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The Ageing of Information: From Particular to Particulate

Paul Duguid

Ours is the age of information. So Marshall McLuhan informed us fifty years ago, and the claim has been enthusiastically reaffirmed at regular intervals since.¹ Such reaffirmations have in turn given rise to periodic attempts to douse the enthusiasm. These often draw on scholars such as Jürgen Habermas and Michel Foucault.² Analysis of our apparently unprecedented age by way of scholars of the eighteenth century might seem odd, but that oddity can be tempered a little if we know that, *pace* McLuhan, in the latter part of that century an Anglican divine and essayist, Vicesimus Knox (1752–1821), declared his to be the “age of information.”³ How should we read this prior appropriation of the phrase?

Information theorists, linguists, and historians have wrestled with *information’s* past, though few have taken the eighteenth century as their

I am particularly grateful to Ann Blair, Michael Buckland, Anthony Grafton, Simon Grote, David Hancock, Carla Hesse, Geoffrey Nunberg, and Leah Price for substantive help with this paper.

¹ Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964), 56.

² For example, Howard Rheingold, *The Virtual Community: Homesteading on the Electronic Frontier* (Reading, Mass.: Addison Wesley, 1993); José van Dijck, *The Culture of Connectivity: A Critical History of Social Media* (New York: Oxford University Press, 2013).

³ Vicesimus Knox, “On Preaching and Sermon Writers,” in *Essays Moral and Literary*, 2 vols. (London: 1778), 2:157. Further citations from the essays use the seventeenth edition (3 vols., London, 1815), the last in Knox’s lifetime.

focus.⁴ Moreover, historians have generally retained a modern understanding of the word. Adroit investigations have explored imperial control in terms of an information order, abundance of reading matter as information overload, the search for enlightenment as information seeking, prerevolutionary France as an information society, and government surveillance as information mastery.⁵ In general, the presentism-resistant task that Peter Burke set himself in tracing “what early modern people—rather than the present author or his readers—considered to be knowledge” remains to be taken up for information.⁶ In this paper, I shall attempt to do so, arguing that in the eighteenth century *information* deserves to be read as a keyword in discussions about relations between mind and world and between individual and state. Paradoxically, I conclude that reading *information* in eighteenth-century context reveals a trajectory similar to ideas of “information” in the twentieth—from youthful enthusiasm to aged suspicion and circumspection—thus making Foucauldian and Habermasian analysis of both ages quite appropriate.⁷

This “arc” of information can, I argue, be traced in part to its contending conceptualizations as these expand from processes within minds to embrace both matter within books and signals sent by senses and nerves that in their different ways initiate those mental processes. Confusions resulting from the changing conceptualization can be found in both popular and esoteric writing. Hence I look not only at Knox, as an exemplar of the former, but also at philosophers—of epistemology, pneumatology, common

⁴ For example, Ronald E. Day, *The Modern Invention of Information: Discourse, History and Power* (Carbondale: Southern Illinois University Press, 2001); Geoffrey Nunberg, “Farewell to the Information Age” in *The Future of the Book*, ed. G. Nunberg (Berkeley: University of California Press, 1996), 103–38; Ernst Müller, “Transferences in the Concept of Information,” *Contributions to the History of Concepts* 6 (2011): 99–120.

⁵ See C. A. Bayly, *Empire and Information: Intelligence Gathering and Social Communication in India, 1780–1870* (Cambridge: Cambridge University Press, 1998); Ann Blair, *Too Much to Know: Managing Scholarly Information before the Modern Age* (New Haven: Yale University Press, 2010); Robert Darnton, “An Early Information Society: News and the Media in Eighteenth-Century Paris,” *American Historical Review* 105 (2000): 1–35; Barbara Shapiro, *Political Communication and Political Culture in England, 1558–1688* (Palo Alto: Stanford University Press, 2012); Jacob Soll, *The Information Master: John-Baptiste Colbert’s Secret State* (Ann Arbor: University of Michigan Press, 2009). See also “Historical Perspectives on the Circulation of Information,” *American Historical Review* 116 (2011): 1392–1435; and the special section on “Early Modern Information Overload” in *Journal of the History of Ideas* 64 (2003): 1–72.

⁶ Peter Burke, *A Social History of Knowledge: From Gutenberg to Diderot* (Cambridge: Polity Press, 2000), 12.

⁷ Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society* (Cambridge, Mass.: MIT Press, 1989).

sense, and politics—as exemplars of the latter, in the belief that their struggles with this word can tell us something about struggles in their world, and not only theirs, but also our own.

A MAN OF HIS AGE

Popular in his day but portrayed now, if at all, as tediously conservative, Knox can easily be assumed to have scanned his “age” with essayists’ conventional gloom.⁸ Though he occasionally indulged the essayists’ trope of comparing his present to a golden past, Knox more often praised his age for becoming enlightened, scientific, and polished. Indeed, this Oxford scholar’s *Liberal Education* sounds almost MOOCish in questioning the continued utility of universities:

[T]he principal cause of establishing universities in an age when both books and instructors were scarce, no longer subsists. Let them therefore be reformed, and rendered really useful to the community, or let them be deserted.⁹

Knox also celebrated the age’s potential for political emancipation, responding enthusiastically to the French Revolution, though he knew that to do so “must give offence to those who are possessed of power and patronage” and put him at professional and even personal risk. Indeed, in 1793 soldiers drove him from a public theater in reaction to a sermon calling for peace. While he defended the sermon, Knox withdrew from publication his more assertive *Spirit of Despotism*.¹⁰ Inverting his earlier criticism of Thomas Paine and praise of Edmund Burke, Knox here urged the age to use sense and reason to throw off its despotic past. This emancipation only needed the press to “supply [the people] with all important information,” he argued, for “[g]ive them fair and full information and they will do the thing that is right in consequence of it.”¹¹ The novelty of Knox’s claims may lie less in his invocation of information than in his idea that this is

⁸ Terry Eagleton, *The Function of Criticism: From The Spectator to Post-Structuralism* (London: Verso, 1984), 36.

⁹ Vicesimus Knox, *Liberal Education* (London, 1781), 154.

¹⁰ Vicesimus Knox, *The Spirit of Despotism* (London, 1821 [first published 1795]), [2]; [Knox], *A Narrative of Transactions Relative to a Sermon, Preached in the Parish Church of Brighton, August 18, 1793* (London, 1793).

