mightily about the conditions of that novel form of argument; and yet from Shapin and Schaffer to their strongest early modern critics, each of these chroniclers of Boyle and his contemporaries took it to be the case that, once their guy had gotten the procedures of laboratory inquiry right, they stayed fixed: the experimental method of Boyle set up a “relationship between our knowledge and our polity that has, in its fundamentals, lasted for three centuries.”⁴

What then lies at the root of so many of these laboratory case studies? What, in fact, is tacitly assumed to be the nature of science such that one can dig anywhere and excavate universal dynamics, either for all time or for a period? Fundamentally, one has to believe that (for example) the nature of experimental science is unchanging, that while the details shift, one could be discussing Dalton or Rutherford, Lavoisier or the Large Hadron Collider. I will call this form of this implicit metaphysics of science case studies, the stratigraphic picture.

2 Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton, NJ: Princeton University Press, 1985).

3 Peter Galison, *How Experiments End* (Chicago: University of Chicago Press, 1987).

4 Shapin and Schaffer, *Leviathan and the Air-Pump*, 343.

By stratigraphic, I mean to call into view an image of a vast and ancient seabed with its layers of sediment equally laid out so that the geographers boring cores can drill their hollow bits into the ground at any site within a region—and extract essentially the same story.

2 Fields of Force

A second kind of localism involves a different picture of the case study. Let's take a look at the way Pierre Bourdieu treats the French academic scene circa 1968 in *Homo Academicus*. There, as elsewhere, he ascribes to each person a portion of cultural, social, and real capital. As he put it, it is as if one has, on a gaming table with characteristic rules, an assortment of chips of different colors—we can (following Bourdieu) imagine a pile of red chips for cultural capital, blue for social capital, and gold for money.⁵ In some domains it may well be much more important to have gold chips than any other kind: the world of business is like this. Bourdieu argues that in the dominion of high culture—the artworld, the judicial world or the academic world—this is not so. In such domains of the elite, knowing, as if reflexively, how to act, how to dress, what to eat, how to celebrate, what to mock and what to admire, how to furnish a room—all this counts for a great deal. It forms, to use the term Bourdieu adapts from Marcel Mauss and Norbert Elias, the habitus.

Each domain (artworld or academia, for example) has its own rules of the game, their own relations of power that determines where someone with his or her portion and proportion of colored chips figures. In knowing how to act, what tastes to exhibit about aesthetic judgments, for example, count for more than a bank account. And power hierarchies within each such institution reflect the charge given to each form of capital. Each habitus carries rules for the transformation of one form of capital into another.

Are Bourdieu and his followers interested in the local? Absolutely. In *Homo Academicus* he casts a loving and detailed gaze on the sixth section of the *École des hautes études en sciences sociales* and their allies at the *École Normale Supérieure* (ENS) (where, in the 1960s Bourdieu was himself, along with Jacques Derrida, Roland Barthes, Jacques Le Goff and others). Bourdieu wants to know how the EHESS-ENS combination innovated, how it bypassed traditional norms. What were the rules of engagement in the halls of EHESS section 6; what kind of

⁵ Pierre Bourdieu, *Réponses: pour une anthropologie réflexive*, with Loïc Wacquant (Paris: Seuil, 1992), 71.

capital circulated around their international connections, around their visiting professors. Or, conversely, what were the rules of capital that circulated around the more impacted, self-referential and controlled networks of a more literary, humanities-oriented Sorbonne where an internal network of former students and teachers controlled the flow of cultural and social capital. But the Bourdieu-ians' concern is less with exposing the universal procedures of experimental science, for example, and more with sketching out the fields that order and hierarchalize each institution. One thinks here of Mario Biagioli's study, *Galileo Courtier* (1993), in which Medician courtiers play their *cultural* capital to better their place. Biagioli explains Galileo's fall as a symbolic-economic outcome: the other courtiers' collective interest in seeing the head courtier fall in order for each subordinate one to move up a rung up the court ladder.⁶

One sees here a form of localism grounded on a different nineteenth-century science: not stratigraphy but another reference point of classical science: the electrodynamic field. This is not an artificially imposed interpretation; here is Bourdieu himself, quoting, anonymously, the work of Hermann Weyl in his 1921 *Raum Zeit Materie*:

In this [intellectual] field, I will find some "particles" (assume for a moment that we have a physical field) which is under the direction of forces of attraction, repulsion, etc as in a magnetic field. To speak of a field, is to accord the priority of this system of objective relations over the particles themselves. One could say, in taking the formulation of a German physicist, that the individual, like the electron, is an *Ausgeburts des Feld[es]*, an emanation of the field. Such and such a particular intellectual, such an artist does not exist as such except in virtue of the fact that there is an intellectual or artistic field.⁷

Though this conception of German field theory is slightly mangled, it does accurately portray a physical concept, not the electron of the late nineteenth-century physicists like Hendrik Lorentz or his successors, but a physics, where matter was just a state of the electromagnetic ether.

Like systematic stratigraphy, field theories are one of the great movements of Victorian science: using a simple formula, every static charge produced a field, E, that was proportional to the charge and inversely proportional to the distance from it. Similarly, charges in motion produced magnetic fields, B. At every point in space, these two quantities, E and B, were enough to determine uniquely the

⁶ Mario Biagioli, *Galileo, Courtier: The Practice of Science in the Culture of Absolutism* (Chicago: University of Chicago Press, 1993).

⁷ Hermann Weyl, *Raum Zeit Materie* (Berlin: Springer Verlag, 1921), 184; trans. Henry L Brose as *Space Time Matter* (New York: Dover, 1922), 203: "Matter is, on the contrary, an offspring of the field." Bourdieu's citation is from his *Réponses*, cited in note 2 above, 82.

force suffered by a moving charge located there. Put a test charge at particular point X and watch how fast it accelerates and in what direction: this tells you what the E and B fields were if you don't know. Or if you do know the field, you can predict what the particle will do if you put it at some spatial position.

Tell me what your father does, Bourdieu liked to say, and I'll tell you what you prefer. Put the electron down in a known field and we can say where it will go. People, on this view, gain their "charges" (that is their quota of cultural, social or cash resources) through training by their parents (habitus, accumulation of capitals). Placed in a field, actors respond to the potential forces and move accordingly.

3 Wolfman Thermodynamics

There is one last form of case study that I want to look at, neither stratigraphic nor electrodynamic. This emerges strikingly in the Freudian case study, built to a certain degree on the older tradition of medical cases, but now with a twist: Freud argued that the unconscious followed universal, immutable laws. Cases embodied those broad principles, but did more just by showing how the talking cure was to work.

In the early 1910s, Sigmund Freud came to know a young Russian aristocrat, Sergei Pankejeff, who suffered a variety of maladies, from tremendous difficulty defecating to bouts of debilitating fear. One day, in treatment, Pankejeff related the following dream to Freud:

I dreamt that it was night and that I was lying in bed. (My bed stood with its foot towards the window; in front of the window there was a row of old walnut trees. I know it was winter when I had the dream, and night-time.) Suddenly the window opened of its own accord, and I was terrified to see that some white wolves were sitting on the big walnut tree in front of the window. There were six or seven of them. The wolves were quite white, and looked more like foxes or sheep-dogs, for they had big tails like foxes and they had their ears pricked like dogs when they pay attention to something. In great terror, evidently of being eaten up by the wolves, I screamed and woke up. My nurse hurried to my bed, to see what had happened to me. It took quite a long while before I was convinced that it had only been a dream; I had had such a clear and life-like picture of the window opening and the wolves sitting on the tree. At last I grew quieter, felt as though I had escaped from some danger, and went to sleep again.⁸

⁸ Sigmund Freud, "From the History of an Infantile Neurosis," 1918, in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, ed. and trans. James Strachey and Anna Freud, with the assistance of Alix Strachey and Alan Tyson, vol. 17 (London: Hogarth Press and the Institute of Psycho-Analysis, 1953–1974), 28.

