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Peter Janich (trans. by Eric Hayot and Lea Pao), **What Is Information?** Minneapolis, MN: University of Minnesota Press, 2018 (Originally published in German in 2006), 216 pp., $25.00 (paperback).

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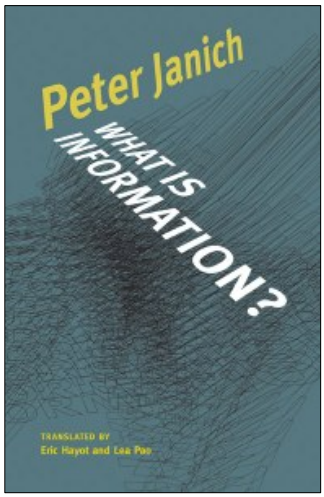

What is overlooked in scientific accounts of information? This is the question philosopher Peter Janich provides an answer to in ***What Is Information?*** In an attempt to denaturalize and demythologize the received view of a concept used within several fields of science, this book will be particularly valuable for scholars in communication and media studies, but also in the philosophy of science, evolutionary theory, neuroscience, and political science. Janich calls for the concept of information to be reembedded in communication, where the meaning and use of information are inextricably linked, and criticizes "metaphorical" applications of information in genetics, technology, and neuroscience.

Denaturalization is Janich's attempt to wrest the study of information away from the exclusive possession of the natural sciences. It is linked to his broader philosophical project of methodical constructivism or culturalism, which interrogates scientific concepts and truth-claims through a methodical tracing of how they were constructed by the use of instruments to achieve human intentions. This is helpfully described by the translators in their introduction as a position within the philosophy of science located between scientific realism and cultural relativism. If one imagines positions in the philosophy of science as located along a spectrum labeled "appetite for epistemological risk"—or skepticism—then Janich's position would be more risk averse than realism (avoiding questions about to what extent science makes true ontological claims), and more risk accepting than relativism (acknowledging that scientific claims are more than products of social conventions, and their authority is not limited to a particular cultural-temporal context). Thus, Janich avoids the problem Roy Bhaskar (2008/1975) identified, that "to be a fallibilist about knowledge, it is necessary to be a realist about things," because "to be a sceptic about things is to be a dogmatist about knowledge" (p. 43). Janich is certainly a fallibilist about knowledge, focusing his attention on the method by which scientific knowledge came to be produced, while remaining agnostic about things (or simply uninterested in ontology). Thus, although the question-title of his book suggests an ontological answer—what information *is*—Janich instead traces the method through which the modern concept of information was constructed, and argues that this method is a poor fit for the multifarious uses to which the concept has since been put.

Janich's denaturalization argument is convincing, and those working in the natural sciences would probably accept it: That while information is analytically separable from meaning (semantics) and use (pragmatics), it should never be forgotten that they form part of an organic whole. The humanities, therefore, should not be excluded from knowledge production about information; the transmission of information is important, but so too are its interpretation or understanding and the uses to which it is put. Janich argues that the natural sciences' use of "information" has ignored semantics and pragmatics, focusing

exclusively on syntactics, the rule-based relationship of signs to each other. This restricted focus originated in the intentions behind those who launched information theory: Their goal was to create technologies for long-distance communication. This remit excluded considerations of semantics and pragmatics, since all communications technology needs is to transmit messages at the highest fidelity using the least energy. Hence, communicators at each end of a technical apparatus could deal with the meaning and use of transmitted information, while information theorists would focus on syntactics to devise the most efficient means of encoding messages. Even for those whose commitments in the philosophy of science differ markedly from Janich's, his argument that the concept of information should be denaturalized, and engaged within the humanities, has force. So too his warning against reducing "human language to telecommunicational structures, that is, to the temporal patterns and processes of physical effects and the taking of these latter *as complete solutions to questions of meaning and value*" (p. 70, emphasis in original).

Janich's attempt to demythologize information, however, is less convincing—at least for those with sufficient appetite for epistemological risk to make, debate, or accept ontological claims. Janich's philosophical project is to reverse engineer how scientific concepts were first methodically constructed, foregrounding the intentions of their authors and the tools they used to achieve them. Ontology—whether the scientific claims constructed accurately describe a mind-independent reality—is outside the scope of this project. Hence, the central ontological claim made by theorists of information as Janich formulates it, that "information is not simply matter or energy but something autonomous, something with its own structure … that only appears via a process or effect" (p. 4), is considered by Janich to be a form of myth, or mythological icon. (This characterization, it is worth noting, is hard to distinguish from an ontological counterclaim: that information *is* not what its theorists claim it is.) But this formulation of information theory's central claim is inaccurate. In César Hidalgo's (2015) formulation, "Information is not a thing; rather, it is the *arrangement* of physical things" (p. xv, emphasis added). Information is autonomous, but it is not something with its own structure—information is the structure of things, things which are not themselves information.