¹¹ Knox, *Despotism*, 27.

something that the press could unproblematically “supply.” As we shall see, such a view of “information” was relatively new. Although the young Samuel Coleridge claimed in the same year and a similar vein that “by information the public will may be formed,” he was probably using the more conventional notion of *information* as more or less synonymous with *education*.¹² For Knox and others, by contrast, it was becoming less a mental process to be developed than a material particle to be delivered.

While it is not clear that Knox and Coleridge agreed what information was, their assertions suggest shared faith in what information did: form, almost irresistibly, the public will. Faith in this efficacy, despite the diverse ideas of what it was, are distinctive features of the notion of “information” in Knox’s age, features that are worth tracing to understand ensuing democratic hopes and related deterministic conundrums. I shall attempt this by looking at examples of how *information* was deployed in political and epistemological writing. The task is tricky because, far more used than mentioned, the concept was rarely made the subject of discussion. Nonetheless, by looking at examples of its changing use, we can understand how *information* might have come aptly to designate but also to confound an “age.”

CONSTITUTION OF INFORMATION

Discussions around the U.S. Constitution offer a useful place to start. In the finished document, *information* appears once, in the decree that the president “shall from time to time give the congress information of the state of the union” (Article II Section 3). The idea of information as something given and received—whether by presidents or the press—is unexceptional today. Alexander Hamilton’s “secret” draft of this section throws some doubt, however, on whether contemporary reading was so simple. Hamilton proposed that “The President . . . shall communicate to [congress] all such matters as may be necessary for their information.” Here it is “matters” that are given; “information” is not the content of the transaction, but more the desired effect. (The use of possessive pronouns with *information* lingers today in the phrase “for your information,” but it is now an oddity. We generally take information to be impersonal and objective. Making it belong to a person or group would for us throw doubt upon it, just as we are suspicious of those who claim “their” own facts.) In contrast to Hamilton, Judge Story, writing on this clause some 65 years later,

¹² Samuel Taylor Coleridge, *The Plot Discovered* (Bristol, 1795), 45.

extolled the “great wisdom . . . in requiring, the president to lay before congress all facts and information.” Here, almost synonymous with *fact* and taking the place of Hamilton’s *matter* as the stuff delivered by the President, “information” seems utterly modern and impersonal. The shifts from Hamilton to Story—and where the Constitution stands between the two—can be hard to grasp, but collectively they ask us to consider whether “information” is input (the stuff delivered), process (the action resulting from that delivery), or outcome (the content of the ensuing mental state, having been informed). The eighteenth century might say “yes” to all three, for all three readings were available, though the dominant reading was changing.¹³

These shifts of the 1770s and 80s are clearer if we contrast usage near the beginning and end of the century. In his “Epistle to the reader” of the *Essay Concerning Human Understanding*, John Locke noted self-deprecatingly that the work was “not meant for those that had already Mastered the Subject . . . but for my own Information.” Here Locke (like Hamilton) used *information* more as we might use *instruction*, *education*, *ratiocination*, or even *enlightenment*, as the process that leads to Locke’s central concern, a state of “understanding.” In a similar vein, Francis Bacon had earlier discussed how experiments “assist . . . the information of the understanding?” and people often wrote of the “source,” “means,” “mode,” or “method” of information—all suggesting that, information was the mental response to a stimulus, rather than, as it would become, the stimulus itself.¹⁴

At the end of the century, William Godwin used the word in the introduction to another seminal text, his *Enquiry Concerning Political Justice*, writing of authors who worked by “collect[ing] the scattered information that had been produced upon the subject.”¹⁵ Here, “information” is not, as for Locke, the process of coming to a coherent understanding through writing, but rather something “scattered,” autonomous, and modular, something authors could collect from others’ and put unchanged into their own writings—no doubt with the hope that it might give rise to that Lockean process in readers, though distinct from that process as stimulus from response. Similarly, Mary Wollstonecraft could write that “[t]he information I received from different persons, I will communicate to you” or “they

¹³ Vasan Kesavan and J. Gregory Sidak, “The Legislator-in-Chief,” *William and Mary Law Review* 44 (2002): 1–64, quotations at 15 and 9.

¹⁴ John Locke, *An Essay Concerning Human Understanding*, 2 vols. (London: Dent, 1961 [first published 1690]), 1:xxxii; Francis Bacon, *Novum Organum* (London, 1620), 13.

¹⁵ William Godwin, *An Enquiry Concerning Political Justice and Its Influence on General Virtue and Happiness*, 2 vols. (London, 1793), 1:6.

then repeated to us the information which has already reached you.”¹⁶ Rather than Locke’s personal process of coming to understand, Godwin’s and Wollstonecraft’s “information” is more Story’s impersonal “facts,” Hamilton’s “matter,” or the stuff supplied by the press which Knox thought would lead the people to do what is right—all building blocks, rather than building. Though, as Coleridge’s comment indicates, the processual sense of *information* still lurks at the end of the century, it was increasingly vestigial; the modular, particulate notion more common.

FROM RESPONSE TO STIMULUS

In short, while at the beginning of this period information was thought of as the response to writing, something in the head, by the end information increasingly meant the stuff in writing or elsewhere that stimulated this response. Thus, when we read of books “providing information” in this period, we must wrestle with the ambiguity that the author might see books as a source of education and enlightenment or as a compendium of facts, or both. (In a single French work, information is used to translate *instruit*, *connaissance*, *lumière*, and *avis*.)¹⁷ Typical of his time, Knox talks ambiguously of being able to “find much valuable information in a[n] . . . essay.”¹⁸

The shift to the content of books not minds was no doubt influenced by the growing amounts of printed matter and the apparent autonomy and granularity of content that publishing, regularly taking copy from one publication to put in another, suggested. Dictionaries in particular reflect this book-driven shift, though less in how they define *information*, than in how they use the word in paratext to define themselves. From the anonymous *Academy of Pleasure* (1665, whose “Poetical Dictionary” was “For the information of the meer English Reader”) to Nathan Bailey’s *Universal Etymological Dictionary* (1721, “for . . . the information of the Ignorant”) to Richard Rolt’s *New Dictionary of Trade and Commerce* (1756 compiled “from the Information of the Most Eminent Merchants”), to Charles Marriott’s *New Royal English Dictionary* (1780, “collected . . . so that the

¹⁶ Mary Wollstonecraft, *Original Stories* (London, 1788), 20; idem, *Historical and Moral View of the Origin and Progress of the French Revolution* (London, 1794), 188.

