Chapter 10
Agnotology: Ignorance and Absence, or Towards a Sociology of Things that Aren't There

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If we knew what we were doing, it wouldn't be research.
Albert Einstein

Studying ignorance invites bad puns and awkward moments of self-reflection. Proctor (1995) claims that we "know very little about ignorance" (p. 1), and the case studies in the important volume *Agnotology: The Making and Unmaking of Ignorance* (Proctor & Schiebinger, 2008) are meant to encourage thinking about the "structural production of ignorance" (p. 3). Like new work "making ignorance an ethnographic object" (Mair, Kelly, & High, 2012, p. 1), this chapter is meant to be a continuation of that inquiry, another contribution to the conversation on ignorance. It is meant, however, to expand the problems of ignorance, particularly those which are matters of absent knowledge, to be a more specific set of cases in the consideration of absences more generally. Or conversely, considering other things that aren't there sheds light on some finer distinctions that might be made within the emerging framework of agnotology, particularly the distinction between absent knowledges as forms of non-knowledge in relation to other agnoses, such as alternative, controversial, illusive, rejected, or otherwise erroneous knowledges (see Machlup, 1980, pp. 144–152, for these categories of what he terms "negative knowledge") which are not matters of absence per se. This chapter is organized into two parts: The first considers agnotology and other studies of ignorance from their various disciplinary origins, continuing with a discussion of privatives and other forms of absence. The end result is a set of clarifications that are meant to enhance the study of ignorance and absences through examining their points of contact and divergence.

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Agnotology: Properties of Ignorance

In the emerging field of studies of ignorance, tracing its relation to synonyms is traditionally the first step in the project (Bernstein, 2009a, 2009b; Gross, 2010; Proctor, 2008, p. 2; Rescher, 2009), and thus I feel free to continue that fine practice and point out some of the interesting associations that the term ignorance has, as a connotative and denotative referent. Terms include benightedness, bewilderment, blindness, callowness, crudeness, darkness, denseness, disregard, dumbness, empty-headedness, fog, half-knowledge, illiteracy, incapacity, incomprehension, innocence, inscience, insensitivity, lack of education, mental incapacity, naiveté, nescience, oblivion, obtuseness, philistinism, rawness, sciolism, shallowness, simplicity, stupidity, unawareness, unconsciousness, uncouthness, unenlightenment, unfamiliarity, unscholarliness, and vagueness. Technical terms that have emerged include *nichtwissen*, *negative knowledge*, and *non-knowledge*, and, of course, *agnotology*. Known unknowns are an understood feature of standard scientific practice in universities—expected knowledge not yet verified through hypothesis-testing or discovery processes.[1] The presence of terms that have contrasting connotations within the list of synonyms (innocent and uncouth, for example), as well as the vast interdisciplinarity of the scholarship on the topic lead to a great deal of confusion and complexity in studying ignorance. Fields include library and information science, psychology, cognitive science, philosophy, sociology, and history, plus popular commentary and disciplinary approaches in the humanities.

Agnotology is a term rechristened from *agnatology* by historians Proctor and Schiebinger (2008), who so handily encapsulated some new and important cases of problems of ignorance in a potential program of study. The categories and examples reported by Proctor and Schiebinger include the identification of ignorance as a native state, a lost realm, selective choice, passive construct, strategic ploy or active construct, and as moral caution or mode of resistance. Throughout this chapter the terms *non-knowledge*, *ignorance*, and *agnosis* will be used. Like Gross (2010), Smithson (1989), and others (Kerwin, 1993; Ravetz, 1993), I am seduced into yet another typological work on ignorance but wish, like Gross, to avoid a linear typology and to integrate multidisciplinary tools and a comparison with theories of absence to improve clarity in thinking about ignorance.

Smithson (2008) argues that a typology of ignorance must make consistent distinctions and be consequential (pp. 211−212), and thus I propose here five important attributes that might be applied to case studies of ignorance or non-knowledge. My goal is not some fully formed generalizable theory of ignorance,

[1] As institutions of knowledge production, universities have an undertheorized role in ignorance production. Disciplinarity is taken to task, and interdisciplinarity or trans- or multidisciplinarity are seen as solutions. Similarly, methodologies such as participatory action research are meant to bring the emic knowledge of people's day-to-day lives into closer contact with emic, analytical, professional, or disciplinary knowledge. The connections between the disciplines, non-knowledge, and the institution as organizations are, however, not sufficiently theorized.

but rather a framework which allows cross-case comparisons and systematic sociological analysis across different domains, even as the challenges of postmaterialist (Latour, 2007) and postrepresentational theories (Barad, 2007) and anthropological specificity (Bille, Hastrup, & Sørensen, 2012; High, Kelly, & Mair, 2012) warn against such a project. (1) To speak of the ontology of ignorance refers to questions about the presence or absence of knowledge, both in relative terms, such as when one person knows something someone else is ignorant about, but especially in regards to the question of uncertainty. As I discuss in greater depth below, there are forms of uncertainty that are the results of as yet unrefined models, and others that are foundational to stochastic or probabilistic phenomena. (2) Chronicity refers to issues of time and the prospective and retrospective elements of knowledge and non-knowledge identification. (3) Granularity refers to the *texture* of the (non) knowledge—concrete facts of specific purview having a fine granularity, while broad statements of knowledge or domains of inquiry have a coarse granularity. (4) Scale, related to but independent of granularity, has more to do with the assignment of the level of analysis and causality in the assessment of ignorance. This can range from individual information or cognitive processes; institutions and organizations such as universities or workplaces; to the workings of cultural formations and ideologies which shape broad matters of interest, inquiry, and explanation. The final dimension discussed has to do with (5) intentionality, whether from direct intent such as fraud or hoaxes, and various forms of censorship, nondisclosure, or knowledge nontransmission, to inadvertent ignorances unconsciously produced through various effects. I review each of these attributes below.

