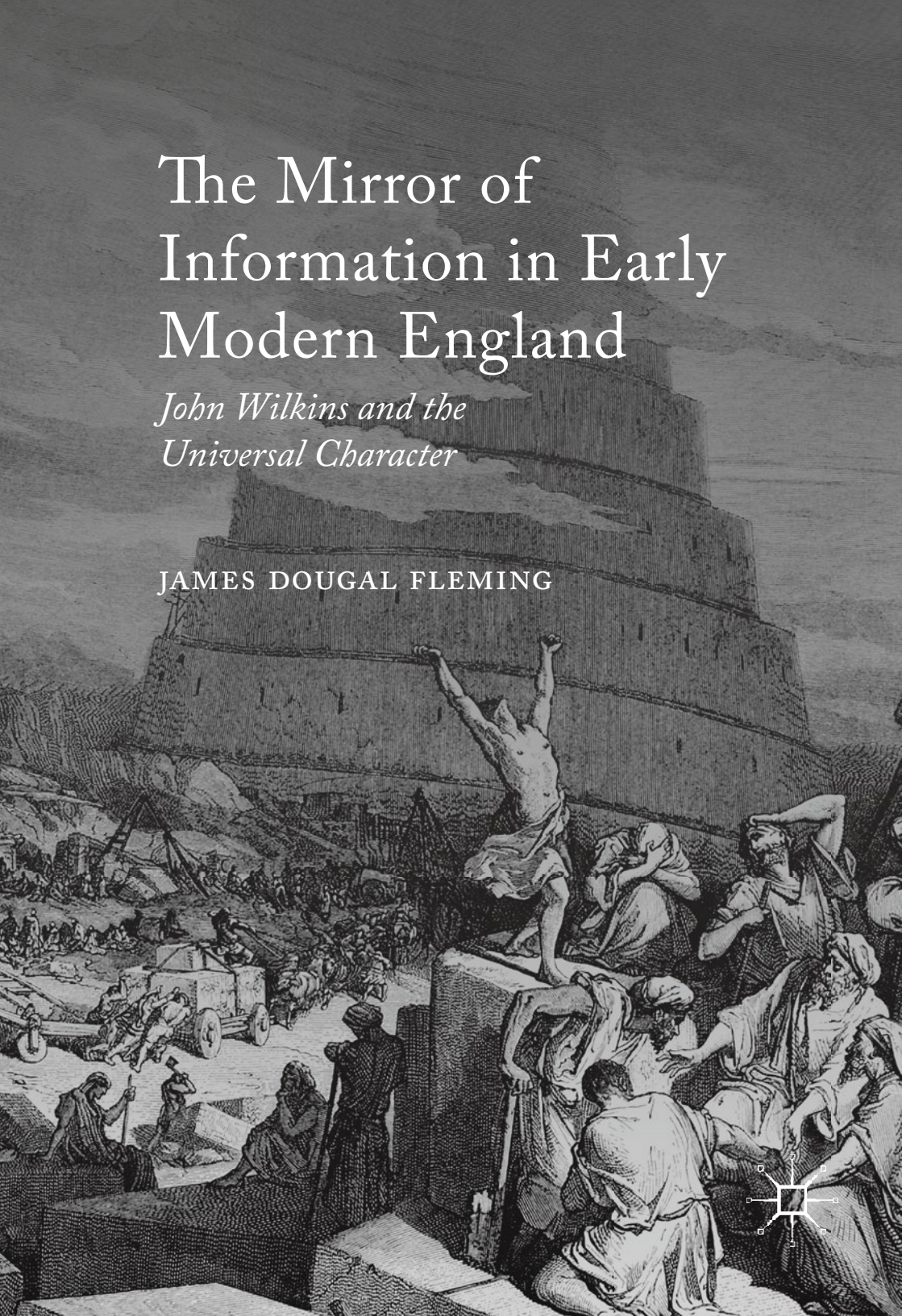
The Mirror of Information in Early Modern England

John Wilkins and the Universal Character

JAMES DOUGAL FLEMING



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For my family, always

Textual Note

This book is largely about John Wilkins's *An Essay towards a Real Character, and a Philosophical Language*, published in London by the Royal Society in 1668. Beginning in my fourth chapter, I'm going to be examining Wilkins's book in considerable detail. The nature of the book is that you really need to *see* it to grasp it, especially for the layout of Wilkins's Philosophical Tables, and the design of his real character. While I have included images of the pages that are most crucial for my discussion (see Figs. 1–4), including them all is impracticable. But lo: the infosphere comes to our aid. Wilkins's *Essay* is on Google Books. I strongly urge the reader who finds my paraphrases and descriptions of it confusing to open up an e-copy and follow along.

Acknowledgements

An awkward question is: How long have you been working on this book? The brief answer—a couple of years—is almost dishonest, but a full answer would be embarrassing. I started to think almost a decade ago that the concept of information was key to the epistemic differences between the early-modern period and our own. But it has taken the informational technologies that have emerged and matured during that decade—notably the internet and its associated networks—to render my inchoate thought at least somewhat utterable. Since then, it has all been a race of research and writing. Which I guess is the short answer.

An analogous, but more pleasant, conundrum: Whom do you want to thank? The academy; my high school history teacher; the inventors of wine and oil. But more narrowly, I can begin with Kevin Killeen and Peter Forshaw, whose 2004 conference on Biblical exegesis and early-modern science (Birkbeck, University of London) really got me thinking in new ways about these matters. Steve Matthews, whom I met for the first time on that occasion, has been a friend and co-laborer since. The delegates, plenary speakers, and supporters of the *Scientiae* conferences: All have my respect and gratitude, but I can especially mention Peter Harrison, Mario Biagioli, Stephen Clucas, Sachiko Kusukawa, Howard Hotson, Thomas Wallnig, Peter Dear, Anthony Grafton, Claire Preston, Jonathan Sawday, Per Landgren, and Sven Dupré. And, maybe even more loudly, the members of the conference's executive committee: David Beck, Vittoria Feola, James Lancaster, and Richard Raiswell, in addition to the aforementioned Matthews. I am very grateful to the staff of the Huntington, British, New York Public, Columbia, University of Toronto, Simon Fraser

University, and University of British Columbia (UBC) libraries; and to Jessica Wolfe, Reid Barbour, Steve Hindle, and Rhodri Lewis. Special thanks to Chelsea Shriver, Rare Books librarian and archivist at UBC library, for her invaluable help with page-images from Wilkins's *Essay*.

Here finally is where I get to thank my beautiful, brilliant, fabulous wife, Cynthia van Ginkel, and our unbelievably wonderful children: Lucas, Nica, Sage, and Troy. In their case, a full comment really is impossible to give.

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CHAPTER 1

Introduction: The Mirror of Information in Early Modern England

In *Gulliver's Travels* (1726), Jonathan Swift imagines a truly objective discourse:

> *An Expedient was therefore offered, that since Words are only Names for* Things, *it would be more convenient for all Men to carry about them, such* Things *as were necessary to express a particular Business they are to discourse on. And this Invention would certainly have taken Place, to the great Ease as well as Health of the subject, if the Women in conjunction with the Vulgar and Illiterate, had not threatened to raise a Rebellion, unless they might be allowed the Liberty to speak with their Tongues, after the manner of their Ancestors; such constant irreconcileable Enemies to Science are the common People. However, many of the most Learned and Wise adhere to the New Scheme of expressing themselves by* Things, *which hath only this Inconvenience attending it, that if a Man's Business be very great, and of various kinds, he must be obliged in Proportion to carry a greater Bundle of* Things *upon his Back, unless he can afford one or two strong Servants to attend him. I have often beheld two of those Sages almost sinking under the Weight of their Packs, like peddlers among us; who when they met in the Streets, would lay down their Loads, open their Saddles and hold Conversation for an Hour together.*

This book is about an early-modern method for communicating via things. Not, to be sure, in quite the manner of Swift's famous satire.[1] But some of the "most learned and wise" of the seventeenth century did imagine replacing human languages with a much more efficient and objective kind of intensional notation. For Bacon, Mersenne, Leibniz and others, the

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hallmarks of all human languages were inaccuracy, redundancy, ambiguity, and unreliability. Words distorted thought, impeded communication, and prevented knowledge. Yet the mind, *prior* to language, seemed to reflect the world; much as a mirror reflects the face that is before it. Therefore (it was thought), if you could craft a symbolism to *reflect the mind's reflections—without* falling back into "language"—you would, effectively, have a way of denoting things directly. This would be what the period called a *real character*: "real" from Latin *res*, thing. Writing down the notions of the mind, if that were possible, would amount to writing down the truth of the world.[2]

For Jonathan Swift (1667–1745), it offered only a way to write down a joke. But then, Swift found much that was funny, when he looked back on his own era. The Academy of Lagado, visited by Gulliver in the famous episode quoted above, clearly satirizes the Royal Society for the Improving of Natural Knowledge, founded in London in 1663. As a pioneering institution of what we now call natural science, the Royal Society looks to Swift like an easy target for satire. A measure of the historical distance between him and us. More recent satirists—think Christopher Hitchens, or Bill Maher—typically get their laughs *on behalf* of science, not at its expense. Anyway, the real-character project was closely associated with the early Royal Society, as a key component of the intellectual reforms envisioned by Sir Francis Bacon (1561–1626). Crafting a real character proved much more difficult than theorizing one. Nonetheless, the Baconian version of the real-character project culminated in the *Essay towards a Real Character, and a Philosophical Language* (1668): published by the Society, with contributions from a number of its associates, under the overall authorship of the intellectual impresario John Wilkins (1614–1672).

Despite its title, Wilkins's *Essay* was not just another theoretical sketch of the real-character idea. Rather, it offered the public a coherent, comprehensive, and usable version of an (allegedly) objective script. Six hundred and two massive folio pages long, complete with engravings, fold-out tables, and detailed user instructions, the *Essay* put a real real character on the desk of everybody who bought it. To be sure, achieving a usable character meant sacrificing some of its ideal potential. The "great undertaking" had not quite been completed, as Wilkins wrote, "with all the advantages of which such a design is capable." And yet it clearly tended toward "the Universal good of Mankind," with the potential to improve trade, unify religion, and increase scientific knowledge.[3] What we have here is the combination—perhaps more recognizable to the twenty-first century than

to the seventeenth—of hubris and humility in a moment of innovation. The *Essay towards a Real Character* was a best-possible application of cutting-edge knowledge, with the plausible goal of empowering people and improving their lives. More than a book, it amounted to a *device*.

Certainly Wilkins's admirers saw his real character as a game-changer. They learned it, corresponded in it, and sought to build upon it.[4] The historian John Webb, writing in 1669, expressed the serious expectation that Wilkins's work could overcome the obstacles to communication presented by the multiplicity of human languages.[5] A Latin translation of the *Essay*, to put the obsolescence of language on a pan-European basis, was being prepared by 1670.[6] The inventor and polymath Robert Hooke, who was devoted to Wilkins, said that his "Universal and Real Character" needed no amendment "to make it have the utmost perfection." Hooke used the character for a proof-text in one of his many public disputes over intellectual property, stating that he hoped thereby to "bring into use and practice that excellent Design."[7] And John Aubrey, gadfly of the early Royal Society, proposed an ideal academy where "Dr. Wilkin's cuts [prints] of the real character" would be placed in every student's room, and where the character would be used for writing out proverbs, for botanical field-work, and for the overall knowledge (as Aubrey rather compendiously puts it) of "things."[8] Annotations and corrections in surviving copies of the *Essay* indicate that the work was not only bought, but also closely studied.

And yet very few readers of the *Essay* seem to have become its users. A vector of adoption for Wilkins's work, if one got started among his admirers after 1668, seems to have gone nowhere. Aubrey's academy (as far as anyone knows) remained notional. Hooke's efforts to promote the character were lonely. The upgrades for which Wilkins's associates hoped, and on which they labored, never appeared. In 1708, thirty-six years after Wilkins's death, his scientific books were republished in the omnibus *Mathematical and Philosophical Works of the Right Reverend John Wilkins*. Here the reader can find Wilkins's Copernican treatise, *A Discourse Concerning a New World and Another Planet* (1640); his book on signals, *Mercury, or the Secret and Swift Messenger* (1641); and his work on mechanics, *Mathematical Magic* (1648): all reprinted in full. But not the *Essay*. Of this great work of the early Royal Society, which Wilkins called his "darling" and for which he expressed such high hopes, the 1708 editors print only an abstract; while commenting that Wilkins's "design of the Real Character" was now "wholly neglected."[9] By the early eighteenth century, it seems—even among people

who were genuinely interested in Wilkins's work—the project for a real character was barely worth remembering.

In that sense, it is actually quite odd that Swift, writing in the 1720s, carefully includes the real-character project among the satirical targets of *Gulliver's Travels*. True, he also seems to want the famous Academy of Lagado episode to invoke the philosophy of John Locke—a more recent, and more prominent, articulation of the view that words were only "Covers of Ignorance" for "the true Knowledge of Things."[10] But this is only an introductory note in a satirical episode that leads back almost to the year of Swift's birth. The Lagadans' belief that they can actually *reduce* words to their common objects, although alien to Locke's thinking, is an admissible caricature of Wilkins's. Their view that "in reality all things imaginable are but Nouns" is consistent with the account that Wilkins gives in what he calls his "Natural Grammar."[11] Gulliver tells us that thing-talk is supposed to function as a universal language[12]—a signature hope (as we will see) of the real-character project. Swift even places the "new scheme" on what he calls the "speculative" side of his pseudo-Royal Society. He makes that point, and uses that word, three times in his introduction of the episode.[13] "Speculative"—from Latin *speculum*, mirror—is opposed to "practical" knowledge in the early-modern period. It suggests, in a way that proved very important for the idea of a real character, the attempt to articulate and contemplate things just as they are.[14] As I have just suggested, it is unclear that Swift's contemporaries would have gotten any of this. Yet Swift is determined to satirize the real-character project anyway. Why?

Jonathan Swift was one of the very last people in the history of the West—until very recently—who could criticize the world envisioned by modern science and technology *without* taking up a Romantic position (of unreason, passionate feeling, productive chaos, etc.). According to the usual history of ideas, there isn't much that is modern, or scientific, or technological, about the seventeenth-century search for a real character. Its epistemology is faulty; its technical consciousness, poor; and it is saturated (as we will see) with Christianity. From this kind of perspective, Wilkins's *Essay* looks, at best, like a dim by-way of modern intellectual history. By contrast, Locke's *Essay Concerning Humane Understanding* (1690) looks like a canonical super-highway. Yet Swift seems to perceive the real character project as being on this same historical line. If anything, he seems keener to knock down Wilkins's ideas than Locke's. Swift evidently saw the previous century's visionaries of a real character as bona fide, and dangerous, prophets of modernity. Was he right?

I'm going to argue that he was. Specifically, I'm going to argue that Wilkins and his peers were prophets of what we now call *information*. I don't mean that term vaguely, as a mere label for communicable knowledge. Rather, I mean the specific form of communicable knowledge that is associated with modern telecoms and computing. Not, to be sure, at the technical level; the real character is not digital, or based on binary code, or (needless to say) electronic. But at a deeper level, having to do with its fundamental *management* of communication on the way to possible knowledge, I am going to argue that the real character manifests some important *shapes* of information. A modular semiotic operating in alienation from any natural language; the possibility of universal communication emerging from just that alienation; and a vision of corralling all knowledge into a single, commanding database: these are some of the facets in which Wilkins's mirror of the world seems to reflect, across the centuries, the information age.

It is striking that we now routinely participate in, and take entirely for granted, conversations that go way beyond the ones Swift satirizes in *Gulliver*. We don't just hold up things and point at them, while others do the same. We hold things up—or carry them, or wear them, or ingest them—that point at each other, processor to processor. Dropping out entirely, "language" is replaced by a code of electronic pulses that no human ear can process, no mouth speak. Swift, if he could have learned about such conversations, would (I think) have been horrified. But Wilkins would have been fascinated. Or so I would like to argue.

Now, mine is not the first book to talk about Wilkins's *Essay*—not by a long shot. But it is different from its neighbors on the library shelf, in three main ways. First, previous studies, especially those of a literary-historical bent, have been strongly contextualizing. Their authors have sought to situate Wilkins within his cultural and personal cohorts; and/or, to situate his *Essay* within its intellectual and informing currents. Both are extremely important, even necessary, agendas. So we learn a lot, on the one hand, about the early Royal Society, its correspondence networks, and scientific hopes.[15] On the other hand, we learn a lot about the widespread period fascination, especially in England, with the possibility of real or universal characters; which, in turn, opens up into broader European stories about language reform, cryptography, logic, and mnemonics.[16] On both hands we find superb studies (I hasten to state), without which the present book would be impossible. Nonetheless, the imperative always to trace historical circles around Wilkins's *Essay* has

left the latter somewhat neglected in the middle. No study focuses, in a sustained and (more-or-less) comprehensive way, on Wilkins's *Essay* as a topic in its own right: a transformative communications product, grounded in the seventeenth-century real-character movement, yet without parallel therein. Taking the time to give the *Essay* its due: that is part of what I am going to attempt in this book.

The second difference has to do with the nature of Wilkins's product—what we are supposed to notice, what makes it such a big deal. The *Essay*, per its full title, has to do with *a Real Character* and *a Philosophical Language* (my emphasis). Scholars, without exception, have approached it via the second part of that clause: subordinating Wilkins's written "character" to his oral "language," or frankly and even casually conflating the former with the latter. As I will argue, this is a way to miss the point of Wilkins's achievement. A real character is precisely *not* supposed to be reducible to a language, in early-modern terms—and not in post-modern ones, either. Rather, the character is supposed to be a non-linguistic, or perhaps para-linguistic, system for doing the kind of intensional and communicative work that is normally done by language. How we can understand such a relation is part of what we need to try to find out. To be sure, "character" and "language" are typically discussed together in the early-modern period. But—if we think about it—that is precisely how we can know that they are different. Abbott and Costello, let's say, are always seen together. That is how we know that the one is not the other. The real character, as such, and as *distinct* from "language," is the *point* of Wilkins's book. Accordingly, it will also be the point of this one. To a degree, and in a way, that no previous study has attempted (as far as I am aware), I am going to try to show how Wilkins's real character works.

The third difference is the one I have already indicated. I wish to read the *Essay* as an illuminating episode in the history of information—not in a general, but in a fairly specific, sense of that term. I am not proposing a genealogy, but an analogy. The late Paolo Rossi, in his great work *Logic and the Art of Memory*, describes the seventeenth-century synthesis of artificial mnemonics with hopes for "universal" learning, in a period that "has justifiably been called 'the age of manuals'." "The time was right," Rossi observes, "for the development of a conceptual mechanism which, once it was set in motion, could 'work' by itself, in a way which was relatively independent of the individual, until one arrived at a 'total knowledge'." Rossi has in mind the fully-fledged and semi-mystical art of memory, which, he wishes to point out, was in the eighteenth century "*erased* from

European culture" (the emphasis is his).[17] And no doubt he is right. Yet it is impossible today to read his book, originally dating from 1983, without constantly being reminded of the information-technological claims and agendas that have emerged since then—in what Luciano Floridi calls the "infosphere," Stephen Wolfram calls the "computational universe," Apple and Google and Microsoft just call theirs. The automation of knowledge, a dream of the early-modern world, is becoming a reality in the post-modern one. The time is right, therefore, to go back and see what was happening, while we were still asleep.

A number of humanities scholars have talked about "information" in the early-modern period. However, the concept of information *itself* has for the most part not been treated critically in these studies. It has just been used.[18] The problem with such an approach, as I will discuss in Chap. 2, is that information is an historically contingent concept *par excellence*. It is *only* because of technical developments in communications and computing, in the decades after the Second World War, that we talk about information as much as we do, benefit from information technology (IT), and live in an information age (recently upgraded, as we will discuss, to Floridi's "infosphere"). Therefore, to *assume* information as always-already "there" in the early-modern period is to risk anachronism. What I want to do, instead, is to construct Wilkins's real character as an emergent period *site* of what we now call information—on the basis of a prior, technical, explanation of the latter. *If* the construction is valid, we then may be in a position to learn something, from the period avatar, about the modern field.

Other humanists have mounted allegedly critical discussions of contemporary information theory and technology. All too often, however, "critical" work of this kind just means "finding occasion for literary or cultural comment or performance."[19] It means *deploying*, rather than examining, key concepts and claims of the digital age (such as machine intelligence, cyborgs, code, information itself); while connecting them, more or less formally, to this-or-that text, this-or-that theory, of the contemporary humanities. The result is a kind of exciting talk *within* the world of information, but not really about it.

To be sure, a fully technical account of the relevant issues would take us right into them, when all we want to do is gain a critical perspective on them. An interdisciplinary conundrum. Nonetheless, a number of philosophers, including John Searle, Hubert Dreyfus, and Albert Borgmann, have demonstrated how to perform the necessary balancing act.[20] I'm not really going to be able to do what they do; but I am going to try to report on it.

A final opening comment. This is a book primarily for students of the seventeenth century, especially those interested in the methodological and epistemological issues that tend to be raised by the period's emergent science and technology. At the same time, I will be engaging, on a much less secure basis, with several other disciplines, including information theory (in a fairly strict sense); the philosophy of information (Floridi and friends); and phenomenology, especially the philosophical hermeneutics of Hans-Georg Gadamer (1900–2002). The danger, of course, is that readers who come to this book from any of those latter areas will find its treatment of them jejune, its seventeenth-century discussions hard slogging. So I have tried to make the historical discussion accessible, the theoretical side acceptable. Which all but guarantees the countervailing danger: that seventeenth-century specialists will find my historical discussions (in places) elementary, my theoretical commentary opaque. If there is any hope of squaring these circles, it rests on an articulation of my central proposition: that Wilkins's *Essay towards a Real Character* can interestingly be read as an early-modern manifestation of an informational phenomenology.

In the bit-stream of information, at the machine level, John Wilkins and his peers would have recognized—I would like to argue—a wondrous version of what they called a real character: a para-linguistic, and non-ambiguous, script of things. The basis of this script in mathematics would have pleased Wilkins even more; and its reliance on binary code would have sent shivers down his spine. For Wilkins (as we will see in Chap. 2) prefigured this innovation, both in the *Essay*, and in earlier work.

So perhaps we have some reason to say that information is like the real character. Perhaps, conversely, the real character is like information. In the mirror of its past, maybe we can read some of the contours—and limits—of our informational future. I'm going to argue that we can. In fact, I'm now going to argue that we have to.

Critiques of the Infosphere: Getting to Oh

In 2001, the distinguished American philosopher Hubert Dreyfus published *On the Internet*. The book was the latest installment of work that Dreyfus had been doing throughout his career: debunking, from a pragmatic and phenomenological perspective, the hype surrounding new information technologies. The World Wide Web, a mass technology only since the early 1990s, was still very young at the turn of the twenty-first century—and it showed. "Surfing" the web was fun; but *searching* it, a

bore. Oh, as long as you knew what specific site you were after, things worked pretty well (connection speeds aside). We all kept careful lists of our doubleUdoubleUdoubleUs. But if you only knew what general *kind* of site you wanted, the millenial network was hopeless. An online attempt to find information about tortoises (in Dreyfus's bookish but accurate example) might lead you instead to sites on pre-Socratic metaphysics (because a tortoise features prominently in Zeno's famous Paradox). There were many so-called search engines, but none that actually worked very well.[21]

For Dreyfus, the search problem was rooted in the difference between syntax and semantics: that is, between the mere ordered form of a symbol (e.g., the sequence of letters in "TORTOISE SPEED"), and the intention it encoded (e.g., "I'd like to learn how quickly a tortoise can walk"). Pre-computing search platforms, exemplified by libraries, worked semantically: through meaningful categories organized by embodied humans for the benefit of each other's intentions. But a disembodied and non-intentional computer network could only work syntactically—which meant that it could scarcely organize information, let alone categorize it, at all. What was worse, the sheer *amount* of information available online was growing, and looked destined to grow, exponentially and incessantly. Before long, it seemed, the landscape of online search would become little more than a vast wilderness of tortoises—and whatever else you might care to name—each piece of it inextricably entangled with every other. "One thing is sure," Dreyfus concluded his first chapter, grimly: "As the Web grows, Net users who leave their bodies behind and become dependent on syntactic Web crawlers and search engines will have to be resigned to picking through heaps of junk in the hope of sometimes finding the information they desire."[22]

In 2009, Dreyfus brought out a second edition of *On the Internet*. The revised first chapter draws a big red line through the original. For as Dreyfus freely and fully acknowledges, his critique of less than a decade before had been undermined—in something like the etymological, fatal, sapper's sense of that word—even as he was writing it. There was this computer scientist at Stanford called Terry Winograd, Dreyfus recalls; and he had a couple of bright graduate students (Larry Page and Sergey Brin) working on the search problem. The young men realized that the meaningfulness of a given website for a specific search term, although subjective to the searcher, could nonetheless be quantified objectively by the searcher's clicks under that term. Even better, the larger and denser the online wilderness, the more relative significance would attach to groupings of

clicks within it. So, for example, if searches for "how fast is a tortoise" yielded many clicks on a given zoological website (among those on the initial hit list), that data counted as "votes" from the searching pages for the clicked-on page. The more votes a page received, the more "important" it was for the search term—raising its placement in subsequent hit lists. That kind of recursive (or self-reinforcing) effect would propagate at every point of the system. An online search organized along lines such as these would become more effective with every single execution.

Around these insights, the grad students built an algorithm. Around the algorithm, a program. Around the program, a search engine. Around the search engine, a multi-trillion-dollar global hegemonic corporation with the explicit and, astonishingly, plausible goal of using the internet to organize and categorize all of the world's information for everybody forever. Google became the latest name for the triumph of online IT—which makes it all the more remarkable that Dreyfus, in 2009, does not even try to incorporate it into any ongoing critique. If anything, the old phenomenologist tries to take a little bit of credit for this decisive technology of the computer age, by noting that Winograd had taught his students some Heidegger in response to Dreyfus's earlier work.[23] But other than that, the erstwhile critic of IT cheerleading just notes, blandly, that "pessimism has turned to optimism" in this area of computer science.[24] He even gives Page and Brin the last word in the chapter, to the effect that there is, after all, "a bright future for search."[25] The first chapter of *On the Internet*, second edition, presents a rare opportunity to watch a brilliant, accomplished, and highly polemical scholar, looking back over a portion of his own previous work—falsified by the very forces he had tried to describe—and saying: "Oh."

I come to optimize Dreyfus, not to devalue his page rank. Nonetheless, and by that very token, I find that his reversal by Page and Brin indicates the stakes in the confrontation between IT and—what? Not anything as narrow as "phenomenology," though a critique of IT is inevitably indebted to that philosophical field. But not anything as broad as "culture," either—a wishy-washy, hazy, vacuous term. We could try "humanism," but this is problematic: in the seventeenth century, which I'll be talking about a lot, it didn't mean anything like "the ism of the human," but rather "the study of secular, as opposed to sacred, literature." Perhaps we will have to settle, at least temporarily, for defining the kind of position taken up by Dreyfus and others (including me) negatively: it is an *info-skepticism*, a base unwillingness to go along with the more grandiose claims of contemporary information technologists; and an attempt

to articulate the validity of this unwillingness. Ultimately, the infoskeptic wants to be able to give a non-technical account of whether there need to be *limits* to the advance of IT. Whether this is even *prima facie* possible is part of what we need to (try to) find out.

On "IT" we can also do some opening definitional work. Dreyfus's target in 2001 was "the internet," but it is not clear this actually names anything anymore. This of course is not because the net has gone away, but because it has gone everywhere. Once upon a time, it *meant* something to point out that a computer was networked. But for a long time now, that has already been achieved as soon as one points out that something is a computer. And the same goes for phones, cameras, books, cars, clothes, TVs, shoes, farms, pets, forests, boats, armies, toasters, your keys, your wallet, your toothbrush, your kids—whatever, in sum, the IT industry has managed to implant with the requisite chips. And whatever it has not yet implanted, it is working on. The internet, which Dreyfus accurately gauged in 2001 as a final phase of technology, has also entered us into the *global* phase of information (and we need to define that word, too—but not yet).[26]

It is for the resulting networked totality, the whole world-as-ball-of-IT-wax, that the philosopher Luciano Floridi has adopted the term *infosphere*.[27] While I disagree with some aspects of Floridi's work, I like this usage, and will follow it. "Minimally," Floridi writes, the infosphere is

> the whole informational environment constituted by all informational entities, their properties, interactions, processes, and mutual relations. It is an environment comparable to, but different from, cyberspace, which is only one of its sub-regions... Maximally, infosphere is a concept that can also be used as synonymous with reality, once we interpret the latter informationally.[28]

Not the world as what gives us the net, but the net as what gives us the world. The infosphere approximates to our whole experience, insofar as IT comes to occupy *the first place* within it. As Floridi gently reminds us—those of us, I mean, who were already grown in 2001—people born thereafter have *always* been "onlife," which is why they always are. The young simply *do not think* of "the space of information as something one logs-in to and logs-out from."[29] Rather, they think of it as just what space is—also time, history, politics, and everything. The infosphere belongs to them; and they to it.

If one is infoskeptic (Floridi, for his part, isn't), one is likely to receive this kind of news with a feeling of distress. And it is easy, surveying the

current state of infospherical marketing, to make that feeling worse. Today we are being told—by very smart, well-funded, and diligent engineers—that our brains will soon be unnecessary. The infosphere itself will think, and will be better at it than we are.[30] Military robots, if they do not actually make war obsolete, will at least make it ethical—reducing the tangle of moral judgment to clear computation, and ushering in the best of all possible kill protocols.[31] Constant and real-time medical monitoring of our every bodily system and subsystem will replace the vague, quaint, and even irresponsible idea that we basically know when we are feeling healthy or ill.[32] And so on. Workers in the infosphere are articulating, whether they know it or not, an authoritarian tendency that has always been latent in modern science and technology—technoscience, for short. Precisely because technoscience is a unique force for human freedom, it has tacitly reserved the right, in some cases, to *overrule* the latter. For most of the last four centuries, this sudden reversal of polarities between science and ethics has occurred only intermittently, and as a kind of short circuit (e.g., in eugenics). But as we approach the first century of the information age, the hegemony of technoscience is starting to look like a rewiring.

And yet it is extremely difficult to say so: to offer a non-technical, but effective, critique of the infosphere. The primary evidence supporting this observation is the sheer number of such attempted critiques. Evgeny Morozov, Jaron Lanier, Albert Borgmann, and Nicholas Carr are just a few of the learned authors (apart from Dreyfus) who have published significant and much-discussed books about the disturbing implications—cognitive, social, psychological, economic, or what have you—of the always-developing internet and its associated information technologies.[33] Several of these authors, for that matter, have slain their infospherical dragons *more than once*, in big books, seriously reviewed in *Wired* and widely shared on Facebook. Here be something suspicious, not only in the repetition of these arguments, but also in their relationship with the forces they attack. Lanier, for example, has deftly parlayed his first career as IT's Polyanna into a second career as its Cassandra. Morozov would not be Morozov without the marginal excesses of contemporary IT; against which, for the most part, his arguments boil down to "gimme a break." Indeed, while the internet has had noticeable effects on the careers of its critics, the converse does not appear to be true. Nobody really believes that Lanier's smirks or Morozov's raspberries or Carr's handwringing has any power to turn back the advance of the online monster, or its aiding and abetting by citizens and policymakers. And thus the proliferation, and reiteration, of coffee-table critiques of

the infosphere. These arguments have to be repeated, or re-attempted, or re-envisioned, precisely because they *fail to work*.

This is due, I would argue, to a technical characteristic of the online phenomenon that is so basic it is hard to see. *The infosphere is unfinished*. And this in a radical, even a unique, way. True, any technology is unfinished insofar as it remains open to possible expansion of its capacities—that is, improvement. Even the simple, ancient hammer (the phenomenological ur-tool) can in principle still be made ever-lighter, stronger, more durable, and so on. However, expansions of this kind are *intensive*, not extensive: they are refinements of existing capacities, not the discovery of new ones. The hammer, we can confidently predict, will never be endowed with the ability to keep the rain off. For that, it needs to be integrated with other tools, in a *network*. The latter, in turn, needs to integrate with other networks. So the hammer integrates with the contents of the toolbox; the latter with the carpenters; the latter with the trades. The networks build a house. Like the individual tool, the network is typically open only to intensive improvement: the toolbox, like the hammer, will never be able to build a house by itself. But at some point, integration with other networks commences a genuinely *extensive* expansion of technological capacities. The latter, apparently, can go on indefinitely. By integration with the building code and the housing market and the electoral system and the media, the immediate networks of our little hammer achieve remarkable and far-flung results. It would be a foolish sage who examined the toolbox and pronounced that there was no reason to think it would ever lead to a neighborhood.

So perhaps a network of networks can be recognized as the extensive form of technology. If so, then perhaps we can say that the infosphere is *the* network of networks. Its limits, as Dreyfus already intimated of the internet, are only those of technology as a whole. And the infosphere races towards its limits at an ever-accelerating speed. As is already very evident, any and all sites of technological action can—and will—be integrated into the online infosphere, and accessed through its portals. For whatever is *not* online does not get accessed at all, as the non-networked world becomes coterminous with our intentional or private space (itself constantly diminishing). For everything else, there's an app; and the set of apps, as much as the set of networks that it replicates, is open. This means that the infosphere, *by definition*, undergoes a constant expansion—extensive, not just intensive—of its technological capacity. Another app is *always* coming online; another network being added to the infospherical roster. Thus by the time an infoskeptical critique can be published, its target has moved on.

Moreover, the multilateral integration of apps, an effect that is itself constantly expanding, consistently produces capabilities exceeding the sum of their parts. Voice-recognizing, Kasparov-defeating, car-driving, Jeopardy-question-answering and championship-winning: these are just a few of the stunning achievements, now clearly within the power of the informational network, that infoskeptics have in the recent past confidently placed beyond it. The implication—logically dubious, but not irrational—is that *all* skeptical markers will, in the end, be overwhelmed by the growth of the infosphere. "Oh" is the revision, or so it may seem, that awaits all attempts at non-technical critique in this area.

Into the Past

How, then, are we to proceed—we anxious, old, infoskeptics? For the beginnings of an answer, we can turn back to Dreyfus. Almost thirty years before *On the Internet*, in 1972, Dreyfus published a book called *What Computers Can't Do*. This was one of the first attempts by a philosopher to criticize the logical, epistemological, and metaphysical assumptions of computer science. In particular, Dreyfus took on two subfields that were at the leading edge of Nixon-era computing: Cognitive Simulation (CS), the attempt to create artificial and computable repositories of human knowledge; and Artificial Intelligence (AI), the attempt to build computers that could independently grasp, manipulate, and synthesize items in a CS database—in a word, think. Dreyfus showed, easily and compellingly, that the grandiose claims of CS and AI research (to say nothing of their echoes in pop culture and marketing) fell very far short of reality. Indeed, he was able to identify a *pattern* in well-funded CS/AI research programs. The pattern was: early and exciting success, quickly followed by devastating and terminal frustration. As the logician Yeshua Bar-Hillel (quoted by Dreyfus) put it: "the step from not being able to do something at all to being able to do it a little bit is very much smaller than the next step—being able to do it well."[34] CS/AI researchers had fooled themselves into thinking that *first steps* toward their goals made reaching them inevitable. But on that kind of logic, Dreyfus observed, "the first man to climb a tree could claim tangible progress toward reaching the moon."[35]

The power of Dreyfus's critique, although greeted with hostility by CS/AI researchers at the time, could be measured by the sound of their labs being cleared out during the 1970s and 1980s. A field that had seemed destined for sunny skies—think of the vision of *2001: A Space Odyssey,*

partly based on the work of Dreyfus's nemesis Martin Minsky—entered instead into the "AI winter" of the 1980s and 1990s. Since then, to be sure, AI has enjoyed a resurgence, and is in fact a key component of the twenty-first-century infosphere. But not AI as Dreyfus encountered it in the early 1970s—what is now called GOFAI (Good Old-Fashioned AI). Rather, new-fashioned AI is a much nimbler and more modest affair—operating around the edges, as it were, of Dreyfus's critique. A major desideratum of twenty-first-century robotics, for example, is the so-called "emergent" effect: intelligent or pseudo-intelligent behavior occurring, or seeming to occur, in the spontaneous interaction between the parts of a robotic system. The evidence, if one can call it that, for emergent behavior is precisely if the system's creator *can't quite explain it*. It is the AI equivalent of ghostbusting—a long way from the proactive confidence of GOFAI. In 1979, Dreyfus published an expanded (as *opposed* to "revised") edition of *What Computers Can't Do* (entitled *What Computers* Still *Can't Do*). This was further expanded in 1992; and the final version has never gone out of print.[36] The "fallacy of the first step" has become a canonical item of debates about AI, and Dreyfus's quip about climbing the tree has become its canonical expression.

How did Dreyfus, *in 1972*, manage to formulate a critique of then-cutting-edge IT that appears invulnerable (so far) to outflanking by subsequent expansion of the infosphere? Computer science, as a field, had emerged just after the Second World War, and so was only about 25 years old when Dreyfus was writing. In that sense, *What Computers Can't Do* looks extraordinarily prescient. But the CS and AI research programs were almost as old as computer science itself. They had already manifested, by the early 1970s, what Dreyfus identified as their characteristic trajectory. The latter, as we have noted, was precisely terminal: from first steps to a brick wall, from endless possibilities to none. CS/AI, whether or not its researchers saw it that way, was by 1972 already a story with an ending. Dreyfus perceived the ending, and told the story. This is not to take anything away from his achievement, but to note what *kind* of achievement it was. In 2001, Dreyfus would work prospectively: looking at the internet, as it then was, and proclaiming how it would go wrong. In 1972, by contrast, Dreyfus worked retrospectively: looking at CS and AI, as they *had been* already, and saying how they *had* gone wrong.

History, in a word, was the winning ground of *What Computers Can't Do*. And this, I would argue, is essential and relatively neglected ground for info-skepticism generally. If we can identify closed experiments and concluded

states of informational history, we may be able to articulate fallacies within them, along the lines of the "first step" fallacy, under conditions of analytical stability. Applying our results to the once and future infosphere is then, potentially, just a matter of scaling and analogy. The retrograde move has the potential to reverse the embarrassment that is so often suffered by infoskeptical prediction: it is not the skeptic, but the info, that has to say "oh" when history comes into play. We see elements of this sort of effect in several recent studies that challenge or qualify aspects of the computing age by charting its surprisingly ancient and complex heritage.[37] IT takes us to the future in a cloud of razzmattaz; taking it to the past, instead, leaves the confetti on the ground. It then becomes much easier to see *what* we have been dealing with, in dealing with some tendency or inertia of the infosphere.

But where? Or rather, when? History is not in short supply. Its superabundance, moreover, is especially problematic when juxtaposed with a concept like "information"—which can be construed broadly enough to include everything from satellite transmissions to Sumerian cartouches to organic stimuli. In this book, I will control for the second problem first, by defining and treating information narrowly. I will not be talking (*pace* Floridi) about any vague standard of meaningfulness, or communication, or data. Rather, I will be talking about the embodiment of messages in binary machine-language—the basic, essential technology of the computer age. Associated with Claude Shannon's seminal 1949 paper *The Mathematical Theory of Communication*, information in this sense can be specified as Shannon Information or (Floridi's usage) MTC information (MTCI). Yet specifying it, in a sense, is misleading; because it is only due to MTCI that we talk much about information, or have (had) an information age at all. Making this argument properly will be part of the work of Chap. 2 ("Mercurial messages"). There, I will also want to put MTCI through a phenomenological reduction: going beyond a merely technical account, to try to say what kind of epistemological and hermeneutic matrix the latter leaves us with. My hope and claim will be that submitting MTCI to such an analysis leaves us with more insight into what it is, not less.

The first problem, then—the problem of history—solves itself. To define information narrowly, as fundamentally MTCI, is to isolate it in history as a technological phenomenon *with a beginning* (if not yet an end). This also shows us how to *maximize* the critical advantage provided by historical analysis—taking the retrospective move to its logical conclusion. For the interpretative advantage provided by historical alienation increases as one traces something *back towards its origins*. In other words, the older, the stranger—and thus the more interesting. Obviously, one does not

want to take historical reduction too far; through sweeping and counterfactual proposals, let us say, that the digital age began with the invention of the alphabet, or numbers, or speech. But equally obviously, one can't just refuse the reduction. Information theory did not spring fully-formed from the head of Shannon (and/or Turing, or Wiener, or whomever) in the late 1940s. It had preconditions and precursors that were necessary to it; even, perhaps, sufficient for it. This is the kind of arrangement I am looking for: not wispy historical threads of information theory, but a recognizable early instance of the tapestry. Perhaps saying "this is as far back as it goes" will never really work. But one still gains tremendous leverage on the infosphere by finding it reflected, or manifested, as far back as one can.

In this book, I will follow a number of other studies, as well as my own training, in tracing the phenomenon of information pretty far back: to the Scientific Revolution of western Europe during the latter half of the seventeenth century. Information has been called "the new language of science," and in that sense it simply stands to reason that it began when modern science did.[38] But more to the point, the Scientific Revolution was experienced by its participants as an information age, both in the sense that they had a great deal of exciting new material to communicate, and in the sense that they were surrounded by thrilling new ways to do so. The printing press had long since made "information overload" part of the period's cultural and intellectual furniture, prompting numerous creative and even obsessive schemes for organizing and collating knowledge. Meanwhile, the colonial expansion of western nation-states, along with their internal political division and conflict, underwrote widespread and urgent period interest in cryptography, signals, and long-distance communication.[39]

To be sure, early-modern IT, if we can begin to speak of that, proceeds on technical platforms that are scarcely recognizable to us. But by that very token, if we *can* begin to recognize IT on the seventeenth-century platform, we stand to learn quite a bit. My goal, accordingly, is not to map the early-modern information age. Rather, my goal is to argue for a *specific* period avatar of information—both technology and theory—that allows a critical sketch of the informational idea, both then and now.

The Early-Modern Code

I will be working backwards from a foothold that historians of information have already placed in the seventeenth century. This is in the work of Gottfried Wilhelm Leibniz (1646–1716).[40] Two aspects of Leibniz's voluminous and eclectic thought are relevant. First, his mathematical

innovations—notably the invention of binary notation (on which all modern computing depends), and co-invention (with Newton) of the calculus. And second, his semiotic vision for a *characteristica universalis*: a universal notation or "character" of thought that would be based on an alphabet of logical simples, and would reduce all discourse to calculation. Here, it seems, is a prefiguration—tantalizing, if obscure—of MTCI. Computing historians have tended to privilege Leibniz's math over his semiotics—for a number of good reasons, including the relative underdevelopment of European mathematics prior to the seventeenth century, and its architectonic significance in modern natural science thereafter. Nonetheless, as intellectual historians of the seventeenth century know, it is the *characteristica* that situates Leibniz's information-theoretical work in its seventeenth-century context. And it is this context with which I propose to work.

Projects for a new, rational, and potentially universal sign system (or character) proliferated in the intellectual life of early-modern Europe. René Descartes, Marin Mersenne, Athanasius Kircher, Jan Comenius, Jacob Boehme, Isaac Newton and Francis Bacon were just a few of the period thinkers—some still household names, others familiar now only to seventeenth-century specialists—who commented or participated. Their motivations were, variously, to reunify western Christianity in the wake of the post-Reformation sectarian wars; to overcome the obstacles presented to international communication by the multiplicity of human languages; and to transcend the obstacles presented to scientific inquiry by the redundancy and ambiguity of any language whatever.[41]

Indeed, while it has become customary to speak of this seventeenth-century movement as being directed toward the creation of an artificial, philosophical, and potentially universal *language*, that common scholarly usage is somewhat misleading. A new character, as envisioned by Leibniz and others, would not really have been—by their lights—a "language" at all. True, it would have done the work that language normatively does: allowing and supporting intensional discourse (conversation, meaning, reference) about more-or-less anything under the sun (if worth talking about, anyway). And true, in at least some of the period schemes, the character would have been retrofitted with phonemes, becoming effable (speakable). Nonetheless, the whole *point* of the character—valid or not—is that it was *not supposed to count* as a language. Rather, it was supposed to offer a way of securing, even perfecting, the functionality of language; without the latter's persistent and apparently unavoidable malformations.

Explaining these matters properly will take quite a bit of work later on. For now, I can suggest very briefly that *the idea of the character is like the idea of information*—in a fairly strong, technical, MTCI-type sense. In both cases, we have a language that is (supposedly) *not* a language—but an un-language or ur-language, a phenomenologically prior code; a code that makes its claim of priority precisely as *pure writing*, rather than being a function of any normative or even residual orality; and a code that claims an alignment with something like the logic of being. In the seventeenth century, this last is the idea that a universal character would not only be able to articulate the universe—pointing out, naming, entities within it—but would also *explain* it, willy-nilly, because the nature of the universe would be coded right into the character. In modern information theory, especially as juxtaposed with theoretical physics, the analogous idea is that the universe *is* nothing other than the final description of the infosphere: the "it" that comes from the "bit" of MTCI.

If the character is informational, in a non-trivial sense, then a technology of the character is a technology of information (in a non-trivial sense). It ought therefore to be possible to read the seventeenth-century real-character project as just the kind of closed, indeed failed, experiment in IT that is recommended to infoskepticism by the historical perspective. Obviously, technical insights into twenty-first-century IT are not a likely output of such an approach. But pragmatic insights, I hope and claim, are. I want to see to what extent we can illuminate some of the major shapes of the infosphere—its assumptions, logics, fallacies and limits—via its seventeenth-century reflection. In my conclusions, I will draw together the results of this historical analysis into questions that may be posed to IT, now and in the future.

None of which, however, will be possible via Leibniz. Although a favorite project of the German philosopher's entire working life, his *characteristica* remained little more than a vague proposal. Perhaps Leibniz grasped *just how difficult it was* to achieve an ur-language of thought, which would ban, or render impossible, "chimerical notions," and would allow disputes to be resolved by a kind of calculation.[42] Descartes certainly got it: he wrote to Mersenne that, while a philosophical character would be very desirable, it would *presuppose* the perfection of knowledge that it was supposed to further, and therefore was likely to be met with only in "the world of novels."[43] For the most part, and especially on the continent, seventeenth-century attempts to bring the character into reality manifested a similar combination of incompleteness and wistfulness.

But Britain was the exception to the rule. Following some brief but suggestive remarks of Sir Francis Bacon's, several thinkers associated with the Royal Society for Improving Natural Knowledge—the world's first scientific academy, founded along explicitly Baconian lines in London in 1663—produced and published actual and potentially working schemes for a philosophical character. Of these, the system that appeared by far the most complete, prestigious, and functional in the period—studied closely by Leibniz himself—was the *Essay towards a Real Character, and a Philosophical Language* (1668) by the English clergyman, academic, and polymath John Wilkins.[44]

The *Essay* is not just an intellectual discussion of an interesting issue (an "essay" in the modern sense). It is, rather, a complex tool-book, designed and offered by Wilkins and his assistants for the practical purpose of scientifically improving life. The *Essay* lays out a new and rational code of written symbols—the character—that is supposed to support factual and unambiguous discourse about anything and everything significant in the world. This entails, first, a massive empirical listing of everything that is reckoned to be worth talking or knowing about (the "Philosophical Tables"); and, second, a rigorous logical system for combining the terms of the character in discourse (the "Natural Grammar"). Wilkins also offers a way of vocalizing his characters, turning them into an artificial tongue (his "Philosophical Language"). But this is a secondary function of the character itself, which is precisely supposed to bring language, once and for all, under the control of philosophy. All in all, the *Essay* offered its buyers a totally new way of writing and communicating, in accordance with the most advanced knowledge of the time. Its buyers were to be its *users*; and the *Essay* was nothing other than a cutting-edge information-technological device, both hardware (the book itself, expensive and weighty) and software (the character, tables, and grammar).

The *Essay* is familiar to intellectual historians of the seventeenth century; who, however, have not articulated its potential implication in the development of information theory or technology. Historians of information, on the other hand, have taken their work back to Leibniz's *characteristica*; but without knowing about Wilkins's character. It is these two scholarly halves that I propose to join together in this book—with a squeeze, if you like, of phenomenological glue. And it is on the resulting treatment of the *Essay* that I hope to make good on my suggestion that we can learn something about the twenty-first-century infosphere from its seventeenth-century antecedent.

From Information to Reality

This will take some preparation. In Chap. 2, I am going to try to explain what "information" actually means in its eponymous age (ours). Most books like the current one—non-technical discussions of issues related to modern information theory and technology—start by abjuring the technical level, or reiterating its pronouncements. I think we need to do better, if we are to attain a genuinely critical perspective. So I will be talking about the concept of the message; about binary (machine) code; and about the alleged epistemological and physical *reality* of information. My goal is to cook the informational model of communication and understanding down to some of its major phenomenological characteristics—what I will vaguely call its "shapes." I am going to emphasize three: (1) the tendency of modern information, due to its origination in the concept of the message, to reify communication as one-way intentional control; (2) its corollary tendency to establish and prioritize information (that is, MTCI) as a pure writing, neither deriving from any orality nor reducible to it; and (3) its alignment, much noted in philosophy and in theoretical physics, with structures of knowledge on the one hand, the cosmos on the other. With a workable, if basic, purchase on this fundamental modern concept, we can hope to bring it into juxtaposition with the early-modern concept of the real character.

But that is actually two concepts. Before we can talk about the "real," we need to talk about the "character." That will be the work of Chap. 3. As we will see, "characters" in the seventeenth century were not just elements of general writing (the term's traditional denotation), but of a *special* writing, used in the first place for taking down speech *verbatim*. Seventeenth-century characters were, in the first place, shorthand. This innovation, originating in England at the end of the sixteenth century, took the next one by storm. By the 1650s, English bookstalls were positively awash in rival publications teaching "short, swift, and secret" writing (as shorthand was often described). The broader cultural discourse of "characters," meanwhile, reflected (or so I will argue) the rather thrilling implications of the new technology. Historians have always been aware of the seventeenth-century shorthand phenomenon, but I believe the survey I am going to provide is unusually extensive. (Although, to be sure, there is a lot more work to be done in this area.) It is necessary for our purposes because the idea of real characters in general—and the project of Wilkins's *Essay* in particular—grew directly out of the antecedent shorthand movement. Orality, finally, as the target or substratum of shorthand, is by that token alienated from it.

This has important consequences for the relationship between real characters and language.

Which is the topic of Chap. 4. Here, I will want first of all to clarify the *epistemology* on which the real-character project was predicated (in England, in the seventeenth century). Minds, in a tradition deriving from Aristotle, were thought to reflect things. This is not to say that minds were supposed to see naturally into the *truths* of their perceptions; but that the perceptions themselves were assumed to be, literally and entirely, *real* (from Latin *res*, thing). I will call this the speculative view (from Latin *speculum*, mirror). Sir Francis Bacon, the new Aristotle of seventeenth-century England, did *not* displace or revise the speculative assumption, but adapted and deployed it. (Bacon's core interest is in the methodological hermeneutics of science, not in the epistemological reliability of apperception.) And so, *mutatis mutandis*, did the Baconians of the early Royal Society and the real-character movement. What makes this such an important topic for our purposes is that it is precisely and only on the basis of the speculative epistemology that the project of a real character makes any sense. For it means that objective referents are always-already established at the cognitive level. Objective discourse is prevented, not by our minds, but by our *words*—which the seventeenth century understands as fundamentally oral. Thus *suppressing language* (that is, orality) is the decisive step for establishing a notation that refers directly to things. Of course, we tend to think that any notation whatever is willy-nilly a language—but that is not how the seventeenth century sees it. At the same time, as I will try to show, work on the real character itself may have played a role in turning the early-modern view of the linguistic category into something more resembling our own.

Chapter 5 is pretty straightforward (in principle): I want to show how Wilkins's real character works. Admittedly, this has been attempted before—but only in bits and pieces, and always (as I have noted) under the phenomenological heading of "language." If Chap. 4 has done its work, it should be evident by this point why we need to approach Wilkins's *Essay* from another direction. Indeed, from the other way around: we need to try to understand his real character, as such, *first*. This also entails trying to understand it in some detail. The reader will not, regrettably, emerge from this chapter able to read or write Wilkins's character with ease (any more than I have). But s/he will, I hope, emerge with a fairly clear sense of what *kind* of communicative matrix the character fundamentally is. As I will try to show, the *Essay* was not placed on the market, or received by its contemporaries, as a theoretical sketch; but as a usable, exciting, and

long-awaited technology. The phenomenology of Wilkins's character, as I will argue in the concluding phase of this chapter, conforms in some interesting and potentially productive ways to the shapes of information as already established.

Finally, in Chap. 6 I will try to interpret some of the consequences of that isomorphism. As is well known, Wilkins and his contemporaries took a number of their working assumptions from the Biblical book of Genesis, which they read and understood literally (a standard attitude in the period). In particular, the Tower of Babel story of Genesis 11 told them that all human languages had originally, and properly, been *one*. Of course, God's curse at Babel doomed language to eternal multiplicity—which is exactly where the real character comes in. Precisely as an un-language or ur-language—the objective and universal denotation of the mind—the character could serve as a platform for universal communication. The analogy is evident to digital information as the universal "machine language," supporting online translation, and, ultimately, universal translation. But as I will argue, borrowing some insights from the late Hans-Georg Gadamer, it is not at all clear that a unitary phenomenology actually makes any sense in this area. A universal matrix for human communication and understanding would not augment, but delete, the nature of worldly experience. The *Essay*, through its technical closure and historical distance from us, offers a test-case. Wilkins makes his character work by presupposing what human communication fundamentally is (what I will call the fallacy of the point). He summarily deletes or removes from the character's range of reference vast areas of experience that he proposes to be insignificant *a priori* (the fallacy of the path). And he summarily posits the finiteness or completeness of the world within which the character will need to be able to refer (the fallacy of the whole). This last is especially interesting because of the obvious similarity between Wilkins's referential encyclopedia—his Philosophical Tables—and what we now call a database. In the *Essay*, we see very clearly how production of a universal database can entail a *reduction* of the world, to a kind of world-lite. Neither does Wilkins present this as an heuristic measure. He presents the contents of his tables as the only world there really is.

Mashing IT Up

The point, of course, is not to criticize the *Essay*, or the larger seventeenth-century character project. The point, rather, is to be able to ask whether the criticisms we can level at these early-modern targets find any echo in

their post-modern reflections. Are we locking in errors? Are our databases world-lite? Are we radically altering, even destroying, the nature of lived experience? These are the sorts of questions that the reader of this book, I hope, will become more empowered to consider. Obviously, they are questions for the present day, and days to come. But as I have argued above, it is precisely—and uniquely—the turn to the informational past that may allow us perspective on the infospherical future.

Nonetheless, I have to admit that the present book is a hybrid, perhaps an ungainly one. It is part intellectual history, part phenomenology, part philosophy of information, part (even) literary criticism. If there is an excuse for such a mash-up (as the kids were saying, recently, I think), it is that hybridization has made all the running in the history of IT. Who would have thought that cattle-ranching would have facilitated the growth of telephony, or that artillery fire would have produced IBM, or that your glasses would one day tell you the weather?[45] Moreover, at the theoretical level—as we will see—"information" is itself a hybrid term. Most terms worth talking about are; the exception is *technical* terms, which are defined carefully and arbitrarily within the context of a given discipline. Information straddles technical and non-technical worlds, in ways that are very problematic and difficult to untangle. However, we have to try, if we are to have any hope of understanding its hold on us.

The Mirror of Information is an attempt to read the seventeenth-century real character project as an illuminating historical avatar of the twenty-first-century infosphere. This will necessitate giving an account of the character as fundamentally, and significantly, informational. And that will necessitate, in turn, giving some initial thought to what information is.

Notes

1. Jonathan Swift, *Travels into Several Remote Nations of the World … by Lemuel Gulliver* (Dublin, 1726), vol. III, 163–64.
2. See William Poole, *John Aubrey and the Advancement of Learning* (Oxford: Bodleian Library, 2010), 50–63; Rhodri Lewis, *Language, Mind and Nature: Artificial Languages in England from Bacon to Locke* (Cambridge: Cambridge University Press, 2007); Jaap Maat, *Philosophical Languages in the Seventeenth Century: Dalgarno, Wilkins, Leibniz* (Dordrecht: Kluwer Academic Publishers, 2004); David Cram and Jaap Maat (eds), *George Dalgarno on Universal Language:* The Art of Signs *(1661),* The Deaf and Dumb Man's

Tutor *(1680), and the Unpublished Papers* (Oxford: Oxford University Press, 2001); Paolo Rossi, *Logic and the Art of Memory: The Quest for a Universal Language*, trans. and intro. S. Clucas (Chicago and London: University of Chicago Press, 2000); Robert Stillman, *The New Philosophy and Universal Languages in Seventeenth-Century England: Bacon, Hobbes, and Wilkins* (London: Associated University Presses, 1995); Joseph Subbiondo (ed.), *John Wilkins and 17th-Century British Linguistics* (Amsterdam: Benjamins, 1992); Vivian Salmon, *The Study of Language in Seventeenth-Century England* (Amsterdam: Benjamins, 1979); and James Knowlson, *Universal Language Schemes in England and France, 1600–1800* (Toronto: University of Toronto Press, 1975).

3. John Wilkins, *An Essay towards a Real Character, and a Philosophical Language* (London, 1668), sigs. a^{v}, $a2^{v}$, b-b^{v}.
4. Lewis, *Language*, 188–221; Poole, *John Aubrey*, 55–61.
5. Lewis, *Language*, 190.
6. Lewis, *Language*, 192–93.
7. Robert Hooke, *A Description of Helioscopes and Some Other Instruments* (London, 1676), 30–31. For the real-character text, see Poole, *John Aubrey*, 59. For Hooke as devoted to Wilkins, see his *Micrographia, or, Some Physiological Descriptions of Minute Bodies Made by Magnifying Glasses with Observations and Inquiries thereupon* (London, 1665), sig. g2.
8. J.E. Stephens (ed.), *John Aubrey on Education: A Hitherto Unpublished Manuscript by the Author of* Brief Lives (London: Routledge, 1972), 40, 56, 35, 66.
9. *The Mathematical and Philosophical Works of the Right Reverend John Wilkins, Late Lord Bishop of Chester* (London, 1708), 169–184; 171. For the *Essay* as Wilkins's "darling," see Lewis, *Language*, 187.
10. Locke, *An Essay Concerning Humane Understanding* (London, 1690), "Epistle to the Reader."
11. Swift, *Travels*, III. 163.
12. Ibid., III. 163–64.
13. Ibid., III. 161.
14. See Chap. 4, below.
15. See, e.g., Poole, *John Aubrey*; Lewis, *Language*; Stillman, *The New Philosophy;* Knowlson, *Universal Language*.

16. See, e.g., Maat, *Philosophical Languages*; Rossi, *Logic*; Subbiondo (ed.), *John Wilkins*; Salmon, *The Study*.
17. Rossi, *Logic*, 4–5.
18. See, e.g., Ann M. Blair, *Too Much to Know: Managing Scholarly Information before the Modern Age* (Yale, 2010); Arndt Brendecke, Markus Friedrich and Susanne Friedrich (eds), *Information in der Fruehen Neuzeit: Status, Bestaende, Strategien* (Berlin, 2008); Paula Findlen (ed.), *Athanasius Kircher: The Last Man Who Knew Everything* (New York: Routledge, 2004); *Journal of the History of Ideas* 64.1 (2003), a special number on "early-modern information overload"; and Neil Rhodes and Jonathan Sawday (eds), *The Renaissance Computer: Knowledge Technology in the First Age of Print* (New York: Routledge, 2000).
19. See, e.g., Geoffrey Cox, *Speaking Code: Coding as Aesthetic and Political Expression* (Cambridge, MA: MIT Press, 2013); Arthur Kroker and Marilouise Kroker (eds), *Critical Digital Studies: A Reader* (Toronto: University of Toronto Press, 2008); N. Katherine Hayles, *My Mother Was a Computer: Digital Subjects and Literary Texts* (Chicago: University of Chicago Press, 2005); Donna Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse: Feminism and Technoscience* (New York: Routledge, 1997); and, *in principio*, Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964).
20. Albert Borgmann, *Holding on to Reality: The Nature of Information at the Turn of the Millenium* (Chicago: University of Chicago Press, 1999); Hubert L. Dreyfus, *What Computers Still Can't Do: A Critique of Artificial Reason* (Cambridge, MA: MIT Press, 1992); John Searle, *Minds, Brains and Science* (Cambridge, MA: Harvard University Press, 1984).
21. See Hubert L. Dreyfus, *On the Internet* (New York: Routledge, 2001), 1–26. Dreyfus cites contemporary research pegging maximum possible search engine accuracy (that is, retrieval of sites relevant to a query) at 30 %. James Gleick gives a brief and amusing account of what search was like in the 1990s in his *The Information: A History, A Theory, A Flood* (New York: Pantheon, 2011), 421–23.
22. Dreyfus, *On the Internet* (2001), 26.