¹⁷ Marquis of Condorcet, *The Life of M. Turgot, Comptroller General of the Finances of France* (London, 1787), 19, 154, 108.

¹⁸ Knox, *Liberal Education* (London, 1795), 112.

Possessors of this work may obtain any information they require”), *information* was a standard of dictionary front matter.¹⁹ This sequence again leads away from the Lockean notion “for the information of” towards Rolt’s and Marriott’s more Godwinian notion that information was content, put into and taken out of books. While these paratextual uses indicate the easy association of information with books in general, as Knox understood when he wrote of title pages that “led [him] to expect a large fund of information,” it was particularly fitting that dictionaries—archetypically modular and, in their alphabetized sequence, epistemically serendipitous—came to typify books as storehouses of increasingly impersonal, self-sufficient, modular matter.²⁰

Knox celebrated this serendipity and autonomy. For him, “information” was “[d]ispersed all over the kingdom” and could be discovered by search and acquired, received, procured, derived, added, communicated, or, as we have seen, supplied.²¹ That he held modularised views of printed information is hardly surprising. Compiler of the *Elegant Extracts* (1784–1816) and thus an early beneficiary of the landmark copyright ruling of *Donaldson v. Beckett* (1774), Knox became expert in extracting items from their original context and distributing them in new ones.²²

Moving from a process inside the head to the material out in the world that stimulated that process, the shifting sense of “information” also reflected changes in the century’s understanding of the relation between mind and world. The Enlightenment quest to map that relation can be traced at least to Descartes, but in the eighteenth century it was transformed by Newtonian aspirations as George Berkeley’s anti-Newtonian assertion that we are “unable to comprehend in what manner body can act upon spirit” gave way to Joseph Priestley’s confident claim that “one great comprehensive law shall be found to govern both the material and the intellectual world.”²³ Changing senses of *information* accompanied these changing accounts of the gap between mind and world and the theories about how

¹⁹ *The Academy of Pleasure* (London, 1665); Nathan Bailey, *An Universal Etymological Dictionary* (London, 1724); Richard Rolt, *A New Dictionary of Trade and Commerce* (London, 1756); Charles Marriott, *The New Royal English Dictionary* (London, 1780).

²⁰ Knox, “On the Manner of Writing Voyages and Travels,” *Essays* 1:139.

²¹ Knox, *Essays*, passim.

²² Robert W. Uphaus, “Vicesimus Knox and the Canon of Eighteenth Century Literature,” *The Age of Johnson* 4 (1991): 345–61.

²³ George Berkeley, *Treatise Concerning the Principles of Human Knowledge* (London: Fontana, 1972 [first published 1710]), 74; Joseph Priestley, “A General View of the Doctrine of Association of Ideas,” in David Hartley, *Hartley’s Theory of the Human Mind* (London, 1775), xxii–xxxii, quotation at xxv.

that gap was bridged, theories with significant implications both for Locke's "understanding" and for Godwin's "politics" and which fueled the optimism of those who thought like Knox that information could transform despotism into democracy.

While *information* is important to understanding such discussions, its contribution is hard to pin down. Unlike other words implicated in mind-world and individual-state debates such as *understanding* (qv Locke), *common sense*, or *reason* (qv Thomas Paine), *information*, though often used, was rarely reflected upon. Where other words were fought over, *information* was more fought with by protagonists who appear almost unaware of their weapon. Hence it was more easily self-effacing paratext than text. Knox was typical: though he saw information as the marker of his age and the means of its transformation, though he scattered the word through his work, and though he extolled the virtues of philology and "verbal criticism," he never directly addressed the term itself.²⁴

It is perhaps because it was so unassuming that it became so useful. Then as now, it worked in tandem with *knowledge* yet escaped as a generally unindicted co-conspirator. *Information* allowed arguments to bypass epistemological angst and drive over philosophical conundrums with chassis unaffected. Nonetheless, as "information" moved out of the head and into the world, and thus from the mental response of the mind's encounter with the world to include the stimuli of that response, attendant causal assumptions raised hopes about how the mind's responses might be foretold and, in consequence, how society could be predictably reformed, the past surpassed and the future assured. Hence, though still self-effacing, by Knox's day *information* appeared almost self-sufficient in its ability to transform both minds and mankind. Yet, as we trace its rising allure, we will see simultaneous disenchantment as the mid-century trope that you "could not have too much information" gave way to the uneasy sense that you could or that you needed other things as well or instead. Where Knox's usage of *information* became standard, his *Spirit of Despotism's* optimism in the concept's efficacy did not.

STRANDS OF INFORMATION

To understand the underpinnings of Knox's optimism, if not (yet) of the disenchantment, it helps to investigate *information's* roots. *Information* is a

²⁴ Knox, "Verbal Criticism Undeservedly Despised," *Essays* 1:176.

“derived nominalization” of the underlying verb *inform*. Nominalizations, linguists warn, are tricky chameleons “in which a semantic category such as a process is realized by an atypical grammatical class such as a noun.”²⁵ We can see nominalization’s dual aspects in words like *instruction*, which can suggest processes (thus we can talk of a “course of instruction”) or, when they appear as count nouns, can suggest discrete substances contributing to the process (thus we can talk of “an instruction”).

In the eighteenth century, at least three strands of *information* with distinct historical paths were at play. (Their relationship is further confused by the disappearance of the count-noun form, which perversely faded as the desire to count information grew.) First, since the fourteenth century, the underlying verb *inform* had meant to form or shape the mind: broadly, to instruct and, more narrowly, to impart a particular fact (that has the potential to inform). Nominalization thus encapsulated Locke’s process of mind shaping and early definitions of *information* used gerunds such as *telling*, *making known*, or later the “act of communicating.”²⁶ But, second, the nominalization could also refer to the input, the “particular fact” that got the process under way. In this regard *information* came to embrace a stimulus or sensation (sometimes referred to as “the information of sense”), or any communication from the world capable of affecting the mind. Thus, where *instruction* and *information* were treated as processual synonyms in Locke’s time, by Knox’s the latter had moved closer to the particulate count noun “an instruction,” though again polysemy can make it hard to gauge exactly where some examples stand.