Ontology and Epistemology

Oreskes and Conway (2008) discuss the ignorance surrounding the issue of global warming. As outlined in their work, there has been enough scientific consensus and a multiplicity of evidence since the mid-1990s to be able to state empirically that anthropogenic global warming is occurring. However, conservative think tanks have stressed the *uncertainty* of the models and the evidence. This represents a conflation of the meaning of uncertainty as a probabilistic outcome, and uncertainty meaning unknown or unreliable. Smithson (2008) also argues that uncertainty and ignorance are often conflated in their respective literatures (p. 214; Tapp, 2000), while Michaels (2008) similarly situates problems of agnotology in the realm of problems of probabilistic outcomes, rather than problems of the existence of knowledge in contestations over toxic chemicals and public health (see also Japp, 2000). This points us in the direction of a distinction between knowledges that are uncertain as unknown-at-this time, to be solved with more research or better modeling, versus knowledges that are fundamentally based on stochastic processes by which probability, and thus uncertainty, are endemic to the system.

Rescher (2009) frames this important distinction as between ignorances which are epistemological versus those which are ontological (pp. 100−101). That is, he helps

us to distinguish between those agnoses that are what he calls "cognitively inaccessible" because we do not yet know, where ignorance is a matter of epistemology, versus things that are unknowable as a matter of property, that is, "developmentally open" via causal indeterminacy or contingencies of "choice, chance, or chaos" (p. 101) as matters of ontology. Gross (2010) capitalizes on the concept of the uncertain in his analysis of surprises: "Ignorance and surprise belong together" (p. 1). The management of ignorance and its resulting surprises is a major feature of knowledge-based societies (Beck, 2007/2009). Gross (2010) clarifies Merton's (1987) specified ignorance in relation to the terms nescience, non-knowledge, and negative knowledge. In Gross's (2010) typology, non-knowledge is related to Merton's (1987) specified ignorance, the ignorance of a discipline which knows where the unknowns are. Where is that damned Higgs boson?[2] Thus, a hypothesis is a kind of specified ignorance, based on the presumed existence of a known unknown.

So, as outlined by many scholars, certain kinds of ignorance are the after-effects of knowledge processes, including the identification of known-unknowns and future work, or Merton's (1987) specified ignorance. For example, Jacklin, Robinson, and Torrance's (2006) discovery of a lack of data about children in public care here qualifies as a form of specified ignorance. In the spirit of Foucault, forms of ignorance are the necessary dual effects of knowledge productions. Relational ignorances can be matters of nontransmittal, also perhaps the result of dual effects, but more specifically knowledge that is available in one realm of social action but absent in another, whether by intention or not.

The question of the ontology of ignorance thus requires clarification as to a specific agnosis's relationality and epistemological features: Someone somewhere knows something, someone elsewhere does not. Someone knows there is something to be known. That which is to be known may be based on probability or stochastic processes which have a residual uncertainty. These knowings and non-knowings are not patternless, but neither are they completely specified or structured.

Chronicity

The epistemological relationality of ignorance is closely paralleled by but not identical to the issues of time in assessing knowledge and agnosis. If the epistemology of ignorance is in part locative in terms of spaces (metaphoric social spaces, literal geographies), then time needs to be figured carefully in discussions of ignorance, as there are forms of agnosis which figure as the not yet known, and

[2]When this text was first presented as a conference paper in 2009, the Higgs-boson particle was an important missing part of establishing the Standard Model in physics. It has since been discovered (2012) and subsequently verified, hence, the problem of chronicity and timekeeping in ignorance studies. See https://home.cern/topics/higgs-boson.

others as the forgotten or obliterated. In addition, social power is operative in similar but not identical ways in producing epistemological ignorances co-constituted with the production and use of ignorance over time.

To theorists such as Giddens, or Simmel, non-knowledge can only be determined in retrospect (Gross, 2007). Nescience is sometimes considered the vocabulary for evaluating ignorance identified in retrospect (Knorr-Cetina, 1999). However, in the same way as historians of science struggle with anachronism in attributing knowledge and non-knowledge to prior regimes of thought and connecting past to present, the problem of time in prospection and retrospection produces specific challenges of inference and attribution. Consider Simon (2002) and his account of cold fusion as an "undead science." Cold fusion, in mainstream accounts and across much of the scientific (particularly physics) community, is dead and discredited. It is, however, still researched (if under a different name), producing rare and difficult-to-explain effects in reputable scientific labs. The possible futures of cold fusion as (in)credible knowledge produce difficulties in reading its past or stating in the present what is known or unknown. This indeterminacy is a matter of epistemology over time (rather than ontology based on probabilistic uncertainty). It is also of a different kind of indeterminacy than the puzzling out of "who knew what when," in cases of negligence, or the case of tobacco companies' obfuscations about harm (Oreskes & Conway, 2010).[3] Nonetheless, establishing chronology and location are essential projects for agnotology.

Granularity

Galison (2008) discusses the classified universe of restricted documents and the processes of classification of secret materials. His insight is the obverse of the usual "knowledge transmission" or replication questions of science studies (e.g., Collins, 1981, 1992), instead about the mechanisms in the prevention of knowledge transmission, as well as an inquiry into what I will call the *granularity* of knowledge. Concrete, factual statements have a higher (or fine) granularity. Galison (2008, p. 52) refers to specific statements as *punctiform* which can be subject to specific forms of censorship, even though in their formulation much can be deduced that is of more theoretical or of lower (or coarse) granularity, and vice versa. The highest granularity of knowledge might be considered like Bertrand Russell's and Ludwig Wittgenstein's ideas for "atomic propositions" (p. 50), some smallest units of intelligible meaning. While specific statements are the most clearly identifiable, and presumably the most easily managed through censorship practices, Galison

[3]Ignorance in time or space is what makes mystery writing work. Someone, if no one else but the author, knows "who done it," while some combination of characters and the reader may or may not be in on the secret, creating suspense. Similarly, most but not all stage magic works through withholding information—how did they do that?—in conjunction with distraction and dissembling.

argues that the excision of punctiform or high-granularity knowledge quickly expands to broad scope and impossible censorship of knowledge domains, because facts are not independent of theory in any straightforward way, thus a tendency to decreasing granularity in classification. The concepts of granularity and the concept of entropy as error/ignorance are the two places at which this framework intersects with information theory and computing. Absent bits of information in communication streams or storage media are discrete elements of knowledge, referred to in terms of granularity as a measure of their size. While censorship is intentional, disciplinary and departmental boundaries produce nontransmissions of knowledge via structural means, which can have high or low granularity.