23. Dreyfus, *On the Internet*, 2nd edition (New York: Routledge, 2009), 21–22. Dreyfus makes a similar claim in his essay "A History of First-Step Fallacies," *Minds and Machines* 22 (2012): 87–99.
24. Dreyfus, *On the Internet*, (2009), xi.
25. Ibid., 24.
26. Dreyfus, *On the Internet* (2001), 1–2.
27. See Floridi, *The 4th Revolution: How the Infosphere is Reshaping Human Reality* (Oxford: Oxford University Press, 2014), and *Information: A Very Short Introduction* (Oxford: Oxford University Press, 2010). Floridi's most comprehensive and scholarly account of the relevant issues is in his *The Philosophy of Information* (Oxford: Oxford University Press, 2011). A very good collection of essays devoted to Floridi's work is Patrick Allo (ed.), *Putting Information First: Luciano Floridi and the Philosophy of Information* (Chichester: Wiley-Blackwell, 2010). See also Floridi (ed.), *The Blackwell Guide to the Philosophy of Computing and Information*, (Malden, MA: Blackwell, 2004).
28. Floridi, *The 4th Revolution*, 41.
29. Floridi, *Information: A Very Short Introduction*, 17.
30. This sort of claim is associated with the Google Brain project, now headed by legendary futurist and "singularity" theorist Ray Kurzweil. See Marcus Wohlsen, "Google's Grand Plan to Make Your Brain Irrelevant," *Wired* magazine, January 2014.
31. See Don Troop, "Robots at War: Scholars Debate the Ethical Issues," *Chronicle of Higher Education*, September 10th, 2012. The prospects for robot ethics in the battle space are associated closely with the work of Ronald C. Arkin: See his *Governing Lethal Behavior in Autonomous Robots* (Boca Raton: Chapman and Hall, 2009); and, in general, the efforts of the DARPA-funded Georgia Tech Mobile Robot Lab, which Arkin (at time of writing) heads: http://www.cc.gatech.edu/ai/robot-lab/publications.html. For a selection of Arkin's critics, see Peter W. Singer, *Wired for War* (New York: Penguin, 2009); and J. Altmann, P. Asaro, N. Sharkey and R. Sparrow (eds), *Ethics and Information Technology* 15.2 (2013), a special issue on armed military robots.
32. This is the "quantified self" movement, itself related to the allegedly unimpeachable "evidence-based" movement in medicine. See http://quantifiedself.com/. For a particularly piquant iteration,

see http://quantifiedbabies.com/. Floridi speaks of "e-health": See *The 4th Revolution*, 75–79.

33. See Evgeny Morozov, *To Save Everything, Click Here: The Folly of Technological Solutionism* (New York: Public Affairs, 2013) and *The Net Delusion: The Dark Side of Internet Freedom* (New York: Public Affairs, 2011); Jaron Lanier, *Who Owns the Future* (New York: Simon and Shuster, 2013) and *You Are Not a Gadget: A Manifesto* (New York: Knopf, 2010); Borgmann, *Holding on to Reality*; and Carr, *The Shallows: What the Internet is Doing to Our Brains* (New York: Norton, 2010), *The Big Switch: Rewiring the World from Edison to Google* (New York: Norton, 2008), and *Does IT Matter: Information Technology and the Corrosion of Competitive Advantage* (Cambridge, MA: Harvard Business School, 2004).
34. Dreyfus, *What Computers Can't Do: A Critique of Artificial Reason* (Harper and Row, 1972), 59.
35. Ibid., 12.
36. Dreyfus, *What Computers* Still *Can't Do: A Critique of Artificial Reason* (Cambridge, MA: MIT Press, 1992).
37. See, e.g., Elizabeth Ryan, *Garments of Paradise: Wearable Discourse in the Digital Age* (Cambridge, MA: MIT Press, 2014); Kevin LaGrandeur, *Androids and Intelligent Networks in Early Modern Literature and Culture: Artificial Slaves* (New York: Routledge, 2013); and Horst Bredekamp, *The Lure of Antiquity and the Cult of the Machine: The Kunstkammer and the Evolution of Nature, Art and Technology* (Princeton: M. Wiener, 1995).
38. See Hans Christian von Baeyer, *Information: The New Language of Science* (London: Weidenfeld and Nicolson, 2003).
39. For these topics see Blair, *Too Much to Know*; Brendecke et al, (eds), *Information in der Fruehen Neuzeit*; William Poole, "*Nuncius Inanimatus*: Telegraphy and Paradox in the Seventeenth Century: The Schemes of Francis Godwin and Henry Reynolds," *The Seventeenth Century* 21 (2006): 45–71; Paula Findlen (ed.), *Athanasius Kircher*; *Journal of the History of Ideas* 64.1 (2003); Rhodes and Sawday (eds), *The Renaissance Computer*; and Lois Potter, *Secret Rites and Secret Writing: Royalist Literature, 1641–1660* (Cambridge, 1989).
40. See Gleick, *The Information*, 89–90; and Martin Davis, *The Universal Computer: The Road from Leibniz to Turing* (Norton, 2000), 3–20. Leibniz's fragmentary and dispersed writings on the

idea of the character have been translated and collected in Marcelo Dascal (ed.), *Gottfried Wilhelm Leibniz: The Art of Controversies* (Dordrecht: Springer, 2006).

41. See William Poole and Felicity Henderson (eds), *Francis Lodwick: Writings on Language, Theology, and Utopia* (Oxford: Oxford University Press, 2011); Lewis, *Language*; Maat, *Philosophical Languages*; Cram and Maat (eds), *George Dalgarno*; Rossi, *Logic*; Stillman, *The New Philosophy and Universal Language*; Subbiondo (ed.), *John Wilkins*; Salmon, *The Study of Language*; Knowlson, *Universal Language Schemes*. Also, though with caution re: Wilkins, Hannah Dawson, "The Rebellion of Language against Reason in Early Modern Philosophy," *Intellectual History Review* 17.3 (2008): 277–90.
42. Quoted in Davis, *The Universal Computer*, 12. See also Maat, *Philosophical Languages*, 273–313.
43. Cited in Knowlson, *Universal Language Schemes*, 65.
44. On Wilkins see Lewis, *Language*; Stillman, *The New Philosophy*; Subbiondo (ed), *John Wilkins;* Salmon, *The Study of Language*; and Knowlson, *Universal Language Schemes*. The two major English (or at least British) Baconian schemes for a character actually brought to print prior to Wilkins's *Essay* were Cave Beck, *The Universal Character, by which all the nations in the world may understand one anothers conceptions, reading out of one common writing in their own mother tongues* (London, 1657); and George Dalgarno, *Ars signorum, vulgo character universalis et lingua philosophica* (London, 1661), a radical revision of the scheme in Dalgarno's earlier *Tables of the Universal Character* (Oxford, 1657).
45. Gleick explains how barbed-wire fencing, itself a new technology of early-twentieth-century ranching, was appropriated as an ad hoc extension of early telephone networks on the Great Plains: see *The Information*, 168–70. The mainframe computers that made International Business Machines into the Google of the immediate post-war period themselves originated, as is well known, in wartime efforts to compute ordnance trajectories. Google Glass—well, at the time of writing, that one is still in process.

CHAPTER 2

Mercurial Messages: What Is Information?

In 1641, the 27-year-old John Wilkins published *Mercury, or, the Secret and Swift Messenger*. The book was a compendium of schemes and techniques for long-distance and/or secret communication. It was one of many such publications in early-modern Europe—unsurprisingly, given the horrendous wars, intense religious controversies, and increasing state surveillance of that time and place.[1] Drawing on authorities both ancient and modern, British and continental, Catholic and Protestant, the eclectic Wilkins discusses secure communications via everything from pigeons to cannons; and secret codes involving everything from metaphor to pig-Latin.

At one point, Wilkins discusses how to communicate using torches at night. This is a topic that receives a lot of attention in early-modern discussions of signaling (e.g., among beleaguered armies). Signal-fires had been used since ancient times, and could be genuinely effective, given enough organization, for sending notifications a very long way. A classic example would be the extensive network of fires that alerted vast swathes of the English coast, in 1588, to the imminent arrival of the Spanish Armada. (The mother of Thomas Hobbes, according to the latter, went into labor with him at news of the signal.) But this kind of thing could send, typically, only one pre-determined message, drawn from within two possibilities: such as fire or no-fire, Armada or no-Armada. It took considerable ingenuity to adapt this simple technology to the sending and receiving of more complex texts.

J.D. Fleming, *The Mirror of Information in Early Modern England*,
DOI 10.1007/978-3-319-40301-4_2

As do other period writers in this area, Wilkins breaks down the problem alphanumerically. Torch-code can be made to work by assigning numbers to the 24 letters (just 24 because early-modern orthography identifies "j" with "i," "u" with "v"). Displaying the number of torches for a given letter will then allow that letter to be "written." In the simplest possible version of this kind of code, you could simply number the letters from 1 through 24—but that would be physically unworkable, from a torch-management point of view, and would also constitute a very unsecure code. A better way is to break the alphabet up into numbered groups. The letters within each group are also numbered. You can then use a set of torches to pick out a letter-group, and another set to pick out the letter you want within that group.

So, for example, Wilkins says (basing his account on the ancient writer Polybius), divide the alphabet into five groups:

a—e (group I),
f—k (group II),
l—p (III),
q—u (IV),
and w—z (V).

The letters in each group are also numbered, one through five. Thus in group I, letter "a" will be number one; "b" number two, and so on, up to "e," number five. And so for the other groups. (The last group, w—z, will have just four letters.) To write a letter of the alphabet using this particular torch-code, all you have to do is display on one side of your signal a number of torches, up to five, for the letter-group you want. On the other side, display the number of torches for your specific letter, again up to five, within that group. If you display group-torches on your right, letter-torches on your left, then the viewer of your communication will read it, conveniently, left to right: group-number, letter-number. Once you have "written" that letter, take an appropriate pause, and then display your torches anew to write the next one.

So, suppose you want to send the message "HASTEN" (Wilkins's example). You will start by holding up two torches for the group, three for the letter:

** ***

Second group (f—k), third letter: "H."
Then you will hold up one torch for group, one for letter:

* *

First group (a—e), first letter: "A."
Next,

**** ***

Fourth group, third letter: "S." And so on for the rest of the word; and so on for the other words you may want to send.[2]

All of which is clever. However, it is still quite awkward. After all, the five-group method requires no fewer than ten torches to be on hand for the entire signaling period. These are not devices that can be easily lit and quenched and lit; neither will they burn ad infinitum. Basically, you're going to need an awful lot of torches. As few as two of them, moreover, are to be visible at any one time. The rest will have to be kept hidden—completely, lest their visible light distort the signal that is being displayed. At the same time, the hidden torches must be available, bright, and ready to be displayed, for whatever the next signal is going to be. Moreover, the ten-torch code requires as many as five torches to be held up, on either side, simultaneously: heavy, hot brands, dripping sparks and tar. (Strictly speaking, the truncated fifth letter-group, w—z, means that the maximum number of torches to be held aloft at any one time will be nine. That's still a lot of torches.) This whole business is going to require a very strong and well-organized signals officer—or (more likely) a large cohort of them, on both sides of the transmission. For the receiver of the initial communication will surely want to send something back.

So let's make it simpler, Wilkins says. We can do this whole thing with just three torches. Divide the alphabet into three groups: a—h (I), i—q (II), and r—z (III). Number the letters, one through eight, within each group. Then just display and hide the group-number of torches, repeatedly, enough times for your desired letter-number. So, for "h"—group I, eighth position—you'll simply display and hide one torch eight times:

*, *, *, *, *, *, *, *

Where the commas indicate sequence, rather than spatial arrangement. For "A" (group I, first member), you'll display and hide one torch once:

*

For "S" (group III, second member), 3 torches twice:

***, ***

For "T" (group III, third member), 3 torches 3 times:

***, ***, ***

And so on.[3]

This is a lot easier to manage than the ten-torch code. Just three torches burning, maximum three displayed or hidden at a time: you can easily do this with just a few pairs of hands. However, Wilkins writes, the three-torch code is "tedious, and inconvenient." Precise time management will be required: "some intermission, betwixt the expression of several letters, because otherwise there must needs be a great confusion, amongst those that belong to the same number of Torches."[4] Simplicity of signaling, in other words, has a statistical cost. The ten-torch code, in effect, gave two different signals at once: group number and letter number. It managed this by deploying itself both in time (the iteration of signals) and space (the left-hand/right-hand display of the torches). The three-torch code, by contrast, dispenses with space—and therefore can give only one signal at once. What is worse, the very same technique that allows a letter to be written—discrete displays of torches, separated by a pause—must serve to mark it off from the next letter. This opens the door to ambiguity and misunderstanding. Accordingly, Wilkins says, he considers the three-torch code inferior to the ten-torch one.

And yet: the impulse for *reduction*, to the simplest possible discrete signals, is something of which Wilkins cannot let go. "It is easie to conceive," he goes on,

> how by the Alphabet consisting of two letters transposed through five places, such a manner of discoursing may be otherwise contrived, only by two torches. But then there must be five shewes, to expresse every letter.[5]

Probably, Wilkins has in mind an alphabetic code he has described earlier in the *Mercury*, whereby quintuples of two letters (such as "a" and "b") can be used to write all the 24: "aaaaa" means "A," "aaaab" means "B," "aaaba" means "C," and so on. "H," in this code, is "aabbb." "S" is "baaab." So if one torch (*) is used for "a," two torches (**) for "b," the first three letters of "HASTEN" will be written:

*, *, **, **, **
*, *, *, *, *
**, *, *, *, **

As Wilkins notes, there is excess capacity in this system. "Two letters, being transposed through five Places, will yield thirty two Differences": $2^5 = 32$.[6] But we only have 24 letters to pick out, which means that eight of them could actually have been written with only four "shewes" of the torch. However, this does not matter very much, and the excess capacity is even desirable, from a cryptographic point of view. What matters is that we now have a way of saying anything we want, across great distances, using just one signaler—one pair of hands—and a single, simple digit: one torch, or two.

James Gleick, uniquely (I think) in the existing literature on information history, is aware of Wilkins's *Mercury* (though not of the *Essay*, or of the real-character movement). Noting that Wilkins has hit upon a quasi-binary code, Gleick is gobsmacked: "Two symbols. In groups of five. 'Yield thirty two Differences'." And he seizes on another comment of Wilkins's: "whatever is capable of a competent Difference, perceptible to any Sense, may be a sufficient Means whereby to express … Cogitations." Gleick comments:

> That word, "differences," must have struck Wilkins's readers (few though they were) as an odd choice. But it was deliberate and pregnant with meaning. Wilkins was reaching for a conception of information in its purest, most general form … Any difference meant a binary choice. Any binary choice began the expressing of cogitations. Here, in this arcane and [originally] anonymous treatise … the essential idea of information theory poked to the surface of human thought, saw its shadow, and disappeared again for four hundred years.[7]

Gleick overstates. Wilkins does not develop, in the *Mercury*, the binary math that is implicit in his cryptographic reductions. The correlation of signification with differences is an intellectual commonplace of the early-modern period—and the dialectic of division one of its omnipresent habits. Authorial anonymity is not unusual in the English print culture of the early 1640s. The *Mercury* is not particularly "arcane," but is a well-known entry by a respected figure in a large and popular period literature. Finally, a 300-year "disappearance" will suffice, presumably, to get us from 1641 to the mid-twentieth-century innovations that Gleick has in mind.

Nonetheless, Gleick is surely right to see in Wilkins's *Mercury* a genuinely interesting episode in the history of communications, resonant with some aspects of modern information theory. Special attention, perhaps, is merited by Wilkins's gesture toward binary notation. As we will discuss below, this is the fundamental mathematics of the computer age, and

of the very concept of "information" in the post-war era. No binary, no information—as theory or technology. Credit for the invention (or at least codification) of binary is usually given to Leibniz, which is one reason his work is typically treated as a decisive starting-point for computational history. No Leibniz, no binary; no binary, no information; and so on. But Leibniz, in the generation after Wilkins, studied his predecessor closely. At one point in his Philosophical Tables—the universal ontology that is at the heart of the *Essay towards a Real Character*—Wilkins reverts briefly to the tantalizing notion of a base-two mathematics. He is tabulating weights and measures, for which he proposes some decimal reforms, only to wonder if these go far enough. The "general *custom*," he notes, is to count things in base-ten. He will "not insist upon the change of it"; but,

> it would seem *more convenient* to determine the first *Period* or Stand at the number *Eight*, and *not* at *Ten*; because the way of Dichotomy or Bipartition being the most natural and easie kind of Division, that Number is capable of this down to an Unitie.[8]

A binary digit (2^1) is clearly glimpsed here, as the real unit of a "stand" at eight (2^3), and also capable of expressing unity, oneness, as such (2^0). Wilkins doesn't do anything further with the thought; in the *Essay*, he has too much else on the go. But for a moment, it seems as though we are going to be able to say, when it comes to binary code: no Wilkins—no Leibniz.

We can't quite say that. What we can say—and here I think Gleick is quite right—is that Wilkins's work in cryptography, and his adumbration of binary, look like elements of what can be called an early-modern information theory. The overall goal of the present book (as the reader will recall) is to read Wilkins's *Essay* as an illuminating avatar of that historical and technological field. But first we need to define it. Not for "early-modern"; rather, for "information."

The Message Is the Medium

Our term has many meanings. Its root is Latin *informatio,* which means "form" or "shape" in classical times, "teaching" or "instruction" in the medieval period.[9] Its cognates appear throughout the European languages. By the Renaissance, "information" has a significant profile in administrative and surveillance contexts: to give information means to inform on

someone, or provide what governments now call "intelligence."[10] In that sense the word has socially negative overtones; a bit like "policy," another early-modern curse-word that now sounds very bland. Morally, nonetheless, "information" also comes to mean "integrity" or "discipline"—a sense that it still has for Wordsworth.[11] Much more recently, as we are all aware, the term has come to be used both for "data" (that is, the natural givens in an observation of the world); and, in a way, "knowledge"—even though this usage is both problematic and contested.[12] Professional librarianship is sometimes designated "information science": knowing how to manage the documents and resources by which it becomes possible to know about anything at all. On the other hand, McLuhan assures us that "the electric light is pure information," by which he means precisely that it *is not* about anything at all, but is rather "a medium without a message"![13] As per McLuhan's dictum, information often gets talked about as a *stuff*—a non-count noun, like water or energy or light. And yet *quantification* also identifies and typifies it, as in the relentless and somewhat breathless claims about how "much" information is in the world today, or gets "produced" year to year. A recent attempt at a full gloss of our keyword has included, non-exhaustively, "shape, structure, configuration, pattern, arrangement, order, organization, or relations."[14] Basically, the semantics of "information," an ancient abstraction that has been stirred a lot over the centuries, now looks like a messy, slippery, and rather unappetizing soup.

Which we don't have to eat. That is because our keyword, in the mid-twentieth century, was adopted ("hijacked" is Gleick's word) for radically new semantic purposes.[15] More to the point, it is *only* because of this re-extension of the word "information" that we speak as much as we do about this stuff; live in an "Information Age"; and are surrounded, ubiquitously, by "information technology." It is not quite the case—not quite—that "information" was *arbitrarily* redefined in the immediate post-war period. But that almost never happens. Rather, what happens is what happened: some brilliant (and, in this case, mostly English-speaking) people, in the decade after the Second World War, came up with an epochal innovation, for which they borrowed and repurposed an existing word. Initially, to be sure, this was *not* "information." Rather, the preferred locutions for the new statistical communications technologies in their infancy included "the transmission of intelligence" and "the mathematical theory of communication" (the title of Claude Shannon's seminal paper of 1949). But by the 1950s, for reasons that are necessarily obscure, the people working in

what we now call information theory and technology had started to think and talk about them in exactly those terms.[16]

It's like the way early-modern biology borrowed "cell" for the tissue structures that were revealed by the new microscope; the way postmodern sociology borrowed "gender" for a new emphasis on sex roles as performance; the way modern physics borrowed "radiate" for the energetic emissions of nuclear decay. Computer science, emerging out of telecommunications around 1950, borrowed the ancient word "information" both for the mathematical theory that underlay it, *and* for the communicative stuff or field it thereby offered to manage. This was, arguably, an unusually complex philological re-inflection; resulting in perennial debates over whether "information theory" is fundamentally about math or meaning. Nonetheless, the current point is simply that if we want to understand the "infosphere," as Floridi calls it, we have to get clear, from the very start, about the concept that fills and defines it. We have to get clear that "information," in the post-war era, is a *technical* term.

It is technical to the congeries of telecoms and computing, as these began to come together in the late 1940s. Electrified communications, by that era, had already become a familiar and dominant global technology. Electronic computing, by contrast, was an entirely new one—which seemed to offer the exciting prospect of transforming its predecessor. This immediate post-war moment, producing the synthesis that came to be called "communications science," fostered reflection on fundamental concepts. The MIT polymath Norbert Wiener, fascinated by the intelligible feedback that can flow between machines and their human operators, asked himself what intelligent operation, fundamentally, was. He decided it was a matter of "statistical mechanics," whether "in the machine or in living tissue": a unified phenomenon he proposed to call "cybernetics."[17] The English mathematician Alan Turing, having spent the war supervising Bletchley Park computers—that is, human (and mostly female) codebreakers—got to wondering what computation, in the last analysis, was. His answer: it is a very small set of discrete and iterable operations, representable in binary numeration, and performable by a machine operating on a segmented tape (the "Turing Machine").[18] Finally, the American engineer Claude Shannon, working on bandwidth problems for the Bell Telephone Company, was led to wonder what communication, at bottom, is: *what it is* for data to be made available and reproducible, even remotely, from a point of generation to a point of reception.

Shannon's answer: communication is basically *sending a message*.[19] Per the famous "Shannon diagram," it is a transmission of a message down a channel, from a sender to a receiver, encoded and then decoded, in the face of potential distortion or "noise."[20] We need to try to recognize (without falling down another philological hole) that Shannon's canonization of the message-concept was neither inevitable nor unprompted. Rather, it was a function of the communicative vectors that Shannon saw all around him, among which he had grown up, and on which he worked. Conduits and filaments, attenuated yet restrictive, connecting people and places at ever greater distances and with ever greater efficacy—via phone and television, as they had earlier by radio, as they had earlier still by telegraph, earlier yet still by pneumatic tube. This was the technological world, the already modern informational world, for which Shannon provided a schematic image and a statistical redescription. Originating in the mid-nineteenth century, but very well established by the mid-twentieth, his was a world of *communicative lines*. And anything that went down those lines could, clearly, be characterized as a message: a stabilized expression of intentions, packaged (encoded) in just such a way as to make it down the line. We are talking here about a norm *generated by technologies*, not just about technologies generated by a norm.

This is absolutely not to suggest that the norm in question is invalid, or that messages don't go down the channels of the informational model. Clearly, what gets generated in history is all we'll ever find there. Moreover, there can be no doubt that large areas of human communication and understanding can indeed satisfactorily be modeled as the sending and receiving of messages. But not all areas, as I will argue below; and, in any case, the historical limits of the message-concept offer a salutary reminder that it is indeed a certain concept, with a certain shape. One of the challenges faced by early telephone network marketing, as Gleick nicely shows, was befuddlement or indifference among potential clients about the core technical benefit of the new system. "If I want to send a message," he records the chief engineer of the UK Post Office as saying in 1879, "I use a sounder [telegraph], or employ a boy to take it."[21] Sending or getting a message, for this historical speaker, is not to be understood as a general communications function that simply reproduces itself on platform after platform. Rather, messaging is to be understood as a specific capability, which already has several platforms, and therefore does not need to be reiterated. A useful technique of communication; but not the whole of it. Perhaps in the City of London, in the late nine-

teenth century, communication was more holistically exemplified by a report; or a speech in the House of Commons; or a stroll down the Thames, arm-in-arm.

Conversely, a hallmark of the new discourses of information, at mid-twentieth-century, was a veritable insistence on the message-concept. Reviewing the range of disciplines that (he felt) came under his new heading of cybernetics, Wiener pronounced them to be "fundamentally the study of communication," unified by the idea of the *message*.[22] "The output of the information source is called a *message*," writes the Bell Labs engineer Gordon Raisbeck in an early technical introduction to information theory. "If the information source is a person talking, the message is what he says."[23] Here we have precisely the kind of normalization and even universalization of the message-concept that cannot be assumed prior to the articulation of information theory itself. And Raisbeck goes on to make very clear that the norm is technologically predicated. "Polite stereotyped utterances," he writes, such as "Happy Birthday" or "Congratulations on the birth of your child," "carry very little information":

> The telegraph company has taken advantage of this fact by listing on its telegraph blanks some 100 stereotyped messages for use in appropriate stereotyped situations. The customer chooses a message, and the signal transmitted by the telegraph company contains only the few symbols necessary to identify the particular message which has been chosen. At the receiving office, a clerk reconstitutes the stereotyped message for transmission to the destination. The fact that such a stereotyped message contains less information than most utterances containing the same number of words is reflected in the lower cost to send the message.[24]

"Cost," here, is both technical and practical. Raisbeck is pointing out that a stereotypical telegram involves less money *because* it involves less transmission time. Statistical and monetary cost align. But more to the point, the patient engineer is appealing to his reader's mid-twentieth-century familiarity with a certain scenario of technologized communication as a basis for explaining information theory. *All* communication, in the wake of this theory, is to be understood on the model of sending a telegram—using a "sounder," per the nineteenth-century norm. And that is to say that all communication is to be understood as just so many experiences of sending, and/or receiving, a message—a word that occurs no fewer than 32 times in the first five pages of Raisbeck's book.

Now, Raisbeck doesn't *define* "message"; he takes it as understood, granted. And (at the risk of arguing from absence) this is a pattern we will tend to find reiterated in early introductory accounts of information theory. Having given his own version of the Shannon diagram, and opened up the whole topic of "the statistical nature of the communication of messages," Fazlollah Reza (electrical engineer, Syracuse University) identifies its "basic questions":

1. How does one measure information and define a suitable unit for such measurements?
2. Having defined such a unit, how does one define an information *source*, or how does one measure the rate at which an information source supplies information?
3. What is the concept of channel?
4. Given a source and a channel, how does one study the joint rate of transmission of information and how does one go about improving that rate?
5. To what extent does the presence of noise limit the rate of transmission of information?

Reza goes on to explain that "the source [re: #2] transmits at random any one of a set of prespecified messages." But what thereby gets transmitted—the very concept of the message itself—this goes unexamined.[25] It is simply taken as understood. Shannon himself, while carefully defining what he considers the five main labeled elements of his eponymous communications schematic—information source, transmitter, channel, receiver, destination—leaves entirely undefined the "message" element at its center.[26] For that matter, he leaves undefined "communication" too. This is not a criticism; only an observation. Information theory, without the slightest exaggeration, totally and decisively transformed the world through its insistence that all communication comes down to messages. And yet the theory tells us absolutely nothing about *what* communication thereby comes down to.

Marshall McLuhan, pied piper of the Information Age, made a large part of his very remarkable career through his own version of the rhetoric of the message. He even developed a stylish line in ironically ripping it off: *The Medium is the Massage* is the title of one of his lesser-known collections of essays. This tweaks (of course) the great dictum that McLuhan spoke into the megaphone of the twentieth century: "The medium is the

message," a bona fide popularization of information theory. But not necessarily an illumination of it. McLuhan told the 1960s that *media*, as such, mattered, much more than whatever they conveyed in any given case. For "the 'content' of any medium," he assured us, "is always another medium."[27] Maybe so; but McLuhan's slogan on the point actually suggests otherwise. The sage of Toronto explained that the new and sexy information technologies of his era—transistor radios, color TVs, comic books—were themselves "the message." This amounted to a short-form way of saying (a stereotyped form, we might even say) that the new media were really, really important. And indeed, McLuhan struggles to improve, in the course of his famous essay, on a strategy of *repeating* his signature assertion: "the medium is the message"; "the 'message' of any medium or technology"; "'the medium is the massage'"; "the medium is socially the message"; "the message of the movie medium"; "Cubism … suddenly announced that *the medium is the message*"; "Before the electric speed and total field, it was not obvious that the medium is the message."[28] McLuhan is insisting, and *not* really explaining, that the new informational media matter. He does this precisely by asserting, over and over again, that they are "the message." *But this precisely assumes that a message, as such, is the very definition of mattering.* On McLuhan's hypoglycemic pronouncement, wanting to know *just means* asking "what is the message?" But that is an assumption *internal to*, and *not* analytic for, the information technology that it supposedly describes.

Instead, we might well ask—more than half a century after McLuhan—a more basic and, perhaps, antecedent question. *What is* a *message*? Evidently, and as we have already noted, it is a transmission, down a channel. OK; what gets transmitted? Evidently, a message. (What other way is there to say it?) But we asked, in the first place, what a message was. If we ask again, it is likely that we will be told, again, that it is a transmission, down a channel. And if we ask again about those terms—or about the "sender," or the "receiver," or the "noise" of the informational model—it is likely that we will just find our way back to the message-concept that sits at the center of this web of tautologies. Raisbeck again: "If the information source is a person talking, the message is what he says." Reza: "the source transmits … messages." The message-concept, in these formulations, is just the concept of some information passing through a communications system, defined in informational terms. And that is to say that the message-concept escapes definition, in information theory, because it *precedes* definition by that theory, and is presupposed by it. "We shall

find the roots of Shannon's broad and elegant theory of communication," writes John R. Pierce in another introductory account (recommended by the helpful Raisbeck), "in the simplified and seemingly easily intelligible phenomena of telegraphy."[29] A trip to the Western Union office: that is a message. It is a quasi-technical concept, pragmatically borrowed from a previous phase of communications technology, for what communications under the new and more strictly defined information technology is fundamentally taken to be. But the message-concept itself is a kind of black box: handled, not opened, in the new technological phase.

Thus a general communications system, as such, just is a general system of messages, for the purposes of information theory. Something that needs to get sent, taken to a place where it can be sent, getting duly sent, received, delivered, understood, liked or disliked, answered or not, remembered or forgotten, regretted, treasured, or what have you; the story of the message is the story of information. This means, of course, that the Shannon Diagram (SD) itself answers the question we have been asking. But it is an answer that will only tend to augment the question. If communications just is messages, then the SD, as a communications schematic, is by exactly that token a message-schematic. *This* is a message, the diagram says: transmission from a source to a receiver down a channel. And yet the SD also *contains* a message, as one of its labeled elements—and has to, in order to represent a system of the message. So if SD answers our question—"what is a message?"—we are still, and thereby, empowered to repeat it. We ask: "what's this 'message'?" The answer is SD. But that contains a message. So we ask: "What's this 'message'?" The answer is SD. But that contains a message. So we ask: "What's this 'message'?" The answer is SD. And so on, and so on. It would appear that the message-concept, far from *defining* communication, defers its definition, into an infinite regress. If *deconstruction* of communication results—if we are always trying to get to the point where communication can *begin*, under the message-concept—then that is precisely to the detriment of the latter.

We can find this point nicely amplified by glancing back at the early-modern period, long before "sending a message" down far-flung yet stable communicative lines was normative for anybody. To be sure, and as we have noted, the period has a considerable literature in signals and cryptography. But this is precisely a thrilling, almost esoteric, discourse. The period is *working out* the possibility of long-distance communication as a practice rich and strange, neither far removed, nor easily distinguished, from magic. Wilkins tells us that his *Mercury,* discussed above,

was inspired by the *Nuncius Inanimatus* ("inanimate messenger") of the late sixteenth-century clergyman Francis Godwin.[30] This pamphlet purports to describe a super-secret, super-powerful tool for remote communication, supposedly capable of covering almost any distance, penetrating almost any fortress, and even defeating time. Perhaps unsurprisingly, the pamphlet never actually explains what this device is; but does compare it to "pigeons, beacons, smoke signals, semaphore, and the brazen speaking tube Camden claimed to have found in the ruins of Hadrian's Wall."[31] The dark art of Godwin's *Nuncius* is not qualitatively *different* from these other period technologies of sending messages down a channel. Rather, it is like them, and they like it. And that is to say that technologies of the message, in the seventeenth century, are not taken as normative for what ordinarily happens whenever people communicate about anything with a view to understanding.

Wilkins's *Mercury* shares the early-modern signals bookshelf with (among other texts) the *Recueil de plusieurs machines militaires et feux artificiels pour la guerre et récréation [Compendium of military machines and artificial fires for war and pastime]* (1620), by François Thybourel and Jean Appier. Among their fireworks is "a method for writing to one's absent comrade by night; and making him understand one's meaning. And also to receive a reply from him, about anything he likes."[32] In short, a torch-code. Like Wilkins twenty years later (who is working in the same Trithemian tradition), Thybourel and Appier proceed via the alphabet, dividing it into groups—just two, in this case—and recommending a display of torches for group number and letter number.

They struggle, fascinatingly, to think through the logistics. You have to remember that "it's necessary to have written down exactly everything you want him [your absent comrade] to know, in order not to make a mistake with it."[33] Also, that "you'll need to be high up, in some prominent place, at the time of the said work."[34] And you will need "something in front of you, to be able to keep your flames hidden, and also to light them when it seems good to you, without being perceived by the one to whom you are writing."[35] At the same time, Thybourel and Appier express a wonderful naïveté about what kind of expression will pass easily through this informational packaging—this encoding. Wilkins's examples (like "HASTEN") are at least designed for concision, but Thybourel and Appier propose sending, much more copiously, "ATTEND, IN THREE DAYS THE KING WILL COME TO YOUR AID."[36] One letter at a time, that is going to mean a long night on the mountain—and that is

even before we get to the distant compadre's reply (or to the comma, which their code does not support at all)!

But the biggest problem with torch-code—as Thybourel and Appier sort of recognize, though Wilkins, it seems, does not—is precisely what makes it necessary. That is distance, absence, geographic isolation of the parties. In short, *what makes it a message*. The torch-code becomes useful (we are told) when, for example, you want to communicate with a confederate who is "within a besieged place, wherein I am neither able to come, nor send letters, nor a *messenger* (my italics)."[37] Precisely because one is, in a sense, *unable* to send a message, one has to turn, in another sense, to the sending of a message. Very paradoxically, the message as such has resistance or prevention as one of its own basic conditions. (In the Shannon diagram, this is of course canonized as "noise.") Sending a message is precisely a *re*-establishment of communications, where they have been broken off or impeded by exigent circumstances.

Moreover, the torch-code, in its awkwardness, as well as its pretension to two-way communication ("also to receive a reply from him, about anything he likes"), makes very clear that a message-transmission can only work if the prospective receiver is *ready* for it. In the current case, the receiver has to be watching, at the right time, in a high place, with his own paper, torches, hide, and so on. How can you make sure he's ready for the message? You'll have to send him a message: "get ready for a message." But how can you make sure he's ready for that message? You'll have to send him a message: "get ready for a message." But how can you make sure he's ready for that message? You'll have to send him a—well, the fact is, you can't. Thybourel and Appier recommend that, prior to commencing your main transmission, you should "hold up one of your lit torches, very high, so that your comrade will see you."[38] But this "get ready for a message" message, clearly, is nothing other than the first step in the regress we have just described.

The only way to control the regress is from *outside* the message-system. As Thybourel and Appier put it, you must arrange beforehand—that is, *before* anybody is besieged, before the *need* for a message as such becomes apparent and urgent—"that the one to whom you are writing has been instructed in this art; and at what time you are to convene together each night to do this work."[39] Prior agreement, *not* vitiated by distance or torches or channels or noise, is required and presupposed, if communication is actually to occur under the aegis of the message. It's a bit like the old family rule "if you're ever lost, stay where you are." Except this

is: "if you ever find yourself besieged, be ready every night at ten, in a high place, with all the following necessary accoutrements, to receive and respond to transmissions in the following secret torch code, which itself depends in part on our having made precisely this antecedent arrangement." A bit ridiculous, and not itself free of paralogistic overtones. But if we are to believe in the idea of a message, we actually have to believe that it is situated in, and guaranteed by, a larger communicative field that the message-concept itself does not fully describe or control.

The point here is not just that we can deconstruct the message-concept, or, à la Derrida, communication *tout court*. The point, rather, is that we encounter certain interesting problems in making sense of the communicative phenomenon *precisely insofar as we take the message-concept as sufficient or comprehensive for it*. Probably, the entire tradition of deconstruction can be understood as a ludic willingness to do exactly that—making it internal to, and *not* critical for, the informational concept that is so dominant for scientific modernity. But the point for current purposes is simply that it is not tautological, or empty, or trivial to point out that information theory canonizes the message-concept as its model of communication. This is indeed *a model*, among others, in the field of communications. And we can see this precisely because the message-concept becomes interestingly and even maddeningly *problematic*, if it taken as the whole of that field. Instead, we need to recognize that the message-concept is limited, non-inevitable, questionable; less than perfectly fit to the phenomenon that it supposedly describes and subsumes.

Now, a message, as schematized by Shannon, is (as we have said) a transmission down a channel, from a sender to a receiver. The message enters the schema, as it were, fully-formed; information theory eschews interest in where the message *comes from*. The *intention* of a message, that is, remains outside the system—and, by that token, drives it. For the goal of information is to reconstitute the sent message, as accurately as possible, at the point of its reception. To send a message is to *copy* it, matching the end to the beginning. In that regard, the intention that precedes and surrounds the system determines the latter as its vehicle. The message-system serves the message-intention by transporting it across the territory of communication, unharmed.

Indeed, what the message *goes through* is strictly irrelevant to it. The channel is instrumental—at best. This point has a nomothetic status in information theory: the Law of Diminishing Information (LDI) states that transmission can leave the amount of information in a message as it was, or

it can take some away, but "what it cannot do is add more information."[40] The informational pattern of relationships, no matter how many transformations it undergoes, must survive "intact throughout," or message-failure has occurred.[41] Another way of putting this, and a more canonical one, is that the only possible contribution of the channel, in transmission, is "noise": interference, distortion, vitiation, resistance. Controlling noise, via calculation of bandwidth and the statistical management of encoding, is more or less the starting-point of modern information theory. But there *is no informational value* to the noisy space in the middle of transmission. "The interim," Hamlet says, "is mine." A truly measly inheritance, from the informational perspective.[42]

Finally, the message-system is a vector, running one way. A message, as such, passes from sender to receiver. It never passes from receiver to sender—much less in any other direction. This of course does not mean that there are no responses to messages, but that responses can only be theorized as inverse reiterations of the system. Receivers become senders, senders receivers. Otherwise, the message-system simply terminates. It is a single lane, with a reversible flow.

All of which, perhaps, seems like saying little. Yet saying it the other way around seems like saying more. A system of the non-message—of communication situated outside the informational schematic—can be modeled with little difficulty. All we have to do is invert the informational sketch, turning it inside out. So, instead of one-way vectors, we can imagine them bilateral, or mutilateral. We can posit a communications field, not of senders or receivers, but of ill-defined and even amorphous *participants*. We can think about communicative space—"the channel"—not as neutral or negative, but as ineluctably productive. We can wonder how participant intentions, far from being transited across communication, become part of it; even get generated by it.

And clearly, there are such non-message-type communicative systems and spaces. Arguably, they are actually the *norm* of communication—what is there *before* utterance and understanding are made to run along the tracks of information. Whenever we *commit* our intentions to communicative space—risk them, expose them, rather than trying to protect and enforce them—we find this space arranged in a way that it is utterly alien to the Shannon model. Feedback loops run between interlocutors, their subject-matter, and innumerable other factors. Channels become positive contributors: through their light, their air, their situation in the wider world. Classrooms, courtrooms, churches, bedrooms: these

are some of the arenas that come immediately to mind, when we think of a communication in which people try to *find out* what they mean, precisely by an unrestricted engagement with the field of communication itself.

We have observed above that the concept of the message, in information theory, is both vacant and essential. Message means transmission, transmission means message; the repetition of these keywords is as telling as it is frustrating. Nonetheless, one way to give some content to the message-concept is by determining, as we have started to do, what it *is not*; defining and grasping it through its negative space. The opposite of the message-system cannot just be understood as message-failure, or a ludic non-communication, since these (obviously) assume the message-system as normative. ("I listen to noise" says a post-modernist bibliographer. It is hard to imagine a more total subservience to the rule of information.) Rather, messages are negated when we remember that communication is always, and by definition, with regard to somebody else, and to that extent always-already beyond our predetermination or control. Furthermore, it is always, as Hans-Georg Gadamer reminded us, with regard to some subject-matter, which is by definition *placed in the middle* of the communication—the transmission, which bombards us from all sides with useful and even crucial inputs.[43] We are inside communication, but outside the system of the message, if we receive from our receivers, send to our senders, and generally lose ourselves in the transmissive nexus that distorts in order to teach. The opposite of a message, in a word, is dialogue. The latter can be theorized as the broader communicative field within which the message functions as a highly specialized term.

The Units of Information

But we digress somewhat. Let us stay, for the moment, on-message.

Reducing communications to messages is only the first step of information theory. The next step, and the much more important one, is an articulation of the whole manifold of messages, for the pragmatic purposes (in the first place) of communications engineering. Grant that the status of the message, as such, is always the same. The much more important question is: what makes any given message *different* from another?

Not, according to information theory, what it is about—its content or meaning or (the semantic term) extension. We can call these qualitative considerations, having to do with *what kind* a given message is. Information

theory, however, has to do with *how much* or—more accurately—*how many* a given message is. Information is quantitative. On precisely that basis, and uniquely so, communications can be (in Shannon's phrase) *mathematized*: made countable, computable, and thereby rendered tractable as a strictly "engineering problem."[44] Once it is processed through the logic gates of Boolean algebra, this quantized information allows a representation, and an automation, of more or less everything communicable—arguments, opinions, judgments, and all that messy jazz.[45] But the quantification itself is the key, indeed essential, step toward that goal. Information technology thereby offers a fulfillment (real, or imagined) to Leibniz's dream of reducing all discourse to calculation.

What gets quantified, in information theory, is basically probability. A given message is differentiated from others based on *how many other messages* that message could realistically have been. In the canonical formulation, a message is quantized by its originating *set of possible messages*. The larger the set, the more information is "produced" or "generated" when a message is selected from within that set; the more information is "contained" or "encoded," "in" or "by" the selected message. I have put scare quotes around those metaphors because that is what they are, and it is all too easy to let them run away with us. Nonetheless, there is no question that the quantitative model of information accords with a fundamental intuition about richness and complexity, vis-à-vis both communication and cognition.

This is the intuition of the "possibility-space." If there are three doors on a game show, and I choose the one with the new car behind it, rather than the donkey or the blender, that is a noticeably surprising, and interesting, result. But if there are 30,000 doors on that game show, and I choose the one with the car behind it, rather than the monkey or the blender or the bus pass or the card table or the goldfish bowl or … that is a heck of a lot more surprising, and interesting.[46] And so it is if we wake up in the morning to find an unfamiliar person beside us; or if, at breakfast, the coffee-maker makes an unusual noise; or if, when we go out, a flock of seagulls flies by in perfect formation. Our whole experience, our whole engagement with the world, is determined and guided by our tendency to notice *where things are different*. Richer possibility-space, more ways things can turn out, simply and obviously and fundamentally lends *more*—interest, significance, momentousness, whatever—to the way they actually do turn out. Information is the mathematics of this more.

Shannon's example, in his seminal discussion of 1949, is a selection of a number from the "ten stable places" of "a digit wheel on a desk computing machine."[47] (A lovely moment of what computing historians call "tape porn.") How interesting is it—how surprising, how worthy of our attention—to find out that one of the ten has been selected, rather than any of the others? Well, noticeably interesting; ten percent, after all, is not very good odds. What about a larger set of possible messages—the alphabet, say? Obviously, the selection of one digit out of 26 (of a modern alphabet) will be yet more interesting, surprising, and so on, than the selection of one out of ten. Richer possibility-space renders each outcome unlikelier, and therefore "more" compelling for our attention. If we follow the mathematician's trick of extreme expansion, we can write this point very large. The number of Chinese *zì*, in the largest dictionaries, is about 50,000. For one specific character to be selected from that total is for a vast number to go unselected—and thus the selection is very interesting indeed. A lot more than in the case of the alphabet; which is still a lot more than in the case of Shannon's desktop decad.

There are actually two points here. The first is that information, as quantitative, is also and by that token relative. There is no absolute or *a priori* measure of information, any more than there is any absolute number of digits for alphanumeric systems. The second point is that the *units* of information—which information theory needs, for its mathematical purposes—are determined precisely by the sets of possible messages that ground its quantitative insight. That is to say, informational units, or digits, are drawn in the first place from the very set logic that allows us to begin talking informationally in the first place. How can we talk, without begging any questions, about the "amount" of information that is generated, and so on, when a number is selected from the ten places of the desktop "digit wheel"? Easy: we can say, with Shannon, that that is exactly one "decimal digit" of information. Let's call that a decit, for short. Selection of one letter from the 26 of the alphabet, by the same logic, will produce exactly one alphabetic digit of information. Let us call that an alphit. Finally, selection of one *zì* from all the 50,000 will produce one *zì*-digit of information; and perhaps we will have to call that, with apologies, a *zì*t.

So far, we have an achievement, and a problem. The achievement is that we have found a compelling way to render communication—as a very stuff, or phenomenon—quantifiable. The possibility-space insight is both pragmatic and profound, reaching from the most ordinary aspects of our lived experience up to (as we will see) the rarefied heights of theoretical

physics. The problem, however, is that we have not yet found a way to render this quantified information *countable*. Without that next step, we will struggle to render it computable. To count anything, we need to know what we are counting; what the *units* are. But that is what we do not yet know, in our introductory account of information theory.

We see that a decit contains "less" information than an alphit, an alphit than a *zìt* (and so on). But we cannot yet specify *how much* less. For that, we need a common informational denominator—a standard, or currency—allowing us to give common and computable values to decits and alphits and *zìt*s; and all other possible digits, based on all possible sets of possible messages. Indeed, without a common informational digit, the set of informational digits will (presumably) be as large as the set of whole numbers. For that will be the set of sets of possible messages; and every one of those sets will generate an informational digit; and every one of those digits will be as valid as every other. Conversion between them, finally, will be both endless and meaningless, since every digit will have to express its value in terms of another.

So, for example: How much information is in an alphit? What is its informational *value*? It will not do just to answer "1 alphit," because that is the question. Perhaps we could, with some mathematical smarts, convert our alphit into decits. We could then answer "an alphit is N decits." But this does not help, because we do not actually know the informational value of a decit, either. And if we express it by converting it into alphits, we are just chasing our tails.

Information theory solves this problem, at the very beginning, by determining its characteristic or standard digit in terms of the theory itself. Information, by definition, is selection from a set; therefore, the base unit of information must follow from the *base set of selection as such*. This, fairly obviously, is a set of exactly and only *two* possible messages: one way or the other, yes or no, on or off, 1 or 0. The binary digit, or bit, becomes the informational unit.[48] Shannon invokes it on the very first page of his famous paper, and uses it to explain how much information there is in a decimal digit: three and a third bits.[49] True, Shannon's immediate point is to show how easy it will be to convert between different logarithmic bases for information. But as we have just seen, the conversion will be meaningless or impossible if there is no unit in which to express it; and the binary digit is the most basic possible expression of the fundamental informational insight into possibility-space. It is sometimes thought that the primacy of the bit, in modern information theory, is just a function of

the basic (very basic) physical structure of computers. But it is exactly the other way around: the very basic physical structure of computers is a function of the primacy of the bit in modern information theory.

Each bit has the structure of a switch. It is a single opposed pair of settings, only one of which can be selected at a time. The selection constitutes exactly one bit of information. Turning that around, we see that a one-bit system (one switch) can handle messages selected from within sets of two. (For example, a baseball game was played/not played.) A two-bit system (two switches) can handle messages selected from within sets of four. (For example, a baseball game was played/not played; and a favorite player did/did not bat.) A three-bit system, from within sets of eight. And so on. Each time we add a bit, a switch, to the system, we double the set of potential messages from within which selected messages can be handled by that system. By the time we get to an eight-bit system—conventionally, one byte—we already have the capacity to transmit messages selected from within sets of 256 ($=2^8$) possible messages.[50] This is the basis for all the quantifications of information—mega, giga, terabytes, and so on—with which we are now all so wearily familiar. There can be no counting without units to count. For modern information theory and technology, however transcendent become its structures, the fundamental unit remains the bit.

Computer chips are nothing other than very rich arrays of real, physical bits (switches). They are infinitesimally fine silicon embodiments of binary information theory. Arranged and rearranged via Boolean algebra, the almost unimaginably tiny and almost unbearably numerous bits on the chip support processing of whatever can be reduced to appropriately huge sets of yes/no, on/off, 0/1 choices. The amazing abilities of modern informational systems and devices follow from hypertrophic expansion of the math we have described. Each gigabyte of capacity multiplies our eight-bit system by approximately one billion times. An extraordinary technical achievement. Yet all it means—if one can dare to put it that way—is that we have on the chip a system amounting to approximately eight billion switches.

This fundamental machine-level simplicity of computers—arrays of switches, each corresponding to one bit—is also how they manage to encode and represent almost any message. Let us suppose that we want some vanishingly tiny part of our computer's capacity to encode a single letter: lower-case letter "b." We can begin, as informational engineers, by assigning our letter a number, more or less arbitrarily. In the American Standard Codebook for Information Interchange (ASCII), lower-case

letter "b" is numbered 98 (again, more or less arbitrarily). Using that numeration, all we then have to do is encode 98 on some of our computer's switches.

We can turn to binary numeration to complete this task, because binary is a way of representing any number *precisely as a sequence of switches.* Suppose that you are lining up switches, right to left. Each switch yields a 1 if it is on; a 0 if it is off. (Or we can think about it the other way around; for current purposes, it makes no difference.) Let the rightmost switch represent groups of one (2^0). The next to the left, groups of two (2^1). The next to the left, groups of four (2^2). And so on. To add up to 98, no more and no less, we will need to have—and now we are adding left to right—1 group of 64 (2^6); 1 of 32 (2^5); 0 of 16 (2^4); 0 of 8 (2^3); 0 of 4 (2^2); 1 of 2 (2^1); and 0 of 1 (2^0). Thus, from left to right: 1100010. That sequence, given to the computer by electrical pulses that set seven of its infinitesimal switches, encodes 98, ergo lower-case letter "b" under ASCII. When we want to encode something else, we just set those very same switches anew.[51]

Of course, the ever-more sophisticated pile of code upon code means that no informational engineer (no programmer) codes directly into the binary or machine level anymore, or even needs to think about it that way. Interpretation and compilation programs, themselves stacked up and inter-involved, translate whatever coding "language" is being used into the universal "machine language." (Pressure of information on the concept of "language" is an issue to which we will return). It remains the case, however, that every single informational device *works* in binary—that is, by throwing switches. That, at the machine level, is the technical reality of what information *is.* This is the technology that is generated by information theory, embodying it and reinforcing it by the wondrous capabilities that become possible when information is scaled up to massive levels.

We are all familiar, whether or not we understand any of these matters, with the ones and zeroes that are "in" the computer. Strings of binaryish numeration have stood for information technology in popular culture for many years—already cliché when Neo, in *The Matrix* (1999), attained enough enlightenment to "see" the 1101011100101s of his kung-fu digital G-Men. Yet this picture, while helpful to an extent, is also misleading. If we could look down to the machine level of our informational devices—these landscapes of alienation, so miniscule, so vast—we would not see any 1s or 0s. That representation of the machine code is indeed a representation: the first "translation" of information as such, provided by

interpretation programs for our convenience. Rather, if we could wander the world of the computer chip, we would see pulses of electricity illuminating, or not illuminating, one side or the other of two-place digital toggles (bits). To be sure, we would need to see a lot more, starting with those Boolean logic gates, if we were really to begin to understand the functioning of this landscape. But our fundamental starting-place, and the primary phenomenon we would need to pursue, would be that flickering transmission of information in its bits: one side, then the other; then the same, then the other; then the other, then the same, and so on and so on.

If, for example, we could be nano-scale witnesses to the encoding of our lower-case letter "b" (number 98), we wouldn't see "1100010," because that's just a translation. Not ON ON OFF OFF OFF ON OFF, either, because that's a translation, too. Perhaps we get closer to the informational landscape if we try to keep in mind that we would be looking, effectively, at switches: ON/~~OFF~~ ON/~~OFF ON~~/OFF ~~ON~~/OFF ~~ON~~/OFF ON/~~OFF ON~~/OFF. But this, clearly, is still very distant from anything we would see on the chip. Maybe, instead, something like:

*|× *|× ×|* ×|* ×|* *|× ×|*

Where the asterisks are the selected side of the bits, the "x"s unselected. But even this is misleading, both more and less than we would see. For it compares "offs" to "ons," "ons" to "offs." But after all, only on is on; and off is just off. So perhaps, instead, it is valid to imagine ourselves seeing something like:

* * *

Information, at the machine level, is a kind of torch-code. This is what gets transmitted, in its trillions, across our infinitesimal and innumerable silicon valleys. Wilkins, as we have seen, is torn in the *Mercury* between the claims of simplicity and the claims of complexity: which vector will lead to a code that can realistically manage the full richness of discourse? What Wilkins *almost* sees, but not quite, is that the way to full complexity is through full simplicity. By breaking things rigorously and all the way down to the binary, one attains a digit that can be used for the purposes of any communicative equation whatsoever. Wilkins's two-torch code does not really offer a binary, but a ternary, digit: selection from the set "two torch, one torch, no torch." The final reduction, to the bit as such, is the way toward information as such.

Information and Language

But let us be careful. The torch-codes of the seventeenth century may look informationey; but that does not necessarily mean they are informational. Examining these historical materials more closely may allow us to draw some fine, but strong, lines of demarcation around the communicative matrix of the infosphere.

As we recall, Wilkins arrives at his quasi-binary code by minimizing its *spatial* display. No more side-by-side displays of torch-sets; for that matter, almost no side-by-side torches—two at the most. Instead, Wilkins extends his code *temporally*. One display at a time; and all displays lined up, exclusively, *in* time. Here, again, is "H" in the two-torch code:

*, *, **, **, **

where the commas indicate sequence, rather than arrangement. To make it even clearer, let us write out the transmission as we might actually receive it. Peering through a spyglass, the first display we see is

*

Remember that we are using the torches as equivalent to Wilkins's two-letter code, a or b. One torch is "a." Noted. Then

*

Another "a." Then

**

"b." Then

**

"b." Then

**

"b." With five displays, the first transmission is complete. It is aabbb: decoded, "H." We write that down, and prepare ourselves to receive the next five displays. Each will be a temporal series, and the whole will be a series of such series.

To adopt a term from semiotics, the two-torch code is *syntagmatic*. That means it occurs in a sequence (a syntagma), proceeding from term to term, in a certain order (syntax). Only one term gets processed—transmitted,

received, understood—at a time. If the correct syntax is not observed, the terms cannot be processed correctly; and processing the terms just *is* observing syntax. The two-torch code has the simplest possible syntax: first, next, next, next … end. Syntagmata need not be as simple as this. But however they are sequenced, in whatever order, ordered sequence in time is an essential part of what defines them.

The two-torch code shares its syntagmatic form with languages—that is, human or (in the modern sense) "natural" languages. Words are syntagmatic, and participate in syntagmata. That is to say, (1) a word is a certain ordered sequence (syntagma) of sub-lexical elements—phonemes, letters, or what have you. And (2) words are in turn entered into larger ordered sequences—phrases, sentences, texts—by way of doing their communicative work. You have to make your way through the textual sequence, in the correct order, to understand it; just as you do to understand each word within it.

Syntagmata have *parts*. An observation as ordinary as it is strange. (Parts have been bugging philosophers for as long as there have been any.) On the one hand, the part is not the whole. On the other hand, the part sort of *is* the whole. For if we have the part, we may find that we are already in a position to determine the whole. So, for example, if we have received " *, *, ** " in the two-torch code, we have not yet received transmission of any letter. "*, *, **" means exactly nothing. At the same time, and nonetheless, it means a significant narrowing of the possibilities for the letter that is being transmitted. After three displays, just four letters remain possible in Wilkins's code. After four displays, just two. At some point, *prior* to completion of the transmission, we are going to be able to hypothesize, with some accuracy, what it is going to be. (A consequence of what is traditionally called the hermeneutic circle.) And the more transmissions we complete, the better placed we will be to complete further or more complex transmissions from their parts.

Thus it is meaningful to speak of a *partial* syntagma. This will not *quite* be the syntagma; but it will not quite *not* be the syntagma, either. (Compare: it not quite not be the syntagma.) This paradoxical state of affairs allow us to be (inter alia) *on the way* toward completing a syntagma; in the middle of it; almost done it. Conversely, if we cannot be under any such circumstance—if we cannot find ourselves making our way through mere parts, that add up to a mere whole—we cannot say that we are dealing with a syntagma. What is absolutely crucial is that the incomplete syntagma *not be the same kind of thing* as the completed one. This is what allows the extremely unstable and yet extremely productive situation of

manifestly incomplete transmission. Here (a) we do not yet have the syntagma and yet (b) we may be able to find that, after all, we do and (c) this is precisely because (and very paradoxically) we know that we do not yet have the syntagma.

And what of machine-level information (in the strict sense)? Consider, again, the binary notation for 98–1100010—ASCII letter "b"—in the vanishingly tiny bits of an informational device. Suppose that we start with all the seven bits that we will need, for 98, set to 0:

0 0 0 0 0 0 0

Clearly, we have not yet written "b." Neither have we started to write it. All we have is nothing. And that doesn't encode anything.

Now we set the second bit (working from right to left) to 1:

0 0 0 0 0 1 0

That gives us the binary notation for 2. Now we have something. What?

Not 98, that's for sure. *Nor any* part *of 98*. True, 2 is smaller than 98, and is one of its factors. But that is utterly different from its being a partial transmission of 98. 2 is the *same kind of thing* that 98 itself is: a whole number, and a number that functions, on its own, *as* a whole. In ASCII (if we are using that), 2 encodes "STX [start of text]." It would be utterly meaningless to assert that "STX" is part of "b." Nobody gets part-marks, on a test, for writing 2, where the answer to the equation was supposed to be 98. Nobody can infer 1100010 from 0000010.

Perhaps it will get better as we go along. For 98, we need to leave the third through fifth bits on 0—still 2— but then we set the sixth bit to 1. This gives 0 1 0 0 0 1 0. In terms of our binary encoding, we are almost there. Just one digit to go. But it makes no difference. We still do not have, in any meaningful way, a partial transmission of 98. What we have, instead, is the binary notation for 34. Smaller than 98; an even number, like 98; but an *entirely different* number from 98. And again—just like 2—a number in its own right, a whole in its own right, a transmission in its own right. In ASCII, 34 means "[quotation mark]." That is in no sense a partial transmission of lower-case b; and neither is 0100010 a partial transmission of 1100010.

The point here is that in the binary code of information, at the fundamental machine level on which informational devices depend, there are no partial transmissions. There are only whole transmissions, and non-transmissions. For a partial notation, willy-nilly, is just another whole notation. A "partial" transmission is just another whole transmission. No binary

encoding is part of, or on the way toward, or an incomplete version of, any other. Rather, the encodings that we transit, on the way to our intended encoding, have *nothing to do with it* and are no part of it. For they are instead their own complete and meaningful encodings. Until we have set all of 1100010, we no more have a part of 98 than we have 98. The proof is that we always have another number, and another transmission. Those numbers we have fully, wholly, and without reserve; and when we encode 98, we have that fully, wholly, and without reserve.

To be sure, the sequences into which digital encodings are entered—making up words, statements, or what have you—may themselves be syntagmatic. And so is the *process* of the binary encoding of information. We are making our way through bits, in a certain order, setting them 1 or 0, on our way toward 1100010. But the information, *as encoded*, is another story. For 1100010 to mean 98, it need not, and *cannot*, be taken in its sequence. For if it is so taken, it will *not mean nothing*. Rather, it will mean something *other* than 98, at every stage, right up until the last bit has been set. 1100010 can mean 98 only on the basis of its final and total value—where it comes out, what it all adds up to. This value, this result for the notation, and nothing else, is the machine information, as encoded. Until it is there, it is not there at all; and when it is there, it is there altogether. No parts; only wholes. No sequence; only result.

At the most basic level, then—no doubt almost stupefyingly basic, from an engineer's perspective—information is not syntagmatic. Instead it is *synoptic*: seen together (more or less), as an overall or unified *Gestalt*; an impression, a structure, a multilateral and synchronic unity. Oddly enough, the idea of the synoptic originates in the canonical form of the New Testament, where the first three Gospels (Matthew, Mark, and Luke) offer differing traditions about the same stories. The reader, far from choosing between them, is supposed to superimpose them—as though writing a meta-text in the mind. The difficulty of modeling this procedure (a kind of cognitive yoga) perhaps speaks to the normative quality of syntagmata for our understanding.

Nonetheless, we encounter synopticity in many areas and in many ways: whenever we click the shutter on a camera, for example, or glance at a graph showing the current state of the market, or ponder the pattern of leaves in the bottom of a tea cup. Data-visualization, in general, is synoptic—appropriately, since it is an advanced product of information technology itself. And so, for that matter, is any sudden or tacit pattern recognition.

We noted above that Wilkins's two-torch code, being syntagmatic, works to that extent like a language. We are now in a position to note

that machine-level information, being synoptic, does not. Information deploys itself in exactly the opposite way from the one favored by Wilkins. He extends his two-torch code temporally, eschewing spatial display. Informational code deploys itself spatially, eschewing temporal display. In this, again, information works in a way that is fundamentally, and radically, non-linguistic.

It is interesting to note that we could quite easily turn Wilkins's two-torch code into an explicit language—that is, something lingual, oral. All we would have to do is turn its displays of double torches into doubled displays: that is, "long" displays, the single ones becoming "short." (Obviously, this gives us a version of Morse Code.) Thus:

—, —, ———, ———, ———: "H." We now have a transmission that can be carried even by a single horn, or pipe, or voice:

La. La. Laaaa. Laaaa. Laaaa.

"H." To transmit that, and the rest of "HASTEN," we just need a loud enough sound, and enough time to make it in.

What about 1100010? Can we sing, or speak, or otherwise sound that? Clearly, we can say "one one oh oh oh one oh," or pipe "LOUD LOUD quiet quiet quiet LOUD quiet," or whatever. But equally clearly, this is not oralizing anything that is set or manifested inside any informational device. For to auralize the sequence, by whatever means, is precisely to treat it *as* a sequence—a syntagma. But this, we have just said, is exactly what information, in the strictest sense, is *not*.

The closest we have been able to get to saying what is inside the device, for 1100010, is something like:

* * *

The bits displayed here, as we have discussed, are not really in temporal sequence—not really a syntagma. Rather, they are synoptic, a single display. They must be assessed together, in order to mean what they mean. Vocalizing this display, accordingly, would entail singing three notes at once. Worse, it would entail singing three of *the same* notes at once—even while differentiating them. For a bit is a bit, an ON an ON. What differentiates them is just their position, vis-à-vis each other, and vis-à-vis the bits set OFF. These, too, we would have to vocalize—not just sounding silence, but, again, four discrete silences, completely identical and yet completely different. This side Zen Buddhism, it is impossible to imagine any such vocalization.