Freud famously used this dream, after Irma's injection, as one of the very first sites at which to work out his account of laws of the unconscious. At the core of Freud's dream interpretation was the idea that a fear of castration lay behind many of Pankejeff's symptoms, and that this particular dream displayed the anxieties that grounded that fear. In one gloss, Freud took the stillness of the wolves to be inverted versions of motion, and that motion to be one that represented having come across his parents having intercourse from behind—and displaced this primal scene onto animals. In another gloss, later in the case write-up, Freud argued that the small child had seen animals coupling and displaced that onto his parents. Either way, Freud contended, the infantile witnessing of copulation awakened a long-term castration in the child, a terror that itself was later displaced onto symptoms (such as an inability to defecate, defecation itself acting as a symbolic displacement of castration).

Freud's analysis of the *case* is not exactly one that is stratigraphic; it is not that all dreams or even all dreams by Pankejeff displayed the same underlying psychic formation. Nor is it that the patient and his dream identified by the forces on them, a location in a field (in the quasi-physics sense of Bourdieu). For Freud, the significance of the case was therapeutic, to be sure; his case studies document the success of treatment in general. And Freud considered the talking cure specifically to have helped young Sergei arrive at a satisfactory insight-driven alleviation of his difficulties.

But beyond this particular patient, Sergei's dream *illustrated the action of a universal law*—the law of the unconscious. Those laws, which included the regular and fixed action of displacement and inversion, for example, were *instantiated* in the dream. Wolves became parents and parents became wolves. Stillness disguised sudden and forceful motion.

Freud was quite explicit about the natural scientific origin of his picture of laws; his ideas of the mind were predicated on a kind of pan-materialism realized in the late-nineteenth century German commitment to an absolute interpretation of thermodynamics, and in particular to the Hermann Helmholtz's conservation of energy, as popularized and extended by Bruecke. Freud:

I should like, finally, to dwell for a moment on the working hypothesis which I have made use of in this exposition of the neuroses of defence. I refer to the concept that in mental functions something is to be distinguished—a quota of affect or a sum of excitation—which possesses all the characteristics of a quantity (although we have no means of measuring it), which is capable of increase, diminution, displacement and discharge, and which is spread over the memory-traces of ideas somewhat as an electric charge is spread over the surface of a body.

This hypothesis, which, incidentally already underlies our theory of "abreactions" in our "Preliminary Communication" (1893), can be applied in the same sense as physicists apply

the hypothesis of a flow of electric fluid. It is provisionally justified by its utility in coordinating and explaining a great variety of psychical states.⁹

Freud believed that psychic energy is conserved, it flows, it can change form; it has all the characteristics of the nineteenth-century physicist's accounting-book notion of energy. You can take electricity and convert to heat; you can make heat into light—but you never create or destroy energy altogether. Blockages of flow, reservoirs of energy: for Freud the form of analysis, and the underlying lawlike behavior of the unconscious as realized in specific cases, came down to the first law of thermodynamics: Helmholtz's conservation of inter-convertible energy. Laws—unchanging, transcendental laws of condensation, displacement, inversion—stood behind the variegated character of the psychoanalytic case.

Just about no one defends a case study on the basis of its self-sufficiency. So it has to stand in for something more than itself. Each of these three bases provides such a mechanism: *stratigraphy* by assuring us that one could have dug anywhere within a region; *force fields* by saying we can capture the scope of social field (compare: a magnetic field) by probing at the relevant spots and using those explorations to identify the individuals and the governing surround that gives rise to them. And *thermodynamics*, with its absolute principles that make a case more than a mere case by illustrating universality below the surface.

4 The Limits of Localism

Of course historians' perennial nightmare is that their subject reduces to one damn thing after another. The simplest objection to case study particularism is that it is, well, not even that: that what the actors in a case are doing might amount to just *one* damn thing. It doesn't and didn't take much deep thinking among medievalists to have accused Carlo Ginzburg of mistaking Menocchio, his extraordinary sixteenth-century miller, for the average peasant. Of course Menocchio was peculiar: not everyone had such delicious fantasies (worms spontaneously in cheese as a model for cosmogenesis). Not every miller had his own way of reading biblical texts. Not every miller had the hellish chance to make a major, recorded appearance in the Star-Chamber.