Scale

In matters of scale, questions of agnotology need to consider both origins or causal processes, and consequences, or the reach of ignorance. If granularity refers to the size of the knowledge to be transmitted, scale refers to the components and systems in which that knowledge, whatever its granularity, might circulate. Is it an individual's knowledge, or lack thereof, that is in question, and in what relation does it stand to various other assemblages which might constitute knowledge or agnoses? The agnoses of disciplines in universities, especially between disciplines, the blind spots of research paradigms, and cultural formations are examples of scales of ignorance.

There are several research traditions focused on ignorance and error at various levels of analysis. For example, Rescher (2009) is focused on ignorance in relation to error as matters largely of cognition based in an analysis of logic from philosophy. For Rescher, ignorance is a matter of individual reasoning, and there is ample work in this area. Similarly, Watts (2011) provides a critique of common sense which is a popularized discussion of similar issues: the conflation of correlation and causation, the cultural and contextual specificity of common sense, and the problems of confirmatory bias and the inadequacy of folk sociology. Watts is concerned with the inability of social science to be predictive or to produce laws in the way that physics does (but see Cartwright, 1983), but his contribution to this discussion of ignorance is his review of the systematic errors in inference produced by common cognitive processes, such as retrospective inference and confirmatory biases.

Organizational theory represents a middle range for the exploration of ignorance, connecting individual cognition to organizational forms and processes. Ten Bos Rene (2007) observes that there are two frameworks for the question of stupidity and organization: "The older one claims that organization in fact needs a certain dose of stupidity and the newer one takes it that stupidity should be banned from organization" (p. 140). Pollitt (2000) observes that re-organization, personnel change, archival practices and changes in storage media, and organization fads produce an organizational amnesia, a set of forgettings that lead to wheels being reinvented, an inability to learn from past lessons, inefficiencies, and ineffectiveness within organizations.

Vaughan (1999) and, of course, Perrow (1984) (and back to Merton (1987) and Weber (1922/1964)) argue that all organizational forms have pathologies. Vaughan's (1999) perceptive analysis of mistake, misconduct, and disaster points to the communication components of ignorance, that is, that organizations produce ignorance, and thus the possibility of mistakes, through compartmentalization and structural secrecy. But there are other structural components, too. For example, centralization has its trade-offs; routine-following can produce error through oversubscription or misapplication of rules. In addition, Vaughan notes that "all judgments are made under conditions of imperfect knowledge, thus routine non-conformity is a normal by-product of techno-scientific work" (p. 279).

The framework for understanding organizations and ignorance can be extended through the examination of organizational cultures, such as described by Eden (2004) or Vaughan (1996), where intraorganizational processes lead to blind spots, prioritizations of data, and intra- and interorganizational competition for resources and prestige leads to ignorances of omission or distortion. For example, Eden (2004) examines the lack of knowledge of fire effects from nuclear weapons as a matter of professionals and organizations focusing on what they do well and excluding that which eludes them, leading to substantial misrepresentations of the world in which they work. In Eden's analysis, the agnosis about fire effects after nuclear detonation led to a mass overproduction of strategic nuclear weapons. In the case of post-Katrina environmental contamination, testing protocols are sedimented into disciplinary regimes and organizational practices, producing ignorance about ecological and sociohistorical contexts and thus the distribution of risks across the landscape (Frickel & Vincent, 2007).

And, of course, there are ignorances of a broader scale, wrapped up in economic, political, cultural, and ideological processes. As Hess (2009) articulates, "social change agents face . . . an often lopsided field of scientific research" (p. 306). Social movements often confront an area of "undone science" which would be useful to them but remains underfunded. His study of civil society research, such as environmental nongovernmental organizations (NGOs) providing research reports in support of movement goals, suggests an alternative to traditional routes for research agenda-setting in science, which is dominated by for-profit and governmental funding organizations. Research in universities is expensive, and access to knowledge production is thereby limited.

Oodshorn (2003) and Daniels (2006) both provide case studies which examine the ways in which configurations of masculinity have led to a lack of technological development of male birth control options for the former, and a lack of research on male reproductive health, particularly its environmental constituents, for the latter. Proctor's (1995) work is concerned with the politics and economics of cancer research shaping what is known and unknown, as the project of "curing cancer" has far more prestige and resources in relation to the project of "preventing cancer."

Finally, there are the frameworks which articulate deep epistemological rifts in knowledge, such as Kosofsky Sedgwick's (1990) analysis of the ways in which the homo/heterosexual binary produces non-knowledges that shape understandings of sexuality and subjectivity. And while Foucault (1994) rarely mentions ignorance or

non-knowledges explicitly, his archaeologies and genealogies are rife with examples of things/bodies/identities elided by epistemological formations. Similarly, Butler's (1993) conception of the abject, while not specifically about ignorance per se, suggests the production of zones of unintelligibility where might be found that which escapes, exceeds, or is cast out of normative modes of being/knowledge.