Wilkins's two-torch code can be understood as a way to write a word. The code's linguistically normative nature can then be reinforced by re-converting its writing into orality. All this is consequent upon, and leaves untouched, the code's syntagmatic structure.

The binary code of machine-level information is entirely different. Its synoptic structure must be destroyed—syntagmatically converted—if it is to be orally deployed. And that is to say that what can be deployed orally is not binary code at all, but the first *translation* thereof; into an oral syntagma that is the first step on the ladder of language.

The late great literary scholar Walter Ong, it is true, was fond of describing the Information Age as bringing with it a "secondary orality."[52] In that way, however, Ong was trying to talk about the capacity of late twentieth-century information technologies (radio, telephone, television) to displace communication by *text*—that is, written words. He was making no claim whatever about the fundamental nature or structure of information as machine code. Moreover, Ong would have been the first to point out that writing and reading follow a syntagmatic structure, mimicking in that regard the structure of oral discourse. Talking on the telephone, as opposed to writing/reading a letter, returns us to communication via the mouth and the ear, after an interval of hand and eye. But it does not return us to communication via the snytagma; because that we never left.

Ong's classic work is worth considering for another moment here because the large story he wants to tell, when he surveys the European textual world from the Middle Ages until the end of the Renaissance, has to do with a large-scale transition from an oral-temporal to a visual-spatial culture. This is a story that begins with writing, swells with print, and concludes with diagrammatic schemes for the representation of knowledge.[53] The story is compelling, and highly relevant (as we will see) to consideration of Wilkins's *Essay*. Yet Ong never quite *names* his protagonist—the force or power or tendency or stuff that is immanent in the cultural and intellectual transitions he describes. When a culture becomes visual-spatial, *what* is it becoming? What is at stake, what is emerging? To answer that question, we need to return to the obsessions of Ong's student—McLuhan—despite the latter's tendency toward intellectual and verbal incontinence:

> Is it not evident that the moment that sequence yields to the simultaneous, one is in the world of the structure and of configuration? Is that not what has happened in physics as in painting, poetry, and in communication? … People used to ask what a painting was *about*. Yet they never thought to ask

> what a melody was about, nor what a house or a dress was about. In such matters, people retained some sense of the whole pattern, of form and function as a unity.[54]

What is emerging in a visual-spatial culture is a capacity for synopticity that is alien to the syntagmatic structure of language. What is emerging, in a word, is information. And while a Ramistic scheme (for example) is not, in a strict sense, informational (the sense, that is, of the current discussion), it nonetheless shares its synopticity with information.

Now, if information, at a maximally basic level, is fundamentally alienated from orality, that has significant consequences for how we understand the communicative and intellectual matrix that fills and animates the infosphere. Orality, traditionally, has been understood as essential to language. Orality also binds language up, as St. Augustine canonically recognized, with temporality. For it is precisely in time that orality occurs; and the passing of the utterance, wafting it "away into the past,"[55] mirrors and manifests the eternal paradox of the new. Thus the syntagma, *as* syntagma, is most purely and naturally experienced in orality. Text on the page offers a synoptic container, a storage mechanism, within which to piece together its syntagmata. But words in the ear, even a single word in the ear, is *never* actually there as a whole. In exactly this way, again, the oral exemplifies the syntagmatic structure that linguistic discourse essentially is.

This ancient and interlocking set of assumptions, still very strong in the seventeenth century, projects writing as a secondary linguistic formation. Written words, marks on a *spatial* substratum, offer a quasi-synoptic analog of the oral-temporal syntagma. As such, writing offers to language certain familiar gains of stability and longevity—which, depend, however, precisely on their contrast with the nature of the spoken word. There can be no such thing, according this traditional phenomenology, as a writing that comes *first,* before the normative orality—much less a writing that comes on its own.

But that is exactly what information, as machine code, is. It is a writing that precedes, and precludes, its own oralization. This is bound up with its synoptic, rather than syntagmatic, structure; which, in turn, is bound up with its spatial, rather than temporal, deployment. Wilkins's two-torch code, about which we have now almost certainly said more than enough, is actually alien to information on each of these points. And so, as we said at the beginning of this section, what looks informationey is not necessarily informational.

Much more importantly: information is alien to Wilkins's 1641 code *precisely insofar as the latter mimics languages.* A special writing, but still

a secondary writing, of a syntagma that can by definition be oralized in time: that is part of what Wilkins offers us in the *Mercury*. Binary code, far less mercurially, offers a synopsis extended in space, beyond orality, and without sequence. It is a primary writing, that can only ever be oralized through a secondary analog that destroys the writing as such.

Physics and Philosophy

It remains to consider an aspect of information theory that is perhaps its most challenging. This involves the relationship between information and (for lack of a better word) the universe. As we have discussed, the modern idea of information originates in a pragmatic insight about probability and communications. The larger the set of possible messages from which a given message is to be selected, the more challenging for communications is a message selected from within that set; the richer, informationally, that message is; the more "bandwidth" is required for a system capable of transmitting that message, lest it be vitiated by "noise." Everything comes down to *numbers of differences*—how many ways there are for things to be, in a given case. According to information theory, this is what is worth communicating; and this is what, in any given case, *gets* communicated.

What follows from this reduction is a very remarkable expansion. As physicists recognized very quickly, with regard to Shannon's work, the possibility-space insight correlates neatly with the second law of thermodynamics. The second law (typically for nomothetic constructions in science) has many formulations, but basically states that things fall apart. The universe passes from more-ordered to less-ordered states: entropy, the measure of disorder, inevitably increases. To be sure, local and temporary effects (the evolution of life, e.g.), may appear to withstand or even counter the thermodynamic trend. But these are only eddies in the course of an entropic river that runs, ineluctably, to an undifferentiated sea. As things fall apart—as entropy increases—there are fewer and fewer different ways for things to be. More and more things are just entropic: broken, disordered, finished. The end of the universe (if, indeed, there is one) is thermodynamic rubble, or "heat death."[56]

Imagine dropping an ice cube into a glass of water. Initially, order is high, and entropy low: water, over and against ice. But over time, entropy increases, order decreases, and the differences of the system blur—along with whatever differentiates it from its various surrounding systems. After a while, there's just cold water in the glass. Then, just lukewarm water. Eventually (through evaporation) no water. Ultimately (through multiple

processes of decay) no glass. Temperature differentials, while they obtain, allow work to be done, such as the melting of an ice cube. But the work itself eliminates the differential, and terminates the productivity of the system. In the end, entropy will reduce the universe to a stale, static, and unproductive puddle of lukewarm sameness. No work will be done—no work will be doable—because there will be no possible differences, or different possibilities. But in the meantime, possibility-space—not yet destroyed by entropy—is pretty much what the universe is.

Information is possibility-space; the universe is possibility-space. It is only a short step from there to the view that information is the universe. "Information is physical," said the physicist Rolf Landauer, thereby converting the counting of bits from an engineering technique to a cosmological agenda.[57] Degrees of entropy, productive differences, present or absent, provide a measure of informational systems—and vice versa. The mathematics of information maps, willy-nilly, a universal ontology. Information theory, via this confluence with theoretical physics, is not just a way for engineers and programmers to compute bandwidth, cut code, and so on. Rather, it is a way to show how these and other operations of communications science are dealing with a stuff—information—that is fundamental to the nature, shape, and destination of existence. Information, as Douglas Adams might have put it, is life, the universe, and everything. It is—in Wiener's formulation—"negative entropy"[58]: what is *there*, as long as there is anything worth being there *for*.

Admittedly, and somewhat maddeningly, there is an alternative, and directly opposed, way of talking about the relationship between information and entropy.[59] (Thus this fundamental and final question turns out to be—a binary digit.) For some commentators, including Floridi, entropy and information vary *directly*. Indeed, they are practically synonymous. According to legend, the physicist John von Neumann urged Shannon just to call his new "information" "entropy," and not only because the impenetrability of the latter concept would always be an advantage in arguments. Rather, von Neumann perceived in information theory a mathematical *redescription* of the second law. And indeed, the information–entropy nexus could be used to articulate anew Robert Maxwell's canonical nineteenth-century work on engines and allegedly counter-entropic "demons."[60] On von Neumann's kind of view, the law of entropy points toward an informational maximum: a state of affairs in which all possible messages have been *sent*. Nothing more to be said—that's the end of the universe. And that, to be sure, makes some sense.

But not as much as one might like. After all, the entropic decay of the universe would be recognizable as such (if we can imagine ourselves as its witnesses) precisely by the *absence of messages to send*: ultimate reduction of its variant possibility-space. Lukewarm puddle, not ice-in-glass, is how the universe ends. Suppose that, following a wild party, one finds lying around nothing but empties and regrets. Is this a festive maximum? In a sense; but in no very straightforward sense. Shannon himself characterized the disagreement over the information–entropy relationship as involving a "mathematical pun"; you could see it as positive or negative, depending on your intellectual humor.[61] People who understand the math may prefer the way that is funnier (information and entropy as varying directly). But this is to some extent a matter of taste, since other mathematicians and physicists prefer the more straightforward version (information and entropy as varying inversely). The rest of us, therefore, are not wrong if we choose to keep a straight face in our attempt to understand these difficult issues. We have a valid, if basic, grasp of the relevant physical question if we understand information and entropy as varying inversely. More information, less entropy, and vice versa. Information is what recedes and decays as the tide of entropy advances. "If the world were completely chaotic," writes Floridi, "there would be no information to process."[62]

The interesting corollary is that, while it holds back that tide, information is just what is there. Not only *can* the universe be mapped informationally; it more or less has to be. Yes/no choices, binary digits, generate and sustain everything around us. Information is physical. Maybe the universe just is "a big quantum computer" and "our reality… is ultimately made up of information."[63] Maybe "the stuff of the world is really, at bottom, information"; "the irreducible seed from which everything else grows."[64] All of these ideas are summed up in the physicist John Wheeler's well-known slogan "it from bit": that is, "it"—life, the universe and everything—arises from the "bit"—the binary digit, discrete yes or no choices, the technical unit of information. Ours is "a world self-synthesized … the notes struck out on a piano by the observer-participants of all places and all times, bits though they are, in and by themselves constitute the great wide world of space and time and things."[65] Thus it is not merely the case, on arguments of this kind, that information encodes the universe. It also the case that this code turns out to be what the universe, at its final reduction, is.

The implications here are not only cosmological. They are also epistemological. For among information-processing devices can be reckoned, arguably, our brains. *Knowing*, according to Floridi and some other

philosophers, is nothing other than our receiving, grasping, and managing of information. But if information just is the universe—and our minds just know information—does it not follow that our minds just know the universe? This would appear to resolve, at a stroke, the perennial challenge posed by epistemological skepticism. "When a metal bar expands," writes Adams, à la Floridi, "its expansion carries information about an increase in the local ambient temperature." If an observer gains that information from the expansion, it can be considered "*the same* information," both in the bar and in the observer. "Naturalizing" information in this way means "naturalizing the mind and naturalizing semantics." Information is real; our knowing is informational. Ergo, our knowing is real. Skepticism tossed.[66]

Or maybe not. For one thing, talking about information in this way seems to run a considerable risk of reification: that is, the questionable reduction of a usefully abstract concept into a naïvely substantial stuff or thing. If "the same" information is "in" Adams's metal bar as is "in" the mind of its observer, has some part or portion of the former penetrated the latter? The question would not arise if Adams talked about the same *amount*, or even *configuration*, of information; but he does not. The physicist Hans Christian von Baeyer, in an accessible discussion, describes information as "the strange, compressible stuff that flows out of a tangible object … and, after a complex series of transformations … lodges in the conscious brain."[67] The strong suggestion here seems actually to be that we are receiving information-beams—transmissions of a *stuff*—from the objects of our perceptions. If so, it would seem that we are in danger of accepting a cognitive-psychological model that has seemed unacceptable since the Enlightenment. As we will discuss in Chap. 4 of this book, medieval scholasticism, persistent well into the seventeenth century, literally held that objects bombard our senses with streams of infinitesimal *species*: real, though non-material, tokens of themselves. That is how we, supposedly, perceive them; that is what perception *is*. From our perspective, this is a pretty strange picture, which, presumably, would be difficult to bring back into good scientific standing. But that would seem to be the kind of task that looms in loose talk about information as a perceptual substance.

For another thing, naturalizing information aligns it with knowledge. But that entails special demands, if not special pleading, with regard to the former. Knowledge, argues Adams (following Dretske and others), requires truth. Information requires it also, if it is to be theorized as emergent knowledge.[68] Misinformation, on this kind of view, is not actually information at all. This argument, which has antecedents in debates

within information theory going back to the late 1940s, has more recently been formalized by Floridi and others as the Veridicality Thesis (VT).[69] Information, according to VT, is *only ever true*. There is no such thing as false information; only information and non-information (although for the latter, somewhat aggravatingly, Floridi sometimes indeed says "misinformation"). If, on occasion, we speak otherwise—complaining to bookies or aides or spouses, perhaps, that their information was false—we are simply falling victim to (that old philosophical villain) "habits of language."[70]

That VT entails a special stipulation of "information" is not necessarily problematic. As we have seen, the whole idea and discourse of information theory, in the post-war period, began with just such a technical redefinition. What is problematic, however, is that VT involves a *redefinition of that redefinition*. For in communications science, where modern "information" is first of all at home, it is very clear that there *is* such a thing as false information. It makes no difference to the bits or circuits or logic gates of any informational device if the message it processes makes a true or false reference to the world. Such qualitative considerations, in Shannon's famous and seminal phrase, are "irrelevant to the engineering problem" of information theory.

To be sure, Floridi dislikes that canonical designation. He is explicit that his Philosophy of Information (PI) is *not* primarily about Shannon-type information—which Floridi prefers to call Mathematical Theory of Communication Information (MTCI).[71] Instead, PI is about Semantic Information (SI): "data + meaning," "the kind of information that we normally take to be essential for semantic purposes."[72] Floridi's appeal to what we "normally" mean, and his insistence that "information theory" is too narrowly conceived for philosophical purposes, make it seem as though PI is going to be pragmatic and eclectic. But not so: elsewhere Floridi tell us that PI is not about "what information in general might be." Instead, it is about SI as "a *specific kind* of information": the kind responsive to VT.[73] One begins to wonder here how much information is actually in the Philosophy of Information. SI is not MTCI—that much is clear. But in what sense, and to what extent, is it information at all?

The question can only be answered via VT. Floridi and his followers seem to consider it settled. But their arguments for VT tend to presuppose it. Notable is the "semantic loss" argument. Consider a chemistry textbook, says Floridi. If all the true propositions in the book are replaced by false ones, don't we feel that "loss of information" has occurred? If so, this (allegedly) proves that information requires truth (VT).[74] Doubtless,

a reversal of the truth-conditions for a given textual field can constitute "semantic loss." *But this only constitutes loss of information if one has already accepted that information is, by definition, semantic.* But that is what the thought-experiment is supposed to prove. Floridi's condescension to ordinary language use also merits comment. Perhaps he is correct that talk of "false information," in the case of the emended textbook, would just be a trope. But how can we know that talk of "loss of information" is not? Only if we have accepted VT; but that, again, is what is at issue.

Meanwhile: *What happens*, intellectually speaking, if a student actually reads and learns all those false propositions? Activities of this kind, clearly, occur, and have occurred: in the alchemical laboratory, for example, or in the pages of a treatise devoted to mythical animals, or in the decoding of a complex message that only misdirects. Perhaps, from the perspective of intellectual history, we may even be persuaded that *most* pedagogic and disciplinary activity undertaken by humans—most learning—both has been and will tend to be expended on propositions that are vulnerable to falsification by the passage of time and the growth of knowledge. Do we really want to say, when we consider the entire past and future of intellectual head-clutching, that most of it goes toward "no" information? Surely, instead, we want to say that most of it goes toward false information. This places us at odds with SI—or SI with us. But it also places us much closer to MTCI than anything in Floridi's PI.

True, a probative relationship is supposed to obtain between MTCI and SI. But it is never quite clear what this relationship is. Sometimes, we are told that MTCI is not "information" at all, but just raw "data."[75] The latter Floridi aligns, in passing, with Kantian noumena (unknowable being), as against SI as phenomena (knowable being).[76] Yet elsewhere we are told that for Floridi "there is just one philosophy of information," its goal being to "transform the nature of philosophical theorizing," which "doesn't apply merely to the study of information in the narrow sense (i.e., the technical notion)."[77] Here it sounds as though the allegedly transcendental dichotomy between data and (Floridi-type) information, between MTCI and SI, is really a continuity—the latter an expansion of the former. How? How do we get from a quantification of possibility-space, which explicitly abjures semantics (MTCI), to a semantic qualification of possibility-space (SI), which refuses to be constrained by quantitativity? It will not do to answer "by adding meaning" or "through a connection to truth," because these are precisely the notions that are in question. At the rhetorical level, Floridi's redescription of epistemology is saturated with computery talk, but its substantive philosophical role is unclear.

Perhaps the fully fledged Philosophy of Information, like the direct variance of information and entropy, is simply beyond the level of the current discussion. In any case, I can try to squeeze under Floridi's umbrella simply by making clear that I am not talking about SI, or VT, or PI in his sense. I am talking about what he calls MTCI—which, as discussed above, is the main reason any of us, including Floridi, find ourselves talking about information at all. The insight of the possibility-space, standardized and mathematized in information theory, is what has carried the computer revolution into all our lives, throughout our cultures and economies and families and institutions, through the enveloping of the infosphere and up into the rarefied heights of physics and philosophy. To grapple with these phenomena, and their implications, we need to focus on MTCI. This is what I have been trying to do above, as a theoretical prolegomena to the historical work that is to follow. There, while continuing to refer to MTCI, I will dispense with Floridi's coinage, and just say "information."

The Shapes of Information

Let us try to sum up. Information theory (IT) is the quantification and management of communicable possibilities. More possibilities mean more information (and vice versa). The standard unit of information is the bit, or binary digit. The latter aggregates into bytes; the latter aggregate into kilo, mega, giga, and terabytes (and so on). A bit is an imaginary switch: two opposed possibilities, linked. It is a theoretical representation of maximally basic possibility. Information theory, at the very most basic level, involves quantifying the bits that are requisite to communication about a given possibility-space. Communication (in IT) means a message: transmission, down a channel, from a sender to a receiver. Computers are physical mock-ups of information. They are massive arrays of real infinitesimal switches (bits), which can be arranged and re-arranged in circuits that represent logical operations through Boolean algebra. Information is encoded in the computer, and processed through its logic gates, by electrical pulses that set and re-set its extremely rich arrays (in 10^9, 10^{10}, 10^{11}…) of bits. Originally a pragmatic move within communications engineering, information theory quickly acquired cosmological and epistemological resonances. The very possibility of knowledge, and of existence, now sometimes appears to be at stake in the notion and phenomenon of information.

Grant that we have now brought information into view. The next step is to ask: what are we looking at? What is the significance of the

phenomenon we have described—what does it look like, and why does it matter? To ask this question is not to pursue any farther our brief and very basic technical excursus into information theory; but rather to turn, quite widely, from the technical to the phenomenological. We want to articulate what *kind* of thing information is; what we are encountering, when we encounter it. We want to ask about the consequences for communication and understanding when they are placed under informational management. These consequences—I will identify three—I will call the shapes of information.

First: information is *anti-dialogic*. It is a matrix of communication as intentional *control*; as against communication as intentional exposure. This is consequent on the message-concept, as a defining feature of informational systems. The non-productivity of the channel—LDI—means that one *gains nothing,* by definition, from transmission. The interim, paraphrasing Hamlet, is void. Instead, IT fosters and formalizes a communicative model in which intentions enter the system from a realm transcendentally external to it; and (if all goes well) re-enter the same kind of realm on the other side of transmission. This is not to say that a message can't be entered into dialogue (of course it can). But it is to say that a dialogue is not a message. A dogmatic commitment to disambiguation and literalism, against the "noise" of rhetorical figuration, are susbidiary characteristics of this informational shape.

Second: information is *counter-oral.* It is alienated from the orality within which language fundamentally lives, and from the temporality that is bound up with the former. At a maximally basic level, as we have seen in our analysis of binary notation, information frankly *refuses translation* from itself, as a synoptic script, to an oralizable syntagma. Any such translation must abandon and destroy the synoptic structure within which the code consists, and on which it depends. But even if we move above this dogmatic focus on the machine level—turning, for example, to the various programming "languages"—the core of our insight will remain. We never find, in the primary position of information, a speaking that may or may not get written. Rather, we find—in the activity of the programmer, the mystique of coding, the very scene of the infosphere—a writing that may or may not get spoken. It is not accidental, as we have noted, that higher-level informational structures, such as data-visualization, write this tendency of the informational matrix very large. Information is predicated on, and consists in, denial of an ancient hermeneutic order. Refusing priority to the oral-syntagmatic, it instead prioritizes the spatial-synoptic.

Finally: information is *quasi-cosmic*. It involves a strong claim of alignment between itself as an order of communication, and the universe as an order of being. In physics, this is the claim of "it from bit"; in philosophy, informational naturalism. Even more broadly, the quasi-cosmic shape is felt in the ever expanding reach of digital technologies, the claim of information theory to describe area after area of existence, and the blurring of any remaining distinction between the infosphere and the world. As discussed above, one of the most striking tendencies of the informational idea is its tendency to take on *reality* (in the literal sense of that word). Beginning as a statistical method for bandwidth management, Shannon Information or MTCI becomes the very stuff that thereby gets managed. No longer just the matrix of communication, information manifests (allegedly) *isomorphism* between itself and the truth. Thus the cosmos adds to itself the wonder of the infosphere. And yet a further wonder awaits: for the infosphere, it turns out, is what the cosmos was, all along.

I hope it is clear that I am trying to sketch, and not sell, the shapes of information. The theory leads us to the shapes; but the *shapes* are what we are thereby empowered to consider. In the remainder of this book, I am going to argue that the real-character movement of the seventeenth century, culminating in Wilkins's *Essay towards a Real Character*, interestingly manifests the informational shapes. The major period discourse we will need to cover, as the ground for this potential critique, has do with what makes Wilkins's character "real." In the next chapter, however, we will need to start farther back: with what makes it a "character."

Notes

1. John Wilkins, *Mercury, or, the secret and swift messenger: Shewing, how a man may with privacy and speed communicate his thoughts to a friend at any distance* (London, 1641). Compare, e.g., François Thybourel and Jean Appier, *Recueil de plusieurs machines militaires et feux artificiels pour la guerre et récréation* (Pont-à-Mousson, 1620); Francis Godwin, *Nuncius Inanimatus* (London, 1629) and *The man in the moone: or, A discourse of a voyage thither by Domingo Gonsales the speedy messenger* (London, 1638); Giambattista della Porta, *De furtiuis literarum notis vulgo* (London, 1591); Noah Bridges, *Rarities: or, the incomparable curiosities in secret writing, both aswel by waters as cyphers, explained and made familiar to the meanest capacity* (London, 1665); John Falconer, *Cryptomenysis patefacta: or the art*

of secret information disclosed without a key. Containing, plain and demonstrative rules, for decyphering all manner of secret writing (London, 1685). Falconer, we should note, uses "information" in a period sense of "informing" or "telling"—an activity, not a stuff.

2. Wilkins, *Mercury*, 156–57.
3. Ibid., 158–59.
4. Ibid.
5. Wilkins, *Mercury*, 159.
6. Ibid., 86–7.
7. Gleick, *The Information*, 161.
8. Wilkins, *Essay*, 190.
9. See Arndt Brendecke, Markus Friedrich, and Susanne Friedrich, "Information als Kategorie historischer Forschung. Heuristik, Etymologe und Abgrenzung," in Brendecke et al. (eds), *Information in der Fruehen Neuzeit*, 11–44; 20–22.
10. See Brendecke et al., "Information als Kategorie," 25–28; and Peter Burke, "Reflections on the Information State" and Jürgen Dendorfer, "'Habita […] plenissima informatione'. Zur Kurienreform Papst Alexanders VI (1497)," in Brendecke et al. (eds), *Information in der Fruehen Neuzeit*, 51–65 and 83–108; and Jacob S. Soll, *The Information Master: Jean-Baptiste Colbert's Secret State Intelligence System* (Ann Arbor: University of Michigan Press, 2009).
11. "The Poet writes under one restriction only, namely, that of the necessity of giving immediate pleasure to a human Being possessed of that information which may be expected from him, not as a lawyer, a physician, a mariner, an astronomer or a natural philosopher, but as a Man." William Wordsworth, "Preface to Lyrical Ballads," in Vincent B. Leitch (gen. ed.), *The Norton Anthology of Theory and Criticism*, 2nd. ed. (New York: Norton, 2010), p. 568.
12. See Paul Young, *The Nature of Information* (New York: Praeger, 1987), 2–3.
13. McLuhan, "The Medium is the Message," in McLuhan, *Understanding Media*, 7–21; 8.
14. Young, *The Nature of Information*, 14.
15. Gleick, *The Information*, 219.
16. See Gleick, *The Information*, 176, 188, 199, and 216.
17. Norbert Wiener, *Cybernetics: Or Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948), 11.

18. See Gleick, *The Information*, 206–212; Davis, *Universal Computer*, 146–64; and (a very useful clear account) B. Jack Copeland, "Computation," in Floridi (ed.), *The Blackwell Guide to the Philosophy of Computing and Information*, 3–17.
19. Claude E. Shannon, "The Mathematical Theory of Communication," in Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1964), 29–125.
20. The diagram, very widely reproduced, is instantly available in many versions online.
21. Gleick, *The Information*, 189.
22. Ibid., 241–42.
23. Gordon Raisbeck, *Information Theory: An Introduction for Scientists and Engineers* (Cambridge, MA: MIT Press, 1963), 2.
24. Ibid., 4–5.
25. Fazlollah M. Reza, *An Introduction to Information Theory* (New York: McGraw-Hill, 1961), 4–5.
26. See Shannon, "The mathematical," 33–34.
27. McLuhan, "The medium," 8.
28. Ibid., 7, 8, 9, 10, 12, 13.
29. John R. Pierce, *An Introduction to Information Theory: Symbols, Signals and Noise*, 2nd rev. ed (New York: Dover, 1980), 20.
30. See William Poole, "Seventeenth-Century Telegraphy: The Schemes of Francis Godwin and Henry Reynolds," *The Seventeenth Century* 21.1 (2006): 45–73.
31. Ibid., 7.
32. "*… methode pour escrire de nuict, à son amy absent: et luy faire conceuoir son intention. Ensemble pour avoir responce de luy, de tout ce qu'il luy plaira.*" Thybourel and Appier, *Recueil,* sig. G4.
33. "*Il faut auoir escript succinctement tout ce que vous voulez qu'il sçache, affin de ne vous tromper auec luy.*" Ibid., sig. G4^{v}.
34. "*Il est necessaire que soyez esleuez en quelque lieu eminent, au temps de laditte operation.*" Ibid.
35. " *… quelque chose deuant vous, pour pouuoir tenir cachez vos flambeaux, et les allumer quand bon vous semblera, san estre apperceu de celuy à qui vous escriuez,*" Ibid.
36. "*PATIENTEZ, EN TROIS IOURS LE ROY VOVS SECOVRERA.*" Ibid., sig. H.

37. " … *dedans vne place assiegee dedans laquelle ie ne puis entrer, ny enuoyer lettres ny* messager," Ibid.
38. " … *tenir vn de voz flambeaux allumé, fort hautement, afin que vostre amy vous recognoisse*," Ibid.
39. " … *que celuy à qui vous escriuez, soit imbu de cest art: Et à quelle heure vous deuez conuenir ensemble toutes les nuicts, pour faire ceste operation*," Ibid., sig. G4-G4^{v}.
40. See Hans Christian von Baeyer, *Information*, 219.
41. Ibid., 26.
42. William Shakespeare, *Hamlet*, ed. G.R. Hibbard (Oxford: Oxford University Press, 1987), 5.2.73.
43. See Gadamer, *Truth and Method*, passim.
44. Shannon, "The Mathematical," 31.
45. See Borgmann, *Holding on to Reality*, 145–161.
46. A version of the so-called "Monty Hall problem"; for which, see von Baeyer, *Information*, 70–76.
47. Shannon, "The Mathematical," 33.
48. Raisbeck, *Information Theory,* 5–10; von Baeyer, *Information*, x–xi, 28.
49. Shannon, "The Mathematical," 33.
50. See Borgmann, *Holding on to Reality*, 128–144.
51. Ibid., 161–65.
52. Gleick, *The Information*, 28.
53. See Walter J. Ong, *Orality and Literacy: the Technologizing of the Word*, 3rd ed. (New York: Routledge, 2012); *Ramus, Method, and the Decay of Dialogue: From the Art of Discourse to the Art of Reason* (Chicago: University of Chicago Press, 2004) and *Interfaces of the Word: Studies in the Evolution of Consciousness and Culture* (Ithaca: Cornell University Press, 1977).
54. McLuhan, "The medium," 13.
55. Augustine, *Confessions*, XI.27
56. See Gleick, *The Information*, 237; Young, *The Nature of Information*, 8–14. and Wojciech H. Zurek (ed), *Complexity, Entropy and the Physics of Information* (Westview Press, 1990), *passim*.
57. See von Baeyer, *Information*, 158.
58. See Gleick, *The Information*, 234; von Baeyer, *Information*, 119; Young, *The Nature of Information*, 11; and Zurek (ed.) *Complexity,* vii, ix, 6.

59. See Gleick, *The Information*, 270–74.
60. See Young, *Nature of Information*, 11; Gleick, *The Information*, 279.
61. Quoted in Gleick, *The Information*, 279.
62. Floridi, *The Philosophy of Information*, 42.
63. Vlatko Vredal, *Decoding Reality: The Universe as Quantum Information* (New York: Oxford University Press, 2010), 22.
64. von Baeyer, *Information*, 38, xii.
65. See Zurek (ed.), *Complexity*, 9.
66. Fred Adams, "Information and Knowledge à la Floridi," in Patrick Allo (ed.), *Putting Information First*, 84–85. See also Jonathan Cohen, "Information and Content," in Floridi (ed.) *The Blackwell Guide to the Philosophy of Computing and Information*, 215–27; and Fred Dretske, "Putting Information to Work" in Philip P. Hanson (ed.) *Information, Language and Cognition* (Vancouver: University of British Columbia Press, 1990), 112–24.
67. von Baeyer, *Information*, 17.
68. Adams, "Information and Knowledge," 85.
69. See the excellent discussion by Andrea Scarantino and Gualtiero Piccinini, "Information without Truth," in Allo (ed.), *Putting Information First*, 66–83. For the history, see Gleick, *The Information*, 246–48.
70. Scarantino and Piccinini, "Information," 72.
71. See Floridi, *Information: A Very Short Introduction*.
72. Floridi, *The Philosophy of Information*, 82.
73. Ibid.
74. See Scarantino and Piccinini, "Information Without," 72–76.
75. Floridi, *The Philosophy of Information*, 31.
76. Ibid., 40.
77. Patrick Allo, "Putting Information First," in Allo (ed.), *Putting Information First*, 2.

CHAPTER 3

Unreal Characters: Technology and Orality in the Seventeenth Century

The student of the early-modern period encounters a number of false friends: words that s/he has to re-learn. "Humanism," which I have already mentioned, is perhaps the quintessential example. We may nod our heads at this term, mean important things by it, ask seriously whether existentialism is it, urge becoming post-it, and so on. But if we do any of these things with regard to the early-modern era, we are just going to expose ourselves to some funny scholarly looks. Petrarch, Sir Thomas More, Erasmus, John Milton—these and many other period luminaries were "humanists," not in our modern sense of an anthropocentric ethics, but in the period sense of pursuing and valuing classical literary education. Machiavelli, in that sense, was a very fine humanist; even though he saw human beings as politically and morally expendable. Early-modern "humanism," in short, is a technical term. And so for many other words of the period that greet us with a deceptive familiarity.

Including "character." When we hear this word, we probably assume that it has something to do with personality, or morals; perhaps especially within the confines of fictional narratives. But that is simply not what the word means in early-modern English usage. True, our keyword does pick out a very large genre of personality *sketches* in seventeenth-century English literature—*after* 1600 (and I'll return to this issue at the end of the chapter). But these satirical "characters"—"Of a Puritan," "Of a Papist," "Of an Unmarried Woman," or what have you—are always and precisely the *texts;* not the people they are about.

J.D. Fleming, *The Mirror of Information in Early Modern England*,
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In this chapter, I want to do something very simple. I want to examine what an early-modern "character," in the first place, was. Due to the nature of the beast, this will turn out not to be so very simple after all. Nonetheless, if we are to understand the seventeenth-century idea of making characters "real," we need first to understand the period idea of characters, *kurz*.

The Character of Their Content

A thrilling innovation of early-modern England was something called *brachigraphy*. Also known as tachygraphy, semography, radiography, and zeiglography, this was a revolutionary technique for real-time data capture. It was taught or exemplified, over the course of the seventeenth century, by more than one hundred English publications.[1] Brachigraphy allowed its users (according to its marketers) to record and recall every word they heard. Users could then either reproduce their files, with complete accuracy; or reserve them, with complete security. Best of all, brachigraphy was easy. You could attain competence in a month—or even as little as a week! This remarkable technology of the period never actually went away; it just became localized to certain professions, even as these became familiar parts of modern societies and economies. Over time, the invention came to seem as homely as its English name. Brachigraphy, in the seventeenth century, was a topic for authors and visionaries. Reporters and secretaries, by the nineteenth century, were the kinds of people who knew shorthand.

Characterie was one more early-modern name for it, after the original text of the field, authored in 1588 by the politically connected physician Timothy Bright. Subtitled *An arte of shorte, swifte, and secrete writing by character,* this seems to have been the first book ever published in English with our keyword (or any form thereof) in the title.[2] Bright lays out a stenographic technique based on simple geometric glyphs. Each of these unique "characters" denotes a word, drawn from a special vocabulary of 537 basic terms. These Bright calls "characterical" or "characterie" (charactery) words. (Modern linguists would call them "radicals.") In using Bright's system, if we hear a charactery word, we simply note down its glyph. If we hear a non-charactery word—well, that depends on the word. The bulk of Bright's book (more than 200 of its 244 pages) consists of a largish English dictionary, its terms tied back to the charactery terms by an eclectic system of inflections (meaningful modifications). Derivation, possession, number, comparison, tense, subgroup, negation: all these

and more will be writable in Bright's system by marks added to the main glyphs. Charactery glyphs, inflected, will yield non-charactery terms.

So: "Slow," for example, is not charactery. But "fast" is; so we put that glyph, adding Bright's mark for negation (a strikethrough). "Fast," negated, means "slow." "Unmarried" is not charactery—but "marrie" is. So we put the glyph for that term, inflecting via negation (strikethrough) and past tense (a prick on the right side). "Labor," charactery, will allow us to write the non-charactery "laborer": we just add two pricks to the side, denoting the -er suffix. The suffixes "-hood" and "-ship" can both be added via the charactery glyph for "ship." Nobody, Bright laconically remarks, will read "neighborship." Charactery terms with homonyms will serve to write all of them, and homophony will also allow us to note down exotic words and proper names. When all else fails, we can do a lot with Bright's simple glyphs for the letters of the alphabet. "Whip," for example, is not charactery, but is referred in Bright's dictionary to the charactery term "beat." No logical or grammatical relation obviously obtains between these terms. No problem: we simply put the glyph for "beat," adding the characters for "w" and perhaps "h." This will allow us to read off "whip" when we come to transcribe our notes. Bright has many other strategies for facilitating characterie, which, he thinks, an average student can learn in about two months. At that point, he claims, we will become capable of copying verbatim, and in real time, almost any speech we hear.[3]

Let us suspend, for the moment, the question of whether or not Bright's claims were true. For now, let's just note that—if they were—characterie added a totally new capability to the mass technologies of early-modern literacy. We can see this by situating Bright's innovation vis-à-vis several of its antecedent and associate technologies. First among these must be the art of memory: an ancient technique, with many early-modern manifestations, for trained recollection.[4] Students of the art were to imagine and contemplate an elaborate location, such as a palace. Memoranda (things to be remembered) were to be mentally placed, one-by-one, in the location's subsections: in that room at the top of the stairs, for example, or on the sunny side of that room, or in the statue niche on that side. Retracing one's mental steps through the imaginary structure would then allow orderly and accurate recollection of its contents. This tradition is so persistent in pre-modern European culture that one hesitates to doubt that it worked. However, the mnemonic art was first and foremost a rhetorical technique for remembering speeches—one's own, that is, in order to deliver them. It was not a technique for recording speeches that somebody else delivered.

Accordingly, the art of memory was about recalling ideas and arguments, not specific words; and anybody who tried to use it that way would surely have discovered that he was going to need a much bigger palace. Finally, setting things down through cognitive discipline was clearly a lot trickier than just plain setting them down. As John Willis, a seventeenth-century teacher of both mnemonics and shorthand, put it: "Writings are simply the most happie keepers of anything in memorie."[5]

That brings us to characterie's second obvious antecedent. Writing—specifically, longhand note-taking—was cultivated in the early-modern period (just as it is today) by literate people who wanted to remember interesting discourses. Indeed, the period had a highly developed culture of gathering knowledge through notes, a practice known as commonplacing, after the large blank "commonplace books" where the notes would be entered and organized.[6] As has frequently been observed, early-modern Europe was a time and place of almost bewildering intellectual expansion. The coming of print, the Reformation, and the encounter with the New World were just a few contributors to what has been called (if anachronistically) the period's "information overload." Note-taking and commonplacing were ubiquitous attempts to cope. But if longhand notes were an attempt to gather the fruits from a discourse, characterie was an attempt to pluck up the whole tree. In that sense, it was actually an entirely different *kind* of writing technology from longhand note-taking. No commonplace book could possibly be large enough to receive the harvests of a successful characterie, which aimed to *reproduce*, not abridge, discourses. Far from contributing to the commonplace-book tradition, characterie offered to break it.

Of course, no early-modern note-taker, longhand or shorthand, dragged his heavy commonplace book around for that purpose. Notes were transcribed from lighter, more portable platforms; and here we meet a third period technology that allows us to see the momentousness of characterie. The slates and horn-books of the medieval period gave way, in the sixteenth century, to *writing-tables*: Small books containing blank pages that were coated with a special, plaster-based finish. These allowed notes to be taken (probably with a "silverpoint" stylus)—and then, with a little water, erased; leaving the page free to be used again.[7] Longhand notes would fill these specialized pages pretty quickly, necessitating frequent cleaning, and reducing their longevity. But shorthand, clearly, was a much better fit. An interesting pattern of twentieth-century computing history is that the machines came first, their programs and uses second.

Only because IBM had a personal computer to market, for example, was Microsoft able to launch MS DOS. Writing-tables had been around for decades before Bright's *Characterie*, but one could almost say that the former technology found its proper application in the latter. Evidence is necessarily scant, since few writing-tables have survived (and because they were designed to be erased anyway). Nonetheless, it seems reasonable to suppose that a set of tables would have been the ideal platform for characterie; and characterie their ideal operating system.

But did it work? There are grounds for skepticism, and not only in how much one had to memorize in order to use Bright's system: 537 charactery words, with their glyphs, and Bright's system of inflections. As an allegedly "secrete" writing, characterie gestured toward dark and thrilling arts; a bit of an odd note, for a supposedly mass technology. Bright's characters suggest rarefied sources, from alchemical symbols, to Egyptian hieroglyphics, to the scripts of exotic languages (notably Hebrew and Chinese). Typographically unprecedented, the glyphs had to be manually inked into copies of *Characterie*, rendering the latter somewhere between mass publication and élite manuscript production. As it happens, Bright's system was soon used in the production of at least one ultra-exclusive text, a presentation manuscript of the esoteric Sybilline Prophecies, meant for the Queen (though it is not clear if she ever received it) in 1589.[8] Perhaps—it has been argued—*Characterie* was not so much a technological, as a political and cultural, innovation; a kind of brilliant bauble, meant to secure royal or courtly patronage for its author.[9]

The argument is smart; but I don't think it's correct. Bright had sought patronage through his work in cryptography, as evidenced by an elaborate manuscript of his cyphers now in the Bodleian library. But this kind of text—extraordinary, unique, reserved for some powerful pair of eyes—is precisely not what the published *Characterie* of 1588 is. The hand-lettering of Bright's glyphs, far from marking off his work as exclusive, can be read as manifesting a determination to make it public by any means necessary. His esoteric overtones, meanwhile, are little more than standard marketing talk in sixteenth-century print culture (where every other book seems to be "of secrets").[10] Bright sought and was granted (according to his title page) an official monopoly on shorthand systems (not just his own): hardly the move of somebody protecting a non-commercial interest. His introductory remarks to *Characterie* emphasize practicality, and user-friendliness. The book is presented as a technological breakthrough that will bring lasting benefit to its adopters. *Characterie*, in sum, looks

like nothing more or less than a product. It was placed on the market, presumably, in hopes of making some money.

Whether Bright succeeded in making any we don't know. What we do know is that, within a year of its publication, his invention—or something very like it—had started to catch on. We have already mentioned Mary Seager's characterie of the Sybilline Prophecies, but this was a calligraphic performance rather than an oral transcription. The real adoption vector for Bright's technique (or, again, something very like it) began with several published works—sermon transcriptions—of 1589. First was the *Ordinary Lecture* of the radical preacher Stephen Egerton, advertised on its title page as having been taken down, "as it was uttered," by the art of characterie.[11] The Egerton lecture was quickly followed by the *Fruitful sermon, preached in Christ's church* by the ex-recusant priest Anthony Tyrrell—also "*taken by characterey.*"[12] Tyrrell, in his preface, relates that the words of his sermon "were no sooner out of [his] mouth, but a yong youth had penned [them] *verbatim* by Characterie, an art newly inuented." The young short-writer "did it most exactly, writing it word for word"; Tyrrell has altered "some words, but nothing of the matter," in the published version.[13] That formula, of a short-writing transcript subsequently approved and perhaps corrected by the preacher, appears in half a dozen separate editions (different title pages, printers, etc.) of a sermon by "silver-tongued" Henry Smith in 1590 and 1591, all "taken by characterie, and examined after."[14] And it is also followed for the second edition of Egerton's *Ordinary Lecture*, in 1603.[15]

In 1590, his monopoly notwithstanding, Bright's *Characterie* encountered its first published competition: the calligrapher Peter Bales included a shorthand system—"the arte of brachygraphie"—in his book of that year, *The Writing Schoolmaster*. The brachigraphic part only was republished in 1597.[16] Bales dispensed with Bright's glyphs, in favor of a literal (in all senses) "short-writing": words reduced to their initial letters, with endings indicated by a system of pricks or dots. So, an alphabetic, rather than a glyphic, shorthand. Scholars have downplayed continuity from Bright's work to Bales's, and at a technical level this is clearly correct. Perhaps, for that matter, Bales ignored Bright's monopoly because, in his view, "brachigraphy" was not "characterie." But if that was Bales's view, it is not reflected in subsequent shorthand publishing, or in the way shorthand gets talked about over the course of the seventeenth century. We do not find "brachigraphy" rigorously distinguished from "characterie" on the title-pages, or in the explanations or approbations, of seventeenth-century short-writing

systems. Quite the contrary, we find these and other technical designations, including "short-writing," used synonymously and interchangeably. This is why I have made free to group them all under "brachigraphy," and I will follow that loose period usage for the rest of this chapter.

It's perhaps a bit like the differences between operating systems today: programmers may care a lot about the different ways they work, but consumers care only that the work they do is mostly the same. Early-modern short-writing systems were different technical means to a shared and marketable end. The scribbled and weirdly dotted letters of Bales's system counted as "characters" in the seventeenth century, just as did Bright's glyphs. Later systems, although primarily alphabetic (rather than glyphic), use customized signs for their letters that are utterly gnomic, especially in combination. In 1602, the otherwise obscure cleric John Willis (whom we have already mentioned) published his *Art of Stenographie,* outlining a short-writing system similar to Bales's, but also owing a debt to Bright. Willis's book, which really opened up the floodgates of the seventeenth-century shorthand movement, went through nine editions by 1628. By that time, its full title was *The Art of Stenographie, or short-writing, by spelling characterie.*

What a Character! Overtones and Undertows

Now, the word "character," coming into English from medieval French, had traditionally denoted an eclectic range of functions having to do with writing. A "character" was variously a letter, a sign, a handwriting, a trope. When Bright called the glyphs of his system "characters," he was, in effect, recalibrating a familiar term for the purposes of his invention. This is technical redefinition of a very particular kind. It is not the kind of semantic flux so famously bemoaned by Samuel Johnson (his examples including the words "zenith," "eccentric," and "sanguine") in which a technical term, figuratively mis-applied, loses touch with its primary meaning.[17] Neither is it the kind of arbitrary re-extension that we sometimes find in technological contexts; and here we can take, as a recent example, the word "tweet." In cases like that, an entirely unremarkable word is arbitrarily repurposed for a technical meaning that could not have been anticipated from its previous usage.

But Bright's re-extension of "character," circa 1588, is more like computer engineers' re-extension of the word "information," circa 1950. Here, an ancient word, with a moderately incoherent semantic range—in

the case of "information" having to do with intelligence, communications, and ontology—was used to denote a new technical concept, but *situated somewhere within that range*. *Re-selection* might be a name for this kind of semantic procedure. Its result is to leave intact a pre-existing congeries of meaning, while giving one area within it a new and decisive role. The success of the computing usage of "information," post-1950, indicates how powerful a semantic re-arrangement this can be.

When it comes to the word "character," post-1588, we have yet to examine the connotations of its usage. But we can begin that work simply by noting that it gets used a lot, in the years following the publication of Bright's book. The evidence for this statement is to be found in the published incidence of the word "character" before and after 1588.[18] For the dozen years prior to the publication of *Characterie*, in any given year, between 1.4 % and 3.8 % of records (returned by the database EEBO) for books published in English (and in England) contain at least one instance of our keyword. Year to year, the incidence bops back and forth; quantitatively speaking, there is no clear trend. For the dozen years *after* the publication of *Characterie*, by contrast, there is a clear trend: and it is upward. On the way up, between 3.8 % and 6.6 % of English publications, year to year, contain at least one instance of our keyword. In the year 1600 (when the situation changes, for reasons that we will discuss later), 8.9 % percent of recorded English publications contain at least one instance of the word "character." What this analysis shows is that our keyword got very hip in the final decade of the sixteenth century. And it is reasonable to suppose that the fashion reflected the technical innovation that had started it.

So, consider Shakespeare's Claudius, circa 1600. In a famous scene, the guilty king receives a letter from his estranged, exiled, and (Claudius thought) dead nephew. "High and mighty," Hamlet writes,

> you shall know that I am set naked on your kingdom. Tomorrow I shall beg leave to see your kingly eyes, when I shall, first asking your pardon, thereunto recount the occasion of my sudden and more strange return.[19]

Claudius, not only surprised by this note, is also flummoxed by it. He asks Laertes for help —"Can you devise me?"—but the younger man only replies "I am lost in it, my lord" (56–7). It is hard to understand what these guys are finding so hard to understand. The meaning of the letter ("I'm back!") is pretty plain. It contains exactly one rank metaphor—"'Naked'," over which Claudius snorts, like a cranky newspaper editor—but this actually

comes with a gloss: "in a post-script," the king notes, Hamlet explains that he means "'alone' (53–4)." Hamlet's letter does not present a challenge to interpretation, so much as the challenge that interpretation is: a finding out of meanings where they have been placed. Not irrelevantly, it is in exactly this scene that Claudius draws Laertes into conspiracy. "Know you the hand?" demands Laertes. "Tis Hamlet's character," the king confirms (4.7.51–2)—one of only two times this word appears in the play. (On the other occasion, at 1.3.58–9, Polonius associates it, appropriately, with memory.) Claudius doesn't mean "shorthand"; "character," here, just means "handwriting." But Shakespeare has placed the ancient word in a context of encoding and decoding that plays upon its modish, shorthandy, profile.

He pulls an almost identical trick in *King Lear* (1605). The bastard Edmund, turning his father Gloucester against the "legitimate" Edgar, claims to have found an incriminating letter thrown in through the window of his room. "There's the cunning of it," he helpfully points out.[20] "You know the character to be your brother's?" Gloucester demands (2.61): our keyword, again, appearing in a context of interpretative urgency. Like *Hamlet*, *King Lear* is full of missives, and all are, perforce, handwritten. But "character" is attached to a writing only here—and on one further occasion, when Edmund finally succeeds in turning his father against his brother. "Here he stood in the dark," Edmund claims of Edgar, "Warbling of wicked charms, conjuring the moon | To stand's auspicious mistress" (6.36–39):

> When I dissuaded him from his intent
> And found him pitcht to do it, with curst speech
> I threatened to discover him. He replied,
> 'Thou unpossessing bastard, dost thou think
> If I would stand against thee, could the reposure
> Of any trust, virtue or worth in thee
> Make thy words faithed? No, what I should deny—
> As this I would, ay, though thou didst produce
> My very character—I'd turn it all
> To thy suggestion, plot, and damned pretence.' (6.64–73)

The name for a new and powerful kind of writing, in this verbatim record of Edgar's supposed speech, focuses an anxiety about what it is for words to get "faithed." "Discover," "Plot," "pretence," "charms": these are, not charactery (in Bright's sense), but *characterish* terms in the early seventeenth century.

Sometimes, indeed, the overtones of our keyword are frankly supernatural. A pamphlet of 1589 (just a year after Bright's book) reported on the "hierographicall letters and characters found upon fower fishes," allegedly caught in Denmark in 1587. Reproducing the scaly characters (which are basically just distorted upper-case Latin letters), and availing himself of the primary wisdom laid down by Pythagoras, "the *Egyptian* prophets, the *Assirian* Chaldes, the *Brittaine* Bards, the *French* Druids, the *Bactrian* Samanaei, the *Persian* Magi, the *Indian* Gimnosophists, *Anacharsis* among the *Scithians,* in *Thracia* Zamolxis, and further East the Brachman Iewes"—extensively supplemented, later on, by Pico della Mirandola—the author reads his fish as prophesying the second coming of Christ.[21] In 1598, a similar publication told a similar story, albeit shifted to Norway, and the fish identified, helpfully, as herring.[22] "Characters," in apposition to "figures and words," are repeatedly placed among magical instruments by Henry Holland in his *Treatise Against Witchcraft* (1590).[23] And Hugh Broughton, in his apocalyptic *Treatise of Melchisidek* (1591), speaks of prophetic words "written with other Characters then their felowes: What wordes had prickes ouer their heades, and such other things," as "handled in the *Zoar*" of Jewish cabbala.[24] Though it was modern, practical, and technological, shorthand could *seem* ancient, sacred, and esoteric. Thomas Heath, in his *Stenography* of 1644, assured readers that it had actually been "the writing upon the wall" in the Old Testament book of Daniel, "which so puzled the Caldean Wisards."[25] And Joseph Mede, in his *Clavis Apocalyptica* (1627), describes the book of Revelation as being mystically "furnished by the holy spirit, with such signes and characters through the whole narration, that thence the right course, order and Synchronismes of all the visions, according to all things done in their time, may be found out."[26]

But more typically, and in the context of the seventeenth-century shorthand movement, the strangeness of characters is presented as all the stranger for being merely human. Indeed, the ostentatiously Greek and Latinate names for the various shorthand systems mark them, in the period sense, as human*ist*: achievements of non-sacred, and certainly non-mystical, philological learning. The hieroglyphics of the Egyptians, writes Bales in his *Schoolmaster,* "were onelie certaine demonstrations for the secretes of *Philosophie*"—things that are not, and perhaps cannot be, known by the multitude. But Bales's own system, better than its ancient antecedent, is a "*Clauis Scientiarum,*" a key to "the readie understanding and apprehension … of anie Diuine or humane knowledge whatsoeuer."[27] A dedicatory poem to the second edition of William Folkingham's *Brachygraphie*

(1622) compares his achievement to that of "true Chymistiques," as opposed to "braggart Mountebanks" and "Quacksalved Mystiques."[28] In 1630, Thomas Shelton (soon to style himself the first "Tachygrapher") published the second edition of his *Short-Writing the Most Exact Methode*. (The first edition has been lost; either that, or it was already a marketing advantage to be *re*-issuing one's shorthand system.) Shelton's extraordinary title page shows the author, apparently suspended in mid-air, under a voluminous, flying cloak; while under him a disembodied hand comes in to write his (Bright-esque) glyphs in the book. This apparently supernatural emblem, however, stands for what Shelton modestly calls an "Impe of my poor labour." The wonders of his shorthand system are a function, not of vision or revelation, but of ordinary "age and education."[29]

Sir Thomas Browne, celebrity intellectual of the seventeenth century, can help us to flesh out our survey of what "characters" meant in the period.[30] For Browne, a character is a letter *plus*: mercurial, elusive, possessed of a profound and tantalizing significance. (Admittedly, most things look that way to Browne, if he looks at them long enough; but let that pass.) Browne assimilates our keyword to the ancient and semi-mystical Neoplatonic doctrine of the divine signatures: the idea that the essential natures of things (their substantial forms, in Aristotelian parlance) had been marked on them by God, and could be read off of their appearances by the wise. But Browne does not turn to the signatures as a way to talk about shorthand. Rather, he turns to shorthand as a way to talk about the signatures. "In this masse of nature," he writes, "there is a set of things that carry in their front, though not in capitall letters, yet in stenography, and short Characters, something of Divinitie, which to wiser reasons serve as Luminaries in the abysse of knowledge." Physiognomy and chiromancy (palm-reading) are also illuminated by the idea of "Characters," which are not "meere dashes, and strokes, *a la voleé,* or at randome." The divine pencil, Browne says, "never workes in vaine." Rather, one has to approach its "dashes and strokes" with a fully turned-on hermeneutic apparatus; much as though nature were a manual of characterie.[31]

Browne's articulation of his Neoplatonism via the new short-writing has an interesting, and perhaps surprising, consequence. Characters, as we have seen, are period inventions of human reason. They are artificial and ad hoc signs, constituting a new set of tools for communication. But if they serve, as they do for Browne, as a way to illuminate essential manifestations, then these artificial tokens curve back toward the natural. "In young Wallnuts cut athwart," Browne writes in his *Garden of Cyrus*, "it

is not hard to apprehend strange characters; and in those of somewhat elder growth, handsome ornamental draughts about a plain crosse."[32] This is the quincunx, or sacred Letter X, with which Browne is obsessed, and which he sees almost everywhere. The innumerable cross-shapes of both Christian and classical antiquity reflect the "open Bill and stradling Legges of a Stork," which in turn reflect the "ascending and descending pyramids" by which "geniall spirits" travel between the transcendental and sublunary worlds.[33] The number five, for the points of the quincunx,

> in the Hebrew mysteries and Cabalistical accounts was the character of Generation; declared by the letter *He*, the fifth in their Alphabet; According to that Cabalisticall *Dogma*: If *Abram* had not had this Letter added unto his Name he had remained fruitlesse, and without the power of generation … the mother of Life and Fountain of souls in Cabalisticall Technology is called *Binah*; whose Seal and Character was *He*.[34]

Browne's attempts to show that the letter X is the very form of the world are limited only by his ingenuity (which is to say that they are scarcely limited at all). But repeatedly, his voluminous discourse finds a focal point in the quasi-technical term he chooses for what the quincunx, as a sign of heightened worldly significance, is. That term is "character."

Characterical Technology: The Next Big Thing

Why not just "letter"? Browne cites, approvingly, claims of Latin and vernacular words found in the bodies of plants. He loves, as does Shakespeare in *As You Like It*, the idea of legible text written on the very body of the world. But what Browne loves even more is the idea of *il*legible text written there: text that one can see, recognize, as text, without being able to see what it means, or even how to find out. As an investigator of nature, Browne wants a hermeneutic mode that is appropriate to the transcendental dignity of the task. One can't just open God's worldly book and find it easy to understand. The text has to be difficult, so that the cosmic mystery can be preserved, even in and through the act of interpreting it. This kind of hermeneutic *Gestalt*, which I have elsewhere called an exoteric secrecy, is primarily associated in the seventeenth century with emblems and hieroglyphs.[35] But the former are artistic and literary; the latter, mystical and ancient. Characters, by contrast, are practical and modern. Their strangeness, accordingly, is uniquely tractable. In a sense, a character *is* just a letter. That's why it's so appropriate to the metaphor of God's writing the

world. But what sets characters apart from ordinary alphabetic writing is also what sets the world apart from ordinary books. A character is a letter that one *struggles* to read.

To be sure, any letter, in the first place, presents that kind of struggle. Reading always occurs in and through the possibility that we may *not* be able to read what is before us. Absent that possibility, it actually becomes difficult to say that there is anything before us to read at all. When we are handed just any old thing—a potato, a velocity, a smell—we don't typically find ourselves saying "I can't read that." Rather, we become empowered (so to speak) to complain of illegibility only when we are handed a member of a certain class of things: such as a book, a text, a symbol, or a word. Legibility is actually *necessary* to illegibility. That is why the latter functions as a sign of the former. Thus the opacity of shorthand, while marking it as strange within the wider field of writing, does so precisely by illuminating the strangeness *of* writing. It's just that the process of learning how to read familiarizes the strange, turning characters into letters. This is the process one followed, long ago, with ordinary alphabetic writing; and it is the process one is supposed to follow, once again, through any one of the seventeenth-century shorthand manuals. The initial or primary presentation of characters is very elliptical; but this state of affairs can only be maintained (à la Browne) through a kind of willfulness. Properly speaking, the strangeness of characters is supposed to decay into familiarity, just as the illegible decays into the legible.

And yet things actually get stranger through this familiarization of the seventeenth-century shorthand movement. Its masters and marketers, printers and booksellers are offering their product to a public that can read and write English. (Early-modern shorthand is a singularly English phenomenon.) Yet shorthand *is* nothing other than a way to read and write English. Strictly speaking, the new scripts appear to be redundant to the matrix of literacy in which they are presented. The shorthand manuals typically include brief and familiar passages written out in the proferred symbols, the Lord's Prayer and Creed being favorite exemplars. By mid-century, these little demonstrations have become publications in their own right: there are editions of the Psalms in shorthand, of the New Testament, eventually the whole Bible.[36] It is as though, looking at this moment in the history of English letters, we are witnessing their divergence into alphabetic and brachigraphic streams; much as some Asian languages (Korean, Japanese, Vietnamese) have come to be writable either in vernacular or in Chinese symbols.

If things didn't turn out that way for English—and, of course, they didn't—perhaps this is because the redundancy of English shorthand is reproduced, massively, within the shorthand movement itself. Every single shorthand book, after Bright's *Characterie*, goes on the bookstalls offering to do *the same thing* as its predecessors. These claims are not implicit or dishonest; brachigraphers don't ignore the field, or pretend that they've come up with something entirely new. Quite the contrary: they typically gesture towards, even review, previous efforts—often approvingly—on the way toward laying out their own. Even individual brachigraphers themselves make this move, vis-à-vis their own previous work. A re-edition of a shorthand system (and there are very many of these) is not, typically, presented as a reiteration, but as a wholesale retheorization. By the end of the century, if we take seriously the brachigraphers' claims all to be offering endlessly different versions of the same capability, English could be written in any one of more than one hundred distinct shorthand scripts. Standardization, to put it mildly, was needed. But even this, as John Milton says in another context, was a heap increasing in the very act of diminishing.[37] For each new brachigraphy *is* precisely an attempt to standardize the field, achieving a version of shorthand that will trump all others.

Here, indeed, is the obvious and simple justification for the extraordinary oversupply of early-modern shorthand systems. And this whether we are looking at older systems from the perspective of newer ones, or at alphabetic writing from the perspective of shorthand *tout court*. The justification is that they are all supposed to be offering a *better* way of writing: quicker, more accurate, easier to learn, easier to do, more compressed, more compendious, more secure, et cetera. "My inuention," writes Bright all the way back in 1588, is "meere English, without precept, or imitation of any."

> The uses are divers: Short, that a swifte hande may therewith write Orations, or publike actions of speach, uttered as becometh the gravitie of such actions, *verbatim*. Secrete, as no kinde of writing like. And herein (besides other properties) excelling the writing by letters, and Alphabet, in that, Nations of strange languages, may hereby communicate their meaning together in writing, though of sundrie tonges.[38]

Here Bright turns (very influentially) to the example of Chinese *zì*—which we still call "characters," and which constitute the single writing system for multiple and mutually unintelligible idiolects. *Zì*, however, simply allow Bright to repeat his claim to be offering a major advance in orthographic technology. The oriental characters, he notes, "are very long, and harde to make,

that a dousen of mine, may be written as soone as one of theirs." Thus the very exemplar of short writing gets shortened in Bright's original system—a recursive pattern that is relentlessly repeated in later brachigraphic publishing.

So we are promised, for example, an *Abbreviation of writing by character, including an abstract of the whole art* (Edmund Willis, 1618); *A new art of brachigraphy … More faire, short, swift, lineall, and legible, than any forme of short-writing, formerly published by any* (Henry Dix, 1633); *The most exact and compendious methode of short and swift writing that hath euer yet beene published by any* (Thomas Shelton 1635); *The most easiest, exactest, and speediest method of all other that have beene yet extant* (William Cartwright 1642); *Short-writing shortned* (John Farthing, 1654); *An epitome of stenographie; or, An abridgement and contraction, of the art of short, swift, and secret writing by characters* (Job Everardt, 1658); *The true art of contraction or abreviation of sentences* (William Facy, 1672); *Short-hand shortned, or, The art of short-writing very much abreviated and facilitated* (Robert Stileman, 1673); *The newest, plainest, and the shortest short-hand* (Elisha Coles, 1674); and, finally, *Short-hand yet shorter: or, The art of short-writing advanced in a more swift, easie, regular, and natural method than hitherto* (George Ridpath, 1687). As we enter the eighteenth century, the proliferation of new shorthand systems, all promising ever greater efficiency and productivity, merely gathers pace and intensity.