A further notion of *information*, which fostered its association with books, came from the fifteenth-century legal term for a criminal complaint—a usage that survives in the cognate *informer*.²⁷ By the eighteenth century this usage had lost its legal exclusivity and was used more generally for a report. (The sixth edition of Phillips’s dictionary defines *report* as “tale, story, relation, account, or information.”)²⁸ From this strand, *information* came to encompass both a composite document made up of facts or, increasingly, the individual facts that made up such a document. And overall, the interrelated strands made the single term available both for stimulus (from composite documents to isolated facts or sensory impulses) and for the response to that stimulus, merging in conceptually

²⁵ J. R. Martin and D. Rose, *Working with Discourse: Meaning Beyond the Clause* (London: Continuum, 2007), 106.

²⁶ Edward Phillips, *The New World of Words* (London, 1671).

²⁷ Thomas Blount, *Nomo-Lexikon, a Law-Dictionary* (London, 1670), 78.

²⁸ Edward Phillips, *The New World of Words*, 6th ed. (London, 1706).

hazardous ways cause, process, and outcome in the development of human understanding.²⁹

DETERMINING INFORMATION

The combination was hazardous because, spanning input, process, and output, it lent support to the notion, held as we have seen by Knox and Coleridge, that information was inherently efficacious and, implicitly, that if you controlled information you could control people.³⁰ Such assumptions rise from the etymology of *inform*. Words like *say*, *speak to* or *tell* assume little about the state of mind of the audience before or after saying, speaking, or telling. “A informed B,” by contrast, carries implications that B was uninformed before and informed after. By extension, once B was informed, the input was, for B, information no more. Hence Marriot’s *New English Dictionary* restricted *information* to “something unknown before,” while Samuel Johnson alluded to the distinction when he wrote that “men more frequently require to be reminded than informed.”³¹ The idea that what was information depended on each individual’s state of mind, however, made ideas of masses, collections, and even books of objective and possibly countable information in principle untenable, and by mid-century, as those ideas spread, the subjective implications were primarily the stuff of arch or pedantic humor. Around the same time, deterministic rather than pedantic arguments around information’s efficacy emerged in new “theories of mind” that, to Priestley’s delight but others’ concern, offered a science of the mind.³² Given its sense of forming or shaping the mind, *information* was easily absorbed into such theories, where it underwrote sometimes-unanticipated, mechanistic conclusions.

David Hartley, for example, sought to bridge the gap opened by Descartes and Locke between sensation and idea by accounting for each in terms of mechanical “vibrations” of the body and resulting “associations” in the mind. This way, he argued, “[t]he whole superstructure of ideas and associations observable in human life may . . . be built upon as small a

²⁹ See Leo Marx, “Technology: The Emergence of a Hazardous Concept,” *Technology and Culture* 51 (2010): 561–77.

³⁰ Alex Wetmore, “Sympathy Machines: Men of Feeling and the Automaton,” *Eighteenth-Century Studies* 43 (2009): 37–54.

³¹ Marriott, *New Royal English Dictionary*; Samuel Johnson, *Rambler* 2 (1750): 2.

³² Adam Ferguson, *Moral Philosophy* (Edinburgh, [1769]), 2:80.

foundation as we please.”³³ Information can seem to fill that foundational role in Hartley.

Writing of sensation as the “fundamental source of information” and of “the information from touch and sight,” Harvey used *information* for something both that the senses “give” and that the mind “receives,” a conception of impulse and response that seems to short-circuit the reflective process of thought central to Locke’s idea of “information.”³⁴ As Hartley professed not to be a materialist, the way “information” leapt the gap between body and mind confused contemporaries. Joseph Berington, an early acolyte but later critic, perceptively asked whether if “each [sense] perceives, is it not also a brain?” For unless it is, Berington argued, “[t]he difficulty is only to conceive how they get their information.”³⁵ For if, Berington worried, information begins where sense organs meet the world and irresistibly ends in the mind, it would seem to bypass the interjection of judgement and reason.

Hartley also extended information from sensations to words. He not only talked of the “infinitely small Quantity of Information, which each [pronoun], singly taken, conveys” (perhaps the first use of the phrase “quantity of information”), but argued that, as at base just information, language could be rendered unambiguous and “with Care and Candour we might come to understand one another perfectly.”³⁶ He also acknowledged the possibility of rising above “mere” understanding: “As the plain didactic Style is intended merely to Inform the Understanding, so the rhetorical and poetical Styles are intended to excite the Passions.” Together informing and exciting gives rise to the “possibility of deducing all our intellectual Pleasures and Pains from Association.” Determined by information, the common substrate in this account to the senses, to language, and to the passions, Hartley’s brain and mind were at base a mechanical information system, and hence, he finally acknowledged, a system of “absolute necessity.”³⁷ He reconciled himself to the inescapability of this conclusion by falling back on the claim that “the Veracity of God seems to engage him to

³³ David Hartley, *Observations on Man, His Frame, His Duty, and His Expectations* 3 vols. (London, 1791), 1:71; 138 passim.

³⁴ *Ibid.*

³⁵ Joseph Berington, *Letters on Materialism* (London, 1776), 40. Barbara Brown Oberg, “David Hartley and the Association of Ideas,” *Journal of the History of Ideas* 37 (1976): 441–54; Ronald B. Hatch, “Joseph Priestley: An Addition to Hartley’s Observations,” *Journal of the History of Ideas* 36 (1975): 548–50.

³⁶ See Stephen K. Land, “Universalism and Relativism: A Philosophical Problem of Translation in the Eighteenth Century,” *Journal of the History of Ideas* 35 (1974): 597–610.

³⁷ David Hartley, *Observations* 1:247, 285, 357, v.

take care, that all those intimations . . . of nature, should give us right information.”³⁸ Though it worried some that God would thus be the father of sin, for optimists like Knox, it was not far from here to his claim that with the right information, people would do the right thing. It was simply a matter of cause and effect, linking not only mind and world but also individual and state, as the idea of information as like the content of newspapers or the content of nerves would seem to entail. Indeed, though Hartley himself did not make the leap, such implications attracted political optimists like Priestley, Hartley’s great promoter, who celebrated the implication that human “action . . . will mechanically flow,” and Benjamin Rush, who saw in Hartley’s theory of mind the potential for the “moral education of youth [based] upon new and mechanical principles.”³⁹

From a different direction, the Common Sense philosophers stumbled on *information* in their search for a theory of mind to repair what Thomas Reid saw as the “holes in the fabric of knowledge” picked apart by David Hume and “other sceptical writers” who had continued Locke’s unravelling of idea and sensation. Reid’s common sense dismissed Hartleyan associations and vibrations as “castles in the air,” but his use of *information* could be as unguarded as Hartley’s. To avoid the trap set by Descartes and Locke, Reid asserted that the nature of what gives rise to sensation is unknowable: “my senses give me no information on this point.” Hence he overcame Hume’s challenge to the perception of cause by remaining incurious about the causes of perception. Rather, he taunted Hume for being “unawares” of the “conviction of the necessity of causes which is common to other men” and asserting that we could and should rely on the “information of sense” as a reliable starting point.⁴⁰ Confusion about an external, unknowable world was not for Reid a failing of everyday common sense, but to the contrary, of sophistical reasoning introduced where it had no place. “[T]he external senses,” Reid argued, “give to all mankind the information necessary for life, without reasoning, without any art or investigation on our part” and “the informations of sense are common to the philosopher and the most illiterate.” This democratic spirit saw information rather as Knox had, as potentially common and available to all, rather

³⁸ Hartley, *Observations*, 2:40.