Scholars from postcolonial studies (de Sousa Santos, 2016) and critical race theory (Mills, 2008) provide examples of epistemological ignorances on a broad scale, in the impossibility of knowing the "Other", particularly under conditions of subjugation. Marx's dialectics of the master-slave relationship inform feminist theory (de Beauvoir, 1949/2009), colonial relations (Fanon, 1952/2008), and black feminist thought (Collins, 2000) in that the subordinated can and must as a matter of survival have knowledge of the master who cannot know the other and cannot be interested in knowledge of the subjected, for that would require recognizing the humanity of the other. Other postcolonial theorists (Said, 2003) similarly articulate the production of ignorance in disciplinary and popular representations of "Others" under colonial relations. One of the major attributes of ignorance requiring articulation is thus the matter of scale, examining processes by which knowledge and agnoses are constituted across assemblages based on size and complexity and overdetermined by power relations.

Intentionality

Beck (2007/2009, p. 126) develops a typology which focuses on the intentionality of the knower: willful ignorance in relation to a conscious inability to know (we know we don't know). The next types are the unconscious non-knowing that "does not reflect on its own limits" and finally the unknown unknown, which provides the "element of surprise." Beck uses as an example the willful ignorance of denying the effects of global climate change to discuss "side-effects" as things that might be unknown, but when known and not acted upon can intensify the effects the system producing the (side-)effects.

There are numerous examples of intentionally produced agnoses. Tuana's (2008) analysis of the erasure of knowledges about the female orgasm and the structure and function of the clitoris, or Schiebinger's (2004) study of the nontransmission of knowledge of the abortifacient properties of bird of paradise plants from colonial contexts to the metropoles of the "long eighteenth century" are examples where race, gender, and culture produce absences of knowledge through nontransmission. Mayor (2008) describes the suppression and neglect of native American and related indigenous groups' paleontological knowledge of fossils as a result of the dismissal by the colonizers of native knowledges as mere myths and legends of barbaric others. Moore and Tumin (1949) posited the functionality of ignorance, for example in preserving privileged positions such as between experts and consumers or competitors. Their framework is ambivalent about the relationship between function and intention—most of their examples, such as producing anxiety about performance

through withholding feedback to spur greater productivity in competitive arenas (pp. 793–794) suggest the production and maintenance of ignorance can be an organizational or interpersonal strategy.

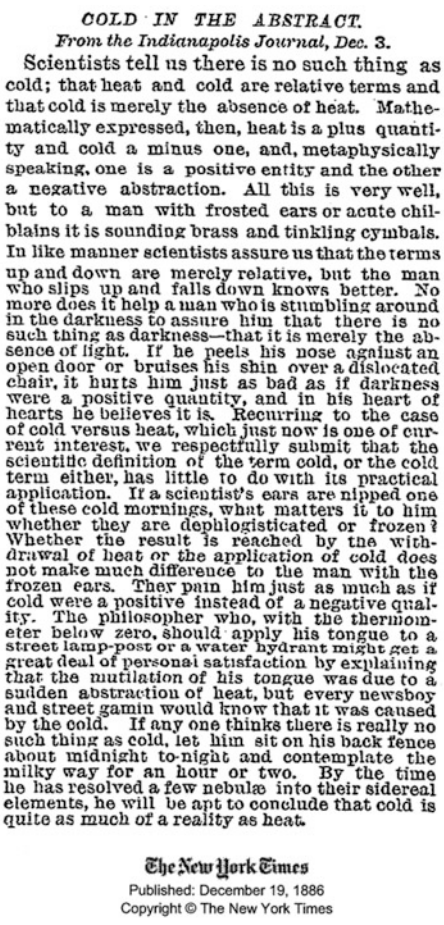
Dismissals and suppressions of knowledges are not identical with the production of falsehoods as non-knowledges, such as fraud, hoaxes, or propaganda (Bernstein, 2009a, 2009b), which are intentional distortions of knowns, although they may be similarly motivated by a multiplicity of factors linked together by considerations of social power.[4] Thus, ignorance has its uses, as the utility of non-knowledge is produced in relation to the intention of its locutors. For example, the sites of the Salem witch trials in seventeenth-century New England were effaced, as are many locations of violent crime, primarily in shame (Foote, 1990).

Social conventions, particularly around privacy and politeness (Smithson, 2008), produce intentional nondisclosures, whether they are of the "too-much-information" variety, or things we really don't want to know about or disclose to our conversational partners and mere acquaintances. Surprise parties require withholding information, although revealing the ending of a story does not necessarily mean ruining it (Leavitt & Christenfeld, 2011). Frickel and Vincent (2007) discuss strategic not-wanting-to-know with regards to Hurricane Katrina, as real estate values and environmental justice outcomes will be shaped by the potential (non)identification of toxic accumulations in the soil.

Ignorance is useful. Bernstein (2009a, 2009b) reminds us that non-knowledge and nonsense are frequently found in the realm of literature and philosophy, such as in Bataille (2001). Knorr-Cetina (1999) identifies *nichtwissen* as knowledge where the limits of knowledge are important to future action and planning, as opposed to negative knowledge which is a deliberate choice not to engage knowledge in a particular direction (as it is presumed to be unimportant) (Gross, 2007, p. 749). The productive nature of non-knowledges is identified in surrealism, for creativity and spiritual enrichment, and for innovation. Smithson (2008) reminds us that some form of ignorance is necessary for creativity and problem-solving. The production of ignorance is part of the work of ideologies and propaganda, and to conspiracy theorists, a necessity for the ever-oppressive state. So perhaps a refinement of the Enlightenment dictum that *knowledge is power*, already turned on its head by Foucault's (1994) power/knowledge formulation, must be refined by considering power/agnosis in its various manifestations.

With the properties of chronicity, scale, granularity, ontology, and intentionality as ways of describing ignorances, we are in a better position to consider a broader range of comparisons across case studies, and to include the dynamism and relationality that undergirds many, but not all, forms of ignorance. Further refinement to our consideration of ignorance has to do with its points of connection to interdisciplinary scholarship on absences.

[4]The problem of *fake news* and propaganda in recent U.S. political discourse can benefit from the framework presented here, but a comprehensive discussion is beyond the scope of this chapter.