Phenomenology of the Device: Upgrades All the Way?

The phenomenon that presents itself here, albeit on a platform of the seventeenth century, is highly recognizable to us in the twenty-first. Seventeenth-century shorthand represents a *technologization* of English letters. Characters, precisely as alienated from the existing field of literacy, offer themselves to it as a set of progressive and transformative tools. This is not to say that letters are not in the first place technological—of course they are. But it is to say that shorthand characters make an explicit *claim* of technologicality, recognizable in their pattern of (supposedly) ineluctable and endless improvement.

Nowadays, we have a word for that kind of thing: we call it an *upgrade*. A given device, marketed as practically perfect, nonetheless turns out to contain within itself an astonishingly wide, even limitless, margin of ever-yet-greater perfection. 2G becomes 3G, which therefore becomes 4 and 5, the iPhone C yielding to the S and the X and blah blah blah.

This bewildering and apparently unstoppable vector of intra-technical transformation defines our most advanced technologies, and therefore sketches a certain form for technology. In the logic of the upgrade, we feel most acutely the claim of the tool.

A dilemma results. On the one hand, recursive improvement (upgrading) means that the horizon of technology is always receding from us. Not for long, perhaps not even for a moment, is the next big thing the very device in our hands. No; almost before we can accommodate ourselves to its strangeness, tomorrow's innovation has become yesterday's news. On the other hand, and at the same time, the inevitability of technological upgrading constantly and as it were helplessly falsifies its own promise. For what the upgrade leaves in its wake—more and more swiftly, less and less ignorably—is, very evidently, an upgrade. The mountains of toxic obsolescence that feed our global recycling chains are, in this respect, phenomenologically emblematic. They are the fossil record of what is coming down the pipe. The chain of next big things, littering the past, right up to the present, suggests that the path it blazes to the future is merely tantalization. By identifying itself with its own reproduction, technology finds itself manifested, willy-nilly, in its own retroproduction.

And it gets worse. For the two-way street of technological change leads backwards so readily that it is difficult to know where it stops. The latest iPhone, for example, is a hot communications technology. But so, at the time, was the first one; and so was the pre-smart cell phone. So were landlines, pneumatic tubes, telegraphs, and the penny post (and so on). In the seventeenth century, as we have seen, a new shorthand system pointed the way to the future of communications. But so did the one before it; and so did the one before that. So, before shorthand, did alphabetic writing. And so, before writing, speech. "When thou didst not, savage | Know thine own meaning," says Shakespeare's Miranda to Caliban, "but wouldst gabble like | A thing most brutish, I endowed thy purposes | With words that made them known."[39] For Miranda, here channeling her father's stern sixteenth-century humanism, orality is nothing other than a technology that serves intention. Modern cognitive science and robotics might well hasten to add that intention is nothing other than a technology that serves biochemistry. And so on, all the way back to thermodynamics and the Big Bang.

To a naïve scientific consciousness, this can look like a pleasing result. But for the category of technology, it is self-defeating. Universalization, in this case as usual, leads to deconstruction, not reification. When a stream, for example, gets altered by a mill, we may feel that we have

witnessed an event of genuinely ontological importance—a sudden and decisive leap from the natural to the cultural. The thrill of technology, as a socio-economic offering, surely depends (in part) on this kind of phenomenological *frisson*. By that token, when we learn that the stream has always-already been altered—by previous stages of economies, by the actions of animals, even by the forces of the landscape—the thrill, to some extent, is gone. If there never was an ontology that wasn't always-already technology, then we have to ask what is actually happening when we receive or identify an instance of the latter. This kind of phenomenological head-scratching is inimical to the ideology of the device, which demands that we wonder at it, not about it. If everything is really technology—if it's upgrades all the way down—then it matters much less to point out that anything is.

In order to protect its phenomenological cogency, as the ground of its socio-economic urgency, a given technology actually has to inscribe its *difference* from the world that preceded and still surrounds it. Implicitly or explicitly, the technology has to project for itself a world where the technology *is not*. Neither can this simply be a matter of blinking at some parts of existence, or placing them *a priori* beyond the possibility of upgrading. No: technology has to assert itself to be *working upon*, controlling and transforming, some worldly substrate, which it thereby projects as non-technological or pre-technological. Not just an upgrade of an upgrade; but an intervention into the very manifold of being.

So Facebook, for example, isn't just an improved platform for an electronic mailing list; rather, it is a transformation and redefinition of the very nature of social contact. The automobile doesn't just build upon pre-existing equestrian networks; rather, it opens up entirely new and unforeseen ranges and forms within the experience of human freedom. The pill doesn't just do a better job than condoms or rhythm—on the contrary, it reconfigures the entire cultural and moral profile of sex. I'm retelling these stories not because I think they're necessarily true (or false), but because I think they are exemplary of the perpetual origin myth that technology is. The developed, the additional, the emergent, and the artificial always supposedly emerge from—and transform—the natural, the immanent, the primordial, and the naïve.

Now, when the technology emerges, the substrate, presumably, is lost. For now the posited horizon of the natural has become a site of the artificial. This doesn't mean that one no longer has a natural horizon, but—exactly to the contrary—that one is empowered to re-project it as distant

from the technological siting. That, of course, is exactly how and what and where the natural horizon is supposed to be.

So: our mill alters a bubbling stream. That site is now technological. The non-technological must be sought farther upstream. But "farther upstream" is precisely what our site was, before its alteration by a mill. Indeed, that was precisely what made the coming of the mill, in a strong sense, technological (rather than just an upgrade).

If, in fact, we do go farther upstream, we may re-attain the natural horizon—finding a site that we can treat as pre-technological. On exactly that basis, we will be empowered, again, to alter the site by imposing technology (such as a mill). If, in fact, we do that, then a site of the pre-technological will again have to be sought farther upstream. And if we find it, that will mean that we are empowered, again, to alter the site by imposing technology; and so on, and so forth.

There are three findings here. First, in altering a site of the pre-technological, technology also *establishes* the pre-technological, as such. That is to say, the site is now conceived and approached and experienced, normatively, from the side of the technological. This was not the case prior to the coming of the device. In our current example, a mill is placed on a stream. Thereafter, one can find oneself by a stream where there is no mill. But *that was impossible prior to the coming of any mill.* For then, being by a stream without a mill was just—being by a stream.

Compare: after the coming of the horse, there is going on foot. But prior to the coming of the horse, that was just going. After the coming of recording, there is live performance. But prior to the coming of recording, that was just performance. After the coming of the cellphone, there is leaving the house without one. But prior to the coming of the cellphone (not so very long ago, it seems to me), that was just leaving the house.

To be sure, being established as pre-technological throws a given site of experience—the mill-less stream, for example—into a new kind of relief. But this new relief, which may become a profound cultural desideratum, is exactly what we are talking about. We are constantly being told that technology enriches our experience, and in this respect, it does; albeit by opening windows onto potential deprivation. (People who sequester themselves in the wilderness, it turns out, are unusual devotees of the civilization they flee.) But what technology is *not* doing, in any such case, is participating in a binary relation that preceded the technology. Rather, the technology itself produces the binary, and consists within it.

Yet it seems that we have to fight to remember that. For the new difference gets folded back into a larger whole that is then presented as what was really there all along. So, for example, from the perspective of going—that is, walking—the new technique of horseback riding looks alien and bizarre. But it turns out just to be a different manifestation of a larger phenomenon encompassing both walking and riding: travel. From the perspective of the theatre—that is, live—the new cinematic capability for recorded and moving images is appallingly degraded. But it turns out to be an interesting extension of a larger phenomenon in which the theatre (unbeknownst to anybody) was actually participating: performance. From the perspective of telephony—that is, talking on the phone, where there is a phone—the new requirement or capability or whatever it is to be on the phone all the time is weird and oppressive. But it turns out to subsume the telephone, and the talker, and everything else, in an astonishingly large phenomenon that was always-already inescapable: namely, connectivity. These categories, *produced by* technological intervention, render it retroactively normative for our experience. Accordingly, if we are to think critically about technology in any given case, we need to try to be alert (if this be possible) to the *pre-determination* of our thinking by its normative categories.

That is the second finding; and here is the third. The non-technological horizon generates a regress. This is in fact a mirror image of the regress (upgrades all the way down) that technology avoids by asserting an ontological alienation between itself and its substrate. If the coming of the mill is understood as a categorical transformation of the natural into the cultural, the natural site is gone. To find such a site again, one must look farther upstream. But that means, if only because of the expansive inertia of technology, that that site itself will soon enough be submitted to the same categorical transformation. And so one will have to look yet farther upstream; and then yet farther; and so on. Technology, in order to keep performing the wonderful trick of its being, needs ever-more-distant horizons for its stage.

But there is a shortcut. It consists in projecting a previous technological horizon *itself* as what a technology transforms; not because it is an upgrade, but because the older technology gets treated as equivalent to the natural. This is the preferred and, as it were, final move in the ideology of the device. What was there before the mill? A quaint, bubbling stream. What was there before the power plant? A quaint, creaking mill. By covering its tracks, falsifying its continuities, technology can keep on performing its

phenomenological masque *ad infinitum*. The power plant manager who hangs a pretty painting of a water-wheel on his office wall is probably not deconstructing, but reifying, the transformative alienation that is supposed to obtain between technology and its own antecedent state.

This means, again, that if we are to think critically about technology, in any of its instances, we need to avoid the aesthetic or nostalgic assumptions that the technology itself presents. The historian Alain Corbin, in a study of the nineteenth-century French countryside, has focused on a decline within it of ringing and listening to church-bells. He finds that the "heyday of the bell," as a timekeeping device, came to an end with the coming of clocks and railways. This has been styled part of the "disenchantment of the world"—"a process that was already well under way by the mid-nineteenth century."[40] But clearly, early-modern bell-towers—complex and powerful fusions of metallurgy, architecture, and musicology—were heavily technological. And so for innumerable other aspects of cultures and economies prior to the nineteenth century. To suppose that the earlier technological period was "enchanted," such that the coming of a subsequent technological phase is like waking from a faery vision, is simply consistent with the ideological story-telling that I have just described.

To be sure, it is very important to understand (as we have been trying to do here) the stories that technology tells. But we need to try to follow them without getting led by them. In the concluding phase of this chapter, I want to argue that seventeenth-century shorthand maps on to the phenomenology of technological transformation. The question then is: what was there before this new device—and what is there after it?

A Wild Word

Shorthand, as we have seen, is in the first place an upgrade of alphabetic writing. But that is not what shorthand, in the last analysis, works upon. Actually, period brachigraphers are quite keen to deny that their art has any significant impact on the traditional skills of the pen. From the 1620s onwards, technical shorthand publications came to be supplemented by secondary marketing pamphlets, taking the form of dialogues between masters and prospective students. The latter, invariably, express a concern that the new writing will come at the expense of the old; making its adepts, for example, worse spellers. Not a bit of it, the master just as invariably replies: if anything, brachigraphy will actually strengthen your ordinary orthography, much as learning a foreign tongue makes your own feel even

more familiar.[41] Shorthand terms refer to English words—in the published manuals, written words—which they can, indeed, be used to transcribe. But this kind of text-to-text transfer is not primarily what the new systems are for. Rather, shorthand is supposed to be a kind of writing that leaps over writing, as it has existed heretofore; going, as it were, to the illocutionary source. Speech is the substratum of shorthand.

Primarily, and as we have already seen, shorthand works on sacred speech. Without the art, wrote Shelton in 1641, "the workes of many worthy Divines" would have "perished with the breath that uttered them."[42] But if you could "take sermons with your pen," as Willis put it in 1602, you could definitely also take "Orations, Mootes, Reportes, Disputations, and the like."[43] Theophilus Metcalfe, publishing his shorthand system at mid-century, extends the art's remit even further: to "the ready, and speedy description of places, manners, customes, pollicies, and government of each Nation." Accordingly, Metcalfe reckons brachigraphy generally useful for "Ambassadors, Messengers, [and] Travellers."[44] The skilled brachigrapher, armed with his stylus and writing-tables, amounts, in this vision, to a general recording device. Shelton, coining a phrase in 1630, urges that the art will allow its adepts to "take tyme in tyme ere tyme depart."[45] It is as though shorthand, by taking down verbatim the fluency of the tongue, defeats and stabilizes the diachronic flux that St. Augustine, famously, thought could only be captured in memory. And this because shorthand gets down on paper what Augustine considered the very music of time; played by its very organ.

"I cause the winged Pen to equipage | The fluent tongue with Characts luminous" wrote the (appropriately amazed, but not very metrical) author of a dedication to William Folkingham's 1622 *Brachigraphy*.[46] An epigram on the frontispiece of Simon West's 1647 shorthand tropes its advent in Neoplatonic terms: "Shaddows are vaine when substances appeare | Words are but wind which vanish in the ayre"; but West's "Improuing art," revealing the real core of the illocutionary phenomenon, allows us simultaneously "to speake *and* write"—"Words turnd to Inke with ease and much delight."[47] The figure of the inking utterance is also taken up in a dedicatory poem to Shelton's 1641 *Tachygraphy,* which exclaims that "Words from the speakers mouth dissolve to inke | And fall upon thy papers."[48] John Milton, varying the figure in his early poem "The Passion," imagines that his tears at the tomb of Christ would "fitly fall in ordered characters."[49] The lesser-known poet Francis Quarles imagines that in order to praise God's works appropriately he would need "a nimble tongue for

every Starre | And every word I speak a Character."[50] William Shakespeare's muse, in sonnet 85, is "tongue-tied" at the prospect of getting compiled by "character"; in sonnet 122, it is in flight toward the "full-charactered" writing tables of the brain.[51] But this kind of resistance is futile, according to the poem in praise of Shelton's *Tachygraphy*: "Nor can we scape (this spight his speed affords) | From being over-taken in our words." It is self-defeating even to "Speake … the Authors praise": "his Art commands" that "our tongues should be more cripled than our hands."[52]

These figures, implicitly or explicitly, offer a paradoxical construction of orality from the side of the new shorthand technology. On the one hand, orality is being represented as an intensional emanation: the very source of meaning, the streaming fountain of the mind. What occurs in brachigraphy, almost miraculously, is a kind of hermeneutic splash—from voice onto page. Yet on the other hand, and as though in reaction, orality is being represented as intensional frustration. The tongue vanishes; it flees; it is crippled; tied. Command and control of the oral, represented by shorthand, is directed toward an orality that resists command and control.

I would like to argue that it suits seventeenth-century shorthand to construct orality in this paradoxical or ambiguous way. The primary achievement of shorthand is to capture the fluent tongue—meaning, as it were, in the wild. By that very token, the wilder the meaning, the greater the capture. Sixteenth-century humanism, as we have recalled via Shakespeare's Miranda, already had a technology of the oral: rhetoric, which disciplined intensional gabble, turning it into a precise instrument. But training another instrument on that vision of orality would amount to little more than a technological upgrade. As we have seen from the commitment of its adepts, and the breathlessness of its marketing, seventeenth-century shorthand is supposed to be a technology in full. Not just a better way to make one's purposes known; but a transformation in the very significance and possibility of their expression.

We have already mentioned Stephen Egerton's *Ordinary Lecture* of 1589, which has been called the earliest shorthand report that we possess in any modern language.[53] Egerton's sermon was taken down and then transcribed by a "yong practitioner" who identifies himself only as A.S. In his preface to the *Ordinary Lecture*, the stenographer explains that he wants the book to serve both as an account of Egerton's inspiration, and as a demonstration of this new "Art called Characterie." Egerton's words appear only in the sermon itself, and there is no indication of his involvement in or approval of the publication.[54]

That changes in the second edition (1603), to which Egerton contributes his own preface. But grudgingly. A.S., the preacher says, seemingly "respected the commendation of his skill in Characterie, more than the credit of my ministery." Accordingly, Ergerton goes on to deliver a little lecture "touching noting at Sermons":

> For the thing it selfe, I dare not (with some) condemne it as unlawful, but rather commend it as expedient, if there be judgment, memory and dexteritie of hand in the partie. Above all things … a good conscience is most requisite, both for the present time, that his own hart who writeth be not hindred, and defrauded of the fruite and power of the word, by the exercise of his head, and the labour of his hand: neither yet the Minister wronged, nor filthy lucre or vaine-glory aymed at. … Therfore to conclude this point, my advice is, to such as have willing harts, and ready hands, and convenient places to write at Sermons, that they would use it for their owne private helpe and edification, and to the comfort and benefite of their families, and such christian friends as they shal have occasion to conferre withal in private.[55]

Egerton's tone is familiar—if you have grown old enough to be bugged by this or that "yong practitioner." The old preacher will not quite condemn the new "skill in Characterie"; but he will insist that it needs to be used properly, directed toward the objects that really matter. For all the world like a twenty-first-century lecturer asking his students to look up from their phones, Egerton urges that the new technical capabilities have to serve the good old goal of learning—and not the other way around. But in any case, the current point is that Egerton does not see *An Ordinary Lecture*, or A.S.'s hand in it (so to speak) as trivial or inconsequential. Rather, he sees shorthand as a momentous development, a technological rupture, that one simply has to accept. "Noting at sermons," as far as Egerton can tell, circa 1603, is the next big thing.

The question therefore becomes (as it always does): where does the new device leave old practices? Egerton is unsure. He has agreed to go along with the second edition of the *Ordinary Lecture*, he says, in the hope of reaching a larger audience. But it is audience, literally (or rather, aurally), that he has in mind. "Whosoever can judge aright," Egerton reflects,

> shall find it a rare and difficult point to be a good-pen-man. It is one thing to speak profitably to the common people, and an other thing to write commendably in this ripe and learned age; neither is every one that can make

> a good sermon, able to write a good stile. It appeareth by ancient record, that in pleading before the people *Pericles* and *Hortensius* were little inferior to *Tullie* and *Demosthenes*; but in penning their Orations, they were no way comparable unto them.[56]

Egerton's classical touchstones reveal his university education, and his style would be no embarrassment to a "good-pen-man." The pose of reluctance to publish, moreover, is far from uncommon in sixteenth-century print culture. Nonetheless, the point is that Egerton takes up this pose through a hermeneutic opposition of writing to speaking. The orator *is not* the writer, according to this ancient view; and neither is there any natural or inevitable relationship between them. It appears to be precisely the advent of short-writing, and his own somewhat reluctant collaboration with A.S., that has moved Egerton to re-assert these binaries.[57]

Indeed, Egerton goes on insist, in a long passage about the nature of preaching, on the *priority* of orator to writer. This is a traditional corollary of his traditional hermeneutic, as well as being an urgent issue for the radical Protestantism of the late sixteenth century. Yet the primacy of the oral, as Egerton goes on to articulate it, appears newly, and paradoxically, and even troublingly reproduced via the encounter with shorthand. "He that hath the greatest measure of grace," the preacher explains,

> doth not handle always the like subject or matter, but as occasion is offered by that scripture which he hath undertaken to interprete. The same man is not alwayes alike prepared, or at the least equally assisted by the spirit of God, either in remembering that which he hath studied, or in uttering that which he remembreth, with the like grace of speech and power of the spirit … Hence it commeth often to passe … that one, and the selfe-same man shall at some times farre exceed himselfe, and that perhaps, when he is most meanly prepared, and sometimes come far short of his ordinarie gift and grace of deliverie, and that when he hath taken most paines … To these things might be added (which I my self have found by some experience) that the swiftest hand commeth often short of the slowest tongue: as I have perceived by diverse things which I have seene penned from mine owne mouth, who am constrained thorough the straightenes of my breast, and difficulty of breathing, to speak more laysurely then most men doe, or I my selfe willingly would.[58]

The sign of Egerton's gifts as a preacher is nothing other than the physical restraint that makes it difficult for him to preach. His "crippled tongue" commits him to orality as something *uncontrollable*. (One thinks here of

singers like Joe Cocker, or Tom Waits: artists whose genius is manifested in their *struggle* to be heard.) Speech has to be sought, attended, hoped for, lost. It appears where it was not looked for, disappears where it was, takes you by surprise, overwhelms, retreats. The more it comes for you—the more grace you receive—the less likely it is that your utterance can be expected. Yet *this is precisely what places the tongue above and beyond the pen*. The short-writing hand, ready and waiting to capture the preacher's tongue, illuminates the latter as wild, strange, and pure.

This is consistent with our third finding in the previous, theoretical, section. A new technological intervention, as such, can project a previous technological phase as its substrate, equivalent to the natural. Interestingly, Egerton's colleague Henry Smith, just a few years after the *Ordinary Lecture* of 1603, would try to promulgate something he called the "Art of Hearing"; this can be understood as an attempt to re-technologize orality, as though in counter to shorthand.[59] But Egerton, it seems, goes exactly the other way. He is writing from a background of Cambridge education, encyclopedic Bible knowledge, and decades of professionalization in the radical Protestant cause; including innumerable sermons and several stretches in prison. He is trained, sophisticated, brilliant, tempered. Meanwhile, the orality on behalf of which he speaks, circa 1603, is itself the product of centuries, indeed millenia, of disciplined development; including the art of memory and the entire tradition of rhetoric, reaching back to the schools of the Roman forum and the teachings of the Greek Sophists. Egerton's orality, in short, is every bit a technology; and he, deploying it, is every inch technological. Yet in the encounter with shorthand he presents himself as raw, his utterance as primordial. Not a power plant (in terms of our core phenomenological example); but a water-wheel, turning crudely in the mist.

Why does Egerton embrace, rather than resisting, this re-naturalization of orality? Presumably, not for the sake of shorthand. Although it is easy to overstate his negative reaction, it is clear at least that Egerton has mixed feelings about the new technology. One observation we can make here is that the ideology of the device does not only depend on its "young practitioners," but potentially involves and shapes the thinking of all who participate in its narratives—even those who are displaced or miffed by it. But I think we can also push this insight farther. It has been argued that the coming of shorthand threatened and impeded the orality of late-sixteenth century London—a golden time and place (we are told) of the spoken word. The advent of the stenographer, allegedly, is the beginning

of the end for the oral preacher. But if the analysis we have attempted in the previous section is correct, things should actually work the other way around. The coming of the stenographer should constitute the *beginning of the beginning* for the oral preacher, as such. For before the stenographer, oral is just what a preacher is. Thus one way to understand Egerton's participation in the re-naturalization of the oral is that it *suits him,* as an oral utterer, to do so. Orality is thrown into *relief* by the coming of shorthand. Established as natural, or pre-technological, orality becomes accessible in a new and precious way. This is consistent with our first finding in the previous section.

And the second finding (with apologies for taking them out of order)? We stated that the differences established by new technologies tend to get folded back into larger phenomenological wholes. These are then presented as having been "really" there all along, merely being revealed through their technological and (supposedly) pre-technological manifestations. So, horse and foot yield travel. Cell and phone, connectivity. Film and theatre, performance. Mill and stream, landscape. The challenge for critical thinking is to recognize these categories without presupposing them. Mandated here is not skepticism about the constructed category, but mindfulness that it may result from the very technological intervention that we are trying to study. If we want to understand the advent of mill technology, for example, we will do well not to presuppose landscape as the category into which it intervenes; not, that is, if we are also trying to understand landscape as the category that results from the intervention.

What results from the intervention of early-modern shorthand into orality? I think the answer to this question is indicated by some of the poetic figures, quoted above, via which people close to this intervention in the period reacted to it, and tried to make sense of it. They are figures of the *writing tongue*. The metaphor is mixed, even grotesque. That means it is mashing up things that really do not belong together—even by the standards of metaphor. As I will discuss in Chap. 4, early-modern people did not assume as a matter of course that speaking and writing were different technical moments of the same intensional emanation. Rather, they seem to have seen orality and literacy as competing, yet associate, in a loose, contested, and as yet untheorized way. This is a familiar topic of early-modern intellectual history, but I think the shorthand movement allows us to grasp its implications newly and decisively. If the tongue writes, as it does through shorthand, what results from the early-modern point of view is neither speaking (the domain of orality) nor writing (the domain

of literacy). Rather, what results is a new category—a new whole, rich and strange, in which both writing and speaking suffer sea change. To this new whole, they then can be said to have belonged all the time.

The inevitable name for this category is *language*. Following up on the relationship between the technology of characters, and the phenomenology of language, will be the work of the next chapter. For now, there are two points to keep in mind. First: if language is what results from the mash-up of pen and tongue, it is by that token not already present in either of those antecedent elements. The technological tendency, as we have discussed, is to suggest that the new phenomenological whole, resulting from technological intervention, was always-already there. But this is the tendency we need to resist, if we are to attempt a critical examination (and who knows if we will succeed) of the given technological process. In the first instance, and as we have seen, seventeenth-century shorthand actually prompts a renewed alienation between the written and the oral. Characters are not continuous with, but over and against, the spoken word. What this means for our purposes is that characters, per the assumptions of the seventeenth century, are in the first place *not* items of language. What they are items of is something we need to try to find out.

Second, as I hope we have seen, there are reasons to think that the seventeenth-century shorthand movement is an important point of historical origin for the emergence of the modern concept of language. This precisely does *not* mean, however, that we can or should assume or deploy this concept in our efforts to understand period shorthand or its immediate legacies—notably, for my purposes, the real-character movement. If we assume "language" as the category to which characters belong, we are letting this technological intervention of the early-modern period lead us along. What we need to try to do, instead, is *see where* it leads us.

Coda: The Theophrastan Character

It remains in this chapter to deal with a problem I adumbrated at the beginning. Strictly speaking, it is tangential to our purposes in this book. But it will bug the reader all the way through if we don't get it out of the way.

As I have noted, early-modern usage of the word "character" does not extend to our modern sense of "personality" or "morals." It does, however, extend to literary sketches or descriptions, moralizing or satirical, of personalities, places, and many other things. Scholars call these texts

"Theophrastan" characters, after the ancient Greek satirist whose work they resemble. Character-texts of this kind constitute a huge archive—more than a thousand records—among English publications of the period.[60] They are titles like *A Brief Character of the Low-Countries under the States being three weeks observation of the vices and vertues of the inhabitants* (1659); *The Character of the Province of Mary-land … Described in four distinct parts* (1666); *The young maids character of an ungrateful batchellor: being a full discovery of all those tricks, cheats, and delusions, whereby young men do often deceive, and many times ruine their too credulous sweethearts* (1677); and *The character of a Quaker in his true and proper colours, or, The clownish hypocrite anatomized* (1672). Probably, our modern sense of "character" is a figurative after-effect of these then very popular (but now almost totally forgotten) seventeenth-century works. Via metonymy, a word for a text *about* personalities came to denote the personalities themselves. But telling that story, and seeing if it is true, would require another book. In this one, it will suffice to ask: what relation, if any, is there between the Theophrastan "characters" of the seventeenth century, and the "characters" of brachigraphy?

The short answer is probably going to be: "no effective relation at all." But the long answer, if we are to attempt one, has to begin from the historical priority of brachigraphy over Theophrastus in seventeenth-century English letters. The antiquarian Isaac Casaubon brought out the first full-dress early-modern edition of *Theophrastus* in 1592, a second part in 1599; but these books appeared in France (specifically Lyon), and in Latin.[61] The first Theophrastan characters in English literature are usually reckoned to be those published by Joseph Hall in 1608.[62] That is 20 years after Bright's *Characterie* (1588)—which, as we have noted, is the first recorded English publication to offer anything to do with any kind of "character" to its prospective buyers. Bright's book, for that matter, comes four years before Casaubon's first Latin edition of Theophrastus. After Bright, in the published record of English books about "characters," come the very strange and wonderful fish-hieroglyphics of 1589; then Bales's *Writing Schoolmaster* (1590)—then the shorthand reports, 1590–91, "taken by characterie" from Egerton's, Tyrrell's, and Smith's sermons. Then Bales's *Art of Brachigraphy* (1597). Then the 1598 version of the characterical fish-tale. And then?

And then, we come to a very interesting text, by a very interesting person, in what is for us a very interesting year. In 1600, Shakespeare's great rival Ben Jonson published his play *Every Man out of His Humour,* acted

at the Globe Theatre the year before.[63] Going through four printings, the book was "a wild success" by the contemporary standards of playbook publishing.[64] This was auspicious, because the 1600 quarto of *Every Man out (EMO)* was not only the first edition of this particular play; it marked the first time (as far as the records show) that Jonson published any of his plays (or, for that matter, anything at all). As students of the period will be aware, plays—popular entertainments, designed to make money until the public tired of them—did not get published as a matter of course at the turn of the seventeenth century. Jonson himself would be instrumental in changing that state of affairs, while insisting (at the cost of some ridicule) that plays as good as his should be seen as properly and truly literary. His efforts, and his argument, would culminate in his magisterial collected *Works,* containing both plays and poetry, of 1616. But it all began with the little *EMO* of 1600.

The play's full title page features another first. "The comedie of Every Man out of his Humour," it reads: "with the several Character of every person." This refers to the play's *dramatis personae*, which Jonson has expanded into little personality-sketches. We read, for example, of Puntaruolo, "*A Vaine-glorious Knight, over-Englishing his travels, and wholy consecrated to* Singularity"; of Carlo Buffone, "*A Publik-scurrulous and prophane Iester, that … with absurd* Simile's *will transform any person into Deformity*"; and of the Chorus member Mitis, who "i*s a person of no Action, and therefore we have REASON to afford him no* Character."[65] As that last example makes clear, it is the satirical *sketches* of each dramatic "person," and *not* the persons themselves, that constitute Jonson's "characters." An über-humanist, Jonson would very likely have known his Theophrastus, whether from Casaubon or other sources. In the *dramatis personae* of *Every Man Out*, we appear to have the original, seminal manifestation of the Theophrastan craze that would emerge in English literature in the following years.

But we also have—I think—a juxtaposition with the brachigraphic sense of "character" that had emerged in the preceding years. After the "characters" of the 1600 *EMO*—though *not* when the play was reprinted in Jonson's *Works*, 16 years later—we find the following apologetic note:

> It was not neere his thoughts that hath published this, either to traduce the Authour; or to make vulgar and cheape, any the peculiar and sufficient deserts of the Actors: but rather (whereas many Censures flutter'd about it) to give all leaue, and leisure, to judge with distinction.[66]

That does not sound like a poet-playwright displaying his self-declared genius in print for the first time. It doesn't even sound like a printer who has worked closely with such an author—even though bibliographers reckon that Jonson's probably did with him.[67] Rather, the 1600 apology for *EMO* sounds like the words of somebody who has *not* worked with the author; somebody who would like readers to forget, or ignore, or just not mind, that he has ripped off, "traduced," the words he has brought to print. The apology for *EMO* sounds, in short, like something a "young practitioner" of short-writing might say.

I am not suggesting that Jonson's first publication had been taken by characterie. But I am suggesting that the book may well have *looked that way,* at first glance, to its prospective buyers in 1600. Consider that *Every Man Out* is only (by my count) approximately the 15th publication ever to appear in English with the word "character" (or its derivatives) on the title page. It is the very *first* such publication (once again, as far as the records show) in which the word "character" does *not* evidently refer to short-writing. Meanwhile, and as we have seen, the play appeared on bookstalls in a year when our keyword had become significantly hip, via the short-writing technology piloted in 1588. Perhaps Jonson's publisher, taking a risk with a relatively new kind of product (a playbook) hoped for a marketing advantage by a tantalizing association with this modish "character" business. Or perhaps the poet himself—intermittently in trouble with the authorities throughout his early career—thought a whiff of characterie might provide a screen of deniability, as he risked his satire in print for the first time.

It is entirely possible that short-writing was deployed in the early-modern playhouse.[68] This would have happened, not for love, but for money. The professional London theatre, itself a technological innovation of the 1570s, was a veritable cash machine for its successful stakeholders (unsurprisingly, given that its main competition for the entertainment penny was bear-baiting). As we have noted, plays of the period were by no means destined for the press. Moreover, copyright in our sense was basically non-existent. Under such conditions, a team of stenographers could, in principle, tap the theatrical revenue stream. Taken by characterie, and supplemented by memory—perhaps even "examined after" (along the lines of the sermon transcriptions) by thespian confederates—popular play-texts could be rushed into print, mistakes and all. To *buy* a play, and have it at home, must already have seemed a thrilling new possibility, cutting through the established practice of travelling to an ephemeral

entertainment in a purpose-built location. All the more thrilling, then, for the play-book to represent a semi-illicit snapshot of that very entertainment; as it had actually occurred, in our terms, "live."

By that token, the thrill must have been lost on a young poet-actor trying to make a name for himself, and a living to boot. There are strong indications, in *EMO*, that the 28-year-old Jonson has short-writing on the brain. *EMO* is a play-within-a-play, hosted by a moderator, called Cordatus. It is full of farcical scenes involving writing, recording, misprision, and misrepresentation. At one point, Cordatus denounces "narrow-eyed decipherers" in the audience, who

> will extort strange and abstruse meanings out of any subject, be it never so conspicuous and innocently delivered. But to such, where'er they sit concealed, let them know, the author defies them and their writing-tables; and hopes no sound or safe judgment will infect itself with their contagious comments, who, indeed, come here only to pervert and poison the sense of what they hear, and for nought else.[69]

In early seventeenth-century English, to decipher is not only to *de*code, but also to *en*code, or set down. Bales uses it both ways in the introduction to his brachigraphy, and in *Every Man Out*, too, we find both senses. Writing-tables, meanwhile (and as we have seen), would have been the ideal platform for short-writing. Jonson is protesting, in a play obsessed with self-presentation and representation, against people who "decipher"—take notes—in the playhouse. They may claim, he is saying, to be faithful to the performance. But in fact they hate and distort it. Characterie is not to be trusted.

Indeed, a perennial critique of early-modern brachigraphy, and a basis for modern scholarly skepticism about it, was its (alleged) inaccuracy. Surely the short-writing hand would bring in many distortions; and surely short-writing systems would struggle to mirror the true complexity of discourse. It is intriguing to read *EMO* with this critique in mind. The satirist Asper, Jonson's avatar, finds much to criticize in his audience. In particular, his hackles are raised by nonchalant fops, who "Sit like an Aristarchus, or starke ass."[70] The second half of that line, from the exceedingly witty Jonson, would barely count as a joke in a humanist schoolyard. But it works pretty well as a stab at the kinds of mistakes, or crude aural reductions, that could be made by ill-educated short-writers. Both "starke" and "ass," as it happens, are among Bright's charactery words. Similarly forced

wordplay, as though designed to trip up brachigraphers, involves a syzygy of "simile" and "smile," and the nonsense neologism "arride."[71] Cordatus, in the same passage where he denounces "decipherers," reassures us that no real classes of Londoners can be meant by Jonson's "humorous" caricatures. "That were to affirm," he says, "that a man writing of Nero, should mean all emperors; or speaking of Machiavel, comprehend all statesmen; or in our Sordido, all farmers."[72] But this kind of reduction—the inflected "Nero" becoming the radical "emperor," "Machiavel" becoming just "statesman," and so on—is exactly what would tend to happen under the pressures of real-time characterie.

As a public figure, Ben Jonson was boisterous and irrepressible. But as a poet, he was profoundly conservative. Writing had to be disciplined: words expressing their proper ideas, and style fitting its proper subject-matter. And works had to be authorized—literally: made by an author, one worthy of that name, and remaining under his proper oversight, from pen to press. If language were allowed, as was its wont, to go madly off in all semantic directions, it would lose its proper capacity to express discrete thoughts. And if texts were allowed, as was their tendency, to get copied and traded ad hoc, the poet stood to be misrepresented, the public miseducated. Not for Jonson the semantic outrages of his rival Shakespeare, constantly and consciously revelling in the glorious misuse of words. Neither, for Jonson, the authorial *sprezzatura* (casual super-cool-ness) of his friend John Donne—treating his brilliant lyrics like jokes around the bar, to be jotted down and passed around, as though on the back of a napkin. No: for Jonson, the poet had to control his texts, just as he did his words. Only in that way could he properly follow his artistic and moral calling.[73]

Characterie would have looked to Jonson like, approximately, his worst nightmare. The term itself, in its technical sense, was a grotesque neologism—to say nothing of the fake-Greek "brachigraphy." It was exactly the kind of confusing nonsense that arose when people ignored or violated the proper extension of words. What was worse, the short-writing art promoted mere dexterity over genuine intellectual acuity. Learning how to use words properly was a laudable, even unmatchable, goal. But learning how to scribble them quickly? That was little better than a parlor trick. Finally, the technology of verbatim copying presented the possibility—at least if its marketing claims were true—that the playwright's work could get stolen from him as soon as it was uttered. Jonson's art and livelihood, just getting going in 1600, might get crushed in the presses of an illicit

and chaotic publishing. Lost in the translation would be the poet's ability to train and educate his public, in, and through, a controlled and productive language. The result, in a vicious circle, would be a further reduction in the critical consciousness that was supposed to be able to see through trendy baubles like characterie.

To defend his oeuvre, a playwright could at least publish his own work. "Containing more than hath been publikely spoken or acted," promises the title-page of the 1600 *EMO*; it is as though Jonson is both heading, and warding off brachigraphy. But what of the linguistic and literary degradation that characterie embodied and fostered? Perhaps, as Ben's namesake Samuel Johnson would ruefully concede the better part of 200 years later, a conservative poet could do little against this sort of dim tide. But perhaps, on the other hand, he could try. I have suggested that prospective buyers of *EMO*, in 1600, may have assumed its titular "character" to have something to do with short-writing; an assumption apparently confirmed by the publisher's apologetic note. Reading the play, they would indeed have heard noises about short-writing (perhaps more than we can)—but these noises, surprisingly, are unremittingly critical. In the end, the original readers of *EMO* may have had to ask: What the heck does "character" mean, in a text so hostile to characterie? And the answer, right after the title-page, is Jonson's personality-sketches: caustic, pithy, Theophrastan *characteres*. Bright, as we have seen, re-extended the familiar and eclectic term "character" to the select requirements of his short-writing system. Jonson, I'd like to argue, *re-extended the re-extension*—deflecting and distorting the technical term, by appropriating it to a better purpose. What are "characters," Jonson asks his readers? *These* are characters, he quickly answers—not those little ink-spots you had in mind. Jonson re-inflects our keyword toward its true Latin root, and its ancient literary heritage. There could be no more brilliant counter-strike, against a bogus coinage, by the conservative humanist.

All of which is, necessarily, hypothetical. Nonetheless, it is clear that Bright's technical term, "character," came by early in the seventeenth century to have this second, semi-technical meaning, barely if at all related to the first one. The historical priority of the brachigraphic sense in English suggests that the Theophrastan borrowing was exactly that—whether or not Jonson bore primary responsibility. In 1608, Joseph Hall introduced his Theophrastan *Characters* by explaining that some ancient moral philosophers "bestowed their time in drawing out the true lineaments of every virtue and vice, so lively, that who saw the medals, might know the

face: which Art they significantly termed Charactery."[74] It is as if Hall, looking back 20 years at Egerton's "yong practitioner" of the "art called characterie"—that is, short-writing—quotes *The Princess Bride*: "I do not think this word means what you think it means." But young A.S., for his part, might read that right back to Hall. For the rest of the seventeenth century, the Theophrastan and brachigraphic senses of keyword would share it, while ignoring each other. And that, I guess, brings us back to the short answer.

Conclusion: Into the Real

We have now completed our character of "character" in early-modern England. Laying the Theophrastan sense of the term firmly aside, we will focus for the remainder of this book on the legacy of its brachigraphic meaning. Out of short-writing, a revolutionary communications technology of the late sixteenth century, would emerge "real characters"—a yet more revolutionary communications technology of the mid-seventeenth century. In the new characters, I will argue, we can begin to perceive and critique the shapes of information.

Notes

1. According to a search of the online version of the *English Short-Title Catalogue* (*ESTC*). Examples: William Folkingham, *Brachigraphy, post-writ* (London, 1620); Thomas Shelton, *Tachygraphy the most exact and compendious methode* (London, 1639); William Cartwright, *Semography* (London, 1642); Henry Reginald, *A concordance of letters to reade all the learned, vulgar or forraigne languages in Europe: with a most useful Radiographie of late invention* (London, 1628); and Thomas Shelton, *Zeiglographia. Or, A new art of short-writing never before published. More easie, exact, short, and speedie than any heretofore* (London, 1649). There appears to be, at present, no comprehensive scholarly survey of the seventeenth-century English shorthand movement. But see Adele Davidson, *Shakespeare in Shorthand: The Textual Mystery of King Lear* (Newark: University of Delaware Press, 2009); and Arnold Hunt, *The Art of Hearing* (Cambridge: Cambridge University Press, 2010).

2. Again, according to *ESTC*.
3. See Timothy Bright, "An instruction to the reader, how the art is to be learned," in *Characterie. An arte of shorte, swifte, and secrete writing by character. Inuented by Timothie Bright, Doctor of Phisike* (London, 1588), sigs. A7-B6^{v}.
4. See Donald Beecher and Grant Williams (eds), *Ars Reminiscendi: Mind and Memory in Renaissance Culture* (Toronto: Centre for Reformation and Renaissance Studies, 2009); Rossi, *Logic*; Mary Carruthers, *The Book of Memory: A Study of Memory in Medieval Culture* (Cambridge: Cambridge University Press, 1990); and Frances A. Yates, *The Art of Memory* (Chicago: University of Chicago Press, 1966). See also Rhodri Lewis, "A Kind of Sagacity: Francis Bacon, the *Ars Memoriae* and the Pursuit of Natural Knowledge," *Intellectual History Review* 19.2 (2009): 155–75.
5. John Willis, *The art of memory so far forth as it dependeth vpon places and idea's* [sic] (London, 1621), sig. A3^{v}.
6. For an introduction to the topic see Ann Blair, "Humanist Methods in Natural Philosophy: the Commonplace Book," *Journal of the History of Ideas* 53 (1992): 541–51. See also Richard Yeo, "Between Memory and Paperbooks: Baconianism and Natural History in Seventeenth-Century England," *History of Science* 45 (2007): 1–46; and Rhodri Lewis, "Hamlet, Metaphor, and Memory," *Studies in Philology* 109 (2012): 609–41.
7. See Peter Stallybrass, Roger Chartier, John Franklin Mowery, and Heather Wolfe, "Hamlet's Tables and the Technologies of Writing in Renaissance England," *Shakespeare Quarterly* 55.4 (2004): 379–419.
8. See Jessica L. Malay, "Jane Seager's Sybilline Poems: Maidenly Negotiations through Elizabethan Gift Exchange," *English Literary Renaissance* 36.2 (2006): 173–93.
9. See Patricia Brewerton, "'Several Keys to Ope' the Character: The Political and Cultural Significance of Timothy Bright's *Characterie*," *Sixteenth Century Journal* 33.4 (2002): 945–61; and Lori-Anne Ferrell, "Method as Knowledge: Scribal Theology, Protestantism, and the Reinvention of Shorthand in Sixteenth-Century England," in Pamela H. Smith and Benjamin Schmidt (eds), *Making Knowledge in Early-Modern Europe: Practices, objects, and texts, 1400–1800* (Chicago: University of Chicago Press, 2007), 163–77.

10. See William Eamon, *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1994); J.D. Fleming, *Milton's Secrecy and Philosophical Hermeneutics* (Aldershot: Ashgate, 2008), 16–25; and Daniel Juette, *Das Zeitalter des Geheimnesses: Juden, Christen und die Oekonomie des Geheimen, 1400–1800* (Goettingen: Vandenhoeck & Ruprecht, 2011).
11. Stephen Egerton, *An ordinary lecture. Preached at the Blacke-Friers, by M. Egerton. And taken as it was vttered by characterie* (London, 1589).
12. Anthony Tyrell, *A fruitfull sermon preached in Christs-Church the 13. of Iulie. Anno 1589. By Anthony Tyrell sometime a seminarie priest. But by the great mercie of God made a true professor of the Gospel, and preacher of his holy word: conteining an admonition vnto vertue, and a dehortation from vice. Taken by characterye* (London, 1589).
13. Tyrell, *A fruitfull sermon*, sigs. A6^{v}, A8.
14. Henry Smith, *The benefit of contentation. Taken by characterie and examined after… Printed by Roger Ward, for Iohn Proctor, and are to be solde at his shop vppon Holborne bridge* (London, 1590); *The benefite of contentation. By H. Smith. Taken by characterie, and examined after … Printed by Abel Jeffs* (London, 1590); *The benefite of contentation. By H. Smith. Taken by characterie, and examined after … Printed by Abell Ieffes for Roger Ward* (London, 1590); *A sermon of the benefite of contentation. By H. Smith. Taken by characterie, and examined after … Printed by Roger Ward, for Henry Car* (London, 1590); *A sermon of the benefite of contentation. By H. Smyth. Taken by characterie …Printed by Roger Ward, for Iohn Proctor, and are to be sold at his shop vpon Holborne bridge* (London, 1590); *The benefite of contentation … Printed by Abell Ieffes, dwelling in the old Bailie. at the goulden Cup* (London, 1591); *The benefite of contentation newly examined and corrected by the author. … Printed by Abell Ieffes* (London, 1591).
15. Stephen Egerton, *A lecture preached by Maister Egerton, at the Blacke-friers, 1589. Taken by characterie, by a yong practitioner in that facultie: and now againe perused, corrected and amended by the author* (London, 1603).
16. Peter Bales, *The writing schoolemaster conteining three bookes in one, the first, teaching swift writing; the second, true writing; the third, faire writing. The first booke, entituled; The arte of brachygraphie …*

The second booke: named, The order of orthographie … The third booke, is, The key of calygraphie (London, 1590); and *The arte of brachygraphie that is, to write as fast as a man speaketh treatably, writing but one letter for a word. With sundry new additions, since the first edition, and better helpes for the ease of the said arte: the order of orthographie, most brieflie set down, for the speedie writing of true English: the key of kalygraphie, opening the readie way to write faire: in briefe rules deliuered* (London, 1597).

17. See the Preface to Johnson's *Dictionary* (1755), in M.H. Abrams et al. (eds), *The Norton Anthology of English Literature*, 7th ed. (New York: Norton, 2000), 2719–25.
18. This is data that I have gathered from the database *EEBO* (*Early English Books Online*), and parsed through the data visualization software Tableau (thanks to Cynthia van Ginkel for her invaluable assistance). *EEBO* purports to contain all books published in English from the beginning of printing until approximately 1700.
19. William Shakespeare, *Hamlet*, ed. G.R. Hibbard (Oxford: Oxford University Press, 1987), 4.7.43–48. Subsequent citations in body of my text.
20. Shakespeare, *The History of King Lear*, ed. Stanley Wells (Oxford: Oxford University Press, 2000), 2.58–9. Subsequent citations in body of my text.
21. *A breefe coniecturall discourse, vpon the hierographicall letters & caracters fovnd upon fower fishes taken neere Marstrand in the kingdome of Denmarke, the 28. of Nouember 1587. Treated by considerations poligraphicall, theologicall, Thalmudicall & cabalisticall* (London, 1589), sig. A2.
22. *A most strange and wonderfull herring taken on the 26. day of Nouember 1597, neere vnto Drenton sometime the old and chiefe cittie of the kingdome of Norway. Hauing on the one side the picture of two armed men fighting, and on the other most strange characters, as in the picture is here expressed. First printed in Dutch at Roterdam by Ian van Doetecam. And now translated into English* (London, 1598).
23. Henry Holland, *A treatise against witchcraft: or, A dialogue, wherein the greatest doubts concerning that sinne, are briefly answered* (London, 1590), sigs. A4, C2, D2^{v}, E1.
24. Hugh Broughton, *A treatise of Melchisedek prouing him to be Sem, the father of all the sonnes of Heber, the fyrst king, and all kinges*

glory: by the generall consent of his owne sonnes, by the continuall iudgement of ages, and by plentifull argumentes of scripture (London, 1591), sig. E3.

25. Thomas Heath, *Stenographie: or, The art of short-writing Composed in a more brief, plain, and easie way, then hitherto hath been published. By which art, sermons, speeches, or the like, may be taken word for word, with very little or no charge to memory* (London, 1644), sig. A1^{v}.
26. Joseph Mede, *The key of the Revelation, searched and demonstrated out of the naturall and proper charecters of the visions. With a coment thereupon, according to the rule of the same key; published in Latine by the profoundly learned Master Joseph Mede B.D. late fellow of Christs College in Cambridge … Translated into English by Richard More of Linley in the Countie of Salop. Esquire* (London, 1643), 27.
27. Bales, *Arte of Brachygraphie*, sig. A10.
28. William Folkingham, *Brachygraphie, post-writt. Or, The art of short-writing* (London, 1622), sig. A4^{v}.
29. Shelton, *Short writing the most exact methode* (London, 1630), sig. A3^{v}.
30. On Browne see Reid Barbour, *Sir Thomas Browne*: *A Life* (Oxford: Oxford University Press, 2013); Reid Barbour and Claire Preston (eds), *Sir Thomas Browne: The World Proposed* (Oxford: Oxford University Press, 2008); and Hugh Aldersey-Williams, *In Search of Sir Thomas Browne: The Life and Afterlife of the Seventeenth Century's Most Inquiring Mind* (New York and London: Norton, 2015).
31. Browne, *Religio Medici* I.12 and II.2, in C.A. Patrides (ed.), *Sir Thomas Browne: The Major Works* (London: Penguin 1977), 73–74, 135–36.
32. Browne, *The Garden of Cyrus*, Chapter III, in Patrides (ed.) *Sir Thomas Browne*, 361.
33. Browne, *The Garden of Cyrus*, Chapter IV, in Patrides (ed.) *Sir Thomas Browne*, 377–78.
34. Browne, *The Garden of Cyrus*, Chapter V, in Patrides (ed.) *Sir Thomas Browne*, 381–82.
35. See Fleming, *Milton's Secrecy*, 16–25; and "Afterword: The Art of the Field," in J.D. Fleming (ed.), *The Invention of Discovery, 1500–1700* (Aldershot: Ashgate, 2011), 181–87.
36. See Jeremiah Rich, *The book of the New Testament of our Lord and Saviour Jesus Christ, according to the art of short writing invented by Ieremiah Rich* (London 1659); *The whole book of psalms in meter*

according to the art of short-writing written by Jeremiah Rich author and teacher of the said art (London 1659); and William Addy, *Holy Bible, containing the Old and New Testaments with singing Psalms in shorthand* (London, 1687). See also Davidson, *Shakespeare in Shorthand*, 57–61.

37. Milton, *Areopagitica*, in Stephen Orgel and Jonathan Goldberg (eds), *John Milton: The Major Works* (Oxford: Oxford University Press, 1991), 252.
38. Bright, *Characterie*, sigs. A3-A3^{v}.
39. William Shakespeare, *The Tempest*, in David Bevington (ed.), *Complete Works of Shakespeare*, 4th ed. (New York: Longman, 1997), 1.2.358–61.
40. Hunt, *Art of Hearing*, 61–62.
41. See e.g. Theophilus Metcalfe, *A school-master to Mr. Theophilus Metcalf's book of short-writing. Explaining all the rules thereof, to the meanest capacity, of such as find any difficulty in learning by his book alone* (London, 1668), 6.
42. Shelton, *Tachygraphy* (London 1641), sig. A2.
43. Willis, *The Art of Stenographie* (London, 1602), sig. A2^{v}. See also Davidson, *Shakespeare in Shorthand*, 54–56.
44. Theophilus Metcalfe, *Short writing the most easie exact lineall and speedy method* (London, 1645), A2.
45. Shelton, *Short writing* (1630), title-page.
46. Folkingham, *Brachigraphy* (1622), sig. A5^{v}.
47. West, *Arts Improvement* (London, 1647).
48. Shelton, *Tachygraphy* (1641), sig. A3.
49. Milton, "The Passion," in Orgel and Goldberg (eds), *John Milton*, 13–15; s7.
50. Quarles, "A Hymne to God," *Diuine poems containing the history of Ionah, Ester, Iob, Sampson* (London, 1633), 63.
51. William Shakespeare, *Shake-speare's sonnets*, ed. Stephen Booth (New Haven and London: Yale University Press, 1977), 75, 104.
52. Shelton, *Tachygraphy* (1641), sig. A3.
53. According to *ESTC*.
54. Egerton, *Ordinary Lecture* (1589), sigs. A2-A2^{v}.
55. Egerton, *A lecture preached by Maister Egerton* (1603), sigs. A4-A4^{v}.
56. Ibid., sigs. A3-A3^{v}.
57. For the background, see Hunt, *Art of Hearing*; and Ong, *Ramus*.
58. Egerton, *A lecture preached*, sigs. A4^{v}-A5^{v}.

59. See Hunt, *Art of Hearing*.
60. According to *ESTC*. See Joad Raymond, *Pamphlets and Pamphleteering in Early Modern Britain* (Cambridge: Cambridge University Press, 2003); David F. Venturo, "The Satiric Character Sketch," in Ruben Quintero (ed), *A Companion to Satire: Ancient and Modern* (Malden, MA: Blackwell, 2007), 550–67; and Benjamin Boyce, *The Theophrastan Character in England to 1642* (Cambridge, MA: Harvard University Press, 1947).
61. See Venturo, 552; Boyce, 1–16.
62. Joseph Hall, *Characters of vertues and vices in two bookes* (London, 1608).
63. Ben Jonson, *The comicall satyre of euery man out of his humor. As it was first composed by the author B.I. Containing more than hath been publickely spoken or acted. With the seuerall character of euery person* (London, 1600).
64. Helen Ostovich, "Introduction," in Ostovich (ed.) *The Revels Plays: Every Man out of His Humour. Ben Josnon* (Manchester and New York: Manchester University Press, 2001), 1–96; 3.
65. Jonson, *The comicall satyre of euery man out of his humor*, sigs. A3-A3^{v}, A4^{v}.
66. Ibid., sig. A4^{v}.
67. See Ostovich, "Introduction."
68. See Hunt, *Art of Hearing*, 139–47; and Davidson, *Shakespeare in Shorthand*, *passim*.
69. Jonson, *The comicall satyre of euery man out of his humor,* sig. Hii.
70. Ibid., sig. Biii^{v}.
71. Ibid., Act II sc.1, sig. E: "How he confounds with his similes! | Better with similes than smiles." sig. Eii: "Fore heauens his Humor arrides me exceedingly. | Arrides you?"
72. Ibid., sig. Hii.
73. For introductions to Jonson see (*i.a.*) Ian Donaldson, *Ben Jonson: A Life* (Oxford: Oxford University Press, 2011); James Loxley (ed.), *The Complete Critical Guide to Ben Jonson* (London and New York: Routledge, 2002); Julie Sanders (ed.), *Ben Jonson in Context* (Cambridge: Cambridge University Press, 2010); and Joseph Loewenstein, *Ben Jonson and Possessive Authorship* (Cambridge: Cambridge University Press, 2002).
74. Hall, *Characters*, sig. A5.

CHAPTER 4

Through a Glass, Literally: From Shorthand to Wilkins's *Essay*

A thing that one knows, in post-modern literary departments, is that one knows no things. Knowledge is only ever of *signs* for things, notably words; and these offer only "contingent" access to the world. This stylish skepticism, in its literary version, can be traced (to this day) to the work of the *belle époque* linguist Ferdinand de Saussure. But as Lorraine Daston and Peter Galison have recently pointed out, it was actually some of Saussure's contemporaries—positivists, such as Auguste Comte and Ernst Mach—who first proposed that knowledge was coterminous with signification. The whole idea of knowing signs *only* was that they were precisely what one could know *unquestionably*. The resulting idea of "structure" was then taken up and elaborated by the "logical" positivists of the early twentieth century (Frege, Carnap, Russell), with the goal of providing an absolutely stable framework for mathematics and science.[1] Ultimately, the modern epistemological sequestration of things from their representations depended on the transcendental idealism of Immanuel Kant. For Kant, we are supposed to *give up* on knowing things in their ideal reality (what Kant calls noumena); and recognize, instead, that knowledge is nothing other than a semiotic and apperceptive function of things as we encounter them (what he calls phenomena).[2] With this move, Kant is trying to *protect* knowledge from any kind of skepticism; which means that either he, or the literary poststructuralist who is his (perhaps unwitting) descendant, has some head-scratching to do. Anyway, the point is that a quasi-Kantian phenomenalism has become ubiquitous since the nineteenth century.

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There is always epistemological hedging, in the modern era, around the awkward cognitive business of minds knowing things.

Not in the early-modern era. Oh, you can engage in all the epistemic doubt you want. A range of period thinkers, from Descartes to Leibniz, will help. But this is not a *default* attitude of the period. Neither is it urged (as we will see) by the central English authority of natural philosophy, Sir Francis Bacon. To state the obvious, the single most important intellectual current of Europe in the seventeenth century is the emergence of modern natural science. This, clearly, is supposed to be a knowledge of things. It isn't supposed to be a knowledge of whether or how there *can be* knowledge of things. Newton, for example, wants to know (*inter alia*) how to calculate celestial motions as a consequence of gravity, and also what gravity is (although the latter issue eludes him). But Newton is not particularly concerned to know, or even ask, if, in principle, one "can" know any of the above. Neither is Galileo, re: the Medicean stars, or Hooke, re: the architecture of a fly's eye, or Kepler, re: the planetary orbits. A properly *epistemological* grounding for science is exactly what Kant set out to provide in the 1780s—in response to his predecessor, David Hume, who had suggested (very irresponsibly, Kant thought) that science could just do without one. Apparent to them both was that the empirical thinkers of the previous century—while recognizing that minds had *work* to do on the data they received from things—in general *took for granted* that things, indeed, had sent it.

In this chapter, I want to situate the real-character movement of the seventeenth century squarely within this period epistemology (or lack of one). To be precise, I want to explain how Wilkins's *Essay,* growing directly out of period shorthand, assumed and deployed the notion of making characters refer directly to things. The story has been told before; but I don't think its implications have been fully grasped. For Wilkins and his peers, there is *no interesting problem* in the epistemic assumption that the mind reflects the world. The interesting problems begin, rather, with the dialectic assumption that *words* can adequately *express* this reflection. Thus the real-character attitude is very nearly the opposite of our own. If we suppose that words are the only way we can know anything, Wilkins and his peers suppose, to the contrary, that they are only the way we *can't.* The *evasion of language* that the real character is supposed to perform has been neglected or obscured, it seems to me, in previous accounts of this period technology. It also constitutes a critical step toward the shapes of information.

Back to Bright: Origins of the *Essay*

In the spring of 1657, a visiting master of brachigraphy gave a public presentation at Oxford.[3] Possibly, he was Jeremiah Rich, a major figure in the field. In his shorthand manual of two years later, Rich would claim to have been received at "*both the universities*" (Oxford and Cambridge) "*with greate approbation and aplause*."[4] Rich's 1659 publication, *The Penn's Dexterity*, upgrades his earlier *Semigraphy* (1654), which upgrades his *Charactery* (1646), which upgrades his *Semography* (1642), which, supposedly, upgrades an unpublished system by the poet William Cartwright, whose nephew Rich claimed to be. Naturally, Rich's 1659 system claims a major breakthrough: one can now note down whole phrases and sentences, not just terms or phonemes. (Actually an established technique for the previous 50 years, but never mind). As though expressing the increased efficiency, *The Penn's Dexterity* runs to a mere eight pages, as compared to 39 for the preceding *Semigraphy*. Rich's system was used for shorthand editions of the Psalms and New Testament, and continued to be reissued and upgraded for more than a century after his death (circa 1669). In sum, we may as well say that the brachigrapher of 1657 was Rich. His work was nothing more, or less, than typical of the seventeenth-century shorthand movement, as sketched in the last chapter.

In the audience for the Oxford talk (and the reason we know about it) was a 37-year-old Scotsman named George Dalgarno. Educated in Aberdeen, Dalgarno had only recently moved to Oxford, where he had started a school. We don't really know why; by his own account, Dalgarno knew almost nobody in the city. We do know that Dalgarno was reasonably successful as a schoolmaster for the rest of his long life, moving several times between Oxford and the Isle of Guernsey. The polarity is almost bizarre: on the one hand, the glittering university town, in the southern heartland of British cultural and economic life. On the other, a patch of sea-spattered farmland, closer to Cherbourg than to Plymouth, and in the seventeenth century backward, poor, and semi-feudal. Yet this is a pattern of center and periphery reflecting Dalgarno's life and career. Utterly obscure before 1657, he would be obscure again by the early 1660s (though he would subsequently enjoy intermittent association with the Royal Society). But in between, and for a few exciting years, the middle-aged schoolmaster came tantalizingly close to finding fame and fortune.[5]

It is a pity we have to tell his story so quickly. The personality that emerges from Dalgarno's writings, especially the autobiographical treatise

he penned toward the end of his life, is affable, frank, and brilliant. Moreover, the role that Dalgarno played in the genesis of Wilkins's *Essay* was extremely, even uniquely, important. As we will see, in 1657, Wilkins had probably already been thinking seriously about the feasibility of a real real character for several years (at least since co-answering a polemic on the topic in 1654). For that matter, in his *Mercury*, all the way back in 1641, Wilkins had sketched the basis for the real-character idea; which, in any case (and as we have discussed) was a widespread desideratum of European intellectual culture in the seventeenth century, and had been explicitly called for by Sir Francis Bacon himself.[6] Nonetheless, it was Dalgarno, working from the specific and local inspiration of mid-century English brachigraphy, who made the breakthrough that would provide the basis for Wilkins's *Essay*. Far the Scottish schoolmaster's social superior (at the time Warden of Oxford's Wadham College), Wilkins would first collaborate with him; then discard him. The tale has been told before—which is lucky, because it isn't very edifying. In any case, our focus must be on the brachigraphic modifications that led Dalgarno to the notice of Wilkins in the first place. The *Essay towards a Real Character* has diffuse intellectual roots: in traditions of rhetoric, artificial memory, Renaissance natural history, and Baconian natural philosophy. But it has only one origin: the seventeenth-century shorthand movement, at its height, focused in the notes of a lonely Scot.