³⁹ Joseph Priestley, *An Examination of Dr. Reid’s Inquiry* (London, 1774), li; Benjamin Rush, “Inquiry into the Influence of Physical Causes upon the Moral Faculty,” quoted in Donald D’Elia, “Benjamin Rush, David Hartley, and the Revolutionary Uses of Psychology,” *Proceedings of the American Philosophical Society* 114 (1970): 109–18, quotation at 117.

⁴⁰ Thomas Reid, *An Inquiry into the Human Mind, on the Principles of Common Sense* (Edinburgh [1785]), vii; idem, *Essays on the Intellectual Powers of Man* (Edinburgh, 1785), 237; 620.

than, as it had been for Locke, personal and a reflection of the quality of a particular mind.⁴¹

But Reid's conventional assignment of "information" to the senses in an otherwise unconventional argument came with problems. Like Hartley, he made language just another sense impression, talking of "the information we receive by means of artificial language." Though superficially "artificial," the information in language is for Reid almost structural: "a Frenchman and an Englishman receive the same information by different articulate sounds." And, he argued, "the general principles of our constitution . . . fit us for receiving information from our fellow creatures by language." Not only does this start to establish what Michael Reddy calls the "conduit metaphor" for information, but thereby language becomes almost as indubitable as sensation. Reid also wrote of the benefit man "receives from society . . . partly from the instruction and information they communicate to him." *Information* thus stretched from the stimulus and response of sensation to the processes of social communication, from the signals in bodies to the content of books and conversation.⁴²

Ultimately, despite distaste for Hartley, the "tendency of [whose] system," Reid had argued, was "to make all the operations of the mind mere mechanism," Reid worked himself into similar confusion between what Nicholas Wolterstorff calls the "faculty of judging, [and] the judgments rendered." Information might embrace the product or process of reasoning, in which case it should be doubted, or it might be limited to the content of sensation, in which case it could be relied upon. Stretched across the two it either made all unreliable (as in Descartes) or made all mechanistic (as in Hartley). In the end, Reid had to take Hartley's exit and rely on God's good will to sort them out.

The Supreme Being has seen fit to limit our powers of perception . . . [nonetheless] the impressions . . . correspond exactly to the nature and conditions of the objects, so our perceptions and sensations correspond to those impressions. . . . Without this exact correspondence, the information we receive by our senses, would not only be imperfect . . . but fallacious, which we have no reason to think it is.⁴³

⁴¹ Ibid., 267, 359.

⁴² Reid, *Inquiry*, 167; 425–26; Michael Reddy, "The Conduit Metaphor" in *Metaphor and Thought*, ed. A. Ortney (New York: Cambridge University Press, 1979), 284–324; Reid, *Essays*, 114.

⁴³ Reid, *Essays*, 93; Nicholas Wolterstorff, *Thomas Reid and the Story of Epistemology* (New York: Cambridge University Press, 2000), 219; Reid, *Essays*, 267.

This approach left the boundary between mind and world, blurred by Hartley and Reid, to be patrolled by God—who, as Karl Marx indicated in his use of Hartley against Locke, was easily circumvented.⁴⁴ Overall, Hartley's and Reid's use of *information* did not cause their problems, but rather reflected and yet concealed them. Its polysemous character, accounting for both bodily stimulus and mental response, for language and sensation, implied that, with God on our side and relatively little thought, the gaps between these pairs could be unproblematically bridged.

SPREADING INFORMATION

Changing theories of mind–world relations inevitably affected theories of relations between the citizen and the state. To the extent that information affected the mind, so it would affect and even effect political opinion. Drawn into political debates, the reach of the term expanded beyond the bounds that Hartley and Reid tried to set, implicitly linking both news and nerves, thereby raising questions of political determinism and endorsing Hume's notion that politics could be “deduced . . . as any . . . mathematical science . . . from *à priori* . . . principles eternal and immutable.”⁴⁵

The single appearance of *information* in Locke's *Treatises* (and in Hobbes's *Leviathan*) and the thirty-four in Godwin's *Political Justice* offer a crude indicator of the expanding role of “information” in political discussion. Examining how Locke, Paine, and Godwin used the term in discussing the appropriate education for a monarch offers a sharper contrast. Locke discussed a prince's education in terms of “The necessities of his Life, the Health of his body, and the Information of his mind.” Paine retained some of Locke's conception when he argued that there was “something exceedingly ridiculous in the composition of a monarchy; it first excludes a man from the means of information yet empowers him to act where the highest judgement is required.” Godwin, by contrast, left Lockean notions behind in arguing that monarchy “acts upon insufficient and partial information” and “[t]he competence of any government cannot be measured by a purer standard, than the extent and accuracy of its information.” Though his usage is different, Godwin's idea may have originated with Paine, who had

⁴⁴ Priestley, *An Examination*; Adam Ferguson, *Institutes of Moral Philosophy* (Edinburgh, [1769]); Karl Marx, *The Holy Family*, trans. Richard Dixon and Clemens Dutt (Moscow: Progress Publishers, 1975).

⁴⁵ David Hume, “That Politics May Be Reduced to a Science” in *Essays, Moral, Political and Literary* (London: Froude, 1904 [first published 1741–42]), 14.

argued that a “true *Republican* system [is] the only means of proportioning the wisdom and the information of a Government to the extent of the country” and who, like Knox, saw newspapers as critical to that “proportioning”: “The spirit of the people for obtaining this necessary information is evident from the incredible number of news-papers and other periodical publications.”⁴⁶ *Information* was now as much used for the content of documents as of minds, and the path between the two seemed eminently mappable.