This subtle distinction is important, because it bridges the gap between two uses of "information": in everyday linguistic communication, and in information technology (from where it has spread to genetics, physics, and neuroscience). The latter usage Janich considers metaphorical, an extension from intentional linguistic communication to mindless biological, electronic, and neurochemical processes. Although he would agree with Runciman (2005) that "much of the language of science is metaphorical and none the worse for it," Janich would dispute the rest of his argument:

> there is no other thing for which theorists of cultural selection [or information technology, biology, etc.] are using the concept of information transfer to stand proxy . . . Information is not a metaphorical term needing to be cashed into something else. (pp. 4–5)

Yet if information is defined as the structure or arrangement of things—a definition echoing the thought of Thomas Aquinas (e.g., Moser, 2011; Peters, 1988, pp. 10–11)— then information in the context of linguistic communication is just one instantiation of information in the "metaphorical" sense. That is, interpersonal communication, carried out (for instance) through speech, originates in the structure of neurons in the speaker's brain (comprising information), continues in the structure of sound waves passing through the air (comprising information), and ends in changes to the structure of neurons in the listener's brain as she

receives the communicated information. Likewise, "communication" between computers originates in the structure of matter in one hard drive, continues in the structure of photons passing through fiber optic cables, and ends in changes to the structure of matter in another hard drive. With or without human intentionality, information-as-the-organization-of-matter is involved.

What distinguishes the human use of information from the natural-science conception of information is *meaning*. Janich is correct to identify a fundamental error in treating "the human use of communication as a means of transmitting meaning and value as identical to the work of a telephone, which follows the laws of physics" (p. 100) and to locate the root of this error in the mind-body problem:

> how can the physical media of information or communication possess or bear meaning and value . . . how can they have qualities that have something to do with the forms of understanding and recognition shared by participants in a communicative process? (p. 100)

What is identical between human communication and the operation of a telephone or any other communication technology is the transmission of information, both of which follow the laws of physics. Meaning and value, however, are generated by human beings out of the information communicated. Regardless of whether the mind-body problem is resolved by a dualist or monist solution, the different-from-matter or same-as-matter human mind creates meaning and value from information. Information theory itself comes close to dealing with meaning, as in the statement that the more uncertainty a message reduces, the greater is its information content (Pierce, 1980, p. 23). Uncertainty, like meaning, value, and use/utility, is a human reaction to or interpretation of messages, which are a type of information-as-the-organization-of-matter. The natural sciences can deal with information in its many forms (in human communication, DNA, computer and neuronal networks, etc.), while the humanities deal with the way we use information, and create meaning and value from it.

Scholars of media and communications occupy a middle ground. Janich notes that in the "media sciences, and in their philosophy . . . one finds, with very few exceptions, an understanding of information and communication . . . that essentially follows the one laid down by the natural sciences" (p. 124). The danger here—of dealing with information from a natural-science perspective only, ignoring the humanities' perspective—can be illustrated with an example from this reviewer's own experience.

In December 2015, I was asked by a foreign friend for my predictions on the U.S. primary elections. My own research uses the natural-science conception of information to interrogate how influences from psychology and the political economy of media affect the functioning of democracy (Beattie, 2019). So for me, the answer was clear: Jeb Bush and Hillary Clinton, the clear winners of the "money (or invisible) primary," would easily win their parties' respective nominations. After all, they had the money to buy the most information-transmitting political propaganda, and their support from deep-pocketed donors signaled to journalists that they were serious contenders—hence "newsworthy," meaning they would receive billions of dollars' worth of free media coverage. I dismissed Trump ("too crass and unorthodox for D.C. insiders, including leading journalists; his campaign will crumble under critical media attention") and Sanders ("polls reveal most Americans agree with his policy proposals, but he'll be starved of media coverage, so few will even know his name, much less his policies") as irrelevant. As Janich would have put it, I was myopically

looking at flows of information from the media as a telecommunications engineer might, leaving out meaning/semantics and use/pragmatics.

Political communication scholars make a point the importance of which is hard to underestimate: that facts have no wings—they must be transported by the media (Althaus et al., 2011). But Janich too makes an important point: lifeless information, the physical organization of ink on a newspaper or photons in a fiber-optic cable, is only the raw material of communication. He would counsel media and communication scholars that we need investigations into how people are interpreting mediated information, turning it into meaning, and using or acting upon it. Had I received this information then, I might have constructed and applied the following meaning: that in a society whose economic system is failing broad swaths of the population, where distrust of the media and the political-economic establishment is rampant, candidates disliked and disregarded by the mass media may actually stand a chance. With an alternative infrastructure for delivering information—the Internet and social media—voters may construct meanings and uses quite different from those of journalists.

What Is Information? may not succeed at "demythologizing" or debunking the natural-science conception of information, but it does succeed in revealing how much scholars of political communication or media studies may miss if they overlook questions of how people make meaning and use of information.

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