COLD IN THE ABSTRACT.

From the Indianapolis Journal, Dec. 3.

Scientists tell us there is no such thing as cold; that heat and cold are relative terms and that cold is merely the absence of heat. Mathematically expressed, then, heat is a plus quantity and cold a minus one, and, metaphysically speaking, one is a positive entity and the other a negative abstraction. All this is very well, but to a man with frosted ears or acute chilblains it is sounding brass and tinkling cymbals. In like manner scientists assure us that the terms up and down are merely relative, but the man who slips up and falls down knows better. No more does it help a man who is stumbling around in the darkness to assure him that there is no such thing as darkness—that it is merely the absence of light. If he peels his nose against an open door or bruises his shin over a dislocated chair, it hurts him just as bad as if darkness were a positive quantity, and in his heart of hearts he believes it is. Recurring to the case of cold versus heat, which just now is one of current interest, we respectfully submit that the scientific definition of the term cold, or the cold term either, has little to do with its practical application. If a scientist's ears are nipped one of these cold mornings, what matters it to him whether they are dephlogisticated or frozen? Whether the result is reached by the withdrawal of heat or the application of cold does not make much difference to the man with the frozen ears. They pain him just as much as if cold were a positive instead of a negative quality. The philosopher who, with the thermometer below zero, should apply his tongue to a street lamp-post or a water hydrant might get a great deal of personal satisfaction by explaining that the mutilation of his tongue was due to a sudden abstraction of heat, but every newsboy and street gamin would know that it was caused by the cold. If any one thinks there is really no such thing as cold, let him sit on his back fence about midnight to-night and contemplate the milky way for an hour or two. By the time he has resolved a few nebulæ into their sidereal elements, he will be apt to conclude that cold is quite as much of a reality as heat.

The New York Times

Published: December 19, 1886

Fig. 10.1 "Cold in the Abstract": Lay versus professional understandings of temperature. Source: *New York Times*, December 19, 1886. Copyright: Public domain.

Absences, More Generally

Figure 10.1 is an editorial clipped from the December 19, 1886, *New York Times*, reprinted from the *Indianapolis Journal* of December 3 of that year. It encapsulates for us two important issues in study of absences in general and ignorance in particular, the issue of privatives and the issue of symmetry. Coldness, and darkness or silences, are understood scientifically as privatives—as negative abstractions rather than positive entities. As noted in the figure, these abstractions, while nice in theory, are irrelevant to the person with their tongue stuck to the flagpole or stumbling around in the dark.[5]

[5]Fantasist Terry Pratchett writes of darkness, and silence, as positive quantities with specific properties: "Old Tom" the bell tolls silences on the hour. See Pratchett (1990) for other literalizations like this.

Embedded within this clipping are issues concerning the public understanding of science, particularly invoking a problem of symmetry (discussed below). Considering forms of ignorance that are matters of absence calls us to think about the problems of absences more generally. As for ignorance, the possibility of cross-cultural and cross-disciplinary studies of absence is rather daunting. For example, Portuguese speakers have the term *saudade*, which is a feeling of nostalgic longing for that which is lost. Derrida (1993/1994) coined the term *hauntology* to describe a nostalgia for an imagined past and the ways in which Marxism will continue to haunt the West. Baudrillard (1981/1994) describes the *simulacrum* as the copy for which there is no original. Both hauntology and simulacrum are both taken as pejorative, in some way inauthentic even as there is no *real* referent which is doing the haunting or is the original for the simulation. The negative connotation of inauthenticity is challenged by Deleuze and Guattari (1980/1987) in positing a *double becoming* of both the referent and the simulation, both as productions of culture machines. These multiple valences of positive and negative valuation—is it real? Does it matter?—add to the complexity of studying absences.

The first point of contact between agnotology and studies of absence I will explore is the question of the privative, a specific form of absence in relation to a known presence. The privative, as a specific kind of absence, encapsulates a number of problems for the social study of ignorance and absences particularly vividly. I will explore various modalities of absence that have been studied across disciplines, focusing on silence and invisibility as key sensory systems from which things might go unperceived. Then finally this section will interrogate the problems of stupidity and symmetry, each being a special problem at the intersection of agnotology and absence.

Privatives and Absences

The Buddhist term, *avidyā,* is exactly a privative, specifically an *alpha privative* formed by the addition of an *a-* prefix. This term reflects the inherent limitations in human knowledge, and is not a lack of knowledge or scholarship, *per se*, but a lack of the knowledge of *being*, and as such the foundation for human misery. But our concern here, besides a cross-cultural interest in a consequence of ignorance, is the formulation of the negation. As a privative, *avidyā* is specifically formulated as an absence of an available (if difficult to achieve) knowledge. Of course, agnosis and agnotology are thus alpha privatives, as is absence.

Why should we care if people misunderstand privatives such as cold? Consider the general "misunderstanding" of how thermostats work. If a house is chilly, the thermostat need only be set to the desired temperature plus maybe one degree. Many, many people, however, add 10 degrees with the idea that the house will heat faster. Most people treat their thermostat as the setting to a pump, which at a higher setting will pump more heat into the house. This is not how they work. This leads to

measurable waste in energy as the furnace will overshoot the desired end temperature, running for longer than necessary. Or consider variations on the joke that circulates about trying to puzzle out how a thermos knows whether to keep its contents hot or cold. That misunderstanding can only come from misunderstanding the properties of the vacuum in the walls of the thermos, and the properties of temperature in materials. This misunderstanding is a form of ignorance: individually enacted within a cultural context, but it is not an absence of knowledge *per se* as it does encapsulate a folk model of physics. It is ignorance *about* a privative, not a privative in itself.

Ignorance may be the privative of knowledge, or, more specifically, certain kinds of ignorance are the privative of knowledge, while others are not, and this distinction is important. Privative forms of ignorance should then be amenable to the same kinds of analysis as other forms of absences, and vice versa, while ignorances that are not the result of an absence but of various forms of misinformation or error require slightly different analytic considerations.