As “information” came to be seen as a measurement not only of the state of mind, but also of the state of the state, so the imperative to amass and circulate political information was widely felt. Various “seditious societies,” from the Society for Constitutional Information, attacked by Burke and defended by Godwin, to the Corresponding Societies explored by E. P. Thompson, resulted.⁴⁷ Another source, less confrontational but more illustrative of contemporary use of *information* in the public sphere, was John Sinclair’s twenty-one volume *Statistical Account* (1791–98). Better known for giving the word *statistics* to the language, Sinclair is an exemplar of how far *information* had gone towards synonymy with *fact* since Locke and how, as such, it had entered political assessments of the age.⁴⁸ In Sinclair’s compendium, “information” is something that can be qualified as more or less, little or much, any or every and show great variety*; it can be ample or full, sufficient,* complete or incomplete, all or some,* and added to or additional; it can be possessed and might be accessible, listened to, acquired, accumulated,* collected, commanded, procured, received, contained (in “reports”), derived, drawn from, condensed,* united, abstracted, or produced; once obtained,* it can be communicated, furnished, given, sent, transmitted,* spread or smattered,* presented, made known, “print[ed] and circulate[d],”* engraved as characters,* restricted* or arranged as a system*; it might be a mass, a scrap, a fund,* or a particle,* with substance,* and is capable of following or inhabiting; it can be political, general and particular or “local and minute”**;* it can remain, or disappear; books can be full of it; it can be attached to a person, yet people can

⁴⁶ John Locke, *Two Treatises on Government* (London, 1713), 226; Thomas Paine, *Common Sense* (Harmondsworth: Penguin, 1986 [first published 1776]), 5; Godwin, *Enquiry*, 1:69, 384; Thomas Paine, “To the Authors of the *Republican*,” in *Miscellaneous Letters and Essays* (London: R. Carlile, 1819), 53; Paine, *Common Sense*, 51–52.

⁴⁷ Edmund Burke, *Reflections on the Revolution in France* (Harmondsworth: Penguin, 1978 [first published 1790]); William Godwin, *Cursory Strictures on the Charges Delivered* (London, 1794); E. P. Thompson, *The Making of the English Working Class* (Harmondsworth: Pelican Books, 1968).

⁴⁸ Johan van der Zande, “Statistik and History in the German Enlightenment,” *Journal of the History of Ideas* 71 (2010): 411–32.

also be at a loss for it, while hints can produce it; it raises issues of quality, being good (“according to the best information” is a particular trope of Sinclair’s), authentic, satisfactory, useful, material, proper,* valuable, important,* relied or depended on or merely tolerable*; “collected and systematized” it might “approach perfection”*. And, of course, it can be agricultural and statistical. In its several guises, “information” offered the means to ascertain, reveal, and ultimately improve, Sinclair claimed, “the real political state of the country.”⁴⁹

In all, by the end of the century, conceptions of information expanded to embrace the means of interpersonal communication. In this guise, it was taken to be the sort of self-sufficient and politically important substance that could be harvested by figures like Sinclair, scattered by corresponding societies, transported by “the public prints,” which Cobbett called “those vehicles of information,” and eventually, as Paine reported, carried on the telegraph.⁵⁰ Socially accessible, it seemed to offer the means for achieving democratic consensus. Hence, Paine and Godwin saw availability of this substance as a measure of a polity much as Knox saw it as the character of an age, and it was by his access to this stuff rather than just, as Locke had seen it, “the information of his mind,” that the modern prince (and his people) should be measured. It was this that Knox hoped would ensure that the people would “do what is right” and that Sinclair believed was the foundation for “promoting the prosperity of a great political community.”⁵¹

INFORMATION’S LIMITS

As political discourse of the age became increasingly enamored of diverse ideas of “information,” hints of determinism that had enticed and entrapped philosophers inevitably gave rise to conflicting reactions. The simple, confident assertions of Knox, Coleridge, Rush, or Priestley that information would beneficially determine popular decision-making were accompanied

⁴⁹ John Sinclair, *A Statistical Account of Scotland* (Edinburgh, 1791), passim. Words marked * appear in collocates with *information* in Sinclair, *Account of the Origin of the Board of Agriculture* (London, 1796) (one of very few books of the period to have *information* in the index); and those marked ** in Sinclair, *Analysis of the Statistical Account of Scotland* (Edinburgh, 1831); *Analysis*, 225.

⁵⁰ William Cobbett, *The Bloody Buoy Thrown Out as a Warning to the Political Pilots of America* (Philadelphia, [1796]), [ix]; Thomas Paine, “Remarks on Governor Lewis’s Speech,” 205–14 in *The Political Works of Tom Paine*, 2 vols. (London, 1819), 2:213.

⁵¹ Sinclair, *Analysis*, 223.

by fears of its potential to mislead, prompting what looks towards the end of the century like a retreat from unqualified assumptions about its efficacy and utility towards a more elaborate and circumspect typology.

It is perhaps in consequence of its deterministic traps that the philosopher and historian Adam Ferguson, who inherited a good deal from Reid, treated *information* with caution. Ferguson provided major insights into history, sociology, and economics, as well as early conceptualizations of “civil society” and “theory of mind.” Yet he was notably cautious in his use of *information* and was rare, if not unique, in discussing the concept directly in his check-list-like *Institutes of Moral Philosophy*. Here Ferguson offered a “law of information.” This fell under the “law of the understanding” (which in turn fell under “laws of the intellectual system”—Ferguson was fond of laws). Like Reid before him, Ferguson challenged the analogy between mental images and “pictures” that Locke had drawn in his *Essay*. But, unlike Reid, he is more careful to keep sensation and interpretation separate under his “general law of information . . . which relates to the perception of material subjects” on the one hand, and to “the interpretation of meaning and thought” on the other. For Ferguson, however, all these nominalizations (*information*, *perception*, and *interpretation*) are processual.⁵² Though no disciple of Locke, in his major philosophical texts Ferguson adopted the Lockean usage and wrote of the process or “progress of information,” avoiding traps that would arise from including as information the external stimuli that initiate, but for Ferguson do not determine, that process.⁵³

A philosopher who preached self-awareness, Ferguson’s avoidance of the trap that caught Reid was possibly deliberate. In his history writing, by contrast, where it would be less problematic, Ferguson used *information* indiscriminately for the process and the content of communication as well the cause of action. There, he wrote of information being, gained, possessed, received, conveyed, and obtained. He wrote of people sent “to procure the information” or who brought “particular” or “minute information.” More distinctly, he resorted to the count noun: “informations conveyed to Agrippina.” The historian, he wrote, could “neither safely take, nor pretend to give, information” on certain subjects.⁵⁴ He also relied on the historian’s standard causal trope “upon this information” to explain

⁵² Ferguson, *Institutes*, part II, “Theory of Mind,” in particular 85–87.