No, in and of itself atypicality isn't what bothers me. I'm questioning something else. I'm after a particular kind of induced filtration of historical phenomena

⁹ Sigmund Freud, "The Neuro-Psychoses of Defense," 1894, in *The Standard Edition*, vol. 3, 59–60.

that occurs by viewing the scene at an inflexible scale—at a scale chosen more for delights of particularism than because the underlying problem occurs at that scale. Take the example of the rise of Nazism. I'm not going to review this staggeringly vast literature, but instead to focus on one of the first of many, many local town studies. In a hugely praised book (*The Nazi Seizure of Power: The Experience of a Single German Town, 1922–1945*) that has become the single most used volume of German history in American universities, William Sheridan Allen broadly reshaped the way the rise of Nazism is understood.¹⁰ Specifically, Allen's promising idea, back in the early 1960s, was to examine a town, Northeim, in Lower Saxony, and to track the rise of Nazism there from the early post-World War I years through to mid-late 1930s. No doubt to ground his choice to keep the camera tight in on a single town, Allen chose a morsel of René Descartes as his epigram:

Divide each problem into as many
Parts as possible; that each part
Being more easily conceived,
The whole may be more intelligible.

From Descartes, *Discourse on Method*

For Allen the problem was to simplify by decomposing the history of the rise of the Third Reich history into its constituent localities and using one to sample the wider whole. The metahistorical basis: stratigraphic. Allen later said he was greatly reassured that the vast number of other town studies conducted these last forty years revealed much the same story (put briefly: there was no powerful resistance to the Nazi takeover because nationalism trumped an atomized civil society, and because the *Machtuebergreifung* was gradual.). As so often, details draw us into the case history. In Northeim, Ernst Girmann was "typical of these first Nazis." He'd gone to business school, not university, fought in World War I, taken a bullet to the chest, joined the Jung deutsche Orden and the Nationalist Party—and picked up a (very early) Nazi membership card (4,294) in 1922. Allen follows Girmann's ups and downs: he rose as a very young man to Local Group Leader (*Ortsgruppenleiter*), bullied Jews and socialists around town, and had a modest come-uppance when accused by fellow Nazis at one point of poor financial management.

There were comedic moments of battles of left and right marching bands confronting each other on the town green; on Kristallnacht, town thugs broke

¹⁰ William Sheridan Allen, *The Nazi Seizure of Power: the Experience of a Single German Town, 1922–1945*, rev. ed. (New York: Franklin Watts, 1984, 1965).

some Jewish shop windows. Girmann, according to Allen, had plenty of venom to go around, “express[ing] contempt for the townspeople. He drank heavily and when drunk was generally morose. His most common emotion was anger, which could develop into furious rage.... [C]onsumed by ambition, Girmann was chiefly responsible for the driving energy of Local Group Northern of the Nazi party.”¹¹ History of Nazism at the village level meant following bullies like Girmann, his toadies, his enemies, his defeated victims and the groupings of Social Democratic civil society crushed under Girmann’s boots.

Throughout the thirties, Allen documents, townspeople heard speeches in the town center, took in entertainment, laid war wreaths, lined up to watch parades with fife and drums, joined conferences in the meeting hall—and quietly witnessed raids against communists, alongside the slow, squeezing pressure on the Social Democrats. Police surrounded Northeim’s Reichsbanner men (Social Democrats) when they demonstrated until February 1933—the moment their last rally began at the town’s Market Square and headed down Wide Street. Meanwhile, Stormtroopers marched where they wanted, when they wanted. Eventually, a despondent Hermann Schulze, a prominent Northeim Social Democrat, took a coffee can, folded his Reichsbanner flag into it, and buried it.¹²

You get the picture. In fact, the whole character of this kind of narrative nonfiction microhistory suits itself, in its visual specificity, to a fiction film. From the story, Allen takes this: “Thus in the first six months of the Nazi regime, Northeim was subjected to a veritable barrage of propaganda. While the NSDAP took the lead, all the various nationalistic and militaristic elements in the town were brought into play to support and generalize the Nazi appeal. In addition to the mass-participation events in Northeim, there was the steady stream of national news stories, radio speeches, and propaganda in magazines and books.”¹³ What’s wrong with this? Nothing, in a certain sense. There are aspects of stratigraphic or at least regional-stratigraphic typicality that emerge from the story Allen tells, and tells well.