Dalgarno had already mastered, he tells us autobiographically, "that way of Short-writing which was commonly practiced." (He does not tell us, annoyingly, which way he means.) He had even added his own modifications, thereby bringing the system to a kind of private upgrade. But the visiting brachigrapher of 1657 was so "ingenious" (clever), his system so "compendious," that the transplanted and perhaps bored schoolmaster was inspired to take up the whole business again. Notably, Dalgarno does not tell us that he set out to learn, or improve upon, the new system that had so impressed him. Rather, he tells us that he was moved by it, in a more general way, "to compare the labours of several men for perfecting this Art," in order "to remedy some defects I perceived in all the ways of that Art I had seen."[7] Perhaps this impulse is merely consistent with the recursive improvement of seventeenth-century shorthand systems; each of which, as we have seen, is an attempt to complete and unify the field. Nonetheless, Dalgarno's inspiration of 1657 seems to have been one of those fateful moments in intellectual and technical history when a very bright person, precisely because he wants to take a given device a step further, finds that he has to take it all the way back to the beginning.

As it happened, Dalgarno was already studying one of the sources for seventeenth-century shorthand. This was Hebrew—an advanced avocation for early-modern humanists, and almost certainly one of Timothy Bright's inspirations for the original *Characterie* (1588). Admittedly, Bright does not say so, even though he does mention the exotic example of Chinese *zì*. But the ancient and sacred script of the Old Testament, a focus of intense fascination for Biblically-obsessed English Protestants of the period, is a much closer parallel to, and more important influence on, the structure of Bright's characterie.[8] As with other ancient Semitic scripts (such as Arabic and Aramaic), written Hebrew conforms to an orthography of radicals and particles (at least in a "pointed" system, such as seems to be relevant here). In the classic and basic example, the consonants of Hebrew words get tricked out by smaller, diacritic marks, denoting vowels. Bright's system of "charactery" glyphs (or radicals), tricked out by a wide-ranging set of diacritic marks for their inflections (or particles), looks like an expansion of this Semitic orthography.

Dalgarno gives no indication of familiarity with his Elizabethan predecessor. Nonetheless, Hebrew script led him towards an alignment with Bright's vision for shorthand. "I perceived then in the Hebrew," he writes,

> that the most part of the particles in the contexture of words were joyned to the primary Radical by way of affixes and suffixes, so that one word in that language many tymes could not be rendered into another language [in] under 4 or 5 words. This consideration suggested to me that the like might be done for the more compendious writting of English, viz, to make a collection of the particles, and so to order them that they might be exprest by points, some before and others after the principal word of the sentence as their nature required.[9]

This sort of thing, he goes on, already happened in shorthand to some extent, where vowels were expressed "partly by points and partly by distinct places about the principal [consonants] of the word."[10] But Dalgarno perceived, in the "great Light" of Hebrew, that a "more compendious" version of shorthand might be obtained by using such diacritic marks for the whole category of "particles": that is, word-endings, prepositions, articles, and the like—any and all grammatical and syntactic inflections. The high way of shorthand was not to find quicker and quicker ways of noting down simple letters and phonemes. It was, rather, to find more and more efficient ways, through a radical/particle structure, of noting down complex words, phrases, and concepts.

"But here," Dalgarno says, "a great difficulty did occur." It was:

> how to distinguish these points, when they were put literally for vowels, and when they were put realy for the notions of Particles. I laboured much to overcome this difficulty, but all was in vain. At last … I perceived that there was no other way of remedying this evil, but to use these points realy for particles with such Characters as were Real and not literal, for some few such real Characters signifying things of most comone and frequent use are used in the comone way of Short-Hand.[11]

A great difficulty indeed—for Dalgarno's reader. Confusion arises from how Dalgarno means the word "real." He means it (if I may be forgiven for putting it this way) *literally*; and that's how he means "literal," too. "Literal," in this early-modern usage, means "having to do with the alphabet, texts, and the whole business of letters"—Latin *litteras*. "Real," or "really," means "having to do, *not* with letters or words, but with actual, objective things": *res*. Real is thingy, or thing-associated, or thing-directed. Literal is wordy, or alphabetic, or verbal. The categorical distinction between words and things, of ancient origin, is ubiquitous in the early-modern period. It is also ancestral for the phenomenalist objectivism with which we began this chapter. The difference, as we will discuss below, is that the early-modern period does *not* necessarily assume that there is any special *problem* with minds gaining access to things. Rather, it assumes that there is a special problem with the *management* of this access that words, very imperfectly, provide. In any case, "literal," in this area of early-modern usage, is not primarily to be taken in a semantic opposition to "figurative," or "metaphorical"—although that meaning will work, too. Rather, the literal is primarily to be understood in opposition to the real. That is to say: the wordy to the thingy.

So, using a point, or diacritic mark, "literally" in shorthand refers it to letters and their inter-relations (such as sequence, or wordhood, or word-kind). Using such a mark "really," by contrast, refers it to non-verbal objects, and *their* inter-relations (such as possession, or plurality, or gender). To be sure, in writing, the latter class of objects can only be expressed by logical, grammatical, or syntactic particles—which are perforce little words, or pieces of words. But the whole idea of particles is that they are supposed to capture "real" arrangements, substantively obtaining among the things themselves. The difficulty Dalgarno had encountered was that the "common way of shorthand" was basically "literal": a way quickly to denote the bits and pieces of alphabetic (English)

words. Introducing "real" particles to such a system caused confusion. For without over-enriching the set of available diacritic marks, it was all-too-easy to confuse real and literal. A given mark might be needed for "literal" duty (i.e., adding a letter or letters to make out a whole word). But it might also be needed for "real" purposes (i.e., making out a word or phrase from a radical, through grammatical or other inflection). Not only would this double duty make a hash of the system, it would also obscure the real/literal distinction that had seemed to offer such an exciting way forward in the first place.

Dalgarno's eventual solution was (again, with apologies) radical. It was to *dispense with the literal altogether, in favor of the real*. And this not only for shorthand particles, but also for the characters they modified. The key, for Dalgarno, was that existing "literal" shorthands already incorporated a special class of characters, "signifying things of most comone and frequent use." Here Dalgarno seems to have in mind the tables of especially useful words, printed with their characters for the purposes of memorization, that are a typical feature of seventeenth-century shorthand manuals. Strictly speaking, the characters in these tables have been formed from "literal" rules. They exemplify, rather than evading, the alphabetic combinations and compressions of their systems. Nonetheless, memorizing these "common" characters directly, and each character as a whole, tends to suggest a direct reference from the character to the word—even to the thing for which the word stands. It tends to suggest, in short, "real" characters. Or so it seemed to Dalgarno. He set about energetically compiling his own tables of key, "real" terms—in effect, tables of categorical things—along with the particles that would allow their inflection into the connection and complexity of discourse.

Thirty years after examining his provisional results for the first time, he can still scarcely contain his excitement over them. "On a sudden," he writes in his autobiographical treatise,

> I was struck with such a complicated passion of admiration, fear, hope and joy, that it would need a more skilfull hand than my own to paint it upon paper … I perceived that that which I had deseigned only for English, was equally applicable to any Language whatsoever, lyke some pictures that looke to every body that look to it. And thoe the scheme I had before me was not comprehensive of all the Notions of comon discourse, yet some few more additions might make it comprehensive of all that Artists understand by *corpus orationis* [the body of speech], so that I did clearly see by comparing what I had done with what was as yet wanting, that the body

> of Language, by which I understand the commone notions of familiar and ordinary intercourse in *vita communi* [ordinary life] … might be exhibited both Dictionary and Grammar upon one face of a sheet of paper.[12]

Through his sole Oxford acquaintance, "an old Skool-fellow," Dalgarno managed to show his scheme to John Owen, Vice-Chancellor of the university. Owen would subsequently introduce Dalgarno to the don Seth Ward; who would introduce him to his friend and colleague, the "all-powerful" Wilkins; who would use Dalgarno's work as the starting point for the *Essay towards a Real Character*.[13] The unknown Scotsman's brief and giddy attempt on the commanding heights of contemporary intellectual and cultural life had begun. It all began with the Oxfordian Vice-Chancellor's swift and (as it must have been) thrilling judgment on what Dalgarno had so far achieved: "Dr. Owen, as soon as he look't upon my Tables, told me that the deseign I had in hand was an Universal Character."[14]

Now: what did that mean? It meant that Dalgarno's character was "equally applicable," as he put it, "to any Language." And this because it *depended* on *no* language, but on (allegedly) objective reference to the notions of things that any language could mean. Dalgarno's glyphs, evidently, were not alphabetic, but abstract. Neither were they supposed to be taken as referring to any words, or partial words; but *to the things* (*res*) for which words and their parts might stand. As we will discuss below, the operative assumption of seventeenth-century Baconians (like both Owen and Dalgarno) was that human minds received simple apprehensions of worldly objects quite unproblematically. This was why it ought to be possible, in principle, to craft a character referring directly to these realities (literally) of the mind. It was further assumed that all human minds, the world over, basically received the same impressions of the same things. Therefore, a real character, if worthy of the name, ought to be universal by definition; and vice versa.[15] Some scholars have argued that the "real" and "universal" character projects of the seventeenth century ought to be treated distinctly. It's a bit like the argument for distinguishing between brachigraphy and characterie as short-writing systems. As in that case, we simply do not find the relevant seventeenth-century agents following the recommended discretion. Rather, for the reasons just described, we find them using "universal" and "real" quite interchangeably.[16]

Bright's "charactery" glyphs, way back in 1588, had themselves come with a pretension to universality: they would allow "nations of strange languages," Bright claimed, to "communicate their meaning together in

writing, though of sundrie tonges." His stated model is Chinese *zì*, which allow written communication among speakers of mutually unintelligible Asian idiolects. (Anybody who has ever tried to avoid conversation on a Shandong mini-bus knows how strongly the people of the Chinese heartland assume that foreigners can read *zì* even if they can't speak them.) Bright could make this claim only and precisely because his glyphs, like Dalgarno's, were non-alphabetic symbolizations of (allegedly) objective referents; which *could* be given in English (or other languages), but didn't have to be. Strictly speaking, Bright's characters, at the very beginning of the early-modern shorthand movement, had already been "real." And precisely because they were real, denoting things and notions rather than words, they could be universal. This is what Dalgarno had stumbled back upon. His "one sheet of paper" was covered, not so much with a new vocabulary, as with the beginnings of a general ontology.

We may be inclined to ask: so what? Surely Dalgarno's characters, "real" or otherwise, were basically just another class of words, or another way to refer to words. There can be no escape (as the literati intone) from the prison-house of language. I hope that we can grant the potential validity of this point while also granting (per argument below) that Dalgarno does not see it. Neither does Owen, or Ward, or Wilkins, or any of the other Baconian luminaries with whom the Scotsman came to be involved. For them, the real character does not *need* to escape from language; because a real character, strictly speaking, is not in it. Moreover, it is decidedly non-trivial, from the seventeenth-century Baconian point of view, to have a system for signification and communication that can plausibly be theorized as non-linguistic. Partly at issue here is their operative idea of language—much narrower and less momentous than our own—which we will discuss later on. But first, we need to get clear about their antecedent idea of cognition. Whatever the wider European picture, and however much epistemic doubt may be entertainable by period rationalism, seventeenth-century British empiricism does not doubt that minds reflect the world. Instead, it doubts that *words* reflect the worldly reflections that minds, properly and normally, receive.

The Mirror of the Mind: From Aristotle to Bacon

We can call this the "speculative" view (from Latin *speculum*, mirror). It is a legacy of the Aristotelian empiricism that grounded European intellectual life from (approximately) the thirteenth to the seventeenth century. For

Aristotle, the senses constitute our indispensable path to knowledge. Of course our "imaginations" may play us false. "We must maintain that not everything which appears is true."[17] Nonetheless, "sensations," if they are indeed worthy of the name, "are always true."[18] Perhaps, for example, we err in thinking that a given wine tastes sweet. That does *not* mean that we err in thinking that we know—*know*, not just imagine or suppose—what it is to taste sweet wine. This kind of knowledge, in seventeenth-century terms, can be called "speculative": not "guessing" or "uncertain" (our modern sense of the word), but rather involving objective contemplation of things just as they are (as opposed to a "practical" inquiry into what one can do with them). "Speculative grammar," meanwhile, explicitly invoked by Wilkins in the *Essay*, is the idea of arranging an order of knowledge to reflect the order of the world. A tall order indeed, it may seem to us. But one of the things we need to get clear in this chapter is that it does not look anywhere near as tall to the seventeenth century.[19]

Arisotle's theory of objectivity is founded on his theory of objects. His is a non-eliminative ontology: he thinks we can't understand what things actually are if we simply discard or discount the way they actually seem.[20] "Substance is a 'this'," he always says; and a species is more a substance—it gets us closer to grasping the actual nature of being—than is a genus or a kind. While avoiding wholesale or eliminative reduction of entities, Aristotle does articulate them via the ontological vectors of form and matter. He tends to suggest that the two are inextricable, in the real nature of any actually existing thing. But form takes a leading role. A statue, for example, isn't just gold; it's golden. That's how we designate the kind of thing a golden statue is. It is a statue made of gold—not gold that is a statue. Form determines matter in a way that matter does not form.[21]

When we encounter the world, Aristotle says, our minds receive "the sensible forms of things without the matter."[22] Objective forms are impressed on our senses, much as a signet ring is impressed in wax. The mind is the overall phenomenon of these impressions. Just as "the hand is the tool of tools," so "the mind is the form of forms, and sense the form of sensible things."[23] Aristotle even sometimes argues that it is *erroneous* to speak of the mind at all, prior to or apart from its thinking of objects. "That in the soul which is called mind," he says, "is, before it thinks, not actually any real thing."[24] Thus Aristotle's ontology grounds an apperceptive unity. Form, as we have seen, is (for Aristotle) what primarily makes any given thing the thing that it is. Therefore, if cognition of something is impression by its form, and if the form is what makes a thing an object

of perception, then "actual knowledge is identical with its object."[25] "The mind while it is actively thinking is the objects which it thinks."[26] The Aristotelian mind, at least according to passages like these, does not cognize objects from a position over and against them. Instead it occurs, *as* mind, precisely in and through that act of objective cognition.

To be sure, the knowing of form is not ontologically uncomplicated—much less theologically. For the Christianized Aristotelianism (Scholasticism) of medieval and Renaissance Europe, forms are infused by God. It becomes problematic to suggest that we "know" a substantial form that the divine will has only allowed us to encounter in a material unity. Indeed, it becomes Scholastically axiomatic that we *never* know the substantial form or essence of anything, as it is, in and of itself. (Voices of the Scientific Revolution frequently abjure knowledge of forms. In this they are reiterating, not attacking, an Aristotelian doctrine.) Instead, we know a given thing through tokens or extensions of its form, such as its "qualities," or "properties." Or, above all, *species:* infinitesimal and (very importantly) non-material copies or representations of the form, emanating from the object in an unbroken stream. (The Latin pronunciation, "spek-yez," will help avoid confusion with the species of taxonomy and biology). *Species*, rather than the substantial form or "essence" itself, enter the senses and are processed by the mind. The overall schema is far more complicated than my thumbnail sketch can possibly suggest. But the main point, originating from Aristotle, and preserved under various Scholastic elaborations, is that perception—if it is to be theorized as valid—has to be theorized as *real*.

These ideas, by then already almost two millenia old, were still very much alive in the early-modern period. Indeed, the period can be seen as an Aristotelian heyday, as his scholars (influenced by humanist methodology) both reached back to the pure doctrines of The Philosopher—clearing away centuries of Scholastic and Neoplatonic accretion—and brought them into contact with new and challenging ideas. Atomism, for example, an ancient but decidedly non-Aristotelian doctrine (refuted by the man himself), re-emerged in the seventeenth century as an exciting theory of matter. The chemist Daniel Sennert, rather than throwing out the old ontology, finds a place for the new one within it. Some interesting effects, Sennert writes, such as the spread of contagious diseases, can probably best be explained as a function of "atoms and minimal corpsucles," travelling through the air. But others, such as magnetism, and the ability of dogs to "read the traces of wild beasts by smell," are "without doubt"

caused by genuinely immaterial *species*, "which flow out like a ray advancing continuously from its own body, are diffused in a circle … and even pass through certain other bodies."[27]

A standard cognitive distinction in this area of early-modern thought is between the "passive intellect, which receives into itself the forms and species of things, and the active intellect, which makes understood by its action the species received from and discerned by the potential and passive faculty."[28] For Julius Caesar Scaliger, a major (if not ubiquitous) early-modern exponent of Aristotelian natural philosophy, "the active intellect impresses on the passive intellect the species [*speciem*] of the horse drawn out of the horse."[29] Thomas Hobbes remarks that "every Agent that worketh on a distant Patient, toucheth it, eyther by the Medium, or by somewhat issuing from it self, which thing so issueing lett be call'd Species … Agents send out their species continually." And Scaliger provides an update for the species concept that will be very influential (as we will see) for the real-character project: "the notions of the understanding are images of things" he writes: "I call *notions* the species of things as they are comprehended by the mind."[30]

A very useful figure, for understanding the persistence of the seventeenth-century Aristotelian view in this area, is the Scottish clergyman and author Alexander Ross (1591–1654). Like Dalgarno a generation after him, Ross was an Aberdonian who sought preferment in southern England. Finding it, first through schoolmastering, and then through patronage, he became a prolific exponent of the traditional philosophy. Prolific and, in professional terms, successful: he published dozens of books, and (according to his entry in the *Dictionary of National Biography*) died a wealthy man. Popular narratives of the scientific revolution don't have much room for people like Ross—or Sennert, or Scaliger, or any of the period's other brilliant Aristotelians. The fact is, however, that these people represent the rule, not the exception, of learned professionalization in early-modern Europe. To be sure, they were fighting a rear-guard action (and may even have realized that, sometimes). Multiple intellectual currents, including rationalism, Neoplatonism, and the aforementioned atomism, were on the way toward displacing Aristotelianism (at least officially), as the paradigm of science. But that would not become clear until the very end of the seventeenth century; and even then, it may not have become as clear as we like to think. In any case, at mid-century, the indefatigable Ross tells us loudly, and at length, why knowledge depends on the old philosophy.

Central to his account is the speculative assumption that the way things appear to us must be our guide to how they actually are. "The Sunne doth not onely seeme, but doth in very deed rise and fall," he writes (against a certain John Wilkins) in his anti-Copernican tract *The New Planet No Planet*. For "if the Sunne doth not truely ascend and descend, then the shadowes doe not truly increase and decrease; and so our Sun-dialls doe not truely shew us the hours of the day."[31] It is a classic Scholastic move: validating one sense-impression (the apparent movement of the sun around the earth), by tying it back to another that is unquestionably valid (time passes, and we can tell). Indeed, one thing we learn from Ross is how *easy* it still was, in the seventeenth century, to wrong-foot some of the arguments that were advanced for the new science. Some Copernican claims, for example, rested on optical illusion (to explain differences between apparent observation and astronomical facts). "I had thought that the action of the eye had been to see, not to imagine," Ross comments, dryly.[32] Excited heliocentrists, confounding "the inward and outward senses," are claiming a knowledge based on *non-observable effects*. That is to say (and naïve accounts of the Scientific Revolution to the contrary), they are *violating* a strictly-construed empiricism; which the Aristotelian Ross is therefore able to present himself as defending.

Nothing gets Ross more worked up than what he sees as modish ignorance of how perception and cognition have to work, according to the received theory. "The fire that heats the stone," he lectures the (moderately confused) atomist Sir Kenelm Digby, "heats also my body, and in that respect it works upon both *materially,* that is, it produceth the same form (*specifically,* not *numerically*) of heat in the matter of the stone, and of my body":

> yet besides this operation, it produceth another, which we call *spiritual* or *intentional,* upon my sense, which it doth not upon the stone, to wit, the *Image, Idea,* or *representation* of that heat which my sense apprehends, or receives, and, by meanes of the *sensitive* soul in me, judgeth of it; which a stone, being inanimate, cannot do: The heat then worketh on the stone only *materially* by heating, it worketh on my body not only *materially* by heating; but *spiritually* also, by impressing the *species* of the heat in my sense of feeling, by which the *soul* in the sense is stirred up to judge of it, and to make use of it, so far as it may be convenient for the body, otherwise to avoid it; therefore we need not labour much to prove these *intentional species* to be in nature, which you deny.[33]

The absurd consequences, as Ross sees them, of dispensing with immaterial *species* in favor of material atoms or corpuscles, are a favorite topic. "When you see a horse," he demands of Digby, "is the same horse in your eye, that is without? Or hath he the same *material* being in the eye, that he hath without?"

> This must needs be true, if he worke *materially* on your eye … if the material *atomes* of the object pierce the *organ*; as for example, of a horse; then tell us how many atomes must meet to make up a little horse: and how can that horse, being bridled and sadled, pierce your eye without hurting of it, especially, if you should see mounted on his back such a gallant as St. *George,* armed with a long sharp lance; or *Bellerophon* upon *Pegasus?* And if a thousand eyes should look at one time upon that object, will it not be much lessened, by losing so many *atomes* and parts as enter into so many eyes? Or can the object multiply it self by diminution, as the *five loaves* did in the *Gospel?* Or suppose, you should see as many horses at a time, as were in *Xerxes* his army, would there be stable-room enough in your braine to containe them all?[34]

The whole point of the Aristotelian view, Ross explains, is to keep us out of such amusing difficulties. For the formal "species or image," precisely because it is *non*-material, can actually and non-metaphorically be "received into the sense." The established doctrine thereby achieves, in a totally secure way, "*adequation* of our conceptions with the things we conceive."[35]

As we have noted, seventeenth-century developments would sweep away Ross's kind of natural philosophy. In England, it would of course be replaced by a version of empiricism deriving from the work of Sir Francis Bacon. Bacon explicitly rejects Scholasticism's ontology, especially the doctrine of substantial form; and its methodology, which he regards as an incomplete empiricism parsed through a childish hermeneutics. But vis-à-vis the Scholastic epistemology, the Baconian revision is much less clear.[36] The contrast with the philosophy of René Descartes (1596–1650), Bacon's opposite number as modernizing genius in continental Europe, is instructive. For the French rationalist, all inquiry must be grounded in an epistemic certainty that has first been submitted to comprehensive doubt. Not only the objective adequation of our sense-impressions, but even their primary or basic reality, must be tested against Descartes's thought experiment of a deceiving epistemic demon. The speculative epistemology, clearly, cannot survive such a procedure. And indeed, one of

the major products of Descartes's work is the revived atomism that people from Sennert to Ross saw as challenging the Scholastic *species*. Bacon rejects atomism, as he does all attempts (Cartesian or otherwise) to presuppose the findings that may be obtained by experimental procedures on worldly data. At the same time, Bacon cannot accept *species*, because these both follow from and lead back to the Aristotelian notion of substantial form. Nonetheless, Bacon adopts, even embraces, a simplified version of the speculative view. But quietly, almost tacitly. Bacon does not lay out or defend any model of *how* or *whether* the mind reflects the world. He just rests his entire natural-philosophical project on the assumption that it really—in the period sense of that word—does.

To be sure, Bacon makes Platonic noises about the potential for infidelity in the impressions we receive about things from the senses. But he is utterly and centrally committed to the position, itself quite Aristotelian, that the senses themselves indicate how to make them faithful. "The senses often deceive," he writes in the *Novum Organum*: "But they also give evidence of their own errors."[37] "It was not without cause," Bacon writes in his programmatic *Advancement of Learning*, "that so many excellent Philosophers became Sceptiques and Academiques [Platonists], and denyed any certaintie of Knowledge, or Comprehension";

> But heere was their cheefe Errour; They charged the deceite uppon *the sences*; which in my Judgement (notwithstanding all their Cauillations) are verie sufficient to certifie and report truth (though not alwayes immediately, yet by comparison; by helpe of instrument; and by producing, and urging such things, as are too subtile for the sense).[38]

Sense experience *assisted* (as scholars are very well aware) becomes the leitmotif of Bacon's natural philosophy. The kind of reform he has in mind is partly a matter of instrumentation (*Novum organum* itself meaning "new instrument," and replacing by implication the cognate *Organon* of Aristotle's works). But more importantly, Bacon thinks the senses can be assisted by experimentation. That is to say, keen, suspicious, and reiterative observation, revealing the law-like behaviors that constitute any given thing's true nature—its form, in Bacon's sense. "Not one of the things which the intellect has accumulated by itself escapes our suspicion," he assures the reader of the *Novum Organum*. "We do not confirm them without submitting them to a new trial and a verdict given in accordance with it."[39] Bacon's forensic suspicions, as we might say today, are directed

toward *cleaning* and *analyzing* the data that the mind receives from the world. But this procedure involves a supreme confidence in the worldliness, the *reality,* of the data that the mind receives. Indeed, while Bacon wishes to codify or at least enact complex hermeneutic procedures for testing the way things present themselves, his basic idea is very simple. It is to attend to the way things present themselves.

"We stay faithfully and constantly with things," he writes, "and abstract our minds no further from them than is necessary for the images and rays of things to come into focus."[40] "The whole secret is never to let the mind's eyes stray from things themselves, and to take in images exactly as they are."[41] Bacon's rhetoric of "images" and "rays," redolent of a Neoplatonized Scholasticism, is not just a portmanteau way of talking about sense-impression. Rather, Bacon takes it as axiomatic that "sight holds first place among the senses."[42] He establishes an explicit analogy between the eye and a mirror. The mind, too, is speculative in this sense—although, to be sure, it is an "*uneven* mirror [my emphasis]," which "alters the rays of things from their proper shape and figure."[43] Nonetheless, the whole thrust of Bacon's methodology is to polish, correct, and redirect this mental instrument. And this on the basis of the cognitive assumption that working on the mental mirror is, uniquely, worth a philosopher's time. Bacon's whole epistemological assumption is that the mind, even if it is not yet working with a correct empiricism, can and should and will. Whatever it is doing to its worldly impressions, it does indeed receive them, in such a way that faithful mimesis of worldly appearances can be recovered.

Several times in the *Novum Organum*, Bacon refers to the work of his close contemporary Galileo Galilei (1564–1642). Bacon is familiar, as he makes clear, with Galileo's revolutionary extrapolations from the Copernican thesis of geomotivity. Galileo and Bacon, one might suppose, go naturally together; mention of the former has even been read as marking allegiance to the latter.[44] But Bacon expresses *disdain* for the Galileo we may have in mind—the disruptive genius, and penetrator of cosmic appearances, through physical reasoning and heliocentric astronomy. His theory of the tides, for example, is according to Bacon a "fiction," which the Italian achieved only by "granting himself the ungrantable (namely, that the earth moves)."[45] (The historian Robert Westman once claimed that, circa 1600, there were no more than ten Copernicans in all of Europe.[46] If so, Bacon was not one of them.) Bacon praises, rather, Galileo the *technician*, the lens-grinder and instrument-maker, whose

"great achievement, telescope," allows "a closer approach to the stars, as if by ferries or dinghies."[47] Bacon often speaks of penetrating or at least re-arranging worldly appearances, but this is a methodological and hermeneutic project founded on a primary epistemological contact. The latter, in Bacon's view, apparently comes down to nothing more or less complex than allowing the world to be imaged in the mind; in a way that is natural and proper to both.

This is the epistemology that we will tend to find reiterated in seventeenth-century England, under Baconian influence. "The mind," writes the poet Andrew Marvell, is "that ocean where each kind | Does straight its own resemblance find." To be sure, the mind "creates" and "transcends," too, in Marvell's vision; but this is precisely on a baseline of a phenomenological mimesis.[48] "The conceits of the mind are Pictures of things," as Ben Jonson, more baldly, puts it; "and the tongue is the Interpreter of those Pictures."[49] For Robert Hooke, in the famous preface to his *Micrographia*, scientific thinking is nothing other than a process of making "a *scrupulous* choice, and a *strict examination*, of the reality, constancy, and certainty of the Particulars that we admit."[50] Giving an account of which "particulars" to admit is Hooke's Baconian concern; but he sees no need to give any account of whether or not the mind can in fact admit them (much less whether or how it can distinguish between particulars that are admissible and those that are not). Ralph Austen, Puritan divine and fanatical Baconian (whose *Treatise of Fruit-Trees* is surely one of the most wonderful books of the seventeenth century), urges that the practice of orchardry has an exemplary cognitive function: it "is profitable to the *Mind* by storing it with variety of *Objects*, and *profitable Notions*."[51] One can imagine the apoplexy that Ross would experience at this folksy image of the mind getting chock-full o'things. But for Austen, that's just how you think about worldly perception.

"Notion," for this period attitude, is a quasi-technical term. As we have seen, the word has a genuinely Aristotelian heritage, being in the first place a neologism for *species*. Well into the seventeenth century, this connection can still be made explicitly. The "*Delection* of *Virtue,* or *Vice,"* writes Walter Charleton in his *Darknes of atheism dispelled by the light of nature* (1652), "is necessarily dependent upon the *Notions,* or *Species* of things objected to our Senses, and traductively to our Cognoscent Faculty."[52] But more typically, the Aristotelian sense, while probably audible to period usage, is subsumed in a more general and dogmatic association. "Notions" just go with "things" like hands go with gloves. "Notions are images of

things in the mind," writes the Polish educational reformer (and, through his disciple Samuel Hartlib, honorary Englishman) Jan Comenius.[53] "By Notions Things are perceived," agrees Thomas Stanley in his *History of Philosophy* (1656); the two are even "conjoyned together."[54] "Notions," writes the autodidact schoolmaster John Webster, in a polemic that both annoyed and excited Wilkins (as we will discuss below), "are but the images or *ideas* of things themselves reflected, in the mind, as the outward face in a looking-glasse."[55] The chemist Robert Boyle, in his *Occasional Reflections Upon Several Subjects* (1665), observes with satisfaction that "Philosophers seem to have justly enough rejected the Opinion, attributed to *Plato, That all Knowledge is but Reminiscence,*"

> yet certainly the Mind of a Man well furnish'd with variety of Notions, is, by the Analogy or Contrariety of Things and Notions, in reference to each other, so easily and readily excited to lay them together, and discourse upon them, that he is oftentimes by any slight occasion helped to light (and that with a strange and almost surprising facility) upon things that he would else have scarce taken the least notice of.[56]

Notions, in this widespread and even ubiquitous English period view, are not quite identical with things. One can, after all, have a notion to which no thing corresponds. *But the converse does not appear to be true*. To encounter a thing, on this seventeenth-century version of the speculative view, is willy-nilly to acquire a notion of it. That is why, as Boyle reminds us, following the trail of notions is precisely how we can find our way to unexpected things. In the end, the mimetic metaphor (for which we could of course also adduce a Platonic heritage) best expresses the Baconian redaction of this originally Aristotelian idea. The face before the mirror is not the one in the mirror; but the face in the mirror, normatively, entails the one before it. A notion, for seventeenth-century Baconians, is the next best thing to the latter.

This toggling of notions and things becomes fundamental to period hopes for a real character. The example of Chinese *zì*, cited by Timothy Bright (as we have seen) at the very invention of seventeenth-century "characters," proves extremely relevant. "It is the vse of *Chyna,* and the Kingdomes of the High *Levant,"* writes Bacon, not quite twenty years after Bright, "to write in *Characters real,* which expresse neither *Letters, nor words in grosse,* but *Things* or *Notions:* in so much as Countreys and Provinces, which understand not one anothers language, can nevertheless read one anothers Writings, because the *Characters* are accepted

more generally, than the *Languages* doe extend."[57] Bacon's categorical opposition between "languages" and "characters" opens up a point to which we will shortly return; but for now, let us pay attention to the cognitive psychology he assumes as a corollary of the speculative epistemology. Like so much in this area, it goes back to Aristotle, who states that "mental affections are the same for the whole of mankind, as are also the objects of which those affections are representations or likenessess."[58] Just as fire burns the same in Persia as in Greece, so the notion of fire is received the same by the apperceptions of Greeks and Persians. To be sure, the *words* by which "things or notions" are expressed differ radically among peoples. But this lexical diversity, far from offering a confound to the speculative view, is typically understood in the seventeenth century as providing it with a kind of recursive proof. The inference may be dubious, even question-begging. But for the Baconians in and around the real-character movement, linguistic diversity shows exactly how "mental affections" are *not*.

"It is recorded," writes Webster, citing Bacon, "that in *China*, and some other Oriental Regions, they have certain characters, which are real, not nominal, expressing neither letters nor words, but things, and notions: so that many nations differing altogether in languages, yet consenting in learning these Catholike characters, do communicate in their writings, so far that every nation can read and translate a book written in these common characters, in and into their own Countrey language."[59] The idea of the real character, precisely in its *contrast* with the vicissitudes of language, reinforces the speculative epistemology that is supposed to be the basis for the real character. The academic Seth Ward, assisted by Wilkins, refuting Webster's critique of the universities, nonetheless assures the schoolmaster that Oxford dons know all about "the *Universall Character,"* which would designate "all *things* & *notions* by certaine common signes which may be intelligible by all alike."[60] It is not even interesting, Ward condescendingly urges, to point out that the speculative epistemology obviates linguistic multiplicity. Everybody just knows that.

Dalgarno, at just the period when he was getting introduced to Ward and then Wilkins, explains that the real character "requires only the expression of those notions and things, which are the same in all nations." The variety of languages is simply an "imperfection and difficulty" through which one can still perceive the pre-existing cognitive transparency.[61] Wilkins himself, with identical confidence, states that "that conceit which men have in their minds concerning a Horse or Tree, is the Notion or

mental Image of that Beast, or natural thing, of such a nature, shape, and use. The Names given to these in several Languages, are such arbitrary sounds or words, as Nations of men have agreed upon"; but since people the world over "agree in the same Notion[s]" of the same things, so it ought to be possible to get them to "consent upon the same way or manner of Expression," by instituting a "real universal Character, that should not signifie words, but things and notions," and therefore ought to be "legible by any Nation in their own Tongue."[62] The multiplicity of languages precisely *does not* reach back to the cognitive level. On the contrary, linguistic diversity is nothing more than a negative image of what is supposed to be a primordial and still operating cognitive unity.

"It is certaine," writes the translator Robert Gentili, in his 1654 edition of a—surprisingly Baconian—oration on natural philosophy, supposedly given before the newly-founded French Academy and its patron Cardinal Richelieu, "that Sciences can not be preserved by any immutable thing, but onely by the Species, which alwaies possessing the Understanding in the same manner, oblige it to conceive all things in the same fashion."

> Nature uses no other Language to speak to all men, and to instruct them in the Knowledge of the truth. Thence it comes that they apprehend an Elephant, an Eagle, a Dolphin, all after the same manner, and they every where produce the same imaginations and Phantasms; in the use, and perfect connexion whereof consists all manner of discourse. The Species, and the word, have this common to them, that they both represent the truth, but this is the difference between them, that the Species being a natural, and immutable signe, must of necessity be the same in all places: and the word being an arbitrary and transitorie mark, must be different every where; so that we may truly say, that the species or notion which represents all things to the mind of man, is the onely Language which did never change, and will always be common to all men; because the Objects which present them to our senses, are not changeable, and make themselves to be knowne everywhere after the same manner.

Gentili, a fascinating yet obscure figure who had previously translated Bacon's Latin tract on the origins of the winds, explictly links the speculative view to the possibility of a universal character. "It would not be very difficult," he explains,

> to invent a more general, more constant, and more easie instrument, than that of forlorn tongues, which should represent things by Characters, which

> youth might learn with a great deal more ease then the words of an abolished Language … and those who had learned those Characters, *seeing* some certain markes, would withall conceive the minds of others, and might presently by other Characters disclose their own [my emphasis].[63]

For a holder of the speculative view, such as Gentili's unnamed speaker, the universality of the character captures the unity of understanding that survived the fall of the Tower of Babel.

One more point before we conclude this section. As we have seen, a real character was universal—cutting through the multiplicity of languages—almost by definition. A sign system that denoted notions directly was supposed to owe nothing to any language; and if the same notions of the same things were indeed cognitively universal, then a character that picked them out had to be universal on that account, too. The only little problem that remained was getting clear about the notions. As Wilkins was to put it, a *real* real character required a "just *Enumeration* and description of such things or notions as are to have *Marks* or *Names* assigned to them." The resulting lists of radical terms should be "full and *adequate*, without any *Redundancy* or *Deficiency* as to the Number of them, and *regular* as to their Place and Order." To ensure both the non-redundancy and non-deficiency of the system, "natural and necessary" rules for grammatical derivation and inflection, via particles added to the radicals, would also be needed.[64] Ultimately, both the ontology, and the morphology of a real-character system would need to reflect the mind's (alleged) reflection of the world. As we will discuss in the next chapter, the full articulation of this issue was as complex as its implications were grandiose. For now, all we need to note is that a real character, if fully worked out, had to be not only universal, but also *philosophical*. Not just a pragmatic instrument for discoursing about things and notions; but a profound system for getting at the truths of the world.

Answering Objections—Or, Cutting Out the Tongue

Yet we again can ask: so what? Grant, for the sake of argument, the speculative assumption that the mind directly reflects things. Grant, too, the corollary that the resulting "notions" will tend to be the same (re: the same things) for all people. Precisely if that's true, why do we need a new way to express them? Isn't that what words are for? Isn't language, effectively, always-already a real character?

No. It is true that words, on the seventeenth-century Baconian view, are theorized as the next stage in the series of ontic reflections that is supposed to connect discourse back to the world. This, again, is an idea that the period adopts from Aristotle. "Words are the images of cogitations," says Bacon with approval, explicitly citing his ancient predecessor.[65] The problem, however—and here we have a very important Baconian modification of the Aristotelian inheritance—is that the words of human languages *don't do their job very well*. In fact, from Bacon's point of view, they barely do their job at all. Part of the problem lies with the multiplicity of languages, which is understood in the period as, literally, a curse, deriving from the episode of Babel as told in Genesis 11 (we will return to this issue in the final chapter). But Bacon also takes the position, very influentially, that discourse is vitiated by its passage through any ordinary human language at all.

"Words," he writes in a famous passage (to which he gives multiple formulations), "are mostly bestowed to suit the capacity of the common man, and they dissect things along the lines most obvious to the common understanding." Of course, Bacon understates: words are not "bestowed" at all. No ordinary human language, as Wilkins reminds us in the introduction to the *Essay*, is given to its speakers by order, or on the basis of any rational plan. Rather, languages grow and change, organically and haphazardly. Since most language users are (in Bacon's admittedly élitist phrase) "common," the linguistic phenomenon that has developed around them is, inevitably, common too. It is a highly imperfect and distorting lens for sharing our cognitive reflections. Indeed, the more precise the latter—the more highly the mirror of the mind has been polished—the *less* accurately will the "lines" of words be able to fit its notions. True, "a sharper understanding, or more careful observation" can attempt to redraw those lines, bringing language "more in accordance with nature." Here, Bacon seems to have in mind both the possibility of linguistic reform, and attempts, like his own, to renew natural philosophy. But neither can conquer the linguistic interface. "Words"—as Bacon grimly and concisely puts it—"resist." *Redefining* words may seem like the solution; but this just leads to more of the problem. For "the definitions themselves consist of words, and words beget words." "Hence it happens," Bacon concludes, "that the great and solemn controversies of learned men often end in disputes about words and names."[66]

It is important to remember, in this respect, that the seventeenth-century vision for Baconian natural philosophy, especially as focused on

the early Royal Society, included a very large role for collaboration and communication. In part, this was a matter of pure practicality. The founding members and associates of the Society, basically a cohort of English gentlemen with pre-existing social or academic connections, wanted to spread the word about the "great instauration" (or renewal of knowledge) in which they felt themselves to be participating. This entailed publishing a scientific journal (the famous and still current *Philosophical Transactions*), before there was any such thing; and an indefatigable campaign of correspondence with learned people throughout Europe. In part, too, the social nature of Royal Society endeavor was a matter of political and fiscal strategy. Then as now, pure research needed the approval, and the money, of those in authority. This is why the founders of the Society made very sure to get a Royal charter for it (though the king does not actually seem to have taken much interest); and enrolled people of high social status, scientists or not, at every possible opportunity.

And in part, the new Baconian science necessitated discourse on methodological and epistemic grounds. Operating before the emergence of modern verification protocols, such as peer-review and experimental replication, Royal Society scientists like Hooke and Boyle had instead to rely on a quasi-forensic standard of *testimony*. This was how to demonstrate that an experiment had, indeed, demonstrated something. But clearly, the tendency of words to be differently meant, or to mean differently, from time to time and speaker to speaker, presented a serious and perhaps fatal obstacle to this model for the construction of knowledge. Enter the real character: an intensional medium that would *mirror the mirror* that the mind directs at the world. And this not by way of (hopelessly) reforming or fixing language as such, but by *cutting it out* of the chain of speculation.[67]

As we have already seen to some extent, the possibility of a real character turns on pragmatic or technical distinctions that can seem, from our perspective, trivial. But from the Baconian point of view, they are profound. The distinction between alphabetic and glyphic characters, for example: a choice between operating systems, as we have described it, when it comes to shorthand techniques for taking down oral language. But when it comes to the possibility of *bypassing language altogether*, then the alphabetic/glyphic distinction amounts to a choice between a path and a cliff. For alphabetic characters, clearly, refer to words. But glyphic or abstract characters can plausibly be held to head straight for things, via notions. Moreover, the "reality" of the character has only to do with its referents. The character itself is artificial—"bestowed," in exactly the

way that languages are not. As such, the character can be seen as alienated *a priori* from the distorting matrix of linguistic change. Its terms are defined, by definition; and its extension and logic can be worked out according to rational and empirical order. Indeed, as we have briefly discussed, they almost have to be. A real character, in sum, is not just a helpful device for building the Baconian project. It is the very window of that project. It offers the possibility of faithfully transmitting the scientific notions that language distorts.

Yet still we can ask: so what? For a real character, if such a thing can be imagined, is just another way to express intensions (cognitively displaced meanings). That means it does what words do; and that means, surely, that it *is* words. This result is consistent with the phenomenological gravity of the linguistic category, as it is understood in modernity (and as we discussed at the outset to the current chapter). From a post-Saussurean perspective, it is simply difficult to understand what is such a big deal about writing words *in a different way*. Isn't a real character, effectively, even inevitably, a language?

No. It is true that a real character is an intensional instrument (that is the whole point of it). And it is true that the character bears certain *relations* to language. It is even true—as we will see—that the project of the real character produces a certain *view* of the linguistic category, as made newly available in its own image. But this is precisely phenomenological work that the project does; work, perhaps, that still clouds our own perspective. In any case, if we examine the intensional shop where the real-character planners get started, we will find that the instrument they are trying to put together is not, from their point of view, any such thing as a language. And this because they do not share our point of view on what kind of thing that is.

The early-modern view of language is of something fundamentally oral. This is yet another of the period's Scholastic clichés. "Being much annoyed with beasts," writes the fifteenth-century ethnographer Joannes Boemus (in an English edition of 1611), early humans "gathered themselves into companies, and joyning their forces together, sought out fit places for themselves to dwell in. That the sound of mens mouths being first confused, and disordered, by little and little became a distinct and intelligible voice, and gave unto everything his proper name."[68] In this non-Biblical anthropology, drawn from pagan philosophers, language emerges via pressure placed on the voice by the exigencies of human survival. "The whole earth," writes the minister Nicholas Gibbons in his *Questions and Disputations*

Concerning the Holy Scripture (1601), was in the first place "of one language and one speech. *Of one lippe*, saith the Hebrue, and one word [my emphasis]."[69] To speak of a language is so much to speak of orality as almost to mean either by the other. We learn from a 1600 edition of the medieval explorer Leo Africanus that East Africans "use all one kinde of language, called by them … the noble toong: the Arabians which inhabite Africa, call it a barbarous toong; and this is the true and natural language of the Africans. Howbeit it is altogether different from other languages, although it hath divers words common with the Arabian toong."[70] "Tongue" and "language" are all-but synonymous, the former embodying, literally, the latter. In Shakespeare's *Henry the Fourth Part One*, when the King despairs over Hal's ribald friends, the Duke of Warwick assures him that "the prince but studies his companions | Like a strange tongue wherein to gaine the language." "Language," in a usage like this one, is something like the *art* of the tongue. Language is *langue*-gage: A tonguing, or a giving tongue.

Now, of course (oral) language can get written, as can the notions of the mind directly. But the period invariably thinks of the written word as only a secondary token of a normatively oral original. "Words are the images of cogitations," as Thomas Blount explains in his *Academie of eloquence* (1658); "Letters are the images of words."[71] Indeed, period commentators routinely mount a rhetorical *opposition* between "letters" and "words": that is, between written tokens of oral utterances, and those utterances themselves. When people covet fame, comments Margaret Cavendish, "they put themselves into such Figures, as letters do, that express words, which words are such praises as they would have."[72] Letter is to word—that is, normatively oral utterance—as the distorting pose of a person is to that person herself. God's "letters are so comfortable," comments the Presbyterian divine Richard Baxter, speaking of the Bible, that we can scarcely imagine "the words that flow from his blessed lips…And the beams that stream from his Glorious Face."[73] The "letters" of scripture, although exceedingly important, are ultimately just a sign pointing back toward the (oral) "words" of the intentional source. Baxter's fellow divine Jeremy Taylor, trying to explain the glorious nature of faith, states that it is only "short of Heaven it self, as infancy is short of manhood, and letters of words." Faith, Taylor goes on, "is Heaven in a Looking-glasse (dark, but yet true)."[74] The speculative metaphor, here in the well-known version of St. Paul, expresses the problematic reiteration of orality as script; just as it has already expressed the even more problematic reiteration of notions as orality.

Indeed, seventeenth-century preachers love to trope writing as the final term in an intentional sequence that depends on the oral; which, in turn, depends on the inward. "What Penne can describe, or what tongue can recount, or what heart can apprehend," rhetorically asks John Dod, "the exceeding greatnes of the joy which [the righteous soul] possesseth?"[75] Thomas Walkington, publishing a sermon with a dedication to the Earl of Suffolk, promises to honour the latter with "my heart, my tongue, my penne and all."[76] "If your pen expresse not what your tongue is able fullie," urges the royal chaplain Daniel Price, against an erroneous opponent, "I would your hart woulde conceive that which your tongue may speake truly";

> that as some thinke there bee certaine strings that passe from the hart to the tongue, so there might bee a concatenation that what your hart thinketh, and your tongue speaketh, and your pen writeth, may so agree, that they may be all to the glorie of God, the instructing of others, and saving of your owne soule.[77]

Heart, tongue, pen: normative steps down an intensional ladder.

A great deal of rhetorical excitement, evidently inter-involved with the advent of shorthand, is occasioned by the 45th Psalm, where David tropes his tongue as "the pen of a ready writer." But the Psalmist's metaphor is typically picked apart, its halves put back into intentional and rhetorical order. "Give me the tongue of the wise, *and* the pen of the ready writer [my emphasis]," pleads Samuel Gardiner.[78] Andrew Willet assures the King that the ministers of his church will emulate David by putting their "tongues *and* pennes" to work [my emphasis].[79] "Why doth he compare the tongue unto a pen?" asks William Burton, re: Psalm 45:

> Surely, for three causes. First, because as the pen sheweth what the mind thought, so the tongue should expresse the zeale of the heart. Secondly, as the penne doth his message without blushing, so the tongue must speake nothing that a man may be ashamed of, but should boldly justifie the same. And thirdly, to shew that there must be that consent between the tongue and the heart, that is betweene the pen and the mind of the writer. As the toung is compared to a pen; so also, to the pen of a swift writer: and that for three causes. First, to shew, that as swift writing is a signe of one that is well practised in writing: so the toung should not be slow, but swift, and well practised in the praises of God. Secondly, to shew, that it must dispatch much in a short time, and not a little in a long time, as the hand of a swift

> writer doth. Thirdly to shew, that the tongue must ever be renewed and corrected as the pen of a swift writer that writeth much, must be still renewed and corrected.

Having re-established the proper relations between heart, tongue, and pen, Burton sums up by reducing the Psalmist's metaphor to a simile: "When Dauids heart was enditing or framing of a good matter, then was his tongue readie (*like* the pen of a swift writer [my emphasis]) to declare the same."[80]

Burton reminds us that swift writing—also known as short writing, also known as brachigraphy or characterie—was very much in the face of English orality early in the seventeenth century. In the terms of our current discussion, we can say that characters are a new element in the intensional sequence. They are a re-technologization of letters; or, perhaps, a reiteration of the technological profile of letters. The alienation or deferral that defines writing, vis-à-vis a normative orality, gets reproduced and hypostatized in shorthand characters. Consider that in seventeenth-century terms, a spoken sermon is primary or original language. Published, it is secondary and parasitic; but still language. Due to fluency of reading, and copiousness of publishing, the latter starts to seem like just another normative form. But characters, in their radical strangeness, even their ostensible illegibility (so prized by a figure like Sir Thomas Browne), are a writing placed over and against orality, all over again. This is not to say that shorthand characters have no relation to the tongue, but—exactly to the contrary—that they are *entirely predicated* on that relation: they exist *only* to be reconverted to the properly linguistic data that they have, for the moment, captured. This is consistent with our insight (from the last chapter) that the advent of shorthand prompts a re-naturalization, or re-ontologization, of orality. The living word is *that much more* the word, when it is confronted by the yet much deader letter.

Perhaps this is why, in at least the first half of the seventeenth century, we find a common ethnographic opposition between "language" and "characters"—a larger and more intransigent version of the one between words and letters. To be sure, these deployments of the word "character" have nothing directly to do with shorthand. But as we have seen, the advent of shorthand characters, beginning in the late sixteenth century, seems to have made itself generally felt on period discourse about writing. In Muscovy, relates Anthony Munday, the "vulgar toong" is "the Sclavonian Language"; but "theyr Carracters are Greeke."[81] Getting writ-

ten in Greek characters does not make Slavonic Greek. On the other hand, the "Servian character," according to Edward Brerewood, "was of Cyrils invention: for which cause … they terme the language written in that character Chiurilizza."[82] That Cyril invented characters for Serbian does not mean he invented Serbian. Pierre d'Avity informs us that "the inhabitants of the countrie of Permia use no bread, but live of the flesh of stagges and other beasts: they have a particular language and characters also which differ from them of Russia: they use dogges and great stagges in stead of horses to carrie their burthens, and to draw their wagons." By contrast,

> They of Iugre or Iugaria speake the Hongarian tongue: and the inhabitants of the prouince of Petzore are verie simple, and have a particular language: they never eat any bread. The Czeremissois live in great forests, and have not any houses. They use a language differing from the rest: they are verie swift, and exceeding good archers. They carrie their bows continually in their hands, and love them in such sort, as they neuer give their children which are growne to any stature any thing to eat untill they have hit a white which they set up before them. They live for the most part of honie, and the flesh of wild beasts; they eat bread seldome, and make their garments of skins. The Morduois are in everie thing like unto the Czeremissois, onely they live in houses, and have a particular language.[83]

Who eats bread, who has honey, who loves bows: these are among the concerns of d'Avity's ethnography. And who has writing: only the Permians, among the people surveyed in the passage above. We know this because they are the only ones who have, in *addition* to "a particular language," "characters." "Language" and "character" occupy opposite sides of a philological divide.

This we will also find in and around the real-character project of the mid-seventeenth-century. "The expression of the minde or thoughts," writes Francis Lodwick in his *Ground-work, or Foundation, Laid … for the Framing of a new Perfect Language* (1652), "is either by the Tongue or Pen most generally performed."[84] "Concerning languages," Lodwick goes on to enumerate a number of "inconveniencies," before turning to writing. This has manifest advantages; but is, unfortunately, "limited to the Languages, and joyntly travelling with them."[85] Lodwick's discussion makes no sense at all unless one remembers that, in the period terms he's deploying, "writings" are precisely not entailed by "languages." You have to mention both, if that is what you mean; and even if so, the two insentional matrices do not necessarily march along together. In the introduction to his *Universal Character* (1657), Cave Beck complains (in very

typically Baconian terms) about the "Equivocal words, Anomalous variations, and superfluous Synonomas (with which all languages are encumbred)." The universal character, Beck assures us, is "a Clew to direct us out of this Laborinth of Languages."[86] Of course, in the post-Saussurean world, there is no such way out. Always-already, we may smugly say, Beck's numerical cypher is a language. But not for him; because his world is not yet Saussurean at all. The universal character would generate "language," in Beck's terms, only by getting fitted with effable (speakable) phonemes. Even then, the language as such would remain distinct from, and subordinate to, the graphic scheme of the character. As do Bacon, Webster, Ward, Wilkins, and almost everybody else who thinks about these issues in the period, Beck cites "the Chinois," who "have a general Character, which serves themselves and their Neighbours, though of different Languages."[87] Chinese *zì* are not a "language," precisely because they are not oral. Neither is language *zì*. On exactly that basis, the characters provide a common ground supporting communication and translation among multiple, and mutually unintelligible, oralities.

And then we have the *Essay towards a Real Character,* and *a Philosophical Language* [my emphasis]. The title links two things—character, and language—in a conjunction. It does not reiterate one thing, in a redundancy. In the early phases of Wilkins's text, similarly, we read of "Tongues and Letters," "Characters, and Languages," "a new kind of Character and Language," and so on.[88] To be sure, and despite the hard-science noises he will make later on in the *Essay*, Wilkins's introduction to the work reveals him to be a very fine and sensitive philologist. Effortlessly, even breezily, he takes us on a brief survey of multiple tongues, both European and exotic. Among other things, we are looking here at a tributary stream of modern diachronic linguistics. Nonetheless, Wilkins's main point is one he shares with Beck. We desperately need to escape the confusions of organic and mercurial orality. Again like Beck (and Dalgarno), Wilkins certainly has it in mind to add an effable function to his real character. But this goal, expressed in his very title, is (again) to produce a language as a *secondary* functionality, based on and distinct from the primary functionality of the character. He will "shew how this Character may be made effable, in a distinct Language."[89] Wilkins insists that he is not thereby just adding to the number of tongues. That would be "like the inventing of a Disease," for which a man can "expect little thanks from the World."[90] Rather, Wilkins is extending the work of his character into orality, in order to bring the latter under philosophical discipline. The character holds immense epistemological promise, precisely because it comes from *outside* "language."

An interesting contrast arises here between Wilkins and Dalgarno. Unlike the great don and bishop, the obscure schoolmaster prioritizes effability in the general project of speculative communication, focussed on the idea of universal character. But by exactly that token, it is very important to note that Dalgarno cannot take his own position for granted. He has to make an *argument* for it. In his *Art of Signs* (1661), he laments "the ignorance of those (and even learned men must be reproached with this error) who have a high estimation of the art of signs in mute figures, that is to say a Universal Character (as it is usually called), but who wish to hear nothing of a new language":[91]

> Do words offend the ears? … If signs that are not rationally instituted (and the words of all languages are such) allow the transformation of sounds into figures and of figures back into sounds, which is a noble and useful art, how much more is this feature of excellence to be desired in rationally instituted signs?[92]

As we will see below, Dalgarno is actually beginning a process of thinking that will lead toward a wholesale philological retheorization. He is starting, that is, to deconstruct the language–character divide. The result will be a reframing of semiotic and communicative categories that will perhaps open up the idea of "language" in unprecedented ways. But when he gets to the end of that process, Dalgarno will have to argue the point all over again. And, in any case, he is not there yet. The Dalgarno of the *Art*, even while asserting that "the art of characters and sounds is one and the same," goes on—in the same breath—to point out that "the easier *of the two* should be presented first [my emphasis]; for to anyone who has fully grasped the use of the language I can teach the use of the character within a single hour."[93] Even for Dalgarno, at least at this stage of his thinking, a character is *not* a language.

As we have noted, some of the most exotic innovations in the movement for seventeenth-century characters turn on distinctions that may seem to us pragmatic, even bland. The distinction between the oral and the written is perhaps the most crucial of these. Dalgarno and Wilkins turn shorthand—a system for noting down expressed intensions—into a fully-fledged system for expressing intensions. This is what makes the real character look like a "language" to us. But if we see it that way, we are missing the point. To approach the real character through the category of language is to misunderstand what is supposed to be important about

it. Language, as we have seen, is for seventeenth-century Baconians the break in the speculative chain. Orality, meanwhile, is the medium and marker of language. "Characters," of one kind or another, are secondary formations from the oral. This is why, like the tribes of the ethnographies cited above, you can have a language without a character; but you cannot have a character without a language. *Until the real character*. A system of signs that is written *first*, and refers directly to the mental notions that are thought to be available on the speculative view, *without* passing through the oral matrix where the troublesome phenomenon of language properly and inevitably lives: This, for the seventeenth-century views that we have been surveying, is revolutionary. A real character is not just a language that is not oral. Insofar as language is fundamentally oral, a real character is not a language at all.

To be sure, both Dalgarno and Wilkins, in their different ways, think it important to add an effable (speakable) sub-system to the system of the character. In Wilkins's case, this is the latter part of the project designated as the *Essay towards a Real Character, and a Philosophical Language*. But as we will see in the next chapter, the real character itself is *never* actually oralized. Wilkins does not provide a way to represent the abstract and glyphic characters in the medium of orality. Rather, he provides a *secondary orality*, alphabetic and phonetic, that copies in language the work of the character. Conversely, and as a proof of the point: The Philosophical Language does not get written down in the real character, but in its own, bespoke, secondary script. This reverses the polarities of the traditional distinction between character and language. In the traditional vision, language gets copied by character. In Wilkins's vision, character gets copied by language. Thus the matrix of the oral, rather than being allowed to provide a confound to philosophy, is brought under the empirical and logical discipline of the latter. It is okay for the Philosophical Language to be one—that is, a language—precisely and only insofar as the real character is not.

None of which, of course, will break through the Saussurean tautologies. Language, the signifiable, the expressible, the knowable: all these, for postmodern phenomenalism, are isomorphic. But that is precisely the relevant difference between the seventeenth century and our own time. What language is for us—after Nietszche, Wittgenstein, Saussure, *et al*.—is much different, and much more, than what it is for them. At its postmodern maximum, our category of language gets so capacious that, like Mr. Creosote in Monty Python's *Meaning of Life*, it bursts. The late American philosopher Donald Davidson, in a famous remark of his rather

ludic maturity, stated baldly that there was "no such thing as a language": "no boundary between knowing a language and knowing our way around in the world generally."[94] It is pleasant to imagine the uncomprehending stares this remark would have prompted in the real-character planners of the seventeenth century. A "language," for them, is simply not an instance of any ever-expanding and all-encompassing semiotic or hermeneutic category. It is, rather, a way of *speaking*. This is no more a basis for a general phenomenology of the world than is a way of licking. The tongue, for the seventeenth century, is *not yet* any such thing as a language, in Davidson's terms. For the real-character planners of the early Royal Society, orality and literacy are not the twin emanations of a single linguistic field. They are communicative manifestations, associated and companiate, but for all that quite separable.

But *Is* There Such a Thing as a Language?

Now, there can be no doubt that the antithesis of language and character, in the seventeenth century, yields some striking syntheses. These, I would like to argue, are the phenomenological *work* (in an almost thermodynamic sense) that becomes possible on the basis of the pre-established differential. The idea and profile of characters, moreover, seems to play a big role in this process. If, at the beginning of the period movement for a universal character, there is "no such thing as a language"—in anything like our sense—there may be at the end of it.