⁵³ *Ibid.*, 164.

⁵⁴ Adam Ferguson, *The History of the Progress and Termination of the Roman Republic* (London, 1783), 1:118, 3:527; *idem*, *An Essay on the History of Civil Society* (Edinburgh, 1767), 126.

new decisions or changes in the plans of his protagonists.⁵⁵ Overall, it can feel as if Ferguson was aware of the trouble that the historian could make for the philosopher and, like a Jekyll conscious of his inner and more reckless Hyde, sought to keep the two apart (as, indeed, did Hume).

Such caution, if that is what it was, emerged elsewhere, particularly among opponents of radicalism. Where Reid held democratic views of the common “information of sense” and Knox, Coleridge, Godwin, Wollstonecraft, and Priestley all saw information as inherently democratizing, Richard Watson, the polemical Bishop of Llandaff and foil of the young Wordsworth, by contrast pushed against leveling accounts, arguing that “It might as reasonably be expected that Men of different Statures should, from the same Elevation, take in the same Prospects . . . as that Men of different intellectual Capacities should, from the same Means of Information . . . believe precisely alike.”⁵⁶ Sinclair qualified the influence of his own work by asserting tellingly that “Political knowledge . . . cannot be intuitively attained. It is the result of information and experience.”⁵⁷ If that phrase attempts to separate particulate information from the Lockean cumulative process of experience, the phrase probably reflects a growing tendency to stress the inadequacy of the particulate as a proxy for the process. Despite Knox’s pairing of the book and the university, he and his contemporaries came to see that all learning did not and could not come from books. Such doubts were reflected in the rise of the concept “practical information.” Knox used the phrase in the context of a medical or scientific education on the assumption that being “practical” these were “less in debt to books than any other liberal art.”⁵⁸

Typologies, qualifications, and general hedging of “information” grew. To indicate its inadequacy or insufficiency, some distinguished “good” from “bad” information or “useful” from the rest. Edmund Burke, never likely to embrace revolutionary enthusiasms for information, regularly made a clear distinction between “parliamentary information,” which he generally took as reliable, and “news-paper information” which he used as a byword for nonsense or lies. Elsewhere Burke granted information respectability in political debate only when coupled with reason (the enigma of the Common Sense philosophers) and authority (the centerpiece of Hobbes and scorn of Godwin). Combined, these three—information, reason, and authority—

⁵⁵ Ferguson, *Civil Society*, passim.

⁵⁶ Richard Watson, *A Letter to the Members of the Honourable House of Commons* (London, 1772), 15.

⁵⁷ Sinclair, *Analysis*, 56.

⁵⁸ Knox, “Considerations on the Art of Physic,” *Essays*, 1:205.

were for Burke truly “irresistible.”⁵⁹ Hence, while some radical thinkers saw information as a challenge to established political authority, Burke tried to domesticate it within that authority.

More generally, people used “useful information” to indicate that there was much that, though information, was nonetheless not useful. From such points of view, the enduring question of “overload” could be addressed anew from a couple of directions. Assuming that information was in some way countable (and so inherently particulate), publishers pushed their books as having “more information than their rivals.” *Longworth’s American Almanack* of 1799 closed out the century with the promise that the next edition of “will be found to contain double the quantity of information ever before inserted in it,” as if twice as much was twice as good.⁶⁰ Critics pushed back that much such information was superfluous or, contrastingly, claimed that if inherently good, information only made up part of the contents of books. Thus, Knox, essayist and editor, denounced the “unhappy rage for wasting paper” whereby authors buried information in bombast, and he quoted large chunks of Watson’s argument about the “chaos of printed information.”⁶¹ Denouncing the superfluity of the “fungous production of the modern Novel-wright,” Knox praised the essay’s contrasting efficiency, which “circumscribed [ideas] within certain bounds, and, like a full vessel, suffers all that is superfluous . . . [to run] to waste.”⁶² In a similar vein, Priestley praised sermon writers who endeavored to “extract from [scripture] all the useful information and direction it contains.”⁶³ Such arguments seem to move back and forth, either distinguishing information from superfluity or suggesting all content is information, but some good and useful and the rest not.

Reflecting growing doubts about the adequacy of “information,” its arc as an index of the mind passed through the odd phrase “man of information.”⁶⁴ This first appears in print in Oliver Goldsmith’s *Good Natur’d Man* (1768). Goldsmith put it in the mouth of his charlatan Lofty in a speech extolling an erudition that Lofty lacked while claiming a modesty

⁵⁹ Edmund Burke, *Two Letters Addressed to Members of the Present Parliament on the Proposals for Peace with the Regicide Directory of France* (London, 1796), 62.

⁶⁰ *Longworth’s American Almanack, New-York Register, and City Directory* (New York, 1799), 398.

⁶¹ Knox, *Liberal Education*, 233.

⁶² Knox, “On the Expediency of Embellishing Compositions with Harmonious Periods, and other Judicious Ornament,” *Essays*, 1:249; “On Essay Writing,” *Essays*, 1:5.

⁶³ Joseph Priestley, *A Course of Lectures on Oratory and Criticism* (London, 1777), 64.