It is this last sentence of the quotation that bothers me, the side remark that follows the main clause: “In addition to the mass-participation events in Northeim,” now the subordinate addition “there was the steady stream of national news stories, radio speeches, and propaganda in magazines and books.” Just that? “In addition” to local papers like the *Thalburger Beobachter*, for example? Under Joseph Goebbels, the propaganda ministry played an enormous role—they

¹¹ Allen, *Nazi Seizure of Power*, 83.

¹² Allen, *Nazi Seizure of Power*, 154–55.

¹³ Allen, *Nazi Seizure of Power*, 216.

distributed truckloads of radios—cheap ones like the “people’s receivers” that were sold in the millions.

Indeed by the middle of the war some three million households had them. But we know radio is an extraordinary medium of incitement—no one who has studied the Rwanda genocide thinks it could have taken place without the spewing of centralized, government sanctioned hate through Radio Télévision Libre des Mille Collines (RTL). Nazi Germany certainly cannot be understood properly without radio—or town-by town installation of loudspeakers, without the *Völkischer Beobachter*, or for that matter the Nazi film industry (“Triumph of the Will,” “The Eternal Jew,” “Jew Süß”). Mass media are not incidental to racial-political incitement—as invisible as they appear in Allen’s *Nazi Seizure of Power*.

But that really isn’t the full difficulty. Instead, the real problem is that there always will be a local story to follow, a Girmann and Schulze, for example. There will always be bands at this hall or that, or a sullen ex-schoolteacher or a proud Jewish banker who refuses to leave until it is too late. The problem is that understanding itself closes in on itself around these details, that the capillary aspects of Gleichschaltung and even violence (as on Kristallnacht and then later the system of trains and camps) were large-scale, not small-scale phenomena. Look at a small enough radius and the large becomes, strictly speaking, invisible.

Invisibility of the global comes to a moral head when it comes to the fate of Northeim’s Jews; and at this point, I have to say I lose touch with the charm of the little village story of alternately amusing, appealing, bullying story of everyman. Allen in his own words:

By the time Hitler determined to murder all the Jews in his power, as his “Final Solution,” almost all of Northeim’s Jews had left the town for a bigger city and supposed anonymity, or had gone to another country for safety. Northeimers did not harass their Jewish neighbors, but they also did their best not to “know” what their government was doing to the Jews.¹⁴

After this sentence the book goes silent about those Jews. In other words, the text repeats the self-imposed ignorance about which it speaks. Where did they go when they left the walls of Northeim—who knows? By restricting the field of view, the text invites the reader to re-create the blinkered moral vision that averted its eyes. It is here that epistemological limits of scale slide into something else. Canceling radios, loudspeakers, films, slide shows, and newspapers from view is a historiographic error; cancelling people from view is something else. They were systematically carted off to industrially-produced death camps, not locally, but through a global, state-mandated, system of roads, trains, chemistry, communi-

¹⁴ Allen, *Nazi Seizure of Power*, 225.

cation, and information control. A thousand village studies like this one would still leave the centralized, global features of the Reich completely invisible; always elsewhere, always out of view. That is where epistemic blindness slides into moral obscurity.¹⁵

5 Scales of Sight

Over these last twenty years of science studies, socio-cultural history, and interpretive social science, is an avalanche of case studies. We have national, regional, village, laboratory, family, and individual cases; we have cases to show subnational or group styles of science. In many instances they offer a lot, these classic, stratigraphic studies. Not always. Sometimes, though more rarely, case studies aim to display universal laws (psychodevelopmental, economic, physical); more often, the universal law impulse is vectored toward micro-sociological claims (such as the experimenter's regress) that are supposed to be a binding law (experiments never are transmitted through explicit procedures alone, and therefore depend on transmission by personnel contact through tacit knowledge). Case studies instantiate these laws or rules—each is supposed to put one more brick on the monument—the way the orbits of the moons of Jupiter or the assembly of stars into a galaxy instantiate Newton's inverse square law. Finally, there are those case studies in which cultural capital is hoarded, dispensed, or converted. Some draw on one, some on another, but these three images of the world return, alone and in combination, as the unspoken support for a more-than-nominal value to case studies.