"There's no native law," writes John Bulwer in his *Chirologia, or, The naturall language of the hand* (1644), "or absolute necessity, that those thoughts which arise in our pregnant minde, must by mediation of our Tongue flow out in a vocall streame of words; unto which purpose we must attend the leisure of that inclosed instrument of speech." Of course, there is indeed such a law; or so it has always seemed (as we have been discussing), in Bulwer's period. The chirologist himself acknowledges as much when he deploys the standard character|language distinction: gesture, he says, is a "universal character," "understood and knowne by all Nations, among the formall differences of their Tongue." But the normativity of the oral, and its opposition to the characterological, simply provides the opportunity here for a stylish deconstruction. The hand, Bulwer writes—with metaphysical wilfulness—"speakes all languages."[95]

We find a similar move in Thomas Nabbe's comedy *Covent Garden* (1638), where one of the *dramatis personae* says of another that "His

Character in his owne language is I and no; yet he speaks well in paper. He is a wit, but somewhat a dull one."[96] Writing in speech, speaking in paper: these are conceits (extreme mixed metaphors), which achieve their startling effect precisely because the things they equate are supposed to be unequatable. We have seen the Presbyterian conservative Richard Baxter invoking a traditional opposition between letters and words. He is nonetheless not above performing a funky mash-up of language and character: "A holy, harmless, humble life," he explains, "doth speak in all the Languages of the World *to men that have eyes to read it* [my emphasis]." Speaking to the eyes: that's pretty cool. In this both "Universal Character and Language," Baxter goes on, "all sorts may perceive you speak the wondrous works of the Holy Ghost."[97]

We will find this inertia toward philological synthesis within the real-character movement itself. In 1654, the radical schoolmaster John Webster published his *Academiarum examen*, an acerbic but eclectic attack on the Oxbridge educational system. Like many of the period's less clubbable Baconians, Webster combines his veneration for the great man's methodology with Neoplatonism, Paracelsianism, and other somewhat lurid visions.[98] "The universal Character (hinted at by some judicious Authors)" is one natural-philosophical project that gets Webster very excited, in part because—so it seems to him—the two universities are neglecting it. Citing Bacon, Agrippa, Comenius and Gustavus Silenus (among others), the syncretic Webster associates the real character with "*Hieroglyphical, Emblematical, Symbolical* and *Crytographical* learning"; with algebra, Chinese, and various technical notations; and with deaf-mute signing, which allows "vocal and articular prolation" to be "brought to pass by the eyes and motions of the face onely." The insight that Webster is struggling to articulate is that all forms of intensional communication ought to be considered together; they are one, in the last analysis—not language–character, letter–words, or any of these traditional oppositions, but some overarching unity for which there is as yet no discourse. This, perhaps, can best be understood on the model of the "natural language" that would have been spoken by Adam in Paradise. In some way, finally, which Webster glimpses but cannot quite describe, the renewal of knowledge is crucially "relative to grammar."[99]

Webster's polemical ecstasies left him exposed before his academic and social superiors. John Wilkins and his friend Seth Ward—prominent Oxfordians both, and both on their way to becoming very heavy hitters of the Restoration intellectual and political scene—brought out their

Vindiciae academiarum, *containing some briefe animadversions upon Mr Websters book* within a few months of the latter. Ward and Wilkins are pretty merciless in taking down the schoolmaster's visions for the renewal of learning. But they are especially harsh on his remarks about the universal character. Not because they do not know what Webster's talking about; rather because, in the dons' judgment, *he* does not. They agree with Webster that "knowledge is conveighed by signification of our notions to one another" and "signes may be made … in any way which doth admit of a sufficient variety … as well by the eye as by the eare." Webster, however, is cooking up a strange brew of both visual and oral semiotics, mixed in with cryptography and orthography and who knows what else. For Ward and Wilkins, denying or reducing categories in this way is absurd: it is "as mysticall as to affirme, that the day light is advanced by the coming of the night, or that [one] would kill a man for his preservation."[100] The dons are particularly keen to have at Webster for his transcendent vision of grammar:

> it is enough for [Webster] that *Orthography* and *Cryptography* have the same end [that is, the same suffix], and he hath heard that the first is a part of Grammar: and why may not *Emblems* be a part of Grammar, as well as *Etymology*, they begin both with a letter, the word sounds as well, and *Emblematical* is a neater word, and suits perhaps better with his mouth, than *Etymological*.[101]

"Grammar" certainly seems to suit pretty well with Ward's and Wilkins's mouths, as they reiterate it to levels of high comedy:

> But in truth I am extremely ravished at the defects he finds in Grammar, and his proposals for its advancement, how sweetly and congruously hath he drawn in to the reliefe and advancement of Grammar and Language, those things which mortal men intended to set in opposition to them … It is reported of Friar *Bacon*, that *time was* when by the strength of Alchymy he made a Brazen head to speake … but how farre hath our Friar exceeded him, who talking of *Hieroglyphicks, Emblems, Symbols*, and *Cryptography*, and according to his capacity, hath extracted out of silence, an advance of Eloquence, and from dumb signes a Grammar.[102]

For Ward and Wilkins, in the *Vindiciae*, it is nothing short of ridiculous to claim some kind of capacious philological union for phenomena and techniques as different as emblems and etymology, or to associate the results

with the prospects for a universal character. Webster, the confused schoolmaster, thinks accidental and irrelevant associations indicate substantive or suggestive continuities. Of course the real or universal character is a philosophical desideratum, which real Baconians (devotees of Francis, not the medieval alchemist Friar Roger) know all about. But the way to the character will be via enforcing, not waiving, categorical distinctions. There is simply no validity to Webster's wild attempt to see the eye in the ear, the pen in the tongue. Mashing things up in this way "amounts to no lesse than a great want of consideration."[103]

And yet: if we ignore the dons' guffaws, we can hear them getting quite a lot out of their encounter with Webster's *Examen*. When they get tired of boxing the schoolmaster's ears, they go on to lecture him about what is really meant by "the *Universall Character*, about which [Webster] smatters so deliciously."[104] Webster, to be sure, showed his foolishness by "bringing this under Grammar." But he is correct that a real character would "take away from every Nation the necessity of Learning any other beside their mother tongue … by designing all *things* and *notions* by certaine common signes which may be intelligible by all alike, though diversly expressible."[105] "To such a character as this," they go on—and here they are maintaining, *contra* Webster, the categorical distinction between character and language—"there is but one thing more desireable, which is to make it effable, because it is a dull thing to discourse by pointing and indication."[106] Thus rendered effable, the linguistic *projection* of a real character "might not unjustly be termed a natural [non-arbitrary] Language, and would afford that which the *Cabalists* and *Rosycrucians* have vainely sought for in the Hebrew."[107] Now, it was precisely on his mystical interest in "natural" (as opposed to conventional or arbitrary) language that the two powerful Oxfordians swooped to the attack on the hapless Webster. Yet having driven him off the field, they now seem to be looting his supplies. Perhaps this is why they fall back on a long passage of absurdist parody:

> The Paradisicall Protoplast, being Characteristically bound to the Ideal Matrix of Magicall contrition, by the Symphoniacall inspeaking of *Aleph tenebrosum*, and limited by *Shem hamphorash* to the centrall Idees, inblowne by the ten numerations of *Belimah*, which are ten and not nine, ten and not eleven; and consequently being altogether absorpt in deciphering the signatures of *Ensoph*, beyond the sagacity of either a Peritrochiall, or an Isoperimetrall expansion … But where the forms are thus enveloped in a

> reluctancy to *Paphoniacall* Symbols, and the *Phantasmaticall* effluviums checked by the tergiversation of the *Epiglottis*, from its due subserviency to that concord and harmony which ought to have been betwixt lapsed man and his fellow strings, each diatesseron being failed of its diapente necessary to make up a Diapason no perfect tone could follow. And consequently this Language of nature must needs be impossible.[108]

As it was in the seventeenth century, so it is today: violent condescension of the learned to the learning is not very admirable—but is quite telling. Ward's and Wilkins's dressing-down of Webster is a familiar episode in intellectual histories of the seventeenth century. But I am not sure if it has been sufficiently noticed that they mock a bit too much.

So it might have seemed to another schoolmaster, also known to Ward and Wilkins, and with some reason to feel used by them. In the autobiographical treatise he penned near the end of his life, Dalgarno fulfilled at least part of his predecessor Webster's attempt fundamentally to *rethink* the boundaries and dividing-lines of language. For the later Dalgarno, the distinction between a mute but real character, and "mediate and vocal" language, "has not that *fundamentum in re* [basis in fact] that many doe erroneously imagine."[109] After all, he goes on—displaying a startling willingness to overturn intellectual apple-carts—"every Language written to every man is a real Character, but when he vocaly pronounces it."[110] Dalgarno goes on to offer a remarkable and difficult thought-experiment involving the deaf-mute: for such people, he says, it is precisely the *vocal* signs that will tend to function as "real" marks. He concludes that "Characters written and a Language spoken are so near a kin that they are indeed not two but two names for the same thing: two they are in dress and enter throw two doors to their Mistress; but by her order, without which they can doe nothing, they bring exactly the same intelligence."[111] As a good old humanist, Dalgarno waxes poetical:

> There is a near affinity and cognation between these two. They are not only Germani but Gemelli; both the sons of Jupiter, not Hercules and Iphicles, but Castor and Pollux, *eodem ovo prognati* [born from the same egg], living and dying by turns, serving humane Society interchangeably, the one the ey the other the Ear.[112]

It is as though, looking from the 1680s back to the 1650s, one peripheral schoolmaster of the real-character movement joins hands with another. For the later Dalgarno, à la Webster, eye and ear, tongue and pen, are not

just related but mimetically identical. Not just brothers, but twins. The projection of a language out of a character is a double manifestation of the same over-arching phenomenon. This, perhaps, is a view that resonates with much more recent phenomenologies of language. But the point here is not to propose a teleology, or even an analogy. The point is simply that Dalgarno conceives himself to have *really come up with something* in his mature insight that a language and a character may be really just one thing. Perhaps there *is* such a thing as a language, comprising both orality and writing, and by that token expanding both of them beyond their previous, narrow conceptions. But if there is, this new phenomenological category amounts—for Dalgarno—to a wondrous intellectual revelation.

Of course, Wilkins broke with Dalgarno pretty early in the project of the *Essay*, and never seems to have shared (as I will argue in the next chapter) his onetime associate's enthusiasm for oral language as such. Nonetheless, we will find Wilkins deconstructing, in his own way, the character|language binary over the course of the *Essay*. As I have noted, in the opening pages of his great work, and to some extent throughout, Wilkins writes conjunctively of "character, and language." That is, he is indicating two different things; not just giving two names for the same thing. On that position, in a sense, rests the whole Baconian real-character project, as an attempt to escape the distortions of the tongue and thereby attain a denotative system commensurate with the speculative view. Nonetheless, Wilkins's usage is quite slippery. "I shall premise some things as *Praecognita*," he writes on the first page of his introduction,

> concerning such Tongues and Letters as are already in being, particularly concerning those various *defects* and *imperfections* in them, which ought to be *supplyed* and *provided against*, in any such Language or Character, as is to be invented according to the rules of Art.[113]

Close reading of this passage, especially for its many figures of rhetorical *addition*, is warranted. "Tongues and Letters," apparently, is a conjunct: two things associated, not one thing reiterated. "Defects and imperfections" may be found in either of them—"Language," that is, *or* "Character." So far, so conjunctive still. And, for that matter, Wilkins's opening chapters follow the same structure: first surveying existing languages, then turning to scripts. On the other hand, in the passage above, "defects and imperfections" seems a rather redundant, repetitious phrase; and it is difficult to know what to do with "supplyed and provided against."

The later seventeenth century, as students of its literature are well aware, is very fond of a kind of casual rhetorical copiousness, in which saying one thing *once* is almost never enough. Sometimes, what results is synonym (different names, adding up to one thing); other times, hendiades (different things, adding up to one name). And other times still, an obscure combination of both.

Other examples, on the same page of the *Essay*, are "things and notions," "marks or names," and "end and design." Difference slips toward identity, on this kind of shifting rhetorical ground. And indeed, as he goes on, Wilkins starts to refer to a "*Philosophical Character or Language*," "Letters or Languages," "a new *Character* or *Language*," "*sounds* or *Characters*," "*Character* or Language" and so on. Conjunction, in usages of this kind, seems to be dissolving into equation.[114]

In his Philosophical Tables (the ontology on which the character is founded), Wilkins makes the resulting implication explicit—while conceding, without acknowledging, a debt to Webster. The tables begin with a chapter on transcendentals: metaphysical and logical categories including genus, species, cause, difference, mode, and relation. (We will come back to these issues in the next chapter.) Finally, Wilkins gives the category for all "those external expressions whereby men do make known their thoughts to one another": the whole business, in other words, of intensional communication. This is equivalent, Wilkins tells us, to "the several notions belonging to *Grammar* or *Logick*." That sounds an awful lot like an architectonic or overarching notion of grammar—for which Wilkins and Ward mocked Webster in 1654![115] More importantly, the Bishop of Chester is also appropriating the hapless and by 1668 entirely forgotten schoolmaster's general impulse to synthesize all of intensionality under a single phenomenal heading. For this Wilkins proposes "DISCOURSE." "To which may be annexed," he explains, "that particular way of discourse, most in use, namely by articulate voice and words, called LANGUAGE, *Tongue, Speech, Linguist, dialect*."[116] Wilkins then refers, in beginning his actual tabulation, to "the framing of Discourse or Language."[117] Just a few moments ago, "discourse" was advanced as the general category of intensional expression. A moment after that, "language" was "annexed" to this category as its oral sub-function. Now, suddenly, the sub-functional term is synecdochally interchangeable with the main one. Not only has the splitting of Wilkins's *Vindiciae* reverted to the joining of Webster's *Examen*; "language," far from meaning (as previously) essentially just tonguing or

speaking, now seems to be functioning as the portmanteau term for the entire communicative and intensional phenomenon.

And indeed, as the *Essay* proceeds, Wilkins quite casually participates in expansion of the linguistic category. The "*Letters* of any Tongue," he writes, mixing his metaphors in almost Websterian fashion, "do not alwaies remain the same, but are subject to the like fate and mutability, to which Languages are exposed."[118] The different kinds of plants may be "almost twice the number of words here intended for the whole body of language."[119] There is a "want of proper words to express the more minute differences betwixt them."[120] It will be necessary to express many things "Periphrastically here as in all other Languages."[121] "Language" does not "afford convenient terms, by which to express several differences."[122] Wilkins's six logical headings or predicaments (transcendence, substance, quantity, quality, action, and relation) are explicitly exemplified by words:

> The word *Goodness* is a transcendental, one of the General differences of things, or affections of entity … The word *Diamond* doth by its place in the Tables appear to be a Substance, a Stone, a pretious Stone … The word *Flower* or blossom is one of the peculiar parts, belonging to Plants … The words *Newness* and *Oldness* do signifie notions belonging to *Quantity*, to space, to time, and more particularly to time past … The word *Moderation* is a Quality, a Habit, an Affection of intellectual virtue … The word *Pitty*, doth by its place denote an Action, spiritual, of the soul in respect of the Appetite … The word *Parent* by the place of it in the Tables, doth denote the thing thereby signified to be a Relation, Oeconomical, of Consanguinity, direct ascending.[123]

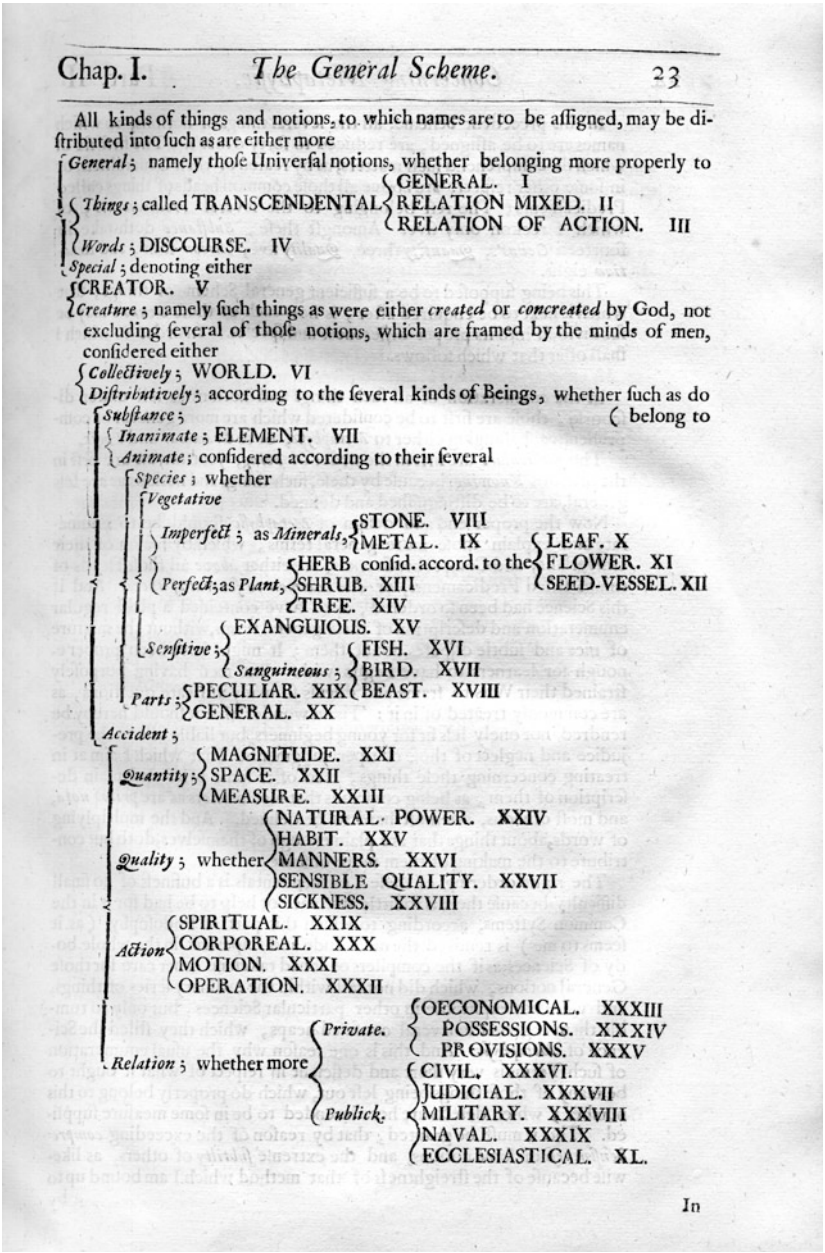
In some of these cases (parent, pity), words *denote* things. Even that is a blurring of the Baconian real-character idea, redolent of the self-defeating linguistic function that the character is supposed to escape. In other cases, moreover (diamond, flower), Wilkins frankly *identifies* word and thing. To be sure, if he is talking about words *of the real character*, then there is no problem. But he does not make clear that he is.

What seems to be happening here is that Wilkins is writing the *Essay*, as he goes along, from a perspective of its conclusion. Strictly speaking, Wilkins's masterwork is fulfilled in his universal character: an artificial graphic sign system, organized in accordance with what Wilkins considers a comprehensive natural history and a speculative grammar, and rich

and precise enough to denote everything in the philosophical tables (i.e., effectively, everything).[124] But after the character comes the philosophical language: an artificial tongue, rationally invented and arranged, with the unique epistemological merit—among languages, that is—of being the oral expression of the same system as the character.[125] In this way, the end of the *Essay* shows its beginning: the speculative relationship that obtains between character and language shows the kind of relationship that is supposed to obtain between the character and the world. But more to the point, the philosophical language, precisely as such, is an unprecedented intervention, from the Baconian perspective, in the perennial distortions of the tongue. Never before has there been a language that expressed the structure of reality. But now, perhaps, there is; and it bids to redefine its kind.

Conclusion: The Emergent Image

But that is the very end of the story—or another story altogether. As I will argue in the next chapter, the vast majority of Wilkins's work in the *Essay*—indeed, the whole point of the text—has to do with the real character *in isolation* from language, philosophical or otherwise. Only by working through the real character *first* does a pathway to the philosophical language even become conceivable. And even then, it is not clear that *language in general* receives any peripheral redemption. I have made several passing suggestions about the role that the real-character project may have played in the phenomenological inflation of the linguistic category with which we are familiar in later modernity. These must rest suggestions; they point well beyond the scope of this book. Nonetheless, I hope I have established that the real character project was conceived and prosecuted under much flatter phenomenological conditions than we are accustomed to. A language, for the Baconians of the seventeenth century, is not a very big philosophical deal, except insofar as it *impedes* philosophy. A real character, by contrast, and precisely insofar as it stands apart from language, has the capacity to solve the problem, and allow the work of knowledge to proceed on an entirely new basis. And that is a really big deal indeed.



Chap. I. *The General Scheme.* 23

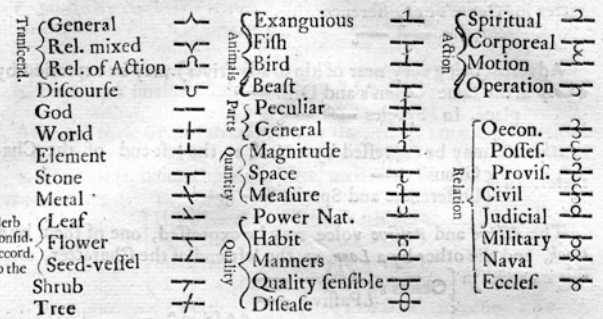
All kinds of things and notions, to which names are to be aſſigned, may be diſtributed into ſuch as are either more

General; namely thoſe Univerſal notions, whether belonging more properly to
- *Things*; called TRANSCENDENTAL { GENERAL. I / RELATION MIXED. II / RELATION OF ACTION. III
- *Words*; DISCOURSE. IV

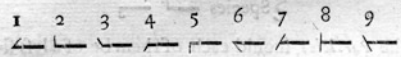
Special; denoting either
- CREATOR. V
- *Creature*; namely ſuch things as were either *created* or *concreated* by God, not excluding ſeveral of thoſe notions, which are framed by the minds of men, conſidered either
  - *Collectively*; WORLD. VI
  - *Diſtributively*; according to the ſeveral kinds of Beings, whether ſuch as do
    - *Subſtance*; (belong to
      - *Inanimate*; ELEMENT. VII
      - *Animate*; conſidered according to their ſeveral
        - *Species*; whether
          - *Vegetative*
            - *Imperfect*; as *Minerals*, { STONE. VIII / METAL. IX
            - *Perfect*; as *Plant*, { HERB conſid. accord. to the { LEAF. X / FLOWER. XI / SEED-VESSEL. XII / SHRUB. XIII / TREE. XIV
          - *Senſitive*; { EXANGUIOUS. XV / *Sanguineous*; { FISH. XVI / BIRD. XVII / BEAST. XVIII
        - *Parts*; { PECULIAR. XIX / GENERAL. XX
    - *Accident*;
      - *Quantity*; { MAGNITUDE. XXI / SPACE. XXII / MEASURE. XXIII
      - *Quality*; whether { NATURAL POWER. XXIV / HABIT. XXV / MANNERS. XXVI / SENSIBLE QUALITY. XXVII / SICKNESS. XXVIII
      - *Action* { SPIRITUAL. XXIX / CORPOREAL. XXX / MOTION. XXXI / OPERATION. XXXII
      - *Relation*; whether more
        - *Private.* { OECONOMICAL. XXXIII / POSSESSIONS. XXXIV / PROVISIONS. XXXV
        - *Publick.* { CIVIL. XXXVI. / JUDICIAL. XXXVII / MILITARY. XXXVIII / NAVAL. XXXIX / ECCLESIASTICAL. XL.

In

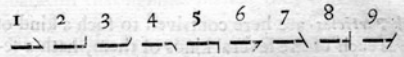
Fig. 1



The Differences are to be affixed unto that end which is on the left side of the Character, according to this order;



The Species should be affixed at the other end of the Character according to the like order.



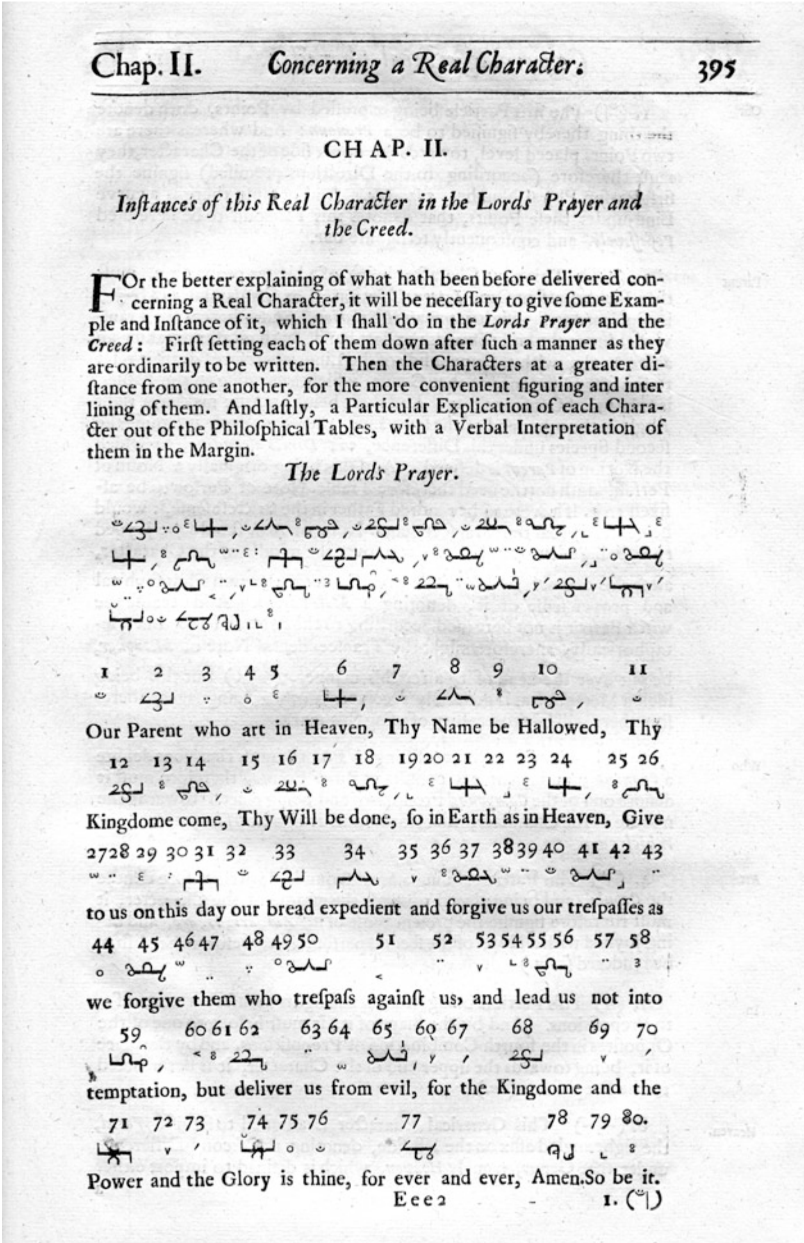
And whereas several of the Species of Vegetables and Animals, do according to this present constitution, amount to more than Nine, in such cases the number of them is to be distributed into two or three Nines, which may be distinguished from one another by doubling the stroke in some one or more parts of the Character; as suppose after this manner, . If the first and most simple Character be made use of, the Species that are affixed to it, will belong to the first combination of *Nine*; if the other, they will belong according to the order of them, unto the second Combination.

Those Radicals which are paired to others uppon account of *Opposition*, may be expressed by a Loop, or ⟨o⟩ at the left end of the Character, after this manner, o-

Those that are paired upon the account of *Affinity*, are to be expressed by the like Mark at the other end of the Character, thus, -o

The double Opposites of *Excess* or *Defect*, are to be described by the Transcendental points, denoting *Excess* or *Defect*, to be placed over the Character, as shall be shewed after.

Fig. 2



Chap. II. *Concerning a Real Character.* 395

CHAP. II.

Instances of this Real Character in the Lords Prayer and the Creed.

FOr the better explaining of what hath been before delivered concerning a Real Character, it will be necessary to give some Example and Instance of it, which I shall do in the *Lords Prayer* and the *Creed*: First setting each of them down after such a manner as they are ordinarily to be written. Then the Characters at a greater distance from one another, for the more convenient figuring and interlining of them. And lastly, a Particular Explication of each Character out of the Philosphical Tables, with a Verbal Interpretation of them in the Margin.

The Lords Prayer.

1 2 3 4 5 6 7 8 9 10 11

Our Parent who art in Heaven, Thy Name be Hallowed, Thy

12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

Kingdome come, Thy Will be done, so in Earth as in Heaven, Give

27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43

to us on this day our bread expedient and forgive us our trespasses as

44 45 46 47 48 49 50 51 52 53 54 55 56 57 58

we forgive them who trespass against us, and lead us not into

59 60 61 62 63 64 65 66 67 68 69 70

temptation, but deliver us from evil, for the Kingdome and the

71 72 73 74 75 76 77 78 79 80.

Power and the Glory is thine, for ever and ever, Amen. So be it.

Eee 2 I. (I)

Fig. 3

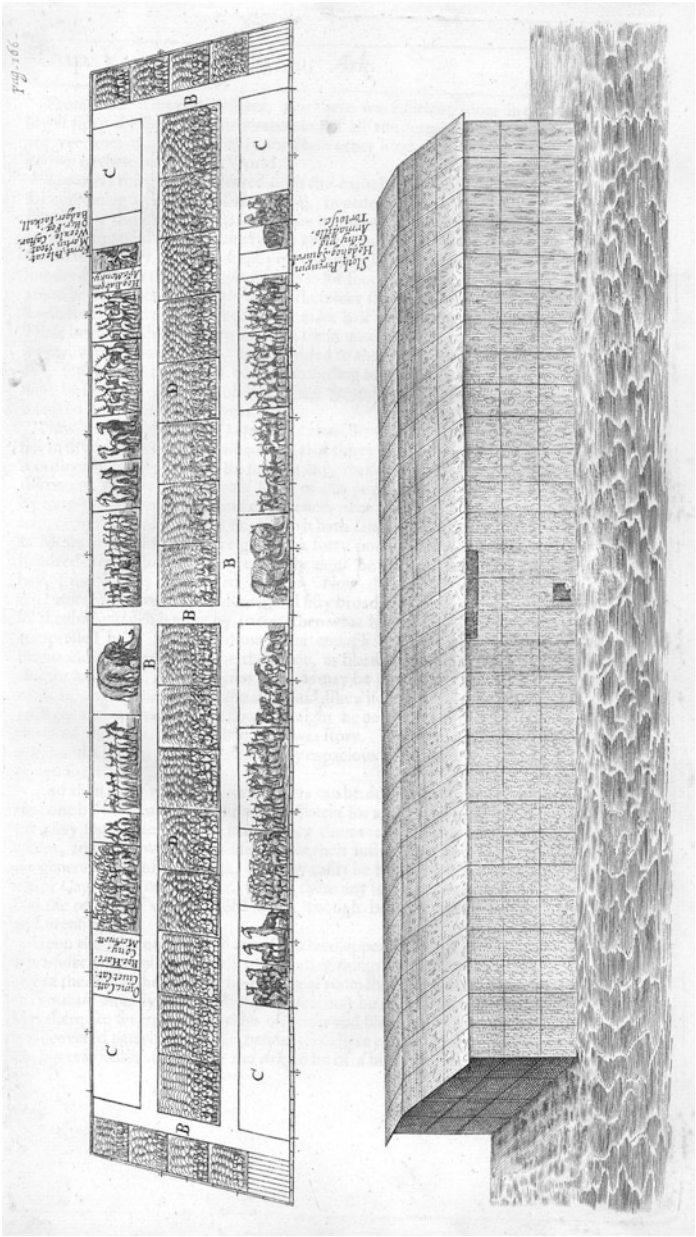


Fig. 4

Notes

1. See Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone, 2007), 213–16, 253–65.
2. See Kant, *Critique of Pure Reason*, trans. Werner S. Pluhar (Indianapolis: Hackett, 1996). Two very good articulations of Kant's relevant thought are Henry E. Allison, *Kant's Transcendental Idealism: An Interpretation and Defense* (New Haven: Yale University Press, 2004); and Angelica Nuzzo, *Kant and the Unity of Reason* (West Lafayette, Ind.: Purdue University Press, 2005).
3. Cram and Maat (eds), *George Dalgarno*, 10–13.
4. Jeremiah Rich, *The penns dexterity by theise [sic] incomparable contractions by which a sentence is writt as soone as a word allowed by authority and past the two universitys with greate aprobation and aplause* (London, 1659).
5. See Cram and Maat (eds), *George Dalgarno*. See also Lewis, *Language*, 85–100.
6. See Lewis, *Language*, 12–16.
7. Cram and Maat (eds), *George Dalgarno*, 353.
8. See Lewis, *Language*, 43–44.
9. Cram and Maat (eds), *George Dalgarno*, 353–54.
10. Ibid.
11. Ibid.
12. Ibid., 355–56.
13. Poole, John Aubrey, 53.
14. Cram and Maat (eds), George Dalgarno, 356.
15. For early efforts along these lines, more-or-less abortive, in the 1640s, see Lewis, Language, 37–42 (pace Boswell), and 46–49.
16. See e.g. Knowlson, Universal, 103; and Cram and Maat (eds), George Dalgarno, 1–10.
17. Aristotle, from De Anima and Categories, in Richard Mckeon (ed.), The Basic Works of Aristotle (New York: Random House, 1941), 587, 746.
18. Aristotle, De Anima, 587.
19. See Vivian Salmon, "'Philosophical' Grammar in Wilkins's 'Essay'," *The Study of Language in 17th-Century England* (Amsterdam: John Benjamins, 1979), 97–126; Lewis, *Language*, 6–13; Poole, *John Aubrey*, 62–63; and Knowlson, *Universal*, *passim*.

20. See (*i.a.*) Anna Marmodoro, *Aristotle on Perceiving Objects* (Oxford: Oxford University Press, 2014), 3–77; A.C. Crombie, *Styles of Scientific Thinking in the European Tradition*, vol. 1 (London: Duckworth, 1994), 230–33; and Mary Louise Gill, *Aristotle on Substance: The Paradox of Unity* (Princeton: Princeton University Press, 1989).
21. A recent and extremely learned collection of essays on this topic is Gideon Manning (ed.), *Matter and Form in Early Modern Science and Philosophy* (Leiden and Boston: Brill, 2012).
22. Aristotle, *De Anima*, 580.
23. Ibid., 595.
24. Ibid., 589–90.
25. Ibid., 593.
26. Ibid., 595.
27. Sennert, *Hypomnemato Physica* (1636), 80. See William R. Newman, *Atoms and Alchemy: Chymistry and the Experimental Origins of the Experimental Revolution* (Chicago and London: University of Chicago Press, 2006).
28. Salmon, "'Philosophical' Grammar," 110.
29. Ibid., 109.
30. Ibid., 107–8.
31. Alexander Ross, *The new planet no planet, or, The earth no wandring star, except in the wandring heads of Galileans here out of the principles of divinity, philosophy, astronomy, reason, and sense, the earth's immobility is asserted: the true sense of Scripture in this point, cleared: the fathers and philosophers vindicated: divers theologicall and philosophicall points handled, and Copernicus his opinion, as erroneous, ridiculous, and impious, fully refuted* (London, 1646), 20.
32. Ibid., 63.
33. Ross, *The philosophicall touch-stone, or, Observations upon Sir Kenelm Digbie's Discourses of the nature of bodies and of the reasonable soule in which his erroneous paradoxes are refuted, the truth, and Aristotelian philosophy vindicated, the immortality of mans soule briefly, but sufficiently proved, and the weak fortifications of a late Amsterdam ingeneer, patronizing the soules mortality, briefly slighted* (London, 1645), 41.
34. Ibid., 48.
35. Ibid., 2.

36. See Stephen Gaukroger, *Francis Bacon and the Transformation of Early-Modern Philosophy* (Cambridge and New York: Cambridge University Press, 2001); Perez Zagorin, *Francis Bacon* (Princeton: Princeton University Press, 1998), 77–83; and Lisa Jardine, *Francis Bacon: Discovery and the Art of Discourse* (Cambridge: Cambridge University Press, 1974), 76–108.
37. Bacon, *The New Organon*, eds Lisa Jardine and Michael Silverthorne (Cambridge: Cambridge University Press), 17.
38. Bacon, *The twoo bookes of Francis Bacon. Of the proficience and aduancement of learning, diuine and humane* (London, 1605), Bk.2, fol. 51–51^{v}.
39. Bacon, *The New Organon* eds Jardine and Silverthorne, 17.
40. Ibid., 11.
41. Ibid., 24.
42. Ibid., 171.
43. Ibid., 19, 41.
44. See Joanna Picciotto, *Labors of Innocence in Early Modern England* (Cambridge, MA: Harvard University Press, 2010), 380, 404–5, 419.
45. Bacon, *The New Organon* eds Jardine and Silverthorne, 189.
46. See Robert S. Westman, "The Copernicans and the Churches," in David Lindberg and Ronald Numbers (eds), *God and Nature: Historical Essays on the Encounter between Christianity and Science* (Berkeley: University of California Press, 1986), 76–113.
47. Bacon, *The New Organon* eds Jardine and Silverthorne, 171.
48. Marvell, "The Garden," in Elizabeth Story Donno (ed.), *Andrew Marvell: The Complete Poems* (New York: Penguin, 1972), 101, s6.
49. Jonson, "Timber, or Discoveries," in C.H. Herford and Percy and Evelyn Simpson (eds), *Ben Jonson*, 11 vols (Oxford: Clarendon Press, 1952), vol. 8, 561–649; 628.
50. Robert Hooke, *Micrographia, or, Some physiological descriptions of minute bodies made by magnifying glasses with observations and inquiries thereupon*, sig. Aa2.
51. Ralph Austen, *A treatise of fruit-trees shewing the manner of grafting, setting, pruning, and ordering of them in all respects: according to divers new and easy rules of experience; gathered in ye space of twenty yeares. Whereby the value of lands may be much improued, in a short time, by small cost, and little labour. Also discovering some*

dangerous errors, both in ye theory and practise of ye art of planting fruit-trees. With the alimentall and physicall vse of fruits. Togeather with the spirituall vse of an orchard: held-forth in divers similitudes betweene naturall & spirituall fruit-trees: according to Scripture & experience (Oxford, 1653), 32.

52. Walter Charleton, *The darknes of atheism dispelled by the light of nature a physico-theologicall treatise* (London, 1652), 348.
53. Jan Comenius, *A patterne of universall knowledge, in a plaine and true draught or a diatyposis, or model of the eminently learned, and pious promoter of science in generall, Mr. John Amos Comenius. Shadowing forth the largenesse, dimension, and use of the intended worke, in an ichnographicall and orthographicall delineation*, trans. Jeremy Collier (London, 1651), 128.
54. Thomas Stanley, *The history of philosophy, in eight parts* (London, 1656), 36.
55. John Webster, *Academiarum examen, or, The examination of academies wherein is discussed and examined the matter, method and customes of academick and scholastick learning, and the insufficiency thereof discovered and laid open: as also some expedients proposed for the reforming of schools, and the perfecting and promoting of all kind of science* (London, 1654), 29.
56. Robert Boyle, *Occasional reflections upon several subiects, whereto is premis'd a discourse about such kind of thoughts* (London, 1665), 76.
57. Bacon, *Advancement* (1605), bk2, fols 59–59^{v}.
58. Quoted in Lewis, *Language*, 10.
59. Webster, *Academiarum*, 25.
60. Ward and Wilkins, *Vindiciae academiarum containing some briefe animadversions upon Mr Websters book stiled, The examination of academies: together with an appendix concerning what M. Hobbs and M. Dell have published on this argument* (Oxford, 1654), 20.
61. Dalgarno, *Tables of the universal character so contrived that the practice of them exced's all former wayes of short hand writing, and are applicable to all languages* (Oxford, 1657), 2.
62. Wilkins, *Essay*, 20, 13.
63. Gentili, Robert, *Le chemin abregé. Or, A compendious method for the attaining of sciences in a short time. Together with the statutes of the Academy founded by the Cardinall of Richelieu. Englished by R.G. Gent.* (London, 1654), 76–79.

64. Wilkins, *Essay*, 20–21.
65. Bacon, *Advancement* (1605), bk2, fol. 60.
66. Bacon, *The New Organon* eds Jardine and Silverthorne, 48.
67. See (i.a.) Peter Dear, "Totius in verba: Rhetoric and authority in the Early Royal Society," and Steven Shapin, "The House of Experiment in Seventeenth-Century England," both in Peter Dear (ed.), *The Scientific Enterprise in Early Modern Europe: Readings from* Isis (Chicago and London: University of Chicago Press, 1997), 255–72 and 273–304; Barbara Shapiro, *A Culture of Fact: England, 1550–1720* (Ithaca: Cornell University Press, 2000); Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1985); and Michael Hunter, *Science and Society in Restoration England* (Cambridge: Cambridge University Press, 1981).
68. Joannes Boemus, *The manners, lawes, and customes of all nations collected out of the best writers by Ioannes Boemus … with many other things of the same argument, gathered out of the historie of Nicholas Damascen; the like also out of the history of America, or Brasill, written by Iohn Lerius; the faith, religion and manners of the Aethiopians, and the deploration of the people of Lappia, compiled by Damianus a Goes; with a short discourse of the Aethiopians, taken out of Ioseph Scaliger his seuenth booke de emendatione temporum; written in Latin, and now newly translated into English, by Ed. Aston* (London, 1611), 6.
69. Gibbons, *Questions and disputations concerning the Holy Scripture wherein are contained, briefe, faithfull and sound expositions of the most difficult and hardest places: approved by the testimony of the Scriptures themselves; fully correspondent to the analogie of faith, and the consent of the Church of God; conferred with the judgement of the fathers of the Church, and interpreters of the Scripture, new and old. Wherein also the everlasting truth of the word of God, is freed from the errors and slaunders of atheists, papists, philosophers, and all heretikes. The first part of the first tome* (London, 1601), 427.
70. Africanus, *A geographical historie of Africa, written in Arabicke and Italian by Iohn Leo a More, borne in Granada, and brought vp in Barbarie. Wherein he hath at large described, not onely the qualities, situations, and true distances of the regions, cities, townes,*

mountaines, rivers, and other places throughout all the north and principall partes of Africa; but also the descents and families of their kings … gathered partly out of his owne diligent observations, and partly out of the ancient records and chronicles of the Arabians and Mores. Before which, out of the best ancient and moderne writers, is prefixed a generall description of Africa, and also a particular treatise of all the maine lands and isles undescribed by Iohn Leo … Translated and collected by Iohn Pory, lately of Goneuill and Caius College in Cambridge (London, 1600), 8–9.

71. Blount, *The academie of eloquence containing a compleat English rhetorique, exemplified with common-places and formes digested into an easie and methodical way to speak and write fluently according to the mode of the present times: together with letters both amorous and moral upon emergent occasions of Eloquence* (London, 1654), 76.
72. Cavendish, *Philosophicall fancies. Written by the Right Honourable, the Lady Newcastle* (London, 1653), 40.
73. Baxter, *The saints everlasting rest, or, A treatise of the blessed state of the saints in their enjoyment of God in glory wherein is shewed its excellency and certainty, the misery of those that lose it, the way to attain it, and assurance of it, and how to live in the continual delightful forecasts of it* (London, 1650), 770.
74. Taylor, *The rule and exercises of holy living. In which are described the means and instruments of obtaining every vertue, and the remedies against every vice, and considerations serving to the resisting all temptations. Together with prayers containing the whole duty of a Christian, and the parts of devotion fitted to all occasions, and furnish'd for all necessities* (London, 1650), 31.
75. Dod, *A plaine and familiar exposition of the thirteenth and fourteenth chapters of the Prouerbs of Salomon* (London, 1608), 143.
76. Walkington, *Salomons sweete harpe consisting of five words, like so many golden strings, toucht with the cunning hand of his true skill, commanding all other humane speech: wherein both cleargie and laitie may learne how to speake* (London, 1608), sigs A4^{v}-A5.
77. Price, *The defence of truth against a booke falsely called The triumph of truth sent over from Arras A.D. 1609. By Humfrey Leech late minister Which booke in all particulars is answered, and the adjoining motives of his revolt confuted* (London, 1610), 3.
78. Gardiner, *A dialogue or conference betweene Irenaeus and Antimachus, about the rites and ceremonies of the Church of England* (London, 1605), sig. B.

79. Willet, *Ecclesia triumphans: that is, The joy of the English church for the happie coronation of the most vertuous and pious prince, James by the grace of God, King of England, Scotland, France, and Ireland* (London, 1603), fol. 2^{v}.
80. Burton, *Ten sermons vpon the first, second, third and fourth verses of the sixth of Matthew containing diverse necessary and profitable treatises* (London, 1602), 148, 185.
81. Munday, *A briefe chronicle, of the successe of times, from the creation of the world, to this instant. Containing, the originall and lives of our ancient fore-fathers, before and after the Floude, as also, of all the monarchs, emperours, kinges, popes, kingdomes, common-weales, estates and gouernments, in most nations of this worlde: and how in alteration, or succession, they have continued to this day* (London, 1611), 235.
82. Brerewood, *Enquiries touching the diversity of languages, and religions through the cheife parts of the world* (London, 1611), 62, 59.
83. D'Avity, *The estates, empires, & principallities of the world Represented by ye description of countries, maners of inhabitants, riches of provinces, forces, government, religion; and the princes that haue governed in every estate. With the begining of all militarie and religious orders. Translated out of French by Edw: Grimstone, sargeant at armes* (London, 1615), 691.
84. Francis Lodwick, *The ground-work, or foundation, laid (or so intended) for the framing of a new perfect language: and an universal or commonwriting: and presented to the consideration of the learned by a well-willer to learning* (London: 1652), 1–2.
85. Ibid.
86. C. Beck, *The universal character, by which all the nations in the world may understand one anothers conceptions, reading out of one common writing in their own mother tongues* (London, 1657), "To the Reader."
87. Ibid.
88. Wilkins, *Essay*, 1–2. See also 385.
89. Ibid., 385.
90. Ibid., 13.
91. Cram and Maat (eds), *George* Dalgarno, 171; see also 63.
92. Ibid., 173.
93. Ibid., 175.
94. See Donald Davidson, "A Nice Derangement of Epitaphs," *Truth, Language and History* (Oxford: Clarendon, 2005), 89–107: 107.

95. Bulwer, *Chirologia, or, The naturall language of the hand composed of the speaking motions, and discoursing gestures thereof: whereunto is added Chironomia, or, The art of manuall rhetoricke, consisting of the naturall expressions, digested by art in the hand, as the chiefest instrument of eloquence, by historicall manifestos exemplified out of the authentique registers of common life and civill conversation: with types, or chyrograms, a long-wish'd for illustration of this argument* (London, 1644), 3–4.
96. Nabbes, *Covent Garden a pleasant comedie* (London, 1638), 11.
97. Baxter, *Directions for weak distempered Christians, to grow up to a confirmed state of grace with motives opening the lamentable effects of their weaknesses and distempers* (London, 1669), 35.
98. See Lewis, *Language*, 73–9 and 111–17; and Thomas C. Singer, "Hieroglyphs, Real Characters, and the Idea of Natural Language in English Seventeenth-Century Thought," *Journal of the History of Ideas* 50.1 (1989): 49–70.
99. Webster, *Academiarum examen* (London, 1654), 24–25.
100. Ward and Wilkins, *Vindiciae,* 18.
101. Ibid.
102. Ibid.
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104. Ibid., 20.
105. Ibid.
106. Ibid., 21.
107. Ibid., 22.
108. Ibid., 22–23.
109. Cram and Maat (eds), *George* Dalgarno, 360.
110. Cram and Maat (eds), *George* Dalgarno, 382.
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113. Wilkins, *Essay*, 1.
114. Ibid., 19, 20, 46, 385.
115. Ibid., 44.
116. Ibid.
117. Ibid., 45.
118. Ibid., 12.
119. Ibid., 67.
120. Ibid.

121. Ibid.
122. Ibid., 289.
123. Ibid., 289–90.
124. Ibid., 385–413.
125. Ibid., 414–40.

CHAPTER 5

The Next Big Thing: How the Real Character Works

Wilkins's *Essay towards a Real Character* (1668) is today a rare book. But not all that rare. The *English Short-Title Catalogue* (*ESTC*) lists about 130 copies, held in research libraries all over the world. (By way of brief comparison: *ESTC* lists the first edition of Hooke's *Micrographia* [1665] as extant in about 70 copies; Milton's *Paradise Lost* [1667], 75; Locke's *Essay Concerning Humane Understanding* [1690], 65.) These are massive, heavy, elaborate books, including a number of engravings, several fold-out tables, and custom-made type for Wilkins's characters. The publisher (a very important designation in the tightly-regulated print market of early-modern England) was the Royal Society itself, which paid for what must have been quite an expensive trip to the press. The Society thereby lent its prestige to Wilkins's book—but also, probably, hoped to receive some back. The *Essay* was clearly an élite achievement, of which Royal approval (so Wilkins was assured) was not in doubt. For all that, the young Society was not in a position to throw its money away. Copies of the *Essay* sold for 16 shillings each, which was "expensive even by the standards of books produced under the Society's auspices."[1] We do not know how well the book sold, or whether Wilkins's peers recovered their investment. Nonetheless, it is clear that the *Essay* was a significant publication of 1668, and went on the bookstalls looking it, every bit.

The core and point of the book is Wilkins's real character itself. This is the culmination, in a sense, of the whole seventeenth-century character movement, leading all the way back to Timothy Bright (not quite a century earlier). As we will see, Wilkins's character is complex yet functional.

J.D. Fleming, *The Mirror of Information in Early Modern England*,
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Relatively easy to learn and use, it nonetheless supports rich discourse within its range of reference (although the breadth and detail of the latter will require further consideration). The explanation of the system for writing and using the real character is preceded and supported by a long theoretical introduction, a comprehensive grammar, and an encyclopedia: Wilkins's "Philosophical Tables." The character is followed and supplemented by a "Philosophical Language"—both script and speech—that is predicated on the character. The final part of the package is an English dictionary, cross-referenced with the Philosophical Tables (so that one can quickly figure out the character for anything named in the dictionary). As we have discussed, Wilkins is not the only person to theorize, or produce, a "real" or "universal" character in the seventeenth century. The *Essay*, for that matter, was not only his work, but drew on a large cohort of collaborators (as well as being based on the earlier efforts of Dalgarno). That is to say, however, that the *Essay towards a Real Character* brought to its fullest realization a technical project that attracted a great deal of diffuse interest and effort in the period. On the basis of the speculative view that we discussed in the last chapter, the *Essay* put a real real character on the desk of everybody who bought it.

Scholars, however, have not typically seen it that way. Instead, they have emphasized the theoretical and provisional aspects of Wilkins's book—even suggesting that it was "just" an essay, or "attempt," showing only how a real character *might* work.[2] Meanwhile, scholars have (without exception) approached the *Essay* via linguistic categories; even going so far as to explain Wilkins's character as if it were a sub-function of his philosophical language.[3] This, literally, is putting the *Essay* back to front. What matters about the real character, as the previous chapters of the current book (I hope) have put us in a position to see, is that it *is* one: a para-linguistic writing, referring directly to notions rather than to words, owing nothing (supposedly) to any language, but instead sequestered or alienated from the linguistic phenomenon in general. Of course, Wilkins's character opens the way to his philosophical language. But the reverse would *not* be true—and that point is absolutely crucial to the nature and significance of Wilkins's achievement.

As for the suggestion that the technology of Wilkins's real character was not meant to be taken at face value: this is an echo of the analogous claims that we have noted, with regard to characterie or brachigraphy, earlier in the seventeenth century. To put it bluntly, these are counter-evidentiary arguments. As scholars well know, not only provisional or thumbnail

works are called "essays," or even "essays toward," in the period.[4] Wilkins does not "insist" that his achievement is only theoretical, but rather makes some vague rhetorical gestures consistent with period modesty tropes.[5] Meanwhile, he also makes some strong claims for the transformative potential of his character. In the dedicatory letter to the *Essay*, Wilkins compares it to both shorthand and logarithms: "most usefull inventions," "of excellent art and usefulness."[6] Concluding his Philosophical Tables, he states that he has now "dispatched … a regular enumeration and description of such things and notions, as are to be known, and to which names are to be assigned, which may be stiled Universal Philosophy."[7] In 1657, the Ipswich schoolmaster Cave Beck published his *Universal Character, by Which All the Nations in the World May Understand One Another's Conceptions*. Compared to Wilkins's *Essay* of a decade later, Beck's *Universal Character* is quite crude (amounting to little more than a dictionary with numbers assigned to the words). Yet it may, Beck writes, "much advantage mankind in their civil commerce, and be a singular means of propagating all sorts of Learning and true Religion."[8] If Beck's book can change the world, Wilkins's can transform it. That, after all, is the whole point.

In the Introduction to this book, we reviewed some of the evidence for reception and use of the *Essay* in the late seventeenth century. At the end of this chapter, we will look at some more. More research remains to be done, but I think it is already evident that people in the period saw the *Essay* as offering a device worth learning. What they saw, namely, was a revolutionary system (the real character) for operating outside the kind of thing that they called language; not a relatively acceptable one for remaining stuck within it. To see that ourselves, however, we will first need to try to see what they saw in the *Essay*. It is time to get clear about how Wilkins's real character works.

From the General Scheme to the Philosophical Tables

As we recall (in fact by now we are perhaps heartily sick of the point), the real character is supposed to be a script for denoting, and deploying in discourse, the notions of the mind. The promise of doing so lies in the linked assumptions that human notions of things are (a) speculative of the latter and (b) shared by all people, vis-à-vis the same things. Sketching the project in that theoretical way, however, is the easy part. The hard work begins

with the practical task of getting clear about the notions "as are to have *Marks* or *Names* assigned to them."[9] Since notions are supposed to reflect things, this is not just a matter of cognitive psychology. It is a matter of general ontology. A totality of notions, reflecting a totality of things: This is the kind of database, apparently, that the planner of a real character has to assemble and arrange.

A number of smart people who thought about this task in the seventeenth century decided that it was impossible. Or rather, they decided that it had to be hacked (as we now would say). Rather than a brute attempt to list all substantive notions/things, the real- or universal-character planner should attempt to break them down: finding the simple and discrete notions that can then yield any and all more complex notions through combination. In a sense, this is turning the problem around: looking for the mind's ideas of the world, rather than the world's impressions on the mind. The model is alphabetic, even, as we would now say, digital: involving a restricted set of simple and discrete elements, which can then come together to make all relevant higher-order entities. Just as the simple letters of the alphabet can be joined to create any and all complexes of words, so the simple notions of the mind—if one could only figure out what they were!—might be joined to create any and all complexes of thought and reference. Wilkins's friend Seth Ward, his young admirer Leibniz, and his sometime collaborator Dalgarno were among those who favored (without much success) versions of this approach.[10]

Wilkins, however, did not. Among other objections, he pointed out that a combinatorial character, in use, would quickly become an origami of ever-more-complex paraphrases. Again the alphabetic analogy is useful, because here it breaks down. Let us say, for example, that we want to denote a monetized wheeled conveyance that, classically, has an internal combustion engine, and an exterior that, in some culturally significant contexts, is by legislation and tradition yellow; in others, black; which can be found mostly in urban settings, and is hailed telephonically, manually, or orally. We can denote that entire description, and any other conceivable richer or more logical version of it, very easily in our a-b-c: "cab." But in our mental notions? The name for "cab" would be something like the full description that we just gave. What is worse, the simpler or more fundamental the roster of notions, the longer must be the description. "Yellow," for example, is probably cheating, from a scientific point of view. An obvious and more significant reduction is available to "the brightest of the primary colors." But "colors" is cheating, too: obvious reduction

remains available to more fundamental issues of wavelength, optics, brain function, and so on. If there ever really could be an "alphabet of thought," any given discourse written with its elements might need to be as long as the *Encyclopedia Brittanica*. For that matter, encyclopedic knowledge would almost be *prerequisite* to deciding what the simple notions of the mind actually are. How else, really, might one determine them? But the whole point of basing a character on these notions is to arrive at the possibility of encyclopedic knowledge.

Wilkins stays out of that cognitive and epistemological whirlpool. Instead (to mix the metaphor), he bites the ontological bullet. His Philosophical Tables, 266 densely-printed folio pages, consist in a listing and ordering of, in effect, everything. This is less megalomaniac than it may sound. Early-modern European learning is quite comfortable with the idea of systematic ontology, this being yet another aspect of the broad and eclectic Scholastic inheritance. Implicit within this part of it are two key assumptions. First, an account of the things that basically exist will have to be reductive. (This is a Neoplatonic modification of Aristotle's own approach.) The vector of ontology is not determined by substantial "thises" (as it was for The Philosopher himself); but by a smaller set of their higher-order stuffs or kinds. And second, one knows the latter, to some extent, in advance. This is not only because one can draw upon pre-existing ontological tradition, but also because higher-order entities are supposed to be just plain more *knowable* than lower-order ones.[11] Ontology is not inductive—a crazy attempt to note all particulars—but deductive: an articulation of universals, which are (as Wilkins puts it in the *Essay*) "first in the order of *Knowing*" (20). As Vivian Salmon noted many years ago, Wilkins's thinking, and his technical vocabulary, are much more Aristotelian than we might expect. And so is the overall scheme by which he approaches the ontology of the *Essay*. We will come back to these issues.

Added to Scholastic work points, in terms of the dialectical underpinnings of Wilkins's project, must be the massive early-modern influence of the anti-Aristotelian logical reformer Petrus Ramus (1515–1572).[12] For Ramus, the complex edifice of Scholastic logic could be, and should be, replaced by the simple and reiterative procedure of positing and then dividing categories. Observing and noting *parts of* wholes is all the logic we need. And, indeed, all the ontology: any "Ramistic" account of anything—and such accounts are ubiquitous in the period—starts by positing the target phenomenon as a whole; then proceeds to divide and sub-divide

it, according to reason and observation. When the Ramist can divide no more, the phenomenon has been mapped. This result is represented, typically, by a kind of branching graph that probably owes more to Scholastic tradition (notably the famous "Porphyrian tree") than Ramus himself would have cared to admit.[13] Nonetheless, the point for our purposes is that Wilkins has available to him an entirely predictable and respectable procedure for mapping the totality of the world. You start by positing it; then you divide it. Perhaps with help from pre-established ontological tradition, you keep on keeping on until you can't. This procedure (it was felt) stands a very high chance of achieving, if not a definitive, at least an effective and useful articulation of worldly complexity.

So Wilkins starts, at the beginning of his Philosophical Tables, at the start: positing "all kinds of things and notions, to which marks or names are to be assigned." To these he provides initial articulation in a Ramistic mock-up, which he calls his General Scheme (23) (see Fig. 1). Taking up just one page, this covers, in principle, all of creation—and the Creator, too. Wilkins initially divides "things and notions" into the "General" and the "Special" (at the upper left-hand corner of the page). General things are then divided into things per se, and words. General things per se, without further division, are "Transcendental"; and these come in three kinds. They are: I. "General" transcendentals; II. transcendentals of "Mixed Relation"; and III. transcendental relations of "Action." (So, for example, we learn in subsequent pages that "Kind" is a general transcendental; "Quantity" a mixed transcendental relation; and "Business" a transcendental relation of action.) Each of those categories, denoted by a Roman numeral, is what Wilkins calls (using the ancient ontological and taxonomic term), a genus. The "general" scheme is nothing other than the system of his 40 genera. Turning to "Special" things—still within the "general" scheme—Wilkins first of all divides God (genus V), from his creatures. By dividing and subdividing the latter, Wilkins eventually arrives at the rest of his genera, which run from "World (VI)," to "Element (VII)" to "Fish (XVI)" to "Manners (XXVI)" to "Ecclesiastical Relation (XL)," and so on.

Wilkins's systematic ontology is surprisingly unsystematic. Consider, for starters, how he uses the word "general." In one way, his usage is precise and concrete: "general" means "pertaining to genera," the group of which makes up the "general scheme." On the other hand, Wilkins's usage is vague and confusing. His very first division of things, as we have just seen, is into the "general" and the "special." "General" things are *not* so-called because they pertain to genera; but just because they are, well,

general—not special. This is also how the word seems to be used in the first actual genus: "Transcendentals General." And the 20th: the "General Parts" of animate beings. So the very concept that technically defines the scheme pops up as a term within it—but carrying, it seems, quite a different, and non-technical, sense. If this is misleading, even confusing, Wilkins seems not to care.

Meanwhile, Wilkins arrives at his genera via some untidy ontological architecture. "Creator," which is a genus (V), is opposed to "Creature," which is not. Ditto for the division between creatures considered collectively ("World," genus VI) and distributively; and for the division between inanimate substance ("Element," genus VII) and animate. An awful lot of important points—for example, that minerals are (per early-modern science) "imperfect" vegetables, or that fish and birds and beasts are "sanguineous"—gets us *to* the genera, without (it seems) getting captured by them. Finally, the student of the General Scheme may be forgiven for wondering whether s/he really is looking at a roster of the categories that fundamentally make up the world. "Stone (VIII)," "Tree (XIV)," "Space (XXII)"—maybe. But "Habit (XXV)"; "Possessions (XXXIV)"; "Herb considered according to the seed-vessel (XII)"? We may feel that we not far, here, from Borges's famous story—itself directly inspired by Wilkins—about the ludic categorizations of a mythical Chinese emperor.[14]

Perhaps the problem is ours, rather than Wilkins's. After all, he is basing his General Scheme on an explicitly Aristotelian template—something as familiar to his contemporaries as it is strange to us. But if we familiarize ourselves with the template, we can actually become more confused. Wilkins is adopting the tradition of the Aristotelian "categories" or "predicaments": the overarching headings (sometimes themselves designated genera) for classifying terms. In Aristotle's *Categories*, these are (ten in all): substance, quantity, quality, relation, place, time, position, state, action and passion. Above them, in a tradition drawn from Aristotle's *Topics*, are placed the even more abstract and general "predicables": definition, property, genus and accident. The prime early-medieval redaction of Aristotle (transmitted by Boethius from the *Isagoge,* or "Introduction," of the Neoplatonic philosopher Porphyry) eliminated "definition" from the predicables, and added "species" and "difference."[15] (That is, taxonomic, not apperceptive, "species.") Wilkins adopts the resulting system, shall we say, freely.

From Aristotle's ten predicaments, Wilkins retains only five: substance, quantity, quality, action, and relation. He binarizes "substance" (what really

or fundamentally exists) with the predicable "accident" (the possible states of substances). The impression of equal ontological billing for these two is highly unorthodox. Wilkins places the predicable "species" in a subordinate position to both "substance" and "accident"—binarizing it with the totally vague "parts." The predicable "difference," as we will see, is then reserved by Wilkins for the sub-generic stage. The whole ontological business is subordinated to Wilkins's freehand sketch of "transcendentals"—which, he somewhat airily suggests, subsumes "that general name which denotes those highest and most common heads," namely, predicaments or categories. It all seems like just so much pseudo-Aristotelian soup.

And that may be the point. A thoroughgoing Baconian, and onetime polemical opponent of the Aristotelian Alexander Ross (as mentioned in Chap. 4), Wilkins carries no torch for the old philosophy. Indeed, he considers it grossly defective, saying so several times in the prolegomena to the *Essay*. Yet Wilkins parted ways with his former collaborator George Dalgarno, in part, because the latter refused to use a "predicamental" order as the basis for the real character.[16] It seems that the Aristotelian system matters to Wilkins, in the first place, just because it is a system—a relatively comprehensive and coherent way of divvying up reality. Something like this (as we have noted), is indispensable to the planner of a real character; and in this respect there was still no rival to the Scholastic ontology in the seventeenth century. But at the same time, the Aristotelian system precisely *does not* matter to Wilkins. He isn't trying to prove it or teach it or impose it; he doesn't even think that it's scientifically correct. What he is trying to do is *use* it—or abuse it, as need be. *Because* it is under attack, out of fashion, and in flux, the old ontology can be cut and pasted pretty much at will.

It is relevant here to note that the topography of the General Scheme—where its genera clump into hills, where they spread out into plains—maps onto the richness and extensiveness of the correlate data that follow in the Philosophical Tables. Wilkins's lists of vegetation, for example, about which early-modern natural history was quite well-informed, take up 67 pages in the Tables. These correlate to five genera of the Scheme (Shrub [XIII], Tree [XIV], and Herbs, by leaf [X], flower [XI], and seed-vessel [XII]). Meteorology, by contrast, much less well understood in the period, takes up just five pages in the Tables. These are covered by just one genus of the Scheme (Element [VII]). Socio-economic relations: 40 pages, eight genera. Minerals: five pages, and two. What we are looking at here is not any kind of *a priori* ontology, by which Wilkins hopes to arrive

at a dictation of everything to which the character will refer. Rather, we are looking at an *a posteriori* ontology, worked out by Wilkins to have room for everything to which, according to the data he has, the character *needs to be able* to refer. The Scholastic system provides a structure and terminology that is both familiar and flexible enough to provide pathways to these outputs, but *what matters is the outputs*; certainly in terms of Wilkins's priorities, and probably in terms of his procedures, too.