⁶⁴ See Nunberg, “Farewell to the Information Age”; Rachel Brownstein, *Why Jane Austen* (New York: Columbia University Press, 2011).

that the speech belies.⁶⁵ (Goldsmith's ironic use of the phrase suggests it might already have been current.) In other works, the phrase was also puffed up and then deflated. At first it, *pace* Lofty, invoked an educated man. Appearing in general claims of the sort that "every man of information among us" knows, allows, or must admit; or "no man of information" can doubt, deny, or controvert, it suggests a certain determinism. Society under this formulation was almost necessarily transparent to the "man of information," but contrastingly opaque to others.⁶⁶

But the phrase increasingly appears with qualification, as if to indicate that information (and bookishness) alone might be a signal of personal inadequacy. A translation of Condorcet's *Life of Turgot* talks of "men of education and information," the latter alone now insufficient for the former. A translation of Mirabeau talks of a "man of information and understanding" ("instruit et sensé")—the former no longer encompassing the latter, as it did for Locke. Charles Sheridan relied on the "man of information and integrity" while David Bogue, a founder of the London Missionary Society, asked more Diogenes-like "where is the man of information and integrity?" Mary Wollstonecraft wrote archly of someone having "considerable information and some finesse." And Sinclair, the information hound, regularly qualified the term: some taxmen are "respectable, both with regard to information and morals," others "with regard to information and propriety of conduct"; some farmers are praised "with regard to depth of information and liberality of sentiment," others "possess a measure of information and politeness" or a "talent for information and enterprise"; while the young are lamented for the "great decay of information and piety."⁶⁷ That decay seems to have extended to political, social, and moral faith in the concept of information itself. By the end of its arc across the century, information was no longer Locke's process of cultivating understanding, the man of information was not inherently admirable, Coleridge's enthusiasm for the efficacy of information could not be maintained without further qualification, and though Knox had suggested that books might offer as much as a university degree, his worry from the first mention of

⁶⁵ Oliver Goldsmith, *The Good Natur'd Man* (London, 1768), Act 3, p. 23.

⁶⁶ See, for example, Alexander Hamilton, *Letter from Phocion* (Philadelphia, 1784); Anon., *Observations on the Jurisdiction of the House of Commons* (London, 1792).

⁶⁷ Condorcet, *Turgot*, 15; Count Mirabeau, *The Secret History of the Court of Berlin*, 2 vols. (London, 1789), 1:223; Charles Sheridan, *Some Observations on the Late Address to the Citizens of Dublin* (Dublin, 1797), 57; David Bogue, *Reasons for Seeking a Repeal of the Corporation and Test Acts* (London, 1790), 16; Mary Wollstonecraft, *Letters Written During a Short Residence in Sweden, Norway, and Denmark* (London, 1796), 228; Sinclair, *Statistical Account*, 3:189; 16:273; 10:589; 13:65; 13:423; 21:325.

the “age of information” that books alone were insufficient for genuine education, was increasingly acknowledged by his contemporaries.

OF AN AGE OR AGELESS?

In calling his time the “information age,” Knox appears not unlike the McLuhan of his day, a widely read enthusiast for, and optimist about, the possibilities of a new communicative landscape, who reflected on and gave expression to changes going on around him. This is not, of course, to suggest that either writer was instrumental in the changes they pointed to. More influential, if not instrumental, I have tried to suggest, may have been the word Knox and McLuhan used to sum up their ages, *information*. Its polysemy and hints of causality, as I have tried to show, made it an attractive concept for mapping the future of a society increasingly enfranchised by new communicative possibilities, where information broadly construed offered on the one hand to underwrite consensus for collective decisions and on the other to make the outcome of those decisions predictable. But for the same reasons, used unreflectively (as it generally was), *information* was also problematic, invoking specters of determinism that were usually only beaten back by invoking either theology or an equivalently optimistic teleology.

In our own “age” that teleology has often involved technology. The development of modern information systems has often emerged alongside mechanistic accounts of mind not unlike those of the eighteenth century, which in turn have been defended in combinations of relentless determinism and optimism. Ronald Day’s account of Paul Otlet, the grandfather of “information science,” maps a technology-driven teleology domesticated by a promise of world peace—in this case, the technology is the book as a compilation of information. We can hear further echoes of the eighteenth-century optimism in Vannevar Bush, the early and influential computer pioneer. As he developed his model of the *memex* computer, he portrayed the mind as a mechanism responding to “information . . . transmitted to the brain,” which he describes with the very Hartleyan terms of “associations,” “vibrations,” or “impulses that flow in . . . the nerves” (and which Bush suggests might fruitfully be intercepted). Like Hartley, Reid, Priestley, and Knox (who argued that “the Spirit speaks a universal language, addressing itself to the feelings of the heart, which are the same wherever sounds are uttered”), Bush suggested that information is somehow prior to language, which merely obfuscates human communication, and encouraged the

design of a universal replacement more suitable for mechanization. (He, perhaps, needed cautioning by Paine, who responded to the similar enthusiasms of his century with the caution “Human language . . . is local . . . therefore incapable of being used as the means of unchangeable and universal information.”)⁶⁸

Similar deterministic assumptions can be found in many of the responses to Claude Shannon’s information theory—a theory that defines information by its efficacy. Information as a causal mechanism went from Shannon—despite Shannon’s resistance—into numerous different fields, perhaps most significantly economics, where ideas of complete, full, perfect, or symmetrical information lead to conclusions (unsurprisingly, echoes of Smith and Ferguson) of a predictable economic system whose mechanistic character is defended with claims for Pareto efficiencies and human welfare optimization.⁶⁹

Other echoes, too many to trace, reverberate up to the present, as enduring hopes for social emancipation are wished onto each new innovation in “information technology.” But having begun with McLuhan, it is perhaps sufficient to end with him, as the godfather of our information age. McLuhan developed an account that was equally deterministic and optimistic, wherein information would bring us collectively and comfortably to an untribalized “global network that has much of the character of our central nervous system.”⁷⁰ With Hartley and Priestley still lurking in the cellarage, it has been easy to claim that here we have the conditions for a harmonious international public sphere. Hence it is not entirely surprising that contemporary critics summon Habermas, historian of the ageing of such aspirations in the eighteenth century, to help analyze their reappearance in the twentieth.⁷¹ Yet, however much the eighteenth-century age of information may echo in our own, I believe that it nevertheless deserves to be understood in its own terms as I have tried to do.

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⁶⁸ Bush, “As We May Think,” *The Atlantic* 7 (1945) online as: <http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/>, [6]; Knox, *Christian Philosophy* (London, 1795), 51; Paine, *Age of Reason* (London, 1794), 45.

⁶⁹ Claude Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1949); Claude Shannon, “The Bandwagon,” *IRE Transactions on Information Theory* 2 (1956): 3; Joseph E. Stiglitz, “Information and the Change in the Paradigm in Economics,” *American Economic Review* 92 (2002): 460–501.

⁷⁰ McLuhan, *Understanding Media*, 348.

⁷¹ See Craig Calhoun, “Information Technology and the International Public Sphere” in *Shaping the Network Society: The New Role of Civil Society in Cyberspace*, ed. D. Schuler and P. Day (Cambridge, Mass.: MIT Press, 2003), 229–51.