My concern is not with the local, it is with localism, the view that *all* the interesting phenomena of science and technology studies are captured locally. The danger is that we will always find local accounts. You can ask why women were largely excluded around 1880 from the physics departments at Göttingen, Munich, Berlin, or at Harvard, Yale, Princeton, Oxford or Cambridge. And in each you will find physicists or administrators to explain why the discipline is or should be the purview of men. But the phenomenon is not a local one—any more than is racial or sectarian exclusion.

Part of the draw of the local, I would argue, is that it seems more scientific; after all, it was a signal moment in the history of physics when James Clerk Maxwell and Michael Faraday produced a local theory of electricity and magnetism shattering the older action-at-a-distance accounts. Just so, Albert Einstein's

¹⁵ Allen, *Nazi Seizure of Power*, 290–91.

General Theory of Relativity took Newton's far-action theory and made into one that was local, with the distended fabric of spacetime serving as the intermediary between masses: gravity waves propagate disturbances in the structure of spacetime itself. But even within physics there are effects that are *not* local. For example, quantum mechanics shows that two particles once entangled with one another can remain so even if one is brought to one side of our galaxy leaving its partner at the other. The correlation between their properties (for example, their spin) is *not* local, and can be used in a whole range of quite realizable technologies, including the intensely studied domains of quantum encryption, quantum teleportation and quantum computing. Nor are such non-local quantum effects the only type of non-locality in physics.

That local effects in physics must be supplemented with non-local ones does not prove anything in history. But it does put the kibosh on the notion that the history of physics somehow means that any reasonable explanation could *only* be local.

I come to the final example of scale and sight: the widespread espousal of scientific objectivity in the nineteenth century. Case I: a fine study by Theodore Porter, illustrates some of the advantages of the method.¹⁶ Porter studies accountants, commodity traders and bridge builders. For example, he looks at American engineers of the later 1800s as they tried to persuade politicians to undertake infrastructure projects. Porter's contention is that American engineers at this time were relatively weak, socially, and so sought to bolster their strength by invoking quantitative methods—in this case cost-benefit analyses. In France, by contrast, graduates of elite schools, such as Ecole Polytechnique or Ponts et Chaussées, formed an elite, one with acknowledged social-cultural cachet. Unlike their American counterparts, the French engineers grounded their recommendations to the government not on quantitative analyses of cost and benefit, but on the authority of their judgments.

Case II: Chris Lawrence, studying a London Hospital, had a similarly structured analysis.¹⁷ One group of doctors argued against the use of some clinical instruments—mere technicalities blocked, so the established, elite doctors said, their own authoritative judgment. For these venerable medics, instrumentation and “objective” measures threatened what they could tell by experienced-based touch. For the opponents of these elite medics, that newer breed of middle-class physicians, it was precisely the *removal* of personal authority that appealed. The

¹⁶ Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton, NJ: Princeton University Press, 1995).

¹⁷ Christopher Lawrence, “A Tale of Two Sciences: Bedside and Bench in Twentieth-Century Britain,” *Medical History* 43 (1999), 421–429.

usurpers charged into the hospital with science-based instruments, making up with objectivity what they lacked in an elite authority grounded in being well-born.

On the face of things, these two accounts are stratigraphic in argumentative structure; both historians chose to dig into the micro-worlds of Chicago commodity goods assessors, Paris-based Polytechnicians or well-heeled London physicians, but they could (so the contention would be) have dug elsewhere. There is a context (American late nineteenth century democratic bureaucrats) where authority is weak and so numbers bolster claims; or a context (French Polytechniciens) where authority did not need the cost-benefit Kevlar. There is a claim, perhaps not so strong as Freud, Bruecke, or Helmholtz would have put it, but a claim nonetheless that there is a kind of functionalist law at work here: each group (rising bourgeois or defensive elite) adopts a view of authority that serves to justify its status. Confident authority rests with elites; challengers to those elites, in their weakness, compensate by invoking protocol (statistics, standardization, instruments, and objectivity). But whenever and wherever, social elites fought for the right to judge on their say-so; the eternally rising bourgeoisie grabbed their instruments to fight back.