In introducing the genus "Natural Power," Wilkins considers "the Predicament of *Quality*." This ancient Aristotelian concept had acquired a new and controversial Cartesian profile in the seventeenth century, and so Wilkins is moved to make a brief metaphysical remark. "Whether many of those things now called *Quality*," he writes,

> be not reducible to Motion and Figure, and the Situation of the parts of Bodies, is a question which I shall not at present consider. 'Tis sufficient that the particulars here specified are most commonly known and apprehended under that notion as they are here represented, and are still like to be called by the same names, whatever new Theory may be found out of the causes of them. (194|202)

Are the "qualities" of things—color, smell, and the like—functions of *species* emitted by substantial forms (Aristotle), or are they secondary effects of atoms in motion (Descartes)? Who knows, Wilkins says; and for the moment, who cares. The goal of the Philosophical Tables is not to get at underlying truths or forms, but just to achieve an effective referential system, a denotation of apparent (speculative) phenomena. This does *not* mean that the *Essay* is a merely theoretical sketch, but—exactly to the contrary—that it is practical, through and through. *All* that matters, for current purposes, is achieving the capability for discourse in the notions that are universally and really in the mind (according to the speculative view). It is to be hoped, as we will discuss, that deploying the real character will lead to significant improvement in the scientific understanding of the way things are. But the first step, precisely in order that enable that natural-philosophical progress, is to achieve a technological system for objective denotation of things as they manifest themselves—and not as they are distorted and misrepresented in the turgid flows of ordinary human language.

This order of business—making it *work*, before making it right—is also evident in the next stage of Wilkins's ontological journey. Here, he subdivides his genera. First into sub-genera, which he calls (after one of the Scholastic predicables) "differences." Then into sub-differences, which

he calls (after the other one) "species." (*Not* the apperceptive "spek-yez" that we discussed in the last chapter, but "spee-sees" in a workmanlike version of the biological or taxonomic sense.) Each genus, Wilkins writes, will have six differences, "for the better convenience of this institution." "Unless," he goes on, "it be in those numerous tribes, of *Herbs*, *Trees*, *Exanguious Animals*, *Fishes* and *Birds*; which are of too great variety to be comprehended in so narrow a compass" (22). So, six differences per genus—except in those cases where the data require more, in which cases there will be more, although how many more is for the moment left undetermined. The guiding standard, totally ad hoc, is "convenience."

As it happens, there actually *is* a consistent numerical base for both Wilkins's differences and his species. It is nine, and is determined (as we will see below) by the orthographic design of his character. Nine differences, nine species: this is both pleasingly symmetrical, and mathematically promising—since, given a fixed base (which is in fact as large, in single digits, as it could be), one can easily expand the notation of both differences and species, even well beyond the limits of the current Philosophical Tables (by proceeding 9×2, 9×3, and so on). Later, Wilkins will exploit this capability in the design of his character. But as he starts to lay out the sub-divisions of his ontology, Wilkins precisely *does not* make that clear. Instead, he prefers to gesture towards an ostensible rule—the rule of six—which he then, quite casually, qualifies or even cancels. The rule that remains, it seems, is only the rule of no rule.

To be sure, many of the genera are indeed divided into six differences. But here we will find more occasion for ontological ad-hoccery. We can start with the very first genus, "Transcendentals General" (25). Its differences are laid out like this:

KINDS. i.

CAUSES. ii.

Differences; more

ABSOLUTE and Common. iii.

Relative to Action; considering

THE END. iv.

THE MEANS. v.

MODES. vi.

As with the opening General Scheme itself, this manifests a hierarchy and order that Wilkins seems to be making up as he goes. "Kinds (i)" and "Causes (ii)" are straightforward enough, but then we come to "*Differences.*" Is difference itself a transcendental general difference? Sort of; it is actually divided, *without* descent to a subsidiary ontological level, into "absolute" and "relative" differences. The former is a proper difference (iii) of the current genus; the latter is not. Instead, it is again divided—again without leaving the current ontological level—vis-à-vis "action." There it yields two more sub-differences ("end" [iv] and "means" [v]), which, nonetheless, are also somehow fully paid-up and equal differences. Now, "Action" itself defines one of Wilkins's transcendental genera ("Transcendental Relation of Action" [II]). Given two differences, in the current case, "relative to action," we might reasonably expect to find here some more differences relative to its companion (the genus of "Transcendental Relation Mixed" [III]). Indeed, given that the very concept of difference would seem to involve a mixed relation, we might wonder why it isn't treated there rather than here. But if we do, Wilkins leaves us wondering. With "Mode (vi)," the final difference of "Transcendentals General," we jump back to the left-hand margin, and to the straightforward ontological differentiation that we have abandoned—or not—in the meantime.

Neither is this kind of dialectical confusion to be found only in Wilkins's articulation of his transcendental or metaphysical genera. The tenth genus, "Herbs Considered According to Their Leaves," is about as down-to-earth as they come (70). It is differentiated as follows (I am schematizing and simplifying greatly). Each small Roman numeral is a difference:

HERBS CONSIDERED ACCORDING TO THEIR LEAVES may be distinguished into such as are:
*Imperfect. i.
Perfect; distinguished by
*Fashion of the leaf; whether
*Long;
*Not flowering;
*FRUMENTACEOUS (having edible qualities). ii.
NOT FRUMENTACEOUS; iii.
Flowering; of
BULBOUS ROOTS; iv.
AFFINITY TO BULBOUS ROOTS; v.

ROUND; vi.

Texture of the leaf; being either
NERVOUS; vii.
SUCCULENT; viii.
SUPERFICIES of the Leaf, or MANNER of Growing. ix.

(Nervous leaves, incidentally, are just the ones with prominent veins in them.) Again we have a complex, not to say confusing, interrelation between the structuring information of the differences, and those differences themselves. Some are defined via other differences; others via merely differentiating characteristics. One would err, for example, to suppose that "having long leaves" is a feature that matters as much, in this genus, as "having round leaves." The latter is a "difference"; the former is not. Yet it is far from evident, on a natural-historical basis, why one should be more probative than the other.

The differentiation of this genus occurs over five hierarchical levels—indicated by the asterisks in my schematic—with actual differences found at four of them. Ontologically speaking, it seems like we are looking at a nested system of differences and sub-differences; but that is not how this system works. Finally, and at the risk of revealing botanical ignorance, some of the axes via which Wilkins is divvying up the genus seem considerably less than taxonomic, even by pre-Linnaean standards. It is hard to feel very committed, for example, to the distinction between those flowering herbs with "bulbous roots," and those with a mere "affinity" to the latter. The botanist John Ray, who drew up the tables of plants for Wilkins, complained that he had been forced to make the data fit the design, rather than other way around.[17] It is not hard, in looking at the resulting system, to give credence to his complaint.

But let us round out our account of Wilkins's ontology before offering further comment on it. The differences of each genus, as we have said, are then further sub-divided into species. We can take the genus "Fish" as an example. The first difference of this genus is "Viviparous oblong fish" (132|134). These can first of all be distributed, Wilkins says, into those that are "cartilagineous" and those that are "Cetaceous," that is,

> *breeding* their young within them, having *lungs* and no *gills*, and *but one pair of finns*; either the *greatest of all living Creatures*, of which there are several

> *species*, one without *teeth* or a *tube* to cast *water*, another with *teeth* and such a *tube*, and another with a large long *horn*; or that other *Fish* of a *less magnitude*, which is *gregarious*, often *appearing above water*.

This entire description yields the first "species" of this difference of this genus. It is:

> WHALE
> PORPOISE

To be quite clear: that is *one species* of the Philosophical Tables. This does *not* mean that Wilkins thinks whales and porpoises are the same. He has stated very clearly that they are not, in the specifying information that we have just quoted. (At the same time, he has made clear that he knows there are many different kinds of whales—casually calling these "species," even though he has absolutely no intention of sub-specifying "WHALE"!) Neither does it mean that he thinks they can just, in a kind of taxonomic muddle, "share a category."[18] What it means is that *for the purposes of the Philosophical Tables, and for the real character that is predicated on them*, whale and porpoise are *toggled*. So, elsewhere, are (e.g.) RAVEN and CROW (145|147); TONGUE and TOOTH (177|181); PULLING and THRUSTING (243|251); MAIN MAST and MIZZEN MAST (281|289), and innumerable other examples. These species-pairs are the main product of the Philosophical Tables. They are where Wilkins's whole ontological system tops out. There are a few solo species in the Tables, but they are very much the exception to the rule. On the other hand, Wilkins contrives some trebled and even quadrupled species, of which he is very proud. It has often been assumed or argued that the pairing (or more) of species is a signal weakness of the Philosophical Tables. And perhaps it is. But Wilkins does not see it that way. We will need to turn to the actual formation of the character to see what referential benefit could possibly follow from this particular strategy of data-compression.

But before we do that, a summary point. I have been suggesting throughout this section that Wilkins's ontology, in the Philosophical Tables, is a bit of a mess. In a way this seems odd, since a real character (this side "simple notions") necessitates an ontology. *But not necessarily a philosophical one*. Actually, from the Baconian point of view, such a thing could only be the *goal* of the natural-philosophical process that the real character itself is supposed to facilitate. For Bacon, and his followers in the early

Royal Society, natural philosophy means a non-prejudicial investigation of worldly appearances, through instrumentation and experimentation, in order to define and designate the underlying, or overarching, phenomena in which they participate. (Admittedly, few seventeenth-century Baconians really did this in quite Bacon's way; but the general point remains.) At the end of that work, one can hope to have a roster of the true worldly phenomena that will support a genuinely philosophical or scientific ontology. But at the start, all one has is the phenomenal appearances that are really delivered to the mind according to the speculative view—along with whatever rough-and-ready ontology makes it easier to pick one's way among them. A real character, by directly expressing speculative notions, is supposed to be immensely helpful for the construction of a real knowledge system. But it doesn't *depend* on any such system; indeed, it couldn't possibly. A "real" ontology can only be glimpsed down the road—very far down that road—that the real character helps to open up.[19]

And Wilkins, to be sure, glimpses it. "If these *Marks* or *Notes*" of the character, he writes after introducing the idea of the latter, "could be so contrived, as to have such a dependence upon, and relation to, one another, as might be suitable to the nature of things and notions which they represented,"

> This would be yet a farther advantage superadded: by which, besides the best way of helping the *Memory* by natural method, the *Understanding* likewise would be highly improved; and we should, by learning the *Character* and the *Names* of things, be instructed likewise in their *Natures*, the knowledge of both which ought to be conjoyned. (21)

To borrow again from our old friend Jonathan Swift, a fully philosophical character would make it impossible to say the thing that was not. Leibniz, with his epistemological vision of an algebra of reason, is perhaps the most significant period exemplar of this idea.[20] Wilkins, a major influence on Leibniz, would probably have loved his younger contemporary's work (if he had lived to see it). But in publishing the Philosophical Tables, he makes clear that he does not think they embody that level of promise. "For the accurate effecting of this," he goes on (that is, a truly philosophical character),

> it would be necessary, that the *Theory* itself, upon which such a design were to be founded, should be exactly *suited to the nature of things*. But, upon

> supposal that this Theory is *defective*, either as to the *Fulness* or the *Order* of it, this must needs add much *perplexity* to any such Attempt, and render it *imperfect*. And that this is the case with that common Theory already received, need not much be doubted. (21)

Names and theory, character and ontology, are in a circular arrangement. The latter half (the ontology), is at present noticeably vicious. Wilkins's countervailing ambition is to make the former half—the character—virtuous. The implied hope is that the technology of the character will lead back into an improvement of the underlying theory; which, in turn, will undoubtedly necessitate redesign of the character; which, in turn, should help even more with the theory, and so on. This is precisely the vector for upgrading that the *Essay towards a Real Character* lays down.

In the meantime, the structure and sequence of the central sections of the *Essay* are, to some extent, misleading. We appear to have an ontology (the Philosophical Tables) onto which a real character is mapped. But it is at least as much the case that we have a real character for which the ontology has been customized. It is just like the relationship between the General Scheme and the Tables: The former is shaped to the latter, and not the other way around. In a later section of this chapter, we will consider whether the same inversion of priorities applies to the relationship between Wilkins's character and his philosophical language (hint: no). In the final chapter of this book, we will consider the broader epistemic implications of this kind of technical circularity.

The Radical Character

With the completed Philosophical Tables of genera, differences, and species, we are in a position to start writing Wilkins's real character. To be sure, we will then need to go and learn Wilkins's grammar, and his rich system of diacritic marks (particles). But the first step is to learn how to denote species of the Tables, each of which will form a radical term of the character.

We start with the genus (387|395) (see Fig. 2). Wilkins (following Dalgarno, Della Porta, and others) contrives 40 variations on a short horizontal line to denote his genera. Wilkins makes no particular claims for this orthography: it is neither ideal, nor ideographic; it is just his best attempt at clarity and reproducibility. In order to form a radical term of the character, at species level, you start with the character for the appro-

priate genus. Then you add a mark to the left-hand side of the genus character to denote the numbered difference you want, up to nine, from the Philosophical Tables. You then add a mark to the right-hand side to denote the species. As is evident at a glance, the marks for differences and species are extremely simple, fall loosely into groups of three (going above, below, or across the main axis of the generic character), and mirror each other (differences on the left, species on the right). They are, in short, easy to learn, remember, and use. All we need to do, to write any given thing, is to write down its genus, plus its numbered difference, and species, as given in the Philosophical Tables.

"Kine" (cattle) is a nice example, with which Wilkins works (156|158). (As one of his rare solo species, it also keeps matters simple for the present.) We first need the genus: kine comes under "Beast." So we write down the character for that genus. (Go on, try it.) Turning to the "Beasts" section of the Tables, we find that the first two differences of this genus are "Whole-footed" and "Cloven-footed." "Kine" comes under the second of these. So we add to our character the mark for "second difference": a short vertical line on the left, above the main axis, and joined at right angles to it. The resulting character says "cloven-footed beast." Under the second difference, "Kine" is listed as the first species. So we add to our character the mark for "first species": a short line on the right, above the main axis, and joined at an acute angle to it. The resulting character says "kine."

Or rather: that character now denotes the entity we are trying to denote when we say the English word "kine." But the character "says" nothing; it has no sayable, effable, dimension. This is exactly how Wilkins can guarantee that the character does not refer to, or encode, a (linguistic) word. In the final portion of the *Essay*, Wilkins will give us an effable analog of his character, calling it the philosophical language. But not even the philosophical language is how you speak the real character. We know this because the real character is not how you write the philosophical language. Rather (and as we will discuss below), the language gets written in a special version of the alphabet (415|423). This is an aspect of the *Essay* that has vexed modern commentators. Why (they ask) does Wilkins have *two ways* to write his philosophical language—the alphabetic version, as well as the real character itself?[21] He doesn't: he rather has two systems, the character and the language, both of which discursively activate the outputs of the Philosophical Tables via Wilkins's rules for syntax and inflection. The philosophical language, as we will see, is not even exactly based on the real character; and the real character, strictly speaking, is totally alienated from

even the possibility of oralization. The transition from Wilkins's character to his language is not iteration, but translation. The difference may seem slight, but for the real-character project, it is massive.

So, consider Wilkins's approach to homophony—a perennial bugaboo of language, for Baconians. The English word FOX, we may notice in the Philosophical Tables, denotes a canine animal, but also a fish (160|162, 133|135). CATERPILLAR can mean a grub, but also an herb that it might crawl on (125, 99). PERIWINKLE denotes both a crustacean, and a creeping flower (129|131, 105). The real character makes short work of this kind of ambiguity: The maritime PERIWINKLE, for example, is going to be 15th genus, its seventh difference, and the sixth species of that difference (plus a little mark, which I will come to in a moment, denoting the second member of the species). The botanical PERIWINKLE, on the other hand, is going to be the 12th genus, eighth difference, and the tenth species of that difference. PERIWINKLE and PERIWINKLE are, to say the least, isomorphic. But the maritime character is decidedly non-isomorphic with the botanical one. Bye-bye bugaboo.

The philosophical linguist Jaap Maat has pointed out, with considerable puzzlement, that the homophony is merely camoflauged by the real character, and will simply reappear when these characters are "read off" in English.[22] But that assumes a normativity of language that is antithetical to what Wilkins is trying to do. For him, the character has achieved an objective disambiguation that remains real and intact, whatever language does. Wilkins will agree that the character can be "read off" in multiple languages, along the lines of Chinese *zì* (one writing system for multiple idiolects). But if that works, it will work precisely because the character taps into the speculative level beyond and below all language.

Now, entries in the Philosophical Tables (as Maat has also complained) are consistently overdetermined for natural-historical lore.[23] To form a radical term of the real character, all we need to know are its numbered genus, difference, and species. But as we have seen, the Tables consistently tell us a lot more than that. At the end of the *Essay*, Wilkins insists that if we are to learn and use his characters, we must do so on the basis of their complete substantive descriptions in the Philosophical Tables—*not* just their "numerical institution" (441|449).[24] So, when we write or read the character for the botanical periwinkle, for example, we are *not* just to mean "12th genus, eighth difference, tenth species." Rather, we are to mean the "primary signification" of the entity that that character denotes. We are to recognize—know—that it means a floral periwinkle: that is, a capsulate

herb not campanulate, leafy, one of the lesser ones, evergreen, and "having weak stalks creeping on the ground" (105). Accordingly, although the *Essay* includes a handy fold-out version of Wilkins's ontology (a kind of crib sheet) the author insists that we are to learn his system from the complete Philosophical Tables themselves.

On first blush, Wilkins's insistence that we are to learn his complete encyclopedia entries seems strange. For it appears, all over again, to make the character a textual function—a reference to a bunch of words. Moreover, while the fold-out version of the Philosophical Tables is quite user-friendly, the full version, to say the least, is not. Finally, while it is pretty easy to encode and decode the numerated parts of Wilkins's characters, remembering what they actually stand for is very much harder. Some commentators have taken all this to mean that Wilkins's characters mostly serve as a guide to his Philosophical Tables; the latter, rather than the former, being the main part of his achievement.

But I think, again, we need to try to think with Wilkins. If, contrary to his advice, we just learn how to read off the numbered parts of his characters, then indeed they will serve as little more than a shorthand guide to his (workmanlike) ontology. But if—following his instructions—we instead learn the substantive descriptions from the Tables, then we are in a position to know, quite simply, what entity any given character denotes. And once we know that, we do not actually need the Tables anymore. It's a bit like learning a foreign language. We may need our own language, in the form of instructions, exercises and so on, to get there. But once we are there, if we can manage that, we're there. If we can learn, for example—and Wilkins certainly seems to think we can—that a given character indicates a certain flower, with a certain nature, which we basically know, then we will have established a reference between the character and the notion that is consistent with the speculative epistemology. The way to get there, willy-nilly, is to learn the Philosophical Tables—a bunch of words. But once we have arrived—once we have achieved competence in the character—the scaffolding by which we climbed can be kicked away.

This kind of speculative leveraging can also be felt, I think, in the paired species of the Tables. As I have said, these are the rule—solitary species, like "Kine," are the exception. But let us consider an ordinary pair, such as SHEEP, GOAT (157|159). Remember, that pair constitutes *one* species of the Philosophical Tables; not as a matter of natural history (Wilkins does *not* think sheep and goats are the same), but as a matter of operational ontology. Denoting *either side* of the species-pair will constitute a radical

term of the real character. The radical term will be formed from the primary entry in the species-pair: here, SHEEP. So we write beast, second difference, second species: what in English is called SHEEP. In order to denote its species-alternate, GOAT, we are to add a little loop, *either* on the left- or right-hand side of the character. It goes on the left, Wilkins tells us, if the species-pair is in a relation of "opposition"; on the right, if the relation is one of "affinity" (see Fig. 2). Wilkins says this is all supposed to "aid the memory." He does not explain what he means by that. Perhaps it is as simple as making any given radical do double duty—or more; some radicals, through a system of what Wilkins calls "double opposites," will be able to denote three or even four distinct notions. Clearly, this greatly reduces the sheer semiotic burden of the character, both for the person designing it, and for the person trying to remember it. But Wilkins actually seems to be suggesting that the radicals for paired species will be *easier to remember* than singular ones would be.

Meanwhile, he tells us that the way to negotiate the pair—to indicate the "other one" involved in a given radical—is *either* by way of a mark for affinity, *or* a mark for opposition. But he gives us no indication whatsoever *how we are to know* which one obtains in any given case. We know that a radical should have an "other one"; we know that if it does, it will be alike, or unlike. Why does Wilkins not give us a way to find out which?

I would suggest he doesn't think he needs to. Or even more, I would suggest that he thinks it is better *not* to. For Wilkins, I would bet, basic relations among substantive creatures, such as sheep and goats, form part of our speculative birthright. That is to say, they are part of the stuff that people simply and properly know, just by being in the world and looking around. If our grasp of this speculative data is helped along by sacred writ—itself uniquely toggled with the book of nature (according to the early-modern view)—that is all the better. How, then, does it aid the memory to specify sheep and goats together? Well, because one always thinks of sheep and goats together—everybody knows that, it is precisely the kind of thing that everybody in early-modern European Christian culture is supposed to know.[25] How do we know, next, if the character for GOAT will get the loop for opposition, or the one for affinity? Well, duh: everybody knows that, too. Calling the opposition between sheep and goats proverbial would be like calling *Paradise Lost* long.

Now, to get to the character for SHEEP, we admittedly have to climb up that linguistic scaffolding of the Philosophical Tables. We want to denote a beast; a cloven-footed beast (second difference); one of the lesser

ones (second species). The resulting character denotes SHEEP. Already, if we can remember what that character means, we are in a position to kick away the linguistic support, and proceed on the basis of the speculative denotation. But we can also go one better, and right away: for we know that radicals of the character come normatively in pairs. That is to say, we know there ought to be an "other one," toggled with this radical. And we know that the "other one" will be found either through affinity or opposition—like or unlike. What's the "other one" for SHEEP? Like or unlike? Oh yeah—of course. If we need the words of the Tables to get to SHEEP, we sure don't need them to get to THE OTHER ONE, in this case. With a kind of deictic lurch, we just go "sheep—[looplefthandside]." Thus in remembering the character for SHEEP, we have the character for GOAT almost automatically. We are floating free of the linguistic scaffolding here, into the pure denotative air of the character itself.

Perhaps an even clearer example is one, from the genus of OPERATION, mentioned earlier: PULLING, THRUSTING (243|251). That is the first difference ("Operations belonging to the mechanical faculities") of its genus, and the fourth species of that difference ("when the mover and moved continue their Contiguity in motion, or amotion"). As usual, the radical character will first of all write the first term of the pair. Operation, first difference, fourth species: PULLING. Again, there must be an "other one"; we remember it as a matter of affinity or opposition; and we do that easily. The "other one" for pulling is the opposite of pulling: left-hand loop. It goes without saying. And that, of course, is the point.

Particulates Matter

Now, a lot of the species entries in the Philosophical Tables are followed by lists of italicized words. They look like little Thesauruses (which, ironically, became part of Wilkins's long-term legacy).[26] Some of these will be mere synonyms for the radicals, but most are not. In the case of KINE, our example from earlier, we have "*Bull, Cow, Ox, Calf, Heifer, Bullock, Steer, Beef, Veal, Runt, bellow, low, Heard,*" and "*Cowheard.*" These are auxiliary denotations that can be made off of the radical, through a special set of particles that Wilkins calls "Transcendental Marks" (391|399). For these Wilkins claims a quasi-metaphysical derivation: they either "enlarge" the sense of a given radical, or bring it into association with a genus from which it is remote. But in practice, the Transcendental Marks just seem to be sets of inflections that Wilkins thinks will be especially use-

ful. They denote intensions including "male," "female," "young," "part," "machine," "pinn," "art," and "habit."

Arranged in groups of six, through a vague standard of ontic association, the transcendental marks are picked out of their group by their placement around a radical character: left, middle, or right; and above, or below. "Cowheard" is a nice example (with which Wilkins works). Starting with the radical for KINE, we can add the Transcendental Mark (TM) for "officer." This is an inverted circonflex, placed above the radical character, in the middle. The resulting character denotes a KINE-OFFICER; a cowherd, more or less. The TM for "male" is a small semicircle, open to the left, placed above and in the middle of the radical. Added to KINE, this will make the character mean "bull" (KINE-MALE). The TM for "female" (small semicircle, open to the right, below and in the middle) will give us "cow" (KINE-FEMALE). "House" (small right angle, pointing left, above and to the right) will give us "barn" (KINE-HOUSE). And so on. The model of inflection is borrowed from written Hebrew and Arabic, but much augmented. The inflections provided by the TMs are not dispersed into the radical, changing its form. Rather, the radical radiates outward through the marks, establishing a combine sense, while retaining its own form intact.

Much the same kind of effect emerges from the part of Wilkins's *Essay* we have yet to discuss: his "Natural Grammar" (297–383|305–391). Situated explicitly in the medieval speculative tradition, Wilkins's account is long and complex, but basically works to tie syntax back to substantiveness. In other words, all grammatical relations in the character are to be understood as direct functions of the radicals (each of which is to be understood as a substance, a thing that fundamentally exists). Through the addition of grammatical particles, of which Wilkins contrives a profusion, the radicals are rendered pronomial, adjectival, verbal, adverbial, passive, active, or what have you. So, for example, WRITING is a species of the Philosophical Tables and a radical term of the character. Its genus is Corporeal Action; it is under the difference "corporeal actions peculiar to men," at number three; and it is the seventh species under that difference. Corporeal Action, third difference, seventh species: WRITING. If we add a single pronoun point to the left and top of this radical character, and a little circle, which denotes the copula (verbhood, basically) plus a little curve, which denotes the active voice, we now have I AM WRITING. The position of the copula, level with the radical, denotes the present tense. Another single pronoun point, to the right and bottom of the character, will add the direct object. I

AM WRITING IT. The radical term with which we started has blossomed into a little text, through the processes of grammatical particularization. And yet this—a single inflected radical—is *one* character.

Following long shorthand tradition, Wilkins renders the Lord's Prayer as an exemplary text in the real character (395|403) (see Fig. 3). He adds a numbered translation into English, character by character; and then an extensive gloss and explanation of each numbered point. We can learn a lot just by following his explanations for the first few characters, centered around the first radical. (This much, in any case, will probably seem like plenty).

The first character of the Prayer—the one that looks like a little smiley face—denotes the grammatical particle given in English as the first-person plural possessive pronoun: "Our." Wilkins comments:

> The first Particle being expressed by Points, doth denote the thing thereby signified to be a *Pronoun*: And whereas there are two Points placed level, towards the upper side of the Character, they must therefore (according to the Directions premised) signifie the first Person Plural Number, *viz. We*. And because there is a curve Line under these Points, that denotes this Pronoun to be here used *Possessively*, and consequently to signifie *Our*. (396|404)

This accords with the explanation Wilkins has given earlier about how to use these grammatical particles. Pronouns are indicated by simple points, "placed at the side of the Character before it" (the left-hand side, in Wilkins's examples). One point for singular, two for plural. Just above the main axis for the first person; directly alongside it for the second; or just below it for the third. That tripartite vertical division—above/alongside/below—is consistently exploited by Wilkins as a differentiating regime for his grammatical particles. Finally, "if any of the Pronouns are to be rendered in their Possessive sence, this is to be expressed by a little curve Line under them" (389|397). Simple enough, then: smiley face, in the real character, means "our."

But not so fast. In his primary explanation of these particles, Wilkins always puts them next to a short horizontal line—a kind of "dummy" character. Similarly, in his gloss of the first Lord's Prayer character, Wilkins gives it next to a little vertical line (which he calls an arrectarius). These extra but non-intensional elements are necessary to show the vertical position—above, alongside, or below—of the grammatical particle relative to the radical. And this because *position, relative to a radical character, is indispensable to the meaning of the particle*. In the top position, our smiley

face does indeed mean "our." But in the middle position, it would mean "your" (plural); and in the bottom position, "their." In and of itself, that is, or in isolation, our little smiley face does *not* mean "our." It means "our/your/their." Or, perhaps, "undifferentiated plural possessive pronoun." But that is really not the same thing as the first word of the Lord's Prayer.

The next two particle characters in this immediate vicinity of the Prayer will respond to the same kind of analysis. The clump of three little points, as such, is recognizable based on Wilkins's rules as "one of the *Compound* Pronouns"; and "being placed towards the middle of the Character, therefore must it signifie *Who* personal, or *Which* real." This character, too, is only what it is positionally. Only by its placement "towards the middle of the Character" can it be correctly read, or written. And so for "art"—the little circle, which Wilkins uses to denote the copula (conjugation of the verb to be). Again, he has to use an arrectarius to show what he means in the gloss. This "small Round," he writes, "being placed towards the middle of the Character … must therefore signifie the present tense… am, art, is, are" (389|397). For placement toward the top would mean future tense; bottom, past. The little circle, by itself, just means "some conjugation of the verb to be."

The point I am trying to make here is that Wilkins's grammatical particles, which are indispensable to the capacity of the character to support complex discourse, never signify in isolation. Rather, they only ever have the meaning they are supposed to have by being entered into an intensional complex centered on a radical. The same will go double for Wilkins's Transcendental Marks, like those for "male" and "officer," which operate within a much richer system of positional variables ([above + below] x [left + middle + right]). The OFFICER circonflex, for example, moved one position clockwise, denotes MECHANIC, instead; one more position, and it denotes MERCHANT; one more, ARTIST, and so on. And while grammatical particles at least have some kind of inflectional purpose in common—pronomiality, for example—the intensions of the TMs are (as we have said) only very loosely associated. In effect, it is *impossible*, finding a TM on its own, to say what meaning it is supposed to have.

The contrast with the kind of text Wilkins is translating is striking. Consider the English possessive "our"—the translated equivalent of Wilkins's positional smiley face. No doubt, we usually use our "our" vis-à-vis a noun, such as "father." But if we find "our" on its own, we still know what it is. Indeed, there is *such a thing* as finding our "our" on its own—naked, so to speak,

without a dummy noun, or arrectarius, or anything of the kind to set it off. The same *cannot be said* for Wilkins's particle. "From hour to hour we ripe and ripe," observes Shakespeare's Jaques, cheerfully: "from hour to hour we rot and rot."[27] Jaques's *memento mori*, parsed through Renaissance pronunciation for "hour" (probably something like "oower") has traditionally been thought to suggest a syphilitic joke on the misogynistic epithet for female sex workers. From whore to whore we rot and rot. But hidden within this extremely mordant pun is another, lovely instead of ugly, recognizing the shared experience that can occur, even by the hour. From our to our we ripe and ripe. That's abusing the pronoun, to be sure (if not abusing *As You Like It*). But the point is that our "our" *can* be treated that way. Smiley-face-above-a-radical cannot. Its dependence on position means that it can only ever be our *something*. And so for Wilkins's other particles, all of which rely on positionality in this way.

Wilkins makes a very interesting comment about that copula—the little circle he gives for conjugations of the verb to be. As we have just noted, this particle's placement, level with the radical for "father," designates it as present tense: am/are/is. Within that range, Wilkins claims, we know that the little circle means "art" (are) because it is "joyned with a Noun of the second person" (396|404). The statement is disingenuous. "Father" is a noun, to be sure, and in the context of the Lord's Prayer it is by implication directed toward the second grammatical person ("you"). But it is not a "noun of the second person," because there is no such thing. Wilkins seems to be implying that "father," in his transcription of the Lord's Prayer, comes with or has received or necessarily implies a mark for a "you." But that is simply not true. For that matter, there *is* no such mark, among Wilkins's grammatical or transcendental particles. As for English, it is very evident that the verb to be, following the phrase "our father who," can easily and validly be conjugated in the first or third, instead of the second, person. For example:

> Our father who is he …
> Our father who I am …

That the second example is poetical does not make it less grammatical.

One thing that is happening at this point of Wilkins's gloss is that he is coming up against a limit of his system for grammatical particles. These, as we have seen and discussed, are intensionally varied by their vertical position vis-à-vis the main axis of the radical character: above, alongside, or

below. The problem Wilkins is encountering, with his sign for the copula, is that he has *already* used the vertical variable to distinguish verb tense: future/present/past = above/alongside/below (thus alongside = present tense). Now, he is claiming or implying that the "alongside" position can *also,* and at the same time, mean "second person" for the copula (as it does for possessive pronouns). But this is inflectional double-dipping. The point here is not just to catch Wilkins's dodge, but also to illuminate what he is trying to achieve by it. Wilkins *wants* the copula, just like the other particles around this radical, to *depend,* as closely as possible, on position vis-à-via the latter. Wilkins is not trying to put together semantic parts that precede their assembly and subsist within it. Rather, he is trying to assemble semantic wholes that *thereby determine their parts*, precisely in the functions the latter are supposed to have.

Neither are his radicals exempt from this holistic dynamic. The character Wilkins has given for "father" is the genus Economic Relation, first difference (relation of blood), second species: "parent." That, clearly, does not quite mean "father." In a long gloss, Wilkins runs through the transcendental particles that would be needed to complete the intension—while arguing that "parent" does not need them in this case. First is the mark for "person" (small horizontal dash to the lower right of the radical); we can dispense with this, Wilkins says, since "parent" is "originally a Noun of Person." Then the mark for "male" (semicircle, open to the left, above and in the middle); that would only be necessary, Wilkins says somewhat vaguely, if the term were being used "in the strictest sense." Instead, it is being used metaphorically—God is not our parent like our parents are our parents—which means that it really ought to receive "the Transcendental Note of Metaphor" (small vertical dash to the upper left). Nonetheless, Wilkins says, "this being such a Metaphor as is generally received in other Languages, therefore there will be no necessity of using this mark" (396|404).

Wilkins is being guided here, I think, by wholly pragmatic considerations. The utter familiarity of the Lord's Prayer (to seventeenth-century readers) is allowing him to streamline both his text and his gloss. He thereby manages a stripped-down and user-friendly explanation of how the real character works. But strictly speaking, to get "father" from the radical for "parent," we clearly do need that particle for "male." The mark for "metaphor," as Wilkins admits, really ought to be there, too. We are not saying "father," to this father, as is his Son, who came up with this prayer. And even the mark for "person" should probably be added; since

animals and other non-persons can, in fact, have parents. The point here is that not even the writing of substantive terms, radicals, is fixed, or predetermined, prior to their entry into semantic complexes. There will be more than one way to mean what you mean, via a radical of the real character. And what will determine *what you have meant* is largely the interaction between the radical and its surrounding particles. Intension of the particles is only achieved vis-à-vis the radicals; intension of the radicals is only achieved vis-à-vis the particles.

One more point. In English, "Our father who art" is a phrase, and, indeed, an independent clause. It is parsed in sequence, from left to right, and this written syntagma symbolizes an oral analog (its normative original, from the seventeenth-century point of view). From side to side, from part to part, from earlier to later: parallel segments of the arrow of time. To say that the sentence is a sequence (as we discussed in Chap. 2) is also to say that it has parts, adding up to a whole. The parts are words; their parts, in turn, are letters of the alphabet, or phonemes. To say that the parts are parts, moreover, is to say that they are *separable* from the whole, precisely as the parts they are. An "f" does not need an "ather" for it to be an f. A "father" is still a "father" without an "our … who art" around it. And so on.

The real character translation of the phrase—the radical/particle complex—works very differently. *None* of its parts can be extracted from the whole, without ceasing to function as the parts whose functions they are supposed to have. The grammatical particles for "our," "who" and "art," as we have seen, function as such only by virtue of their position vis-à-vis the radical. Extract them from the complex, and they simply *are not* the particles that they are within it. The same would certainly go for the transcendental marks—"person," "male," and "metaphorical"—that Wilkins mentions as properly belonging in their own relations to the radical. "Father," meanwhile, is only "father" in its reciprocal relation to those transcendental marks. The real character translation, in sum, is not "our father who art." It is something more like "ourfatherwhoart"; or, perhaps, "our<father>whoart"; or, perhaps,

$$\text{our} < \text{parent}^{(\text{person})(\text{male})(\text{metaphorical})} > \text{whoart.}$$

Ultimately, the radical/particle complex does not work as a sequence at all—much though it is translating one. Any unit of discourse in the real character is focused on a radical, which relates reciprocally to grammatical

and transcendental particles (as we have seen). Its syntactic movement, accordingly, is a circulation between center (the radical) and periphery (the particles). Or—perhaps more likely—it is not a movement at all, but a tacit recognition, a snapshot. As we have noted, Wilkins seems to conceive competence in the character as involving a sudden and holistic recognition of its radicals, rather than a puzzling-out or decoding of their parts. Now the radicals, as we have just been seeing, enter into and depend upon larger semantic complexes, involving intensional determination by radical-particle arrangements. Perhaps "fluency" in the character, if we can speak of that, would involve recognizing these larger complexes, too, at a glance.

Marin Mersenne, the French friar, experimentalist, and correspondent of Descartes, was one of the non-English and not-really-Baconian contrivers of a universal character in the seventeenth century. He wrote to his more famous philosophical friend that the ideal of the project would be a kind of utterance so primitively universal that people would understand it immediately, and as it were automatically: "simply on hearing it, without having grasped its meaning, as they would gather that somebody is happy from his smile, and that he is sad when he cries."[28] As has been pointed out, it is very unlikely that Wilkins or his peers would have known of this comment; strictly speaking, the Descartes-Mersenne correspondence is tangential to our story.[29] Nonetheless, Mersenne gives us an insight into the *kind* of intensional matrix that a real or universal character could be hoped to be in the period. Rather like the imaginary palaces of artificial memory, which were supposed to allow detailed recollection *without* much cognitive effort, a universal character could be envisioned as allowing effective understanding without much syntactic processing. For Mersenne, it would be just like the way we understand the meaning of a smile without even trying. (And, for that matter, just try not to.) Yet smiling and crying, if they could be broken down syntactically, would be pretty complex. Perhaps the meaning of a face, received willy-nilly, and in an instant, is a model for meaning in the real character.

But whatever model or metaphor we choose for processing real-character syntax, one, clearly, will not do. This is the syntagmatic model of a linear transition, along the arrow of time, from beginning to middle to end. We have already contrived several English-language simulations of the "our father who art," after its translation into the real character. But we need to go much farther if we are to try to capture the spatial order that is being deployed in Wilkins's radical/particle structure. Using the "full" version of the complex, including the grammatical and transcendental

marks, in their required positions around the radical—and dispensing with Wilkins's questionable "art" conjugation—we can perhaps understand Wilkins's translation as looking, and working, something like:

$$\text{Our}< \left({}^{[>\text{male}<]}_{[\text{metaphor}<]}\text{PARENT}_{[>\text{person}]} \right)^{>\text{who}} > \text{present being}$$

Where the brackets—lesser<greater—indicate relations of syntactic and semantic hierarchy and dependence. The crucial proviso is that each of these elements has to be understood as occurring simultaneously. For each, as we have seen, is a direct function of the others.

Another example, also from the Lord's Prayer transcription. Wilkins renders "forgive us" through a real-character complex anchored by a radical from the 37th genus, "Judicial Relation." (It is also numbered 37 in the transcription of the Prayer, but that is mere coincidence.) The genus character receives the second difference, "*Judicial Actions*" (though in fact the character appears to show the third difference—a printing problem); and the ninth species of that difference, which is given in the Philosophical Tables as "EXECUTING, *inflict, suffer, Executioner, Hangman*" (270–71|278–79). Of course Wilkins wants the "other one" from this species-pair: "PARDONING, *forgiving, remit, release, venial, Indulgence, put up.*" So the character gets the "other" loop on the left-hand side (for opposition). A hook, added to the "affix for the difference," denotes "the *Active voice.*" Another, added to the species mark, denotes "the Adjective." All this is in accordance with Wilkins's grammatical strategies for deriving verbal intensions from his species, which are all fundamentally nouns. He is not here trying to denote a static thing, but an action (see Fig. 3).

To get the sense of "forgive," in the imperative mode, the radical needs to be tricked out with the particle for "the Imperative Mode by way of Petition": a little figure-of-eight in the "top" position vis-à-vis the radical. Wilkins translates this particle "mayst thou be," but this is a semantic dodge, like his rendering the copula "art" in the prevous example. The "petition" mark does not carry an inflection toward any grammatical person, but just means something like "please be." After the radical, Wilkins puts marks for the preposition "to" (a double curve, top position); and the plural first-person pronoun (two dots, top position). "Coming after a Verb," he says, this

is "to be rendered in English as we do the Accusative Case," that is, "us" rather than "we." Which is reasonable enough; but is a yet further level of dependence between the intension of Wilkins's particles and their referring radicals. In the end we have, for "forgive us," something like:

$$\begin{array}{c} > \text{active} < \\ {}^{\text{please be}} < (\text{opposite})\,\text{EXECUTION} >^{\text{to} > \text{us}} \\ > \text{adjective} < \end{array}$$

"Please be the opposite of executing toward us." A very complex unit of real-character discourse, involving a necessarily synchronic interaction of multiple and interdependent radical and particle elements (400|408).

One final example. After the Lord's Prayer, and in accordance with long shorthand tradition, Wilkins also provides a real-character transcription, with gloss, of the Creed (404|41). The first clause of which is: "I believe in God the Father Almighty Maker of Heaven and Earth." The long apposition of that predicate—everything after "God," hanging together as a modifier of the latter—creates an extraordinary density of texture in the real character. Wilkins starts with the character for "faith"—25th genus, fifth difference, fourth species—adding the hooks for "active" and "adjective" (much as he does with "forgiving," above). To this he adds the mark for the first-person pronoun (single point, top position), and the present-tense copula (circle, middle position). For the direct object, Wilkins gives the character for "God the father," which is defined in the Philosophical Tables as the first difference of the fifth genus, CREATOR. So we have:

$$\begin{array}{c} {}^{1} < \text{being present} < \text{FAITH}\langle \text{GOD} - \text{THE} - \text{FATHER} \rangle \\ > \text{active} <> \text{adjective} < \end{array}$$

"I am faithing God-the-father." (The "active" mark goes below the radical here, because the mark for fifth difference extends downward from the main axis). Already something has happened which we have not seen in our previous examples, which is that a complex based on a radical is extending to and including more than one radical: both FAITH and GOD-THE-FATHER. Admittedly, the latter could perhaps be detached from this complex, retaining its intension intact. But the former could not be; since

it is only and precisely for its function in this complex that FAITH gets tricked out as "faithing," via the grammatical marks for "adjective" and "active voice."

So it is perhaps GOD-THE-FATHER that is the real radical center of this complex. In apposition to it, we find the compound character for "Almighty": two dots in the bottom position for "All," joined by a hyphen to the radical for "Mighty." Thus, schematically,

$$_{\text{ALL}—>}\text{MIGHTY}.$$

"The" is indicated by a simple mark, but "Maker" is a sub-complex unto itself. It begins with a "small transverse line" in the upper position, thereby denoting "the Preter Tense": "having been." The radical is "creating"—CREATION with the marks for "active" and "adjective"—plus the transcendental mark for "person" ("a little flat Line on the top towards the right hand"). So we have

$$\begin{array}{l} \qquad\qquad > \text{active} <> \text{adjective} <^{\text{person}} \\ {}_{\text{the}<}{}^{\text{havingbeen}<}\,\text{CREATION} \end{array}$$

The characters for "of Heaven and of Earth" round out the apposition. They, perhaps, are separable from that complex character for "maker." But it is not separable from them: it needs to be a maker *of* something. So that the whole complex to that point works something like:

$$\begin{array}{l} {}^{\text{I}} < \text{being present} < \text{FAITH}\left\langle \text{GOD} - \text{THE} - \text{FATHER} \right\rangle_{\text{ALL}—>} \\ \qquad\qquad > \text{active} <> \text{adjective} < \end{array}$$

$$\begin{array}{l} \qquad\qquad\qquad > \text{active} <> \text{adjective} <^{\text{person}} \\ \text{MIGHTY} >_{\text{the}<}{}^{\text{havingbeen}<}\,\text{CREATION} >^{\text{of}} \end{array}$$

With, as usual, the proviso that so many of these elements are multilaterally interdependent—depending on other radicals or particles in order to function as the radicals or particles that they themselves are—that the complex cannot really be understood as a diachronic sequence in and of itself; but rather as

a synchronic effect, which may or not be entered into sequences. The real-character complex needs to be all there at once, if it is to be there at all.

One thing is for sure: it is very difficult, if not impossible, to see how one could *speak* such a complex. Not only is it unclear where to start—with the radical, or one of its grammatical or transcendental particles. It is unclear whether there even *is* a start. If the parts of the complex are not parts, except as functions of each other, then the complex has to be simultaneous—a chord, perhaps, but not a melody. And even if a chord, its constituent notes would rely on the whole to be the notes they are. The residual sequentiality of Wilkins's Lord's Prayer transcription is not only a function of his target text; of course discourse in the real character does get written out in a line. But the *units* of such discourse—complexes of radicals and particles—follow quite a different structure. This is the syntactic structure of the real character *sui generis.*

Real Language

Wilkins's final move in the *Essay* is to "shew how this Universal Character may be made effable [speakable] in a distinct *Language*" (414|422). We need to pay close attention to how Wilkins formulates this part of his project—and how he carries it out. "The Qualifications desirable in a *Language*," he says, "should have some analogy and proportion to those before mentioned concerning a Character or way of *Writing*." Wilkins's idea is to craft a language that will work the way the character does. But this is based on the working assumption that a character and a language are "distinct." This somewhat dogmatic splitting is consistent with the strict seventeenth-century understanding (discussed in Chap. 4) of what a language fundamentally is—so different from our own period's syncretic and rather lurid phenomenology. To be sure, and as we have seen, Wilkins does not always keep this particular rule. Earlier in the *Essay*, he seems to countenance a conflation of character and language; thereby (perhaps) contributing to a categorical inflation of the latter. But in the final phase of the *Essay,* Wilkins reverts to a traditional phenomenological discretion. Making the character "effable" means making it *something else*.

What makes the difference, of course, is *orality*. Wilkins lists the following criteria for a philosophical language (as such):

1. The words of it should be *brief*, not exceeding two or three syllables, the Particles consisting but of one syllable.

2. They should be *plain* and *facile* to be taught and learnt.
3. They should be *sufficiently distinguishable* from one another, to prevent mistake and equivocalness; and withal *significant* and *copious*, answerable to the concepts of our mind.
4. They should be *Euphonical*, of a pleasant and graceful sound.
5. They should be *Methodical*; those of an agreeable or opposite sense, having somewhat correspondent in the sounds of them. (414|422)

Sound—as word and concept—reverberates in this account. Several of Wilkins's points, notably the second and third, would be as much applicable to the character as they are to the language. But what marks the transition from the one to the other is precisely a renewed interest in the oral medium. As we have seen, alienation from orality is step one on the character's road toward speculative objectivity. Nonetheless, the tongue has its uses. The point of a philosophical language is to re-appropriate the fluency and ease of speech, while bringing it under the philosophical discipline that has already been laid down by the character. This means extending the latter into territory that is not its own.

Indeed, to make his language, Wilkins does not actually work from the character. Rather, he works from the ontology on which the character was based. Going right back to the outputs of the Philosophical Tables, Wilkins starts all over again with his genera, differences and species. Each genus of the General Scheme will be denoted in the philosophical language (PL) by a monosyllable of consonant and vowel (415|423). God, for example, will be "D*a*" ("a" as in "daw"); World, "Da" ("day"); Element "De"; Stone, "Di." Exanguious animals: "Z*a*." Fish: "Za." Birds: "Ze." Beasts: "Zi." And so on. The nine differences of each genus will be denoted by numbered consonants—b, d, g, p, t, c, z, s, and n—added to the end of the generic monosyllables. The nine species of each difference, finally, will be denoted by numbered vowels, added after the consonants for the differences: *a*, a, e, i, o, oo (for which Wilkins uses a bespoke letter), y, yi, and yoo. As he does with regard to the character, Wilkins denies any great significance to the system he has designed: "it were not difficult to offer great variety" of alternatives; this is just "that which at present seems most convenient" (415|423). Nonetheless, there is a degree of what Wilkins calls "methodical" modularity to the language, such that ontologically associate terms (that is, those from the same genus and difference) will tend to sound somewhat alike.

The genus "Element," for example, is "De" in the PL. The first difference of that genus, in the Philosophical Tables (PT), is "fire." The consonant for "first difference" is "b"; therefore "fire," in the PL, is De+b: "deb." The first species of that difference is "flame"; The vowel for "first species" is *a* ("aw"). Therefore, "flame," in the PL, is Deb+*a*: "Deb*a*." Ti" signifies the genus of "Sensible Quality," the second difference of which (in the PT) "comprehends Colours." The consonant ending for second difference is "d." Therefore, "tid," in the PL, means "colours." Under that difference, the second species is "redness." The vowel ending for second species is "a." Therefore, "tida," in the PL, means "redness." "Be" denotes the genus of "Transcendental Relation of Action." The sixth difference of that genus is "*Ition*" (going). The consonant ending for sixth difference is "c"; so "bec," in the PL, means going. The sixth species under that difference is "following"; the vowel ending for sixth difference is "oo"; therefore "becoo" means "following." De, deb, deb*a*; Ti, tid, tida; Be, bec, becoo. Moderately silly though these sequences may sound, they have the flavor of an ontological unfolding. To hear the species, in the philosophical language, is also to hear the difference and the genus. Conversely, to hear the genus is to acquire a rudimentary grasp of what its differences and species will sound like.

This ontological modularity has some precedent in the real character. There, as we know, the radical for a genus forms the basis for writing the species, and is still apparent within the latter. However, the "methodical" effects of the language typically do *not* map very well onto those of the character. Consider, for example, Wilkins's oral system for denoting species-pairs—"those Radicals," like our old friends sheep and goat, "which are joyned to others by way of *Affinity*," or "*Opposition*." "In *Monosyllables*" of the philosophical language, a term of affinity will be indicated "by repeating the Radical Vowel before the Consonant." "In *Dysyllables*," the same can be accomplished "by repeating the second Radical Consonant after the last Vowel" (416|424). So, for example, the monosyllable "De," meaning the genus "Element," is paired by affinity (Wilkins tells us) with "meteor." Therefore, the philosophical word for "meteor" will be "Ede." The disyllable "Dade" means "planet." It is paired by affinity with "comet." So this will be "Daded."

As for opposition: in monosyllables, this can be managed by a system of opposed vowels, "putting the *opposite Vowel* before the first Consonant." So if "D*a*" means "God," "Id*a*" will mean "idol" ("I" being nominated

as the opposite of "*A*"). In disyllables, an opposite term will be indicated simply by adding an "s" at the end. "Thus if (Pida) be *Presence*, (Pidas) will be *Absence*." And so on. (Technically, we are talking here only about what Wilkins calls "single" opposition—the straightforward, sheep/goat kind. The system for "double opposites of excess and defect" is subsidiary to this.)

Two things are notable about Wilkins's "methodical" innovations here. First, they are utterly different from his analogous techniques for indicating affinity or opposition in the real character. There, as we recall, the whole business of paired radicals was managed by one little loop, added to one side or the other of the radical axis. Wilkins's proliferation, for the purposes of the philosophical language, of *various* phonemes and their placements to indicate affinity and/or opposition is as alien to the character as is his talk of monosyllables and disyllables.

And second, Wilkins is articulating a role for paired terms that is *without precedent* in the character. As we recall, the whole functionality of affinity and opposition emerged in the first place via the paired radicals of the Philosophical Tables. It emerged, that is, at the species level. The whole point (or so it seemed) was the great, speculative promise of those paired ontological outputs. Wilkins gives us no indication, when he teaches us how to use that little "other species" loop, that it can be used for differences and genera, too. Neither do the Philosophical Tables—relentlessly pairing species in capital letters at the end of Wilkins's Ramistic branches—give us much reason to think so. Yet for the purposes of the philosophical language, Wilkins *bases* his account of affinity/opposition, explicitly, at the *generic* level—"Element" and so on. The pairing of species, such as "planet," is then explained as a function of the generic version. This does not exactly reverse the work of character; but it sure does not extend it, either. Wilkins has framed this capability of the language in a way that the character does not support.

Wilkins similarly innovates vis-à-vis the overloaded differences of the Philosophical Tables: the ones, that is, with "supernumerary" species, 9(2) or even 9(3). In the real character, species from these "second and third nines" are represented, simply and effectively, by doubling or tripling the species mark. An "11th" species, for example, gets the mark for second species, twice: thereby denoting "second species of the second nine." An added benefit of this sensible and modular system is that one can *see*, immediately, the kind of denotation it is getting at. A second (or third) enumeration of species is indicated by a second (or third) species mark.

In the philosophical language, by contrast, supernumerary species get their own special phoneme—entirely different, and weirdly removed, from the one for species *kurz*. The second or third sets of nine species, Wilkins says, are to be indicated in the language by "adding the Letters L, or R, after the first Consonant" of the radical. That is, *after the generic consonant* (415|423). So, the species "tulip," for example, is in the PL genus "flowers" (Ga), second difference (d), third species (e): "Gade." Now, that generic difference (Gad) has more than nine species. In the second nine, the third species is "Ramson." This will be, in the PL, "G*l*ade" (my italic): genus "flowers"— *second nine*—second difference, third species. That "*l*," indicating the supernumerary species, is out of morphological order. For it seems to be an intervention into the morpheme for the *genus* ("Ga"). Not only is this formally *different* from the species phoneme (that concluding "e"); it is compositionally about as far removed from the latter as it could get, in this allegedly "philosophical" word. And—more to the point—it is alien indeed from the system for supernumerary species in the character, as we have just described.

Wilkins's oral system for denoting supernumerary species is especially odd since, as he says, it makes them "scarce capable of the derivation of the adjective" (416|424). Here we have another departure from the rule laid down by the character. There (as we recall), radicals are rendered adjectival through the addition of a little hook. Typically, as we know, the radical will be a species. So, again, to get to the adjectival modification, we are proceeding down ontological, semantic, and even syntactic ladders. From genus to difference to species—and finally to the "adjective" mark, which is precisely added to the species mark. To reuse an earlier example from this chapter: the initial radical of Wilkins's transcription of the Creed clearly, even manifestly, says "believing" or "faithing"; based on the species ("faith") that that radical encodes; and especially on its species-mark, which is where the adjectival hook has been added. By that token, the inflected radical clearly *does not* say "Infused Habitting," after the difference of that radical; let alone "Habitting" after the genus (404|441).

But in the philosophical language, adjectival inflection is to be indicated by a set of transformations, again, *in the initial consonant of the radical*—that is (again), the *generic* consonant. This is why "supernumerary" species, which are indicated in the same way, cannot easily be made adjectival. Thus if "De" means "element," "Dooe" will mean "elementary." Which makes perfect sense, if we are modifying a word for a genus; but not if we are modifying a word for a species. Consider, for example (one we

have already mentioned), the PL word "Deb*a*," "flame." The "*a*" ending marks "Deb*a*" as a species of its difference (fire), and indicates *which* species of the latter it is (the first). But its adjectival form, based on the system Wilkins has established, will be "Dooeb*a*." This is supposed to mean "flame-like"; but it seems, and sounds, to mean something more like "elementary flame." The adjectival inflection, rather than attaching to the species-vowel where it apparently belongs, attaches instead to the generic consonant, where it apparently does not.

"Believing," from the Creed, Wilkins translates as "tooalti" in the philosophical language (427|435). The radical here is "tati": genus "Ta" (habit); fifth difference, "t" (infused habit); fourth species, "i" (faith or belief). The "l," here being used to denote the active voice, attaches to the difference phoneme ("t"), much as it does to the difference mark in the real character. But the "oo"—the adjectival phoneme—intervenes in the part of the word that indicates *the genus*, rather than the difference or species. "Tooalti," rather than clearly meaning "believing," seems instead to mean something like "habiting infused passively belief" (whatever that can mean). Only by Wilkins's fiat, rather than by logical or consistent encoding, does the word arrive at its designated intension.

The point here is not to criticize Wilkins's philosophical language. The point is to show that it is *not* an oral manifestation of, let alone guide to, his real character. The two approach the same end—speculative discourse—via different means. Perhaps this is as obvious, and as crucial, as the fundamental difference between the character and the language. Nonetheless, if only because of our own (modern) tendency toward an expansive linguistic phenomenology, this is a point that we need to work hard to keep in mind. When Wilkins adds a language to the achievement of the character, he is neither obliterating, nor bridging, the gap between them. Rather, he is *adding a functionality to the system of the* Essay—a functionality that precisely was not there before. Notably, and as we have mentioned, the philosophical language *does not* get written in the real character; but in a phonetically modified version of the alphabet. Neither is there any way to sound out Wilkins's characters, without obliterating the semantic and syntactic structures that they are. The move between Wilkins's language and his character is not a matter of reiteration—utterance to text, speech to script. It is a matter of translation. The character and the language are distinct codes.

We can illuminate this point most clearly by returning to Wilkins's transcriptions of the Lord's Prayer and Creed. "Our father who art," we said above, looks in the real-character version something like this:

$$\text{Our}_{<}\left(\overset{[>\text{male}<]}{\overset{[\text{metaphor}<]}{\text{PARENT}}_{[>\text{person}]}}\right)^{>\text{who}} > \text{present being}$$

Each of those elements needs to be there at once, since they all rely on each other, precisely in order to function as the semantic elements that they are supposed to be. It is this dense syntactic weave, this multilateral counterpoint, that makes the "our-father-who-art" transcription a *unit* of real-character discourse. For after the "art"—with "in heaven"—we precisely find characters that are not as dependent on the preceding complex, even as they start another. Characters clump together into syntactic congeries that stand or fall, semantically, united; whether we call these units words, or texts, or something else altogether.

In the philosophical language version, by contrast, Wilkins gives "our father who art" as "*Ha*i coba oooo ia" (421|428). "H*a*i" means "our" (and we'll come back to that); "oooo ia" means "who art," in that order (we'll come back to those, too). "Coba," meanwhile, the radical anchoring this clause, is genus Economic Relation (Co), first difference (b), second species (a). Technically, this is "parent"—here as before Wilkins omits the transcendental notes of "person," "male" and "metaphor." But here as before, we can add them back in. Here as before, we will learn something by doing so.

Wilkins does the transcendentals, in the PL, by means of monosyllables and dipthongs that he has not yet used elsewhere in his system. The transcendental term for "person," for example, is "iy." For "male": "ra." For "metaphor": "i*a*." Wilkins does not actually tell us, for compositional purposes, in what order these should go. But let's say that "person-male-metaphor," after the base radical, makes good syntactic sense. If we follow that order, the full version of "our father who art" will be:

*Ha*i cobaiyrai*a* oooo ia

We can make two main points about this phrase, vis-à-vis its analog in the real character. First, Wilkins's particles, both grammatical and tran-

scendental, have *regained the separability they lost in the real character*. "Our," "who" and "art," as we noted in the previous section, mean in the character what they do mean *only through their positionality toward the radical*. The real-character particle for "our" (old friend smiley-face) has to be in that upper position, vis-à-vis the radical, precisely in order to function as the real-character particle for "our." For in the middle or bottom position, it would mean "your (plural)" or "their," respectively. Found on its own, it would just mean "non-specific plural possessive pronoun." Not even Shakespeare's melancholy Jaques would be able to do much with that. But "*Hai*" (haw-ee), in the philosophical language, does indeed mean "our"—wherever you find it, and in whatever company. This is because "your (plural)" is "Hai" (with that long "a" as in "day"); "their" is "Hei." "*Hai*" "Hai" and "Hei" are distinct, just like "our," "your" and "their." These are not terms that achieve intension only within syntactic complexes. Rather, they are terms that *bring intension to syntax*, and then bring it away again. We will get similar results with the philosophical-language terms for "who," "art," and so on.

As for "person," "male," "metaphorical," and all Wilkins's other transcendental marks: they owe *nothing*, in the philosophical language, to the way they work in the real character. Strictly speaking, the real character has only eight TMs, each varied through six places. Thus, perhaps even more manifestly than Wilkins's grammatical particles, his transcendental marks *consist entirely in* a relational function to the radical—in the character, that is. "Metaphor, kind, thing, like, manner,"; "person, sepiment, vest, house, armament, armour, chamber"; "ability, inceptive, endeavour, phronesis, frequentative, impetus." These are some of the six-fold sets from which specific meanings will be indicated, in the real character, by a tiny mark; a given member of the set picked out only by the placement of the mark around the radical (391|398). Detached from the complex, found on its own, a transcendental mark means *nothing*; unless one thinks that meaning one of six entirely different things, which barely even add up to a coherent category, is meaning something.

But in the philosophical language, Wilkins totally dispenses with this system. For convenience, given the work already done with the character, he displays the marks in the same groupings and arangements. But these are without significance. Effectively, the philosophical language just has a list of 48 (6 x 8) distinct transcendental fragments (some monosyllables, others dipthongs) (419|427). They work not because of the group they are from, or because of any residual relationship to a radical term. Rather, each fragment

works precisely and simply because it is a unique morpheme with an assigned meaning. We are looking here, in a totally normal way, at little words that mean on their own. Just as with Wilkins's system for grammatical particles in the PL, you can find his transcendental fragments in varying syntactic company, or on their own, and they will mean exactly the same things as they always do. "Ra," for example, meaning "male" in "cobaiyrai*a*," equally and clearly also means "male" wherever it is found—as part of other words, or on its own. For "male" is the only thing that "ra" *ever* means, in the PL. We are simply no longer looking, here, at the kind of strong semantic-syntactic interdependence that we had in the real character. In its place is a renewed compositionality: an assemblage of semantic pieces that retain their discretion and integrity wherever they are put, and however they are used.