Theories and Modalities of Absences: Silences and Invisibilities

The analysis of things absent to two of our senses, sight and hearing, produce much of the scholarship on absences. There are various forms of silences and silencing practices. There are, as Bourdieu (1972/1977) notes, the things that go without saying, the *doxa* which limit thought, action, and social mobility. There are things unspeakable and forbidden, explicitly through censorship and social convention, and there are the things discursively unthinkable and thus unspeakable inhabiting abject spaces. Open secrets (Kosofsk Sedgwick, 1990) are those things that everyone knows but must not be said, in contrast with what Bourdieu (1972/1977) calls the "complicitous silence" (p. 188), the silence that sustains ideologies. Speech withheld, whether refusing interpellation or in other forms of resistance, has revolutionary potential, and yet speech withheld has been identified as "reactionary" in certain contexts (Habermas, 2002, p. 67). This points to a relational quality to absences, as absences *from* one domain in relation to another—a question of the ontology and epistemology of an absence as well that absence's consequences.

Besides being silent, things can be invisible. We know that there are invisible colleges, that the poor are rendered invisible in public life and media, that transgendered people are invisible, and that many other kinds of bodies and or facts about them are erased. Secrets, considered either as unspoken words or nondisclosed representations, are situated at an awkward nexus of individual rights to privacy, at least for those able to protect personal information as property, and the need for transparency (e.g., visibility) as a part of the social contract of contemporary public life in liberal democracies (Harris, 2009).

Casper and Moore (2009) articulate the ways in which bodies can be invisible, as matters of representation, or figure as missing in more literal ways. Calling for an ocular ethic to complement Rose's (2008) somatic ethic, Casper and Moore (2009) ask us to consider why some bodies are valued for their invisibility, and others

valued for their hypervisibility. Similarly, Gordon (2008) recognizes "[v]isibility is a complex system of permission and prohibitions, of presence and absence, punctuated alternately by apparitions and hysterical blindness" (p. 193). Like Rapp (2000) and the concept of stratified reproduction, Casper and Moore (2009) suggest that complex webs of valuation, most evidently by sex/gender, sexuality, race, and class but also by perceived ability, attractiveness, and other ascribed and achieved characteristics, are tied to processes of valuation of bodies in relation to their potentials for representation and their capacity for sustaining existence.

As a postcolonial scholar, de Sousa Santos (2016) argues that several logics undergird the production of nonexistence: "Non-existence is produced whenever a certain entity is disqualified and rendered invisible, unintelligible, or irreversibly discardable. What unites the different logics of production of non-existence is that they are all manifestations of the same rational monoculture" (p. 172). Here tying nonexistence to ignorance, de Sousa Santos (2008) argues that the Western monoculture of knowledge with the elevation of science as the sole arbiter of knowledge, produces "non-existence . . . in the form of ignorance or lack of culture" (p. 238). The other logics include the monoculture of *linear time*, of *classification* which naturalizes differences and hierarchies, of privileging the global and erasing the local, and the logic of *productivity* which privileges growth and market logics. De Sousa Santos argues these are "forms of non-existence produced by hegemonic epistemology and rationality" (p. 239) to be confronted by a sociology of absences.

Looking briefly at silence and invisibility, I note that the properties of scale, granularity, chronicity, ontology, and intentionality that provide a framework for comparing and contrasting studies of ignorance can similarly organize and inform studies of absences. These studies are not identical, however, and each produces problems related to symmetry, formulated as epistemological (Collins, 1981), methodological (Bloor, 1976), or the generalized symmetry of Latour (1992).

Symmetry and Stupidity

Bernstein (2009a, 2009b) argues for a symmetric approach to the categories of knowledge and non-knowledge, despite the argument by Ten Bos Rene (2007), who considers stupidity "an independent quality with a logic all its own" (p. 147; see also van Boxsel, 1999/2003). For example, "Terms associated with knowledge at all levels can usually be matched with approximate counterparts in the domain of nonknowledge" (Bernstein, 2009a, p. 27). However, Tuana (2008) warns that "while the movements and productions of ignorance often parallel and track particular knowledge practices, we cannot assume that their logic is similar to the knowledges that they shadow" (p. 110). Bernstein's (2009a) goal is a classificatory one in support of libraries and their need to order knowledges: Where would knowledge about non-knowledges be classified?

Ignorance may be useful, or may have a socially or psychologically adaptive mechanism, and much the same can be said for stupidity: "All our organizations

work by virtue of stupidity. Our world revolves around fantasies and around fools who believe in them. Stupidity is useful" (van Boxsel, 1999/2003, p. 43). However, both ignorance and stupidity are often taken as problematic, with stupidity in particular framed as non-knowledge that is self-defeating (Welles, 1986). "Stupidity is the talent of acting unwittingly against your own best interests, with death as the ultimate consequence" (van Boxsel, 1999/2003, p. 31).

Garcia (1997) also points to a potentially moral dimension to ignorance—ignorance in decision processes can be an indication of choosing stupidity by avoiding responsibility. Burt (2005) describes how public attribution of stupidity, particularly in public political discourse, has the effect of "an advanced Orwellian double-speak in which the stupid masquerades as the smart, the zealot as the skeptic" (p. 30). Public attributions of stupidity, then, are political. Take, for example, a recent argument that young people are too stupid to vote, or other vitriolic exchanges of attributions of stupidity in the public sphere (Thomas, 2012; see also Hardy & Clark, 2005; Moore, 2002). The role of social power in attributions of stupidity, and as one of the objectives of those attributions, points to a challenge to symmetry in the study of ignorances and absences.

