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IJoC Media, Hot and Cold

The Materiality of Media Heat

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It is not surprising that temperature has been used so often to conceptualize media and communication, both colloquially—from freeze-frames to WiFi hotspots—and across media and cultural theory. Temperature is a mode of environmental description attuned to the speed and rhythm of movement, the densities of substances, and their sensory effects. As we inhabit an increasingly volatile climate, and the language of hot and cold filters ever more extensively into descriptions of media and culture, the stakes for reflecting on these metaphoric transfers are raised. The following paragraphs chart four ways that temperature has animated media and communications studies. The last of these, a new materialist consideration of media's heating and cooling, reveals the profound effects that media temperature has on global infrastructure and environmental conditions.

First, we might think about *taking a medium's temperature*. Perhaps the best-known example of this approach is Marshall McLuhan's (1994) distinction between hot media such as cinema, which are high definition and affective, and cool media such as television, which require more interaction and engagement. For other scholars, the photographic has been that which freezes time (enacts a "spatiotemporal standstill"), thus described in terms of cold and ice (Alter, Koepnick, & Langston, 2013), and the cinematographic has been aligned with fire (Wollen 2003). The implicit question here is ontological and at times diagnostic: What temperature is a medium? Or, what temperature is a culture? In this approach, a medium or society appears as an organism unto itself, one whose momentum, affect, and relationships can be charted using the indices of temperature. Although this kind of analysis rarely registers the actual transmission of heat, it nonetheless uses everyday embodied interactions with the environment as a basis for imagining media.

A second way that temperature has permeated the analysis of media is vis-à-vis thermodynamics and information theory–influenced descriptions of the *conductivity of particular media and communications technologies*. Influenced less by the experiential dimensions of temperature—our perceptions of hot and cold—than by the correlation between heat and information, media with high levels of content transmission are seen as conductive, generating heat and intensity. This approach is rooted in Claude Shannon's theory of information, which advanced thermodynamics-inspired concepts such as entropy in the description of communications systems. In considering media culture, the language of thermodynamics can help to describe the extensive transformations of a technological modernity—one that is heating up, increasing in entropy, and ultimately moving toward a "heat death" (Parisi & Terranova, 2000). In contrast, cold in this paradigm is used to describe the inability to transmit. Günther Selichar's photography project, *Screens, cold*, which depicts a number of blank, nonfunctioning screens,

operates in this mode. For a medium, to be cold is to be *off*, to lack the ability to transfer information. Rather than an ontological question—whether a medium is a hot or cold one—this is a question of capacity: Any given technology might be more or less conductive, and thus conducive for the movement of information as heat.

A third approach to temperature—the analysis of *phase transitions*—is more often used in the characterization of culture than media. This genealogy can be traced back to Marx's phrase "all that is solid melts into air," which draws upon the process of boiling to describe the coming revolution. Here, the transitions of phases—of states of matter—brought about by temperature changes form an apt set of metaphors to describe the process of media and cultural change. For an example in popular media discourse, the failure of Facebook's initial public offering was widely referred to as a "meltdown"—a transition that helped to illustrate the dissolution of what had previously appeared as a solid structure. Writing about technological change, Gillespie, Boczkowski, and Foot (2014) use a story about glass's malleability at different temperatures to explain the variable rates of media transformation. Media scholars have also used "transduction" to describe the process by which media and other objects effect changes of state—the language of temperature resonates here as well (Helmreich, 2007; Mackenzie, 2002). If taking a medium's temperature invokes an environmental imagination to naturalize certain media ontologies and a thermodynamics-inspired model of communication helps us to see those media as not simply hot and cool but varying in conductivity, this mode draws from temperature to explain how media crystallize in different figurations as they morph over time.

More recently, temperature has been taken up as a material property and product of media ecologies. Here, hot and cold are used less to characterize individual media technologies or register their conductive capacities than as a gauge for understanding *how media shape the equilibrium of their surrounding environments*. Data centers and computer systems generate enormous amounts of heat, which in turn form one of the greatest threats to communications systems. One network manager reflects: "An invisible enemy lurks within computer networks and communications equipment. The enemy is not a hacker, virus or worm, but something that appears much more innocuously: heat" (Mordick, 2006, p. 34). Increases in processing continue to generate heat, and as Gordon E. Moore observed in the 1960s this could result in a "heat problem" if computers become small enough, though this has been less memorable than Moore's law about the acceleration of computer growth (Maxwell & Miller, 2012). An attention to the generation and redistribution of this heat connects media to the energy infrastructures on which they depend, and, in turn, to the intensification of global warming (Carruth, 2014; Cubbitt, Hassan, & Volkmer, 2011; Starosielski, 2012).

The analysis of material media environments has also been concerned with the expansive cooling infrastructure needed to dissipate communications heat. Andrew Blum (2012), quoting a Facebook infrastructure director, reports of our media systems: "This has nothing to do with clouds. It has everything to do with being cold" (p. 258). The need for cooling is shaping the geography of global Internet distribution, relocating some of its nodes to the colder climates of Oregon and Scandinavia. Cold climates shelter signals in more ways than just offsetting heat. Cold weather keeps Hewlett Packard's computer equipment safe from thieves as it moves through Central Asia (Bradshler, 2013); the cold, hard ground keeps fiber optic cables safe from local public works projects. This is not a strictly digital

phenomenon: Archives also need to be cooled, and our ability to access media history via nitrate film, for example, is dependent on extensive temperature control. In a related vein of media research, climatic zones, including the cooled archives of digital content, the development of "polar media" across the Arctic regions, and the regulation of heat inside museums, have come to define a new set of parameters for analysis (Domínguez Rubio, 2013; Hogan, 2013; Krapp, 2009).

Research on media's materiality—from media archaeology's excavation of artifacts to platform studies' investigation of hardware—has focused attention on the technologies, objects, and artifacts that undergird media culture. A materialist consideration of media heat offers a different take on the "materials" of media studies. Tracking media heat, we cannot simply view matter as discrete, determinate, and solid—a firm substructure—but rather, as Coole and Frost (2010) advocate in their introduction to the new materialisms, we must see it as a relational, lively force. Heat exchanges are not confined to communications systems, but move across and through infrastructure, ecologies, and bodies. Whether the burning of fossil fuels or the calories of laborers, the cooling of hard drives or movie theaters, such exchanges can help us to better understand how media both enfolds and gives rise to a set of broader environmental relations and conditions for life.

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