One problem with this form of localism is that it leaves out the lateral connections that join many sites, across disciplines and addresses, to one another. In the nineteenth century, scientific atlases blossomed almost everywhere: from atlases of skeletons and skulls to atlases of clouds, flowers, crystals, and blood. Publishers became adept at commissioning and distributing the *genre* of the atlas, not just at “physics” or “medicine” or “biology.” Often printed, often in several languages, with a minimum of purposely interpretive text, a maximum of pictorial quality, and enormous attention to archive quality paper, the atlas became a model for reliable knowledge.

Everything about the production of this episode in the history of the book aimed at *de*-localization. No need to print in English, German, and French if the atlas was designed to stay at the home laboratory or even the home nation—and no need to print on paper for the long term if the target audience was an assembly of colleagues and students in the then and there. These books stood in libraries and laboratories, in medical offices and, in smaller form, joined the front line of medical dissections and scanning rooms. The risk in ignoring them is similar to the risk that the local historians run in other realms of history: the turf war in diffusion is precisely what we miss when we focus the lens of inquiry exclusively on the local Northeim battle between Girmann and his enemies, to the *exclusion* of nationally-orchestrated newspapers, radio, and film. Does this mean that the local history is misguided? Not at all. It means that localism, when its claims and methods are exclusive, can be blinding.

6 Conclusion

For much of our work in history, social science, science studies, we have come to rely on nineteenth century scientific models (strata, classical fields, absolute laws) that offer no place to scale.

Within a wide range of sciences, that has changed dramatically over the last three decades. Here’s a metaphor that turns out to be much more than that. Water waves on the ocean range in size from a millimeter to a thousand kilometers, and if you live on the ocean, only some of them are relevant, that is, only certain scales matter. If you happen to be a water bug, small oscillations on the surface can matter a great deal, while smooth hundred-meter waves are entirely irrelevant. For a massive container ship on the open seas, millimeter waves matter not at all; as far as this ship goes, the phase, direction, and frequency of such tiny disturbances are entirely trivial.

But, importantly, just as irrelevant are the largest ocean waves, kilometers, even hundreds of kilometers long. Ships not far out in the harbor off some of the tsunami-ravaged Southeast Asian coasts felt nothing at all. But at the scale of the ship’s own length, waves can matter a great deal; at about the rate of one a day such waves swallow whole ships.

Why is the selective importance of scale *more* than a metaphor? Because in the quantum world, objects and waves are intimately associated; an electron of a given momentum acts like a wave of a specific length. What this means is that the world divides into physics of different length scales; it doesn’t matter, or it *strictly and rigorously* matters to the nanoscientist, working at a scale of 10^{-9} meters, what string theorists, working at 10^{-33} cm have to say. And it also doesn’t matter what happens at the scale of meters.

Pace Descartes, the question we have to ask, therefore, is not one of dividing up the world into small tractable parts, because we risk choosing a scale not relevant to the problem at hand. There may be some questions that are answered, and answered stunningly, at the town level in the history of Nazism. But there are many that are not. There may be aspects of objectivity that are best treated in the London confrontation of gentlemen doctors with upstart bourgeois competitors. But both run the twin risk of obscuring larger scale-phenomena of objectivity—and of losing, and then misattributing the scope of effective action.

The pleasure of particulars, the pleasure of the local can reveal—and blind.

The pitfalls of a reductionist globalism are glaring—there is little to recommend a return to “in the air” *Zeitgeist* explanations. Localism, in its exclusionist form, leaves us unable to account for the broader engagement with broader-scale shifts in the practice of science. What we need is a more attentive analysis of what happens at the intersection of the media of knowledge flows on the one side

(atlases, journals, books, radio, film, electronic communications) and the material-local on the other. In the present moment of history of science nothing seems more urgent than figuring out not only the modes of production and circulation of virtual knowledge but how these are taken up, brought into the material and redistributed.