The conventional model of analyzing lay or public understandings of science, identified as the deficit model, can be criticized for treating lay nonuse of canonical science as matters of absence, a deficit, or as matters of distortion (Wynne, 1995). Consider again the newspaper clipping from Figure 1. How might the difference between public understandings of cold and thermodynamic understandings of cold be treated symmetrically, especially when in this context they have approximately the same behavioral outcome: Do not stick your tongue to freezing cold metal posts.

As Christensen (2008) notes, symmetry as a journalistic norm for reporting *both sides* of a controversy can produce ignorance, as equal weight ends up given to knowledge statements either intentionally misleading or otherwise marginal or discreditable. "Knorr-Cetina and I [Michael J. Smithson] have accurately identified the main problem here, namely[,] that anyone referring to ignorance cannot avoid making claims to know something about who is ignorant of what" (Smithson, 2008, p. 210). High et al. (2012) are not concerned with knowledge gaps as recognized or adjudicated by social science analysis. Instead, they focus on ignorances that are culturally recognized by participants. As anthropologists, they claim there is little to be done to draw universal conclusions about ignorance or its relations to "comparable phenomena such as stupidity, error, and confusion" (p. 17).

In the sociology of scientific knowledge, Bloor's (1976) argument for symmetry in the sociological explanation of both true and false beliefs helped shepherd in transformations of social studies of science. Symmetry is similarly demanded of actor-network theory, although the methodological principle is that the distinction between the technical and the social (or political) is an outcome of actors' articulations and not an a priori attribution. However, through the ostensible collapse of the social (Latour, 2007) as an explanans, there still remains the problem of sorting out whether or not the network and assemblages are the explanans or the explanandum, assuming explanation is in fact the goal of agnotology and related studies of absences.

Conclusions: Studying Things that Aren't There

> Absence is therefore not just a theoretical concept implied as the default logical antonym to presence; it is also a corporeal, emotional, and sensuous phenomenon articulated in discretely concrete, political, and cultural registers. (Bille, et al., 2012, p. 12)

The projects of agnotology and absence (should that be absentology?) require a great deal of taxonomic work, and this chapter is meant to add to the conversation, not as a matter of lexical policing, but as a necessary step in theory-building and developing the capacity for cross-case comparisons in studies of ignorance, as well as to articulate a possible framework for studies of other kinds of absences. Unpacking the distinctions within the framework of agnotology provides insight into the multiple forms of ignorance, especially those which are indeed forms of absent knowledge. This provides a way of interrogating things that are absences more generally, illustrating some particular challenges for the social studies of science and knowledge. For example, identifying an agnosis, especially, but not solely, privative agnoses, requires a suspension of traditional epistemological symmetry. Like the case of the scientific understanding of cold as the absence of heat rather than a substance in itself, the identification of things as privatives, or identifying ignorances as either absences or misunderstandings, requires claiming positionality as to knowing the properties of the primary referent or elemental "truth" identifying the *gnosis* to which the *a-* might be attached.

Full exploration of the challenges to symmetry will need to be taken up elsewhere, but it is clear that strict epistemological symmetry generating sociological explanations for both "true" and "false" beliefs cannot hold in studying either ignorance or absences. But neither can a generalized symmetry which eschews social causes for explanation at all: Each perhaps is to be replaced by a more modest methodological toolkit which maintains integrity across comparable levels of analysis in various case studies. We do not want to return to the pre-Bloor (1976) days of explaining "false beliefs" with sociological explanations and apparently "true beliefs" with "just-so stories," reducing the power of science studies to muckraking journalism.

Methodology

Like physicists who study black holes by their effects, sociologists and other theorists have an emerging repertoire for studying absences. A black hole is not visible, although it is not absent, and its effects on light and nearby masses are measurable. Vacuums are an absence of matter in space, and while not an object of study in themselves, as an absence in which things might be made present, vacuums highlight properties of those things: the properties of light in a vacuum, for example. Gordon (2008) adopts the term hauntology to describe the ways that various kinds of

absences linger and trouble discourses as present absences. Slavery in the Americas, or the disappeared in Argentina are both absences (missing persons) and knowledge about those made absent. These haunt rationality and consciousness, both subjective and public: Hauntings are analyzed through their a-effects. Structural holes (Burt, 1995) are absences in a network or between networks. They are measurable as network phenomena: nodes or linkages that might be expected given all the mathematically possible connections in a network but are not present. These absent network features need to be explained, as do the eventual apperception and capitalization of these absences by some participants in the network, and the lack of perception of the possibilities of structural holes by other participants.

In their theory of knowledge and culture, Deleuze and Guattari (1980/1987) suggest the metaphor of the rhizome as a new model of knowledge and subjectivity, as a poststructuralist orientation that does not reproduce dichotomies of knowledge/power. They specifically oppose the rhizome, think bamboo and its structure and proliferation, to the tree, as a model of knowledge. The rhizomic principles of (1 and 2) connection and heterogeneity and (3) multiplicity means rhizomes are epistemically flat, like Latour's (2007) assemblages and networks. We might think of rhizomes through a fourth principle, what Deleuze and Guattari frame as the asignifying rupture, a way of tracing knowledges as de- and re-territorializations that are "drawings in" of features. With this drawing in, knowledges are more than simple additive collections. Deleuze and Guattari also suggest what they call aparallel evolution as their fifth and sixth principles, proposing cartography and decalcomania (a form of tracing). That is, there is no regularity in the reproduction of rhizomic extensions, and rather than representational maps knowledge should be conceived of as nonrepresentational tracings. (See, for example, maps of the London underground.) This is articulated in Barad (2007) as a post-representationalist theory of performance and functionality in knowledge production.

However, these are theories of knowledge, and ignorance and absence are themselves absent from Deleuze and Guattari's (1987/1980) method. I argue that the tracings of rhizomes nonetheless produce spaces between the lines of the rhizome or the tracings of routes as empty and as potential agnoses. In addition, they argue that rhizomes are nonhierarchical and antigenealogical, that there is no deep structure to knowledges and that "the rhizome connects any point to any other point" (p. 21) and the rhizome is not "overcoded." However, rhizomes do have dimension, length, and mass. They are not, themselves, structureless, nor are the spaces between: They have granularity. This suggests that a fractal or holographic metaphor may be more apt than that of the rhizome: that the structure of the macro is reproduced through diminishing scale (or vice versa), or that the whole is present, even if at degraded resolutions, in the parts and fragments. Similarly, like the network theory underpinning structural holes, Deleuze and Guattari make the assumption that all network relations—or rhizomes—are equally possible, which may be mathematically true. Thus, what explains the lack of rhizomes or network positions or knowledge that might have otherwise been expected in a fully articulated network?

Along with these suggestive models and metaphors, there are caveats for an emerging methodology of the sociology of absences. For example, Collins (2007)

warns against the use of counterfactuals as a methodology for historiography or historical sociology. This "thought experiment" is the projection of the presence or absence of a person, place, thing, or specific event changing "the course of history." Collins finds the use of counterfactuals to interrogate historical events as misrepresenting historical causality and the scale and scope of historical forces. To shift the frame slightly to apply to a methodology for absences, looking for absences as causal features of social life must be done carefully to avoid anachronistic fallacies and related logical errors produced by counterfactual thinking.

Two other hesitations warrant consideration at this time for our emerging methodology for the analysis of ignorance: The first is the aphorism that "absence of evidence is not evidence of absence" Like black swans and other absences, the not-yet-ness of evidence challenges the easy attribution of knowledge and non-knowledge. Originally appearing in print to justify long-term investment in searches for extraterrestrial intelligences, the aphorism is considered a logical fallacy and is frequently deployed to shift the burden of proof.[6] For example, for the stereotypical conspiracy theorist, the absence of evidence for conspiratorial activities is taken, at face value, as evidence *of* the conspiracy. The second problem not easily resolved is the matter of imputation: Based on the presumed inaccessibility of others' minds, our agnoses of each other's motives, the imputation of intentionality, while an important dimension of the politics of agnotology and absence, is a fraught project. What would a "symmetric" analysis of these attributions of knowledge and motive to others in the absence of evidence look like?

What do we know about ignorance and absence?

Ignorances can be distinguished by kind and by degrees, requiring attention to the factors identified above as granularity, chronicity, scale, intentionality, and ontology. Some forms of ignorance are absences, some are errors, and those that are privatives can benefit from some of the theoretical and methodological resources from fields concerned with the identification and study of absences. Conversely, applying ideas such as granularity, intentionality, ontology, chronicity, and scale can inform inquiries into the production and structuration of absences. Not every one of these properties will be of the most analytic or political interest for making cross-case comparisons, but these properties do provide some traction in theorizing agnoses and absences.

While physicists worry about their "theory of everything" and the integration of general relativity and quantum physics remains elusive (itself a form a disciplinary specified ignorance which is epistemological and of low granularity), what I propose

[6]The "absence of evidence" quote is attributed to astrophysicist Martin Rees and quoted in Sagan (1995, p. 213).

is the articulation of the sociology of nothing,[7] or a project similar to that of agnotology which will articulate methodological parameters necessary for studying things that aren't there. What do we know about the things that aren't there? That they can take many modalities based on their absence from our senses and discursive practices; that they are constituted in systems of stratification and valuation which render these absences (il)legible; that they are institutionalized; and that we can study them by their effects, ever attentive to the complexity of inferences about absences.

By moving back and forth between ignorance and absence, many of the conceptual tools for studying agnotology may help to shape a framework for connecting the diverse studies of absence and its causes, and the studies of absence illuminating studies of ignorance, particularly those forms of ignorance which are absences, especially privative agnoses. Moving back and forth between the two, we will need to remind ourselves that ignorance and absence are produced, and productive, situated in time and reflecting the regimes of knowledge and legibility that constitute an episteme.

Postscript

Croissant and Smith-Doerr (2008) review the state of research on university–industry research relations (UIRRs), noting that location plays an important role in the establishment and effectiveness of these collaborations. Location can figure literally, where research parks and other forms of spatial proximity can have positive impacts on likelihood of UIRR establishment and success. In addition, location can figure metaphorically (p. 697), as the social location of institutions, in terms of prestige, for example, greatly affect their perceived desirability as research partners. A literal absence, geographically speaking, is the establishment of research parks which remain, despite optimistic models (Etzkowitz & Leydesdorff, 2000), large tracts of open space and underutilized capacity.[8] An absence of knowledge haunts the optimistic assessments of places like Silicon Valley or Research Triangle Park, and that lack of knowledge about the factors which actually influence geographic concentration of UIRRs and if they can be manipulated through policy challenges the reproduction of these sites. The multiple versions of space, empty and full, of location and relationships, both present and missing, and of knowledge, both present and absent, provide a lens, if not always geographical, then at least spatial in

[7]This sociology of nothing is different from, but not incompatible with, Ritzer's (2003) "globalization of nothing," which is a critique of global commodity fetishism and its intentional stripping of meaning from products for mass consumption. The stripping away of local meanings is a kind of ignorance production, constituting an agnosis that allows commodities to circulate without controversy (see also de Sousa Santos, 2008).

[8]On the absence of successful UIRR establishment, see, for example, the decades-old empty lot that serves as the annex to the University of Arizona "Tech Park" (University of Arizona, 2015).

allowing us to think about absent projects and absent knowledge. Geography and landscape become one kind of scale for thinking about knowledge-distribution (non) processes, and for conceiving of them as a metaphor for the the ecological system of disciplines and interdisciplinarity of the academy and beyond. Boundaries and bridges, as metaphors for exclusionary and inclusionary processes, become ways of understanding the relational features which produce or inhibit knowledge transmittal. The literal and metaphoric use of geography provides another dimension and potential methodological resources for conceptualizing and assessing agnoses and absences in various aspects of contemporary knowledge systems.

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