And that, of course, is the second point. With the return to language—with the return to orality—comes willy-nilly a return to sequentiality. Wilkins's linguistic phrase, clearly, does not put together its meaning like its transcription in the real character—a circulation (as we have said) between center and periphery. Rather, discourse in the philosophical language runs from beginning to end, front to back, side to side. This is so much the norm of our language, and language generally, that we need the defamiliarization provided by the character to see it in any kind of relief. But this is exactly what Wilkins has provided in the *Essay*. In turning to the philosophical language, we are turning back to the temporal and linear matrix of language as such. Once again attending with Augustine, we are back on the arrow of time.

We said above that the strong semantic interdependence of real-character discourse—the tendency of its syntax to *be* its semantics—was exemplified in Wilkins's transcription of the first clause of the Creed. In the philosophical language, the same is:

a ia tooalti d*a*b eootoo*a* *a*l ooi coo*a*lb*a*ioo l*a* dad na la dady (427|435)

We already know what this means. But more importantly, we know *how* it means. We know the kind of thing we are looking at, when we are looking at a language. We precisely do *not* know what kind of thing we are looking at, when we are looking at the real character—until we learn. This is why, as I have been saying all along, it is very important that we not assume in advance that the project of the character is fundamentally linguistic, or even approach Wilkins and his peers as "language-planners." That is the last thing they are—literally. A language in the strict period sense, a return

to orality, is the final contribution of the *Essay*, and the termination of its main work. But this, as Wilkins makes clear from the beginning, is the "real universal character": "the principal design of this Treatise" (13).

Doubtless, Wilkins is proud of his philosophical language, in which "every Word" can be considered "a description of the thing signified by it," and even "every Letter" has a precise and objective meaning. He even compares it favorably to 50 other tongues, arguing that it is 40 times easier to learn than Latin! (440|448). Nonetheless, we need to recall Wilkins's opening statement about adding another language to the existing totality: this would be "like adding a disease, for which a man can expect little thanks from the world" (13). There is room for the philosophical language, in Wilkins's work, precisely because it signifies the ideal termination of all its non-philosophical analogs. And we know, by now, what has effected this destructive hygiene. The very last section of the *Essay* proper (followed only by an appendix on Latin grammar, the fold-out version of the Tables, and the referential dictionary) is a brief chapter on "*directions for the more easie Learning of this Character and Language*." It begins: "If any Man shall think it worth his time and pains to learn this Character …" (441|449). The hendiades, given in the title, is abandoned in the body. Character and language, as we have seen throughout this book, go together like bacon and egg. But that is precisely why they can be given *together*. They are two different things, not two servings of the same thing. And first and last, in the *Essay towards a Real Character, and a Philosophical Language*, the former precedes, determines, and subsumes the latter.

Reception and Adoption

Certainly Wilkins's contemporaries, in the years following publication of the *Essay*, seem to have understood its achievement primarily in terms of the real character. We have already mentioned Robert Hooke's use of it to record his invention, in 1676, of a new kind of spring watch; John Webb's approbation of the character as "a fair overture" toward supplying the Western world with its own version of Chinese *zì*; and John Aubrey's vision for the role of the character in an ideal education.[30] One of Wilkins's followers, Francis Lodwick, was said to be so fluent in the character that he could read it off in English "standing on one foot."[31] Another, Andrew Paschall, arranged Wilkins's botanical characters into large posters, "so that horticulturalists could see at once how to classify and how to notate

their plants."[32] The botanist John Ray, on whom Wilkins relied heavily for the relevant sections of the Philosophical Tables, agreed to "translate his real Character into Latin"—that is, translate the *Essay*, for which the character, as such, stands in this phrase. And duly, "Wilkins's universal character coming out in Latin" was promised (though it seems never to have appeared) in 1670.[33]

These contemporary views of the core significance of the character are from within Wilkins's own circle. Coming from well outside it is a book primarily on the healing waters of Scarborough, North Yorkshire: *Hydrologia chymica,* published by the physician William Simpson in 1669.[34] Simpson, about whom little seems to be known, was a prolific writer on the medical applications of a reformed chemistry in the late seventeenth century.[35] Mineral water, in this context, was a cause for voluminous and polemical debate; to which Simpson contributed no fewer than five books, including the 374 pages of the 1669 *Hydrologia*. At its intellectual and rhetorical climax, Simpson's discussion of the Scarborough spa opens up into an architectonic and highly Baconian consideration of the very nature and promise of scientific knowledge—which is where the universal character comes in.

Simpson denies his long "digression" to be based on the *Essay*, claiming to have written it "before I had seen anything of Dr. Wilkins's Book to the same purpose." As we will see, this claim is not very plausible; Simpson follows the *Essay* extremely closely. But in any case, Simpson explicitly subordinates his account of the character to Wilkins's, "such a clear Methodical draught thereof, as that without doubt, he hath outdone all that ever we heard of, that went before him." "Which if it take," Simpson goes on,

> and get footing in the world, will (without a peradventure) prove the most facile direct road, to the improvement of the natural parts of man, in the true outward *Scientifical* knowledge of things, by this Universal Character. For by this invention, Children (and others) will be train'd up, not in the knowledge of letters, or words alone; but in the true *Characteristical* knowledge of things themselves, according to their most External distinguishable *Signatures:* which if it take, will save posterity a great deal of time, which we have with little fruit spent at the Schools.[36]

The digression of the *Hydrologia,* in sum, is practically an advertisement for the *Essay.* As such, it serves as an excellent example for how Wilkins's work was initially understood and received.

It is, indeed, all about the character. "By the Universal Character," Simpson writes, "I mean such a Compendious Character,"

> as being known in all parts abroad, should signifie the same thing amongst all Countries; so that all People that are skill'd therein, should in several parts of the World, read it, every one in their own Language. As, for instance, the numerical Figures which are the same in most Nations, are a Character of Numbers, which signifie the same thing, to all those foreign places they are us'd in, and every Nation reads them in their own Language.[37]

The dogmatic distinction between character and language, though it may have gotten slightly blurred in Wilkins's work itself, is on full view here. To the typical example of numbers as a kind of real character, Simpson adds the equally typical hope that a more "compendious" version of the latter would wonderfully facilitate both knowledge and communications worldwide. And the standard, speculative account of why this ought to be possible:

> The mind which receives the impressions of things is the same, and informs it self of the Signature of things, after the same manner as to it self; and that, whether in words (and those whether varied according to all Languages of the World) in figures, in Characters, Hieroglyphicks, or the like; for before the Building of *Babel,* all Languages were as one. What the Character of that Language was, if written, we do not know: but surely as the Language, so the Character was but one upon the whole face of the Earth … And though this primitive Language hath lost its unity, by being involved in the Confusion, and multiplicity of Tongues; yet we see, that the human mind, in the Apprehension of things, understands the same in all, the whole variety of Languages, yea and the various changes, of the different *Idioms* of each of those Languages.[38]

As we will discuss in Chap. 6, the myth of Babel is ubiquitous in and around the seventeenth-century real-character project. Wilkins is no exception to this rule. Like Wilkins, Simpson takes it as axiomatic that the original and unified human language can never be re-established. At the same time, he takes it as realistic that a single and universal character can be established in its place.

Accordingly, and somewhat like Webster a decade and a half earlier, Simpson envisions and calls for a Baconian academy whose members "should in lieu of reading Logick, and Metaphysick Lectures to their Pupils, be employed in clubbing together their wits about the invention

of an Universal Character."[39] To these imagined scholars, Simpson then proposes a series of mostly rhetorical "Queries"; the implied answers to which are, clearly, and in detail, indebted to Wilkins's work in the *Essay*. Would it not be best, Simpson asks first, if the character "had no dependance, upon any particular manner of writing, peculiar to any particular Country"? That way it would avoid association with any given national project, or any local site of the confusion of tongues. Instead, Simpson goes on, would it not be a good idea to "search out so many Roots, or Radical Characters, as might express the most known and useful things in the world; as, *Man, Book, House, Stone, etc*., which should be orderly placed down in a Vocabulary"?[40] We proceed here from the theoretical promise of the character to its ontological basis, such as Wilkins tries to provide in the Philosophical Tables. And from there to the framing of the real characters themselves, which, Simpson reckons, "should be writ pretty fair, and large." They should also be "so contrived (as to their form) as that they might indicate to the mind, the things they represent." Simpson doesn't seem to thinking ideographically here, but simply of what Wilkins calls a "methodical" relationship between characters and their referents. As for syntax, this can scarcely be better expressed than by "points in various places, and little dashes or strokes of different shapes, interwoven amongst the Characters."[41] A fair, if vague, snapshot of Wilkins's grammatical and transcendental particles.

The more Simpson says about the character, the more familiar his discourse sounds to a student of the *Essay*. "The Additional points, and dashes, which represent the *Syntax* of the Character," should be "discernable enough, though much less, than the Character it self." The character should not be based on any existing model, such as Hebrew or Arabic, but "new invented," so that it can be "of a more universal extent." "It should not be Alphabetical at all"; not only because "there is no general concurrence of any of the Languages in an Alphabetical order," but also, and more importantly, because on an alphabetical basis it "would *not … be a Character, but a Language* [my emphasis]; which is a thing quite different from what I aim at: not to mention the tediousness of such an Alphabetical Character; seeing it is only required to be writ, and not to be spoken."[42] As for grammar, "in the Character it self, there can be no *Declension* at all":

> only it may by Additional Strokes, represent the differences of the *Case, Gender, and Number, of Nouns*. The *Genders* are to be but three, Masculine,

> Feminine, Neuter. Here all *Conjugations of Verbs* and special Rules of *Nouns* are to be omitted; the *Moods of Verbs* to be but three, *viz. Indicative* which is the Verb it self; the *Imperative,* and *Infinitive,* which should be noted distinctly; and *Tenses* to be but three, *viz. Present, Preterperfect and Future Tense,* Noted also with their distinct marks. The three *Concords* to be chiefly noted; the *Pronoun* to be set down in a smaller Character; the *Adverb, Conjunction, Preposition, Interjection* to be marked with different pricks. And some few pithy Rules should be given for the better construction of the Character, which might be comprized in short, without those tedious *Ambages* of the multitude of Grammatical Rules, ordinarily given for the teaching [of] *Latine, Greek etc.*[43]

It is as if Simpson is defining the semiotic, syntactic, and semantic desideratum that the *Essay*, then, magically answers.

Two summary points about Simpson's enthusiastic abstract of 1669. First, it omits mention of a philosophical *language* as such, while maintaining a traditional distinction between languages and characters, and a Baconian determination to subordinate the former to the latter. Indeed, Simpson's pedagogic, scientific, and cultural commitment to the character, as such, waxes into a hegemonic vision that perhaps points the way to Swift's reaction of fifty years later. "The Universal Character (we are speaking of)," Simpson writes,

> should be plac'd down in Vocabularies or Dictionaries, with the signification thereof in every particular Language, which should be taught in all Schools, in every Nation, *viz.* first to be read chiefly and particularly in the native Language of the place; and if any after the thorough understanding it in their own Language, should be desirous thereof, may be taught to read it into *Latin, Greek,* or what Tongue they please.[44]

Simpson has perhaps cottoned on to the strange redundancy of having a philosophical language, in addition to a real or universal character. After all, one of the starting points for the real-character project was the idea that it might be "read off" in one's own, or any, language. What matters is precisely that the character is a scientific writing at a categorical remove from language as such. And it is this distinction and hierarchy that Simpson is extremely keen to preserve, and even impose:

> And for the making it Universal, it should be so ordered, as that no other form of Writing be at all followed, not so much as to Write their own Native

> Language, any other ways than by this Character; and that lest any other manner of Writing should gain ground, and thereby cause a deficiency in the general Character; so that let a man learn as many Languages as he pleaseth, yet if he would express any thing in any of these Languages he should do it by the Character, and by that he may as well express what he hath of experiment or observation to communicate to the World, from his own native Language, as from any other whatever. Also all Books of publick use, and of general instruction, should be writ or translated in this Character, and Children should be train'd up in no other from their Childhood. Thus (in a few years) the whole Scene of Writings, I mean such as are most proper for the use of Mankind, would be transpos'd, and put into a new form of this Universal Character; so that one Nation may read the various Transactions, and rare Inventions of each other, in their own Language, without an Interpreter or Translator of one Language into another, which would beget a community of correspondence, even betwixt the remotest of Kingdoms.[45]

Universal translation between languages, as we will discuss in Chap. 6, is supposed to be a main functionality of the real character. But it depends precisely on the technological breakthrough of a translation system that is not, in any normal sense, a language at all.

Which brings us to the second summary point. In marketing terms, Simpson might be considered an ideal member of the target audience for the *Essay*: Learned, professional, Baconian, and progressive. As such, he clearly does not see Wilkins's achievement as theoretical or provisional—a mere sketch of what a real or universal character *might* be like. Rather, he sees the *Essay* as the real deal: a world-changing platform for a communications technology with the capacity to transform all discourse, and render it newly productive of knowledge. "All liberal Sciences," he writes,

> Ingenuous Arts, and thriving Manufactures, with Mechanical inventions, would receive no small improvement by this way of communication, through the help of the Universal Character; and by observations in Physiological Essays, from all parts abroad, the Structure of a body of true Genuine Philosophy, might (in a little time) be raised, to the great use, and benefit of mankind in all sorts of useful learning, both speculative, and practick. So that (thereby) in a few years, more might be done, as to the Completing thereof, than hath been in whole Centuries of years before.[46]

In Simpson's ecstatic vision, the real character is a technology that will allow sudden, and broad-based, scientific and cultural advance. Wilkins's *Essay*, so praised by Simpson as a fulfillment of the vision he has sketched, is not just a book with an idea. It is an object with a use.

And there is evidence that it indeed got used: to be found in extant copies of the *Essay*.[47] Some, to be sure, are pristine, but others are absolutely filthy: covered in ink spots, ambiguous stains, and calcified blobs of ancient organic matter (from lunch, perhaps—or the eater of it). Pages are well thumbed and dog-eared. There are paper traces where, it seems, notes have been pasted. There are miscellaneous annotations, underlining, and highlighting marks. On a copy held at Columbia University, many outside page edges are spotted with ink, just where fingers might touch the page to turn it. (Pen-and-ink, in the seventeenth century, means exactly that.) These are so numerous that on the front edge of the book (opposite the spine) they form an inky galaxy.[48] In a copy held at the New York Public Library (NYPL), small bullet-type ink dots are found irregularly on the inside margins of almost all pages, from Wilkins's dedicatory letter all the way to the end of the book. Sometimes at the start of a paragraph, sometimes in the middle; sometimes few on a page, sometimes many. These are the marks of a closely-reading pen.[49]

The NYPL copy (for which provenance has not been determined) is especially interesting because it shows the extent to which the *Essay* could be approached as a tool, a system, meant for ease and efficiency of use. The copy has been extensively, even obsessively, cross-referenced. Throughout the Philosophical Tables, when Wilkins initially lists the differences of each genus, the page number where each difference will be found has been entered into the NYPL copy by hand. No more leafing through that part of the Tables; you just go straight to the difference you want. At the end of the *Essay*, where Wilkins lists abbreviations for the genera (and some other elements of his system), page numbers have been entered for finding each of them in the Tables. On page 298, where Wilkins initially lists the sections of his discussion of Natural Grammar, the NYPL MS gives page numbers where each of those sections will be found. On pages 320–22, where Wilkins provides the quasi-metaphysical breakdown that will support the Transcendental Marks, page numbers are given where these will be found.

Finally, the list of abbreviated genera on page 459 (which, perforce, receives an MS numbering) is cross-referenced in the NYPL copy to the General Scheme: "vid: Pag: 23." This in addition to the cross-referencing

of each abbreviation to the page where that genus is first laid out; where, as we have stated, the differences are also cross-referenced. What seems to be happening here is that the owner of the NYPL copy is making very full use of the English dictionary that is appended to the *Essay* proper. In the dictionary, each word is given with its abbreviated genus, plus numbered difference and species (if applicable). At least while learning the character, one can thereby start with the dictionary to find things in the Philosophical Tables. (Remember, we are *not* supposed to learn our characters just via their genus/difference/species; but rather via the full description of the things and notions they mean). But leafing through Wilkins's massive book to find the genus, and then the difference, and then the species, takes time. The MS additions in this NYPL copy cut it to an instant. This is a version of the *Essay* souped up for referential speed.

The NYPL copy has also been meticulously *corrected*. So has the copy held at the University of British Columbia; and a second copy at Columbia University.[50] A list of "errata"—mistakes that crept in during the printing process—is of course a typical feature of seventeenth-century books, usually placed among the preliminary pages. Much less typical, but distinguishing these copies of the *Essay*, is to find that the errata have been carefully dealt with, throughout the book. Errors have been scratched or crossed out, and corrections entered—including corrections to the printed real characters themselves. At the same time, the *Essay* contains a number of errors, in the printing of characters and other matters, that are *not* captured in the errata list. These unnoticed errors go *un*corrected; which tells us that we are not looking at copies of the *Essay* owned by people well-informed about, or involved with, the project of the real character (that is, Wilkins or his associates). Rather, we are looking at copies owned by people who wanted to *learn* the system of the *Essay*. Their first move, evidently, was to make sure they were not learning it wrong.

But this was easier said than done. The *Essay* is a big book, and its list of errata is pretty long. Complex and precise alterations are called for to entries in the Philosophical Tables, to their marginal headings, and to the real characters in Wilkins's examples and explanations. In the copy held at the University of British Columbia, the corrector has evidently been a bit daunted by the task. Rather than entering full corrections, s/he just does a kind of efficacious minimum: underlining a letter rather than crossing out a whole word; omitting correction in cases where the errata list is ambiguous or unintelligible. The corrector of the NYPL copy we have

mentioned, when the task gets too big, falls back on his preferred strategy of cross-referencing. On page 181, for example, in Wilkins's discussion of geometry, the errata list calls for a whole sub-table to be entered. The NYPL corrector just writes: "Vid. errata."

Errors beget errors. An erratum for page 177 of the *Essay* quotes text immediately surrounding the desired correction, so that the reader can find his bearings. Correctors of the NYPL, UBC, and Columbia copies all instead start to enter some or all of the text that has been quoted in the erratum. Then they catch their error, cross it out, and generally make a mess. On page 390 of the *Essay*, a mistake has crept in to Wilkins's presentation of the grammatical marks for prepositions. These are supposed to work through paired oppositions: "upwards" with "downwards," "above" with "below." Unfortunately, "upwards" has been erroneously paired with "above"; "downwards" with "below" (390|398). The erratum, accordingly, directs the reader to re-order these terms: "*upward, downward, above, below*." But the corrector of the UBC copy, apparently noting that only two of those terms have commas on page 390, thinks that is the intended correction—and simply enters the missing punctuation!

Another erratum directs the reader to turn to page 142, in the "Fish" section of Wilkins's Philosophical Tables. There he is to correct one of Wilkins's marginal Latin headings, rendering it *Leuciscus*. In the UBC copy, the corrector has dutifully turned to page 142, where he has found printed in the margin the word *Lucius*. This the corrector has underlined, leaving the "L" and adding "*euciscus*." Erratum corrected. But not so fast: for the next page is also, erroneously, numbered 142 (there is no page 143); on that page, there is a marginalium reading *Luciscus;* and it's *here* that the correction is actually supposed to go, turning the latter into the intended *Leuciscus*! The corrector of the UBC copy, no doubt cursing time and fate, has gone back and attempted to blot out the incorrect correction on the correct page 142. But it is too late. He succeeds only in making a mess, before entering the correct correction onto the incorrect, second, iteration of that numbered page.

A final piece of evidence for retail use of the *Essay,* as indicated by extant copies, has to do with the large fold-out leaf that is included near the end of the book. This gives you a condensed scheme of Wilkins's whole ontology, plus a quick-reference guide to the real character and the philosophical language. In the UBC copy of the *Essay*, with its evidence of careful use (those corrections), the leaf has been unfolded and refolded so many times that it is almost falling apart. But what is most interesting about the fold-out insert, for our present purposes, is that it is *absent* from

some copies of the *Essay*.[51] It is possible (and this has been suggested) that the leaf just never made it into all copies. But I think it more likely that it has been *removed* from some. Where the fold-out leaf is present, it may be bound in the wrong place (it is supposed to go between pages 454 and 455, but instead we find it near the beginnning, or at the very back).[52] In one of these copies (that I have consulted), the erstwhile fold-out has been bound back in as a kind of codex: no longer a big leaf, in other words, but a tightly-folded little book unto itself.[53]

The library of Robert Hooke, according to its sale catalogue after his death, contained not only the *Essay*, but also "*An abridgment of the real character*," in quarto (that is, about half the page-size of the *Essay* itself), under Wilkins's authorship.[54] There seems to be no other record of any such publication. I would suggest that this "book" may actually have been Wilkins's fold-out leaf, removed from the large *Essay* and bound separately for portability and ease of use. John Aubrey, we recall, not only wanted the students of his ideal academy to have "cuts" (prints) of the real character on their dormitory walls; he also wanted them to use the *Essay* for botanical and other field-work. The latter suggestion is mildly ridiculous, for a book of more than 600 huge pages. But it makes good sense for a miniaturized version, that you could easily slip in your pocket. At a later date, the mobile Wilkins could be bound back into the main book; unless, of course, it had disintegrated from handling. If Hooke, and perhaps others, detached Wilkins's fold-out tables and rebound them for this kind of purpose, then at least some buyers and users of the *Essay* were truly trying to make it their speculative template for encountering the world.

Conclusion

Everything in this chapter comes down to three points:

1. Wilkins's *Essay* is not "just an essay." It is, rather, the marketable container for a technological breakthrough that is supposed to allow the gathering and communicating, in a totally new and transformative way, of observational, objective, scientific knowledge.
2. The main content of the breakthrough—what makes it a breakthrough—is not Wilkins's philosophical language, which is merely a bonus or secondary functionality. Rather, what makes the *Essay* matter so much, to Wilkins and his contemporaries, is the real character.
3. The way the real character works is significant.

The final business of this chapter is to flesh out (3). Not by way of repeating the technical breakdown we have already attempted; but rather by taking a step back, and asking what it amounts to. As the reader will recall, my goal in this book is to construct the *Essay* as offering a seventeenth-century window onto the infosphere—in no vague sense, but on the basis of a claim that the real character itself is a form of information. And this, again, as no mere generalization (or anachronism), but by meaningful analogy to the phenomenological shapes that we derived from an analysis of Mathematical Theory of Communication Information (MTCI) in Chap. 2.

The first thing we need to note, if we are to make this analogy good, is that the real character is quasi-cosmic. It posits, or assumes, or projects a correspondence between itself as a signifying system and the system of reality. At bottom, this ontological profile rests on the speculative epistemology that we reviewed in Chap. 4. Signifying a notion in the real character, cutting out the troublesome mediation of language, is supposed to entail signifying a thing (*res*). To be sure, the ontology to which the character is keyed may be *philosophically* wanting. Perhaps we do not know, for example, exactly what kind of thing a sheep is; in terms of its underlying forms or natural inter-relations. But this has no bearing whatsoever on the plain fact that we know what it is to signify a sheep—referring to it, meaning it, entering it into discourse. Moreover, if we are to improve our *knowledge* of the sheep, or any of its ontological fellows, there can surely be no better help than a tool like the character; which enables direct, objective, effective, and universal reference to the things that we, "really," perceive. Ultimately, the real character points toward a recursive effect via which discourse will improve knowledge, which will improve discourse, and so on. The end-point of this procedure is a tantalizing, comprehensive, and final agreement between discourse and facts. As we have seen, Wilkins, like Dalgarno, Leibniz and others, glimpses and is in part motivated by the possibility of a universal character that has become so *truly* philosophical that it generates knowledge, willy-nilly. At that point, the speculative character becomes a mirror of the universe.

This picture bears comparison, I would like to argue, with the explicitly ontological implications of information, as these began to be recognized and articulated by both engineers and physicists quite soon after the MTCI breakthroughs of the immediate post-war era. The real character, much like information, is supposed to contain the possibility of finding one's

way toward uttering and understanding the very code of being. True, we do not find in the seventeenth-century movement toward a real character an explicit version of the "it-from-bit" thesis—the idea that the universe *just* is information (or the character). But we do find a hope of attaining such a close philosophical fit between the cosmos and its characters that it will almost make no difference which one you have. If not quite like the informational universe of John Wheeler, this is nonetheless quite a bit like the computational universe of, say, Stephen Wolfram. Moreover, and as we have seen, this ontological fulfillment of the character is nothing other than the final consequence of the speculative epistemology—the idea that our mental notions, as tokens of our cognitive manipulations, *just are* things, insofar as these are perceivable and perhaps knowable. Perhaps, in that sense, the *end* of information theory is there at the *beginning* of the real-character project. Information is supposed to fulfill itself as *real*—the very naturalizable and thermodynamic stuff of what we can know. But what we can know, according to the real-character project, is real by definition, and from the get-go.

Second, the real character is counter-oral. Meant to go unspoken, as a pure and primary writing, it indeed *cannot* be spoken (orally) without a complete departure from and destruction of the character's syntactic structure. Text in the character, as we have seen, is based on syntactic units consisting in complexes of radicals and particles. This structure is a function of Wilkins's determination to found his character on substantive radicals (species); which, in turn, is a function of the speculative assumption that an inventory of substantive notions, or what seem like them, is the indispensable starting point for a referential and discursive system that will be up to the task of constructing truly philosophical and/or scientific knowledge. The consequence, as we have seen, is that the syntactic elements of any given radical-particle complex are, semantically, *inseparable functions of the whole*, rather than being separable elements that are added to it and contribute to it. Moreover, and by the same token, the complex has to be parsed as though given all at once, each element multilaterally simultaneous with and dependent on the others. The tendency of real-character text, as we have seen, is toward ever-larger and more capacious congeries of this kind. Thus while the complexes that make up a real-character text can be arranged syntagmatically, the complexes themselves are not syntagmatic. Instead they are *synoptic:* needing to be taken, as they are given, together. And while the character translates, and can be translated into, diachronic discourse along the arrow of time, this is not how mean-

ingful complexes of the real character work. Instead they are *synchronic*: segments of time, where the elements of the complex are simultaneously present through a spatial arrangement. The diachronic and syntagmatic structure of the oral is utterly alien to the synoptic and synchronic structure of the real character. You cannot speak the latter, without destroying it. That is why Wilkins has to offer and maintain the somewhat awkward analogy and correspondence between the real character and the philosophical language, in order to secure the communicative benefits of orality.

On these accounts, the radical-particle complexes of the real character work somewhat like the machine-level bit-code of MTCI. To be sure, the technical platforms of the two systems are utterly different. But their phenomenological alienation is much the same. As with a complex of the real character, a segment of binary code must be given and taken as a whole—all its ONs set on, its OFFs off—if it is to mean what it means, rather than something else entirely. As with a radical-particle synopsis, syntagmatic treatment of the code segment—processing its elements individually and diachronically—is the way not to express, but to destroy, its meaning, along with its way of meaning. With regard to MTCI, we made this point in the first chapter by examining how little sense it could possibly make to speak of the *parts* of a segment of binary code—bits encoding a number with a meaning (like our old friend lower-case "b"). For until the encoding is there as a whole, its parts are *not* its parts; but are, rather, other whole encodings. We can map this analysis onto the radical-particle complexes of the real character. If we write, for example, Wilkins's genus for "Economic Relation," do we know that we are part-way toward writing a certain radical? No, because (1) it is entirely possible that the genus itself will be the radical, and (2) if not, we have no idea what it will be. Neither, in the latter case, are the possibilities limited to the six differences and 40 species Wilkins determines to that genus; because *any of these potential radicals is open to an indeterminate range of inflection by particles, up to and including ligature in complex with other radicals, each and every one of which is also inflectionally open in this same way.* "Parent," to re-use that example, can become a person and/or male and/or metaphorical and/or a range of other things, limited, in the end, only by the intensional situation itself. We know that a radical has arrived at its final meaning only when we move on to the next synoptic complex of the discourse. And that is to say, again, that there are no parts to the units of real-character code; only wholes.

Finally, the real character is anti-dialogic. As a mode of utterance, it encodes and secures a very high degree of intentional control to the utterer. This is a consequence of the counter-orality (including synopticity and synchronicity) that we have just described. As a pure and synoptic writing, in which text is assembled via semantic complexes that are closed only by the commencement of the next complex, the real character can only ever support *completed* utterances. *Interruption* of a real-character utterance would not be a moment in its overall trajectory toward conclusion, but would simply constitute failure of the utterance. Discourse in the real character, that is to say, does not and cannot enter into a communicative space where multilateral and unpredictable inputs—interlocutors, conditions, nullifications, or what have you—have the possibility of contributing productively to the discourse. Rather, discourse in the real character assumes and requires a communicative space where contributions other than the utterer's (writer's) intention can only be modeled as interference with the latter. *Noise*, in other words. The surfaces on which the characters are written, the hands that bear them, the eyes that read them or mouths that translate them into language are no more than aspects of a channel through which the text must pass unchanged—if it is to pass unharmed. Of course, these more basic observations would be the same for any written correspondence. But what makes the character special is precisely that it is only *ever* written correspondence; and is, indeed, an extrapolation and elaboration, through advanced technical means, of what kind of correspondence *could be* only ever written—namely, the kind that is totally and artificially alienated from the organic life of orality, by way of fulfilling the scientific promise of the speculative epistemology. The members of the Wilkins circle who communicated in the real character did so across the country or across London, but it would have made no difference if they had been sitting across the room. As a medium, the real character is essentially, and by definition, a message. Into the latter, it fits all discourse.

Thus the answer to (3) above: the real character, as a scientific, communicative and cognitive sign system, is (a) quasi-cosmic; (b) counter-oral; and (c) anti-dialogic. It conforms, in all these respects, to the shapes of information (as we have described them). This does not mean that no other sign system could be made to respond to the same kind of analysis; neither does it mean that the real character is the same as MTCI. What it does mean is that there is a sufficient isomorphism between the phenomenology of the real character, and that of machine-level information,

to allow us to hypothesize that Wilkins's *Essay* may turn an interesting seventeenth-century face toward the twenty-first century infosphere.

Perhaps it may be objected, with some justice, that we stand here at the end of a circular procedure. The analysis of information *per se* with which this book began yielded a bespoke phenomenological reduction. The analysis of the real character with which this book is drawing toward a close turns out to resemble, lo and behold, the bespoke phenomenological reduction. To me, this is neat; to others, perhaps, too neat. Maybe the only way to find out whether the character really reflects the infosphere is to see what, if anything, it can teach us about the latter.

Notes

1. See Rhodri Lewis, "The Publication of John Wilkins's *Essay* (1668): Some Contextual Considerations," *Notes and Records of the Royal Society* 56 (2002): 133–46; 139.
2. See Lewis, *Language*, 160; Poole, *John Aubrey*, 54, 61; and Maat, *Philosophical*, 141.
3. See Poole, *John Aubrey*, 50–63; Lewis, *Language*, 163–64 and *passim*; Dawson, "The rebellion of language"; Maat, *Philosophical*, 135–42, 221–30, and *passim*; Knowlson, *Universal*, *passim;* Subbiondo (ed.), *John Wilkins*; and Salmon, *The Study of Language*.
4. See e.g. (there are very many other examples) Seth Ward, *A philosophicall essay towards an eviction of the being and attributes of God. Immortality of the souls of men. Truth and authority of Scripture together with an index of the heads of every particular part* (Oxford, 1652); Matthew Newcomen, *Irenicum; or, An essay towards a brotherly peace and union, between those of the congregational and presbyterian way; shewing out of the most learned and renowned divines of the congregational way, that their positions concerning 1. Church matters and members. 2. Church constitution and form. 3. Church state. 4. Church officers and ordination. 5. Church government and censures. 6. Church combinations and synods. 7. Communion with and separation from churches, are sufficient for the establishing a firme and lasting peace between them and the Presbyterians* (London, 1659); Anon., *A Table shewing the dominical letter, golden number, epact, Easter-day with all the rest of the moveable feasts for any year past, present, or to come, by inspection only: whereunto is added an essay toward the reform*

of the Julian calendar whereby the aequinoxes will insensibly be reduced, and for ever kept from anticipation, carefully corrected at the press by the author himself (London, 1665); Robert Plot, *The natural history of Oxford-shire, being an essay toward the natural history of England* (Oxford, 1677).

5. *Pace* Poole, *John Aubrey*, 54.
6. Wilkins, *Essay*, sig. a2^{v}.
7. Ibid., 297.
8. Beck, *The Universal Character*, sig. A7.
9. Wilkins, *Essay*, 20. Further page-references to the *Essay* will be provided parenthetically in the body of my text. N.B.: The *Essay* is available on Google Books. In what follows, I will be referring to Wilkins's great work in considerable detail. The nature of the *Essay* is that seeing the layout of its elements on the page is extremely helpful for understanding it. While I have provided images of Wilkins's most crucial pages (see Figs. 1 through 4), reproducing all the ones I want to talk about would not be practicable. Therefore, I strongly encourage the reader to open up the *Essay* via Google—infoskepticism, after all, needs all the help it can get—and follow along. Google's page numbers detach themselves, after a certain point, from the page numbers of the digitized book itself (due to pagination errors, and unnumbered page-inserts, in Wilkins). In these cases, I will give both the printed and the Google page number, in that order: eg: (150|152), that is, Wilkins number, Google number. Where the page numbers are the same, as in this case, I will give just one number.
10. See Lewis, *Language*, 106–107; Knowlson, *Universal*, 66–72; Paul Cornelius, *Languages in Seventeenth-and Early Eighteenth-Century Imaginary Voyages* (Geneva: Droz, 1965), 100–102; and Davis, *Universal Computer*, 1–16.
11. See Salmon, "'Philosophical' Grammar."
12. See Ong, *Ramus.*
13. See Rossi, *Logic.*
14. See Borges, "The Analytical Language of John Wilkins," *Other Inquisitions, 1937–1952*, trans. Ruth L.C. Simms (Austin: University of Texas Press, 1964), 101–105.
15. See Lewis, *Language*, 160–62.
16. See Lewis, *Language*, 88–90; Cram and Maat, *George Dalgarno*, 27–30; and Maat, *Philosophical*, 50–55.
17. Lewis, *Language*, 198–99.

18. *Pace* Lewis, *Language*, 163; and Maat, *Philosophical*, 169.
19. See Knowlson, *Universal*, 65.
20. See Knowlson, *Universal*, 78–96; Rossi, *Logic*, 176–93; Davis, *Universal Computer,* 16; and Maat, *Philosophical.*
21. See e.g. Maat, *Philosophical*, 158–60.
22. Ibid., 160–61.
23. Ibid., 180.
24. *Pace* Lewis, *Language*, 163; and Maat, *Philosophical*, 168.
25. Due to the proverbial symbolism of the gospel: "When the Son of man shall come in his glory, and all the holy angels with him, then shall he sit upon the throne of his glory: And before him shall be gathered all nations: and he shall separate them one from another, as a shepherd divideth *his* sheep from the goats; And he shall set the sheep on his right hand, but the goats on the left." Matt. 25:31–33 (KJV).
26. For Wilkins's influence on Roget, see Lewis, *Language*, 224.
27. Shakespeare, *As You Like It* ed. Juliet Dusinberre (London: Arden, 2006), 2.7.26–27.
28. Quoted in Knowlson, *Universal*, 66.
29. See Lewis, *Language*, 20–21.
30. See introduction, above.
31. Poole, *John Aubrey*, 57.
32. Ibid., 59.
33. See Lewis, *Language*, 188–93.
34. William Simpson, *Hydrologia chymica: or, The chymical anatomy of the Scarbrough, and other spaws in York-Shire. Wherein are interspersed, some animadversions upon Dr. Wittie's lately published treatise of the Scarbrough-spaw … Also, a vindication of chymical physick; where a probable way is propounded for the improvement of experimental philosophy; with a digression concerning an universal character* (London, 1669).
35. There is no entry for Simpson (not this one, anyway) in the *Dictionary of National Biography.*
36. Simpson, *Hydrologia*, sigs. A3^{v}-A4.
37. Ibid., Part II, 219.
38. Ibid., Part II, 221–22.
39. Ibid., II. 223.
40. Ibid., II. 224.
41. Ibid., II. 225

42. Ibid., II. 225–26.
43. Ibid., II. 230
44. Ibid., II. 236.
45. Ibid., II. 236–37.
46. Ibid., II. 238–39.
47. These remarks are based on first-hand consultation of 11 extant copies of the *Essay*, in addition to the Scolar's Press fascimile edition, and the Google Books and EEBO digitizations.
48. Columbia University Library, shelfmark B408.9 W65.
49. NYPL, shelfmark RAE+Wilkins, J., copy 1, 567924.
50. Columbia shelfmark Plimpton 400 1668 W65; F.
51. Among copies of the *Essay* I have consulted, those held at the General Theological Seminary in Manhattan, the New York Academy of Medicine, and University of Toronto are all missing the fold-out summary tables. The facsimile edition of the *Essay* produced by the Scolar Press in 1968, from a copy owned by the series editor (R.C. Alston), reproduces the fold-out tables from a separate, British Museum, copy. Presumably, Alston's own copy was missing the tables.
52. See the copy held at Union Theological Seminary in New York, and both copies at Columbia University.
53. Columbia University B408.9 W65.
54. See the online database "Hooke's books," a collaboration between Will Poole, Felicity Henderson, and Yelda Nasifoglu: http:||www.hookesbooks.com.

CHAPTER 6

The Circularity: Or, How to End the World

In 2016, information was becoming intelligence—finally. Humanoid robots, able to answer questions and recognize facial expressions, were an increasingly common achievement of advanced tech labs. Virtual reality, a "first steps" technology since the 1990s, was seriously bidding to transform gaming, cinema, and who knew what else. Self-driving cars were on the roads of California; they were only test models (by Google and others), and were experiencing some interesting problems, but the technology was still widely expected to come to market very soon. IBM's Watson, scion of the program that had soundly defeated "Jeopardy!" champions in 2011, was being marketed to businesses and professionals as a new kind of "cognitive assistant": able to (per their advertising) take data in all its forms, understand it, learn from it and reason through it. The film *Ex Machina—2001* for the millennial generation—caught the moment, depicting a reclusive robotics genius and his sentient, even sensitive, creation. To many people, it seemed only a matter of time before we reached the technological tipping-point that had long been popularized by the futurist Ray Kurzweil: when powerful analytic engines, interacting online, would suddenly become collectively self-aware and transcendently smart. The virtual brain would then either make us immortal through its bits; or reduce us to our own. The infosphere, in short, seemed to be approaching The Singularity.[1]

A significant step along the way had to do with translation of natural language. This was a leading edge of the broader technology of natural

J.D. Fleming, *The Mirror of Information in Early Modern England*,
DOI 10.1007/978-3-319-40301-4_6

language processing—no longer a graveyard of Artificial Intelligence (AI) ambition. Google and Microsoft had already for several years offered free and instant online translation between and among dozens of languages. At the same time, a number of companies, including Systran, WordLingo, and Wordbee, were offering fee-based translation softwares (presumably more powerful than the free products). Facebook, which used to *offer* translation, now just went ahead and did it automatically, unless you turned that feature off. (You could still turn it off.) Twitter, less boisterously, made you click an icon to obtain a tweet translation—and then asked if you wanted to improve it. And indeed, the results of online translation, the free versions, anyway, were still pretty iffy; sometimes very iffy. But couldn't you get some kind of a gist even from a very imperfect translation? And wasn't this better than no translation at all? It was of course assumed that this particular capability of the infosphere was still only on its first steps. Eventually, maybe even before the rise of the machines, we could hope for its fulfillment. Information itself—the universal machine language—would then make all discourse instantly available to any local understanding. The curse of Babel would be undone; universal machine translation would, effectively, make all languages one.

Thrilling promise? Or ridiculous hype? You know better than I. If you're reading these words, they're dated; maybe very dated. As we discussed in the Introduction, nobody can keep up, for more than a moment, with the expansion of the infosphere. That is the whole reason for trying to seek the shapes of information in its past, rather than its future. In this final chapter, I want to ask to what extent the real character, as envisioned in Wilkins's *Essay*, can offer us a critical perspective on the project of universal translation. This is a capability that the real character is supposed to support—for which, indeed, it is in part designed. In effect, the character is supposed to be able to function as a universal translation hub, turning freely at the center of the linguistic system precisely because it is not a "language" itself. This is the same kind of function, when it comes to the possibility of universal machine translation, that is claimed for the ons and offs of informational code, or Mathematical Theory of Communication Information (MTCI). I argued in the last chapter that Wilkins's real character is, to an interesting extent, phenomenologically (though not technically) congruent to the latter. In this final chapter, I'm going to argue that the universalizing promise of the character, as an information technology, involves some unpalatable trade-offs at the level of ontology. The *Essay towards a Real Character* offers to take us to a new world. But not neces-

sarily a world that we would want to live in—or would even recognize *as* the world. Are any there any implications for the analogous trade-offs of twenty-first century informational systems? This will be up to the reader to decide.

The Twinned Tower

To that end, we have to go back to the beginning. To Genesis, that is. The seventeenth century was the last time in history when learned investigators of the natural world—scientists, for lack of a better word—assumed and deployed the Bible as essential to their own work. Arguably, it was the first time, too. Prior to the mid-sixteenth century (as scholars of these issues are very well aware), the Christian scriptures were practically sequestered by the Roman Catholic Church. Only one edition, the Latin Vulgate, was approved; and translation into the vernacular (French, German, or what have you) was illegal. Meanwhile, established *interpretation* of the scriptures subordinated their apparent or literal meanings to penetration and clarification by figurative techniques. A given Bible story might be rich in worldly detail—historical, topographical, zoological, or what have you. But under the tradition of figurative exegesis, what mattered more were other-worldly meanings, spiritual or moral.

The Protestant Reformation changed this picture. Without wholly discarding traditional exegesis, the reformers established a new emphasis on widespread vernacular reading, and—as much as possible—literal interpretation of the Bible. One was now supposed to try to *learn*, from this vast and eclectic text, whatever God had seen fit to teach through it; rather than supposing its meanings to be managed by authority or understood in advance. Ultimately, a similar hermeneutics came to be adopted even by Counter-Reformation Catholicism.[2] By the seventeenth century, Biblical literacy was culturally ubiquitous across Europe (among people who could read) in a way, and to a degree, that was unprecedented. This was a Biblical *literalcy*. What one knew about, in knowing a given scripture, included and even depended upon its self-evident or primary worldly referents: animals, plants, peoples, places, topographies, forces, celestial bodies. In effect, the Bible became a foundational reference work for early-modern natural philosophy. Even for those in the period (such as Galileo) who wanted to reinterpret some of its relevant episodes, the sacred text was fundamental and indispensable to the articulation and defense of scientific argument.[3]

For period natural philosophy in general, no part of the Bible was more important than its first book. Genesis, in telling how the world came to be, also gave fundamental indications about what kind of world it thereby *was*. For the project of the real character, in particular, no part of Genesis was more important than its 11th chapter. The story of the Tower of Babel, in telling how human communication became dysfunctional, was surely crucial for any attempt to fix or reform it. In this strange, folkloric, and (for the seventeenth century) utterly familiar tale, the descendants of Noah (some generations after the flood) attempt to build "a city and a tower, whose top may reach unto heaven." A noticeably petulant God kibboshes the project, destroying the incomplete structure and dispersing the populace. The fable thereby sets a transcendent barrier between the divine will and human ambition, while explaining how different peoples came to be "scattered abroad upon the face of the whole earth" (Gen. 11:4).

But more important, for the real-character project, is the mechanism of this process, which is also its result. Before Babel, it is written, "the whole earth was of one language, and of one speech." This is the basis for God's distress, when he surveys "the city and the tower, which the children of men builded":

> And the LORD said, Behold, the people is one, and this they begin to do: and now nothing will be restrained from them, which they have imagined to do … Let us go down, and there confound their language, that they may not understand one another's speech … So the LORD scattered them abroad from thence upon the face of all the earth: and they left off to build the city. (Gen. 11:6–8)

God's linguistic tactic, in the closing of the episode, is then memorialized and underlined with regard to the location where he deployed it (probably an ancient mis-hearing of "Babylon"): "Therefore is the name of it called Babel; because the LORD did there confound the language of all the earth: and from thence did the LORD scatter them abroad upon the face of all the earth" (Gen. 11:9).

On the seventeenth-century "literalist" understanding of the Bible, this is more than just a story. It is a history. The events at Babel (or something very like them) really happened, very close to the beginning of the history of the world. While there is some disagreement in the period about exactly how to understand the Babel episode—notably whether the "confusion

of tongues" happened organically, or by miracle; and whether the original, pre-Babel language of Adam might persist somewhere on the earth—there is little dispute that it happened, and constituted a primordial and decisive event of human history, "certaine both from reason, and from Scripture Authority."[4] Indeed, it would not be overstating very much to say that seventeenth-century European culture was *fixated* on this event. The famous paintings and engravings of the tower by Breughel and others are only the tip of a representational iceberg.[5] Lewis suggests that the period's fascination with the looming tower expresses a general "anxiety about language," deriving from an (alleged) decline of Latin, as well as from the mercantile encounter with ever-newer and -stranger tongues.[6] It seems to me at least as plausible to suggest that things worked the other way around: that the Babel story, a focal point for the seventeenth century's intense and detailed interest in the Bible, produced and authorized linguistic anxiety.

The episode's placement in Genesis—immediately following the Flood and its aftermath (Gen. 6–10)—makes it the first significant event of any kind, in the world that is being re-created after having being wiped clean. Thus the stakes could scarcely be higher for the story's implications. Some are anthropological: here is why a tongue has always denoted a people, and no doubt always will. Others are political: the people of pre-Babel are able to mount their extraordinary project—for which God himself shows the respect of opposition—because they are unified, presumably under some kind of strong leadership. (Nimrod, named in the previous chapter as a "mighty one in the earth," his kingdom including Babel, was traditionally imported into the story of the Tower as the ruler who built it.) But above all, the implications of Genesis 11 were phenomenological. In the prolegomena to the *Essay*, Wilkins dwells on the linguistic aftermath of the confusion not just anthropologically, but also polemically: scripture helps him to make the argument for the necessity of the character. In any case, the period's many projects for linguistic reform are invariably tied back to Babel. The tower *stands for language* in the seventeenth-century consciousness. In particular, it stands for the nature of language in its relationship to difference.

This relationship is entirely, even transcendentally, negative. It is a *disaster* that human language now comes in multiple forms, all mutually unintelligible. "Forthwith a hideous gabble rises loud | Among the Builders," writes Milton, when he briefly retells the story of God's linguistic monkey-wrenching in the last book of *Paradise Lost*:

> each to other calls
> Not understood, till, hoarse and all in rage,
> As mocked they storm; great laughter was in Heaven,
> And looking down to see the hubbub strange
> And hear the din.[7]

Utterance, the very tool with which one reaches out to communicate, instead clatters to the ground, making communication impossible. The divine laughter, a Miltonic tweak of the Genesis account, serves as a sounding board for this all-too-familiar human frustration. But mere inability to make oneself understood is only the start of the problem. Linguistic diversity, as the seventeenth century was keenly aware, impedes trade, frustrates science, and fosters war. Even the religion of the Bible itself is spread across a continent of innumerable tongues—and now even more, due to exploration and colonialism, from the New World to the Far East—suffering a continual dialectic of conflict and schism as a result.

Wilkins, when he surveys the linguistic landscape, sees a veritable wilderness of ever-more shifting forms. "The most received conjecture," he writes, is that the languages spoken immediately after Babel numbered no more than 72, "according to the several Families from *Noah*" (which are genealogically listed at Genesis 10). But this total, he goes on, had already expanded exponentially by classical times. The ancient historians Pliny and Strabo

> do both make mention of a great Mart-Town in *Colchos* named *Dioscuria*, to which men of three hundred Nations, and of so many several Languages, were wont to resort for Trading. Which, considering the narrow compass of Traffick before the invention of the magnetic Needle, must needs be but a small proportion, in comparison to those many of the remoter and unknown parts of the world. (3)

And indeed, the widening apertures of trade and technology have brought to light a simply staggering diversity of tongues. "Some of the *American* Histories relate," Wilkins writes,

> that in every fourscore miles of that vast Country, and almost in every particular valley of *Peru*, the Inhabitants have a distinct Language. And one who for several years travelled the Northern parts of *America* about *Florida*, and could speak six several Languages of those people, doth affirm, that he found, upon his enquiry and converse with them, more than a thousand different Languages amongst them. (3)

Neither does one have to travel far to encounter such mega-polyglossia. Dialects, Wilkins notes, are mentioned extensively in scripture, and are also a prominent feature of the English linguistic scene. If not quite mutually unintelligible, they are certainly headed that way, through "the various changes and corruptions" to which human speech is prone (2). "Every *change*," Wilkins notes grimly, "is a *gradual corruption*" (8). Wilkins goes on to review the historical transformations by which earlier forms of English themselves seem like foreign tongues. Even a single language, even *one's own* language, has a built-in and apparently unstoppable tendency toward multiplicity. The blast-wave of Babel, in this almost despairing vision, continually expands both extensively and intensively.

What made Genesis 11 especially painful, from the seventeenth-century point of view, was that the phenomenon of language had already been a significant theme of Genesis 1–2. In the beginning, as the Gospel of John says, was the word: "and the word was with God, and the word was God" (1:1). John is of course insisting on the coeternal unity of Father and Son, but he is also reminding us that God *speaks* the world into being, at the beginning of the Christian story. Creative utterances of this kind are what speech-act theorists call performative: that is, they bring about the states of affairs they designate. When God says "let there be light," there is light, and so on. At the same time, however, the God of Genesis 1 repeatedly pauses to engage in merely nomenclative utterance: giving names ("day," "night," and so on) to the things he has created. And he seems to use the same kind of intensional tokens—words—for both kinds of speech. In Genesis 2, God brings the animals to the newly-created Adam, "to see what he would call them: And whatsoever Adam called every living creature, that was the name thereof" (Gen. 2:19). Adam's nomenclative utterances, apparently, work much like his creator's. Meanwhile, the latter converses, easily and transparently, with both Adam and Eve, up until their fall and expulsion from Paradise (Gen. 3). Thus humanity, according to scripture, originally shared a language *that they shared with God*, and that connected them meaningfully and even essentially to Creation. Between Genesis 3 and 11, these issues are precisely *not* discussed. By implication, the language of Paradise survived both the Fall and (through Noah) the Flood. Babel, therefore, destroyed a communicative unity that was primordial, and contained a sacred power.

And yet, in the empty box of the Adamic language, there remained a kind of hope. For some in the early-modern period, such as the anti-academic John Webster (discussed in the fourth chapter of this book), loss

of the language of Adam did not necessarily entail its destruction. Perhaps, among the clouds of languages that had spread out from the shattered tower, the primordial tongue had actually been one. Perhaps it was still spoken, somewhere, at least in some form—Chinese, maybe, or Hebrew, or Algonquin. Perhaps it could be found, and/or reconstructed; with the possibility of regaining Adam's ability, suggested in Genesis 2, to understand the essential or *real* names of things.[8] These ideas are popular, even tantalizing in the period, but they are also quite mystical. As such (and as Lewis has rightly emphasized), they are remote from the real-character project in its rational Baconian version. Wilkins and his peers are not trying to re-attain the language of Paradise; for that matter, and as we have discussed, they are not basically trying to attain a *language*, as such, at all. What they are trying to do, nonetheless, is to regain a *phenomenological* unity that the Babel story presents as normative for human communication. Linguistic diversity, resulting from the curse of an angry God, was by that token *not the way things were supposed to be*. If not, then the project for a universal character was actually running with the phenomenological grain.

Unsurprisingly, the Babel story is therefore ubiquitous in the theoretical commentary of Baconian character-planners (to say nothing of their Comenian, Boehmenist and/or Neoplatonic counterparts). They explicitly, even if hyperbolically, present their projects as having the real potential to reverse the curse of Genesis 11. For Webster, academic attention to the universal character "would have been a potent means (in some measure) to have repaired the ruines of *Babell*, and have been almost a *Catholick* Cure for the confusion of tongues."[9] Dalgarno, in his *New Discovery*, proclaims "releife of the confusion of languages," from which "it is scarce conceivable what advantages should redound to the generality of mankind."[10] "Let each one contribute material from his own stock for the reparation of Babel," he says in the later *Art of Signs*: "Indeed, a foundation large and reliable enough has been laid."[11] In one of the dedicatory poems to Cave Beck's *Universal Character*, the author marvels that Beck should "make our hands officious to help out | Of tongues confusion, made at *Babels* rout."[12] In another, Beck's book is "Tongues in Brief; | *Babel* revers'd; The traveller's Relief."[13] In Francis Godwin's *Voyage to the Moon* (1638), a science fiction thought experiment that had an enormous influence on Wilkins and others, the protagonist Domingo Gonzales commences his lunar journey (hoisted by giant birds called gansas) from the island of Tenerife. An engraving shows the island's famous

black mountain—which, in this treatment, looks quite a bit like period representations of the Babelonian Tower.[14]

Wilkins is no exception to the rule of Genesis 11. "He that knows how to estimate," he writes in the *Essay*, "that judgment inflicted on Mankind in the Curse of the Confusion, with all the unhappy consequences of it, may thereby judge, what great advantage and benefit there will be, in a remedy against it." As he does later with respect to Genesis 6–9, Wilkins uses Genesis 11 to draw a strong distinction between what is, and is not, properly natural-philosophical or scientific thinking. The Bible, on Wilkins's very characteristically seventeenth-century view, is the very standard of what real knowledge *is*. Pagans, he writes, will try to tell you that the phenomenon of human language arose organically or spontaneously. But "to us, who have the revelation of Scripture … 'tis evident enough that the first Language was *con-created* with our first Parents, they immediately understanding the voice of God speaking to them in the Garden. And how Languages came to be *multiplyed*, is likewise manifested in the Story of the *Confusion of Babel*" (2). Here we have both the despair, and the hope, of human communication, predicated on the Genesis stories, which hide the latter within the former. The matrix of human intensional communication "was but *one* at first, but hath since beene confounded into severall kinds."[15] Far from being a proper function of the world as God created it, linguistic multiplicity is an ontological distortion. Being itself, therefore, really ought to support and empower a concerted attempt to reduce the dysfunctional many in this area into the normative one.

And yet language—in the narrow, seventeenth-century sense—cannot be the way out of language. Rather, the linguistic multiplicity and instability that Wilkins reviews in the first part of the *Essay* all point the way to the real character. Even though God's curse at Babel renders all spoken language protean; and even though, as Wilkins notes, the oral curse is mirrored and continued in "the *variety* of *Letters*"; despite all that, the primordial universality of human intension remains intact at the cognitive level. This, as we have discussed, is the whole point and promise of the speculative epistemology. People the world over, just by benefit of being people, "agree in the same Principle of Reason." And "so do they likewise agree in the same Internal Notion or Apprehension of *things*" (13|20). God did not, according to this standard seventeenth-century Baconian position, condemn us at Babel to *think or perceive differently* thereafter. Quite the contrary: down at that level, the level of apperception and intension, the Tower remained intact. And while letters *reflected* the oral curse,

this could not attach to letters that were based on no orality at all. This is the very basis for the project of the real character, and for thinking it can provide a way toward international, indeed universal, communication. It will function *like* the universal language that no language is—but that all language once was. "If men should generally consent upon the same way or manner of Expression, as they do agree in the same Notion, we should then be free from that Curse in the Confusion of Tongues, with all the unhappy consequence of it" (20).

We have noted repeatedly that the expansive, almost inescapable modern and postmodern phenomenology of language is very different from the seventeenth-century baseline conception of an ordinary orality. But what, in the last analysis, is the expansive phenomenology in this area? It is that whatever seems *not* to be language turns out to *be* language. It is non-identity yielding to a larger identity. This is exactly what happens in and through the real-character project of the seventeenth century. As we discussed in the third chapter, we are looking here at a legacy of technological intervention reaching back to the shorthand movement, with its roots in the late sixteenth century. Characters, in the first place, are not language—that is, not orality. Yet precisely because they do the kind of work that oral language does, capturing and mimicking its intensional and discursive effects, characters start to seem, after all, like language. The result of their being folded back into the category from which they were distinguished results in a new conception of the latter. The real-character project, tying the shifting and changing linguistic project obsessively back to Babel, suggests its further transformation and augmentation. Thus there is no contradiction—and this is the point—in talking about the real character project in terms of the legacy of the Biblical obsession with linguistic universality. A character is, indeed, not a language. But this not-a-language is precisely the origin and shape of the idea of a phenomenological category reaching over and beyond all languages, projecting a unified field to which they all supposedly belong, and yet from which they all supposedly, ineluctably, fall away. The character is the vision of this universal intensional field.

One Code to Rule Them

Now, Genesis 11 has traditionally informed discourses of natural language processing, machine learning, and machine translation, within computer science. Warren Weaver, surveying this area of the growing field in 1955,

thought it perfectly natural to speak of "The New Tower," and to tie the relevant issues explicitly back to scripture.[16] The "tower of Babel problem," meanwhile, has traditionally designated the desire of computer programmers for "a common reference ontology—a shared taxonomy of entities."[17] If this could be provided, "each group of data analysts would need to perform the task of making its terms and concepts compatible with those of other such groups only once—by calibrating its results in the terms of the single canonical backbone language." Neither does the vision stop there:

> If all databases were calibrated in terms of just one common ontology … then the prospect would arise … [of creating] in more or less automatic fashion, a single integrated knowledge base of a scale hitherto unimagined, thus fulfilling an ancient philosophical dream of a Great Encyclopedia comprehending all knowledge within a single system.[18]

This, of course, is the very ontological impulse to which Wilkins is responding in drawing up his Philosophical Tables. It is, perhaps, the very core of the impulse underlying the kind of informational collection and arrangement we now call a database, which has always had universality as its implicit or explicit telos. The difference—happy or not—is that the twenty-first-century infosphere is better-placed to fulfill the vision than was its seventeenth-century analog, or any of the latter's predecessors.

In the marketing claims of online translation systems today, one finds little reference to Genesis 11. (A lamented exception, via Douglas Adams, is Yahoo's now discontinued Babel Fish translator—swallowed by Microsoft.) What one does find, nonetheless, is a powerful and totally unexamined set of assumptions about the fundamental nature of human communication; assumptions that are completely resonant with the work of the seventeenth-century character-planners, as well as with their Biblical heritage. If we are to specify these assumptions, we can say that for Google, as for Wilkins, as for Bacon, as for scripture, human communication—the *very idea* of communication—is fundamentally, primordially, and essentially singular. This is why Mathematical Theory of Communication Information (MTCI), constitutes the supreme intervention of science and mathematics into human discourses, claiming and deploying a capacity to rule over and unify all. Linguistic diversity, from this point of view, is a little more than a mistake. It is ontologically non-normative: no part of what the intensional field naturally is or has to be. And it is informationally negative: adding

nothing to, but subtracting much from, the effective transmission of messages. The multiplicity of languages is just a bunch of noise. Nothing could be more continuous with the seventeenth-century view of the matter.

Now, the masters of the infosphere do not propose that we should displace our languages with the transparency of code. What they do propose, however, is that code can provide the technical basis for managing and equating all languages, providing a kind of secondary universality: every language, eventually, translating to every other, automatically and more or less accurately. MTCI, in this vision, fulfills the same kind of universalizing function that the real character does for Wilkins. In a memorandum of 1949, just before there *was* any such thing as "information" in the technical sense, Weaver offered the following vision for a translational matrix between natural languages. "Think," he writes, "of individuals living in a series of tall closed towers, all erected over a common foundation":

> When they try to communicate with one another, they shout back and forth, each from his own closed tower. It is difficult to make the sound penetrate even the nearest towers, and communication goes very poorly indeed. But, when an individual goes down his tower, he find himself in a great open basement, common to all the towers. Here he establishes easy and useful communication with the persons who have also descended from their towers.[19]

Weaver actually has in mind some kind of deep grammar or structural linguistics, "the real but as yet undiscovered universal language." But he and Claude Shannon, who originally proclaimed MTCI in the same year as Weaver's memorandum, provided another way of theorizing "the common base of human communication." Machine translation (MT) very soon became an advanced and exciting goal of the new information theory and technology.[20]

Admittedly, the goal proved tantalizing. Beginning in the 1950s, machine translation projects sucked up billions of dollars in research funding, with relatively little to show for themselves. In the early twenty-first century, however, the technology has made some significant advances, through a combination of new tools, new money, and new techniques. The new tools are the collocations and unifications of the internet and its associated networks—what we are now calling, in the aggregate, the infosphere. The new money is of course the vast, almost incalculable wealth of the great internet hegemons: Google, Apple, Microsoft, and friends.

The new techniques, finally, are the *statistical* methods of machine translation.[21] Unlike old-fashioned "symbolic" MT, which tried to teach computers the meaning and syntax of human languages, statistical methods simply ask the machines to *notice* what words occur together, and in what ways, when one human language (such as English) gets translated into another (such as French). (*Mutatis mutandis*, and per Dreyfus's critique of 2001, computers still work a lot better on syntax than on semantics.) A statistical system, in this way, is epiphenomenal on the vastness of the internet itself: so much text is online, generated by humans, that lots of it consists of human-generated translations. The system scans these corpora in order to build up models of word- and phrase-pair probabilities between specific languages, which it can then deploy in its own translations between those same languages.

So, for example, consider the following two extremely similar English sentences:

1. The kid eats free.
2. The free kid eats.

Translation of the first sentence into correct and idiomatic French will probably not include the word *libre*. But translation of the second sentence probably will. By processing enough such examples, the system can recursively acquire a significant capacity to disambiguate between correct and incorrect translations. It can then deploy this capacity to carry out analogous translations itself, between the languages on which it has trained. Repeat the process for every natural language, in translation with every other, and the result should be universal machine translation (UMT). To be sure, it will be a long march. But another way of saying that is that it is just a matter of marching. Computers, in general, like that sort of thing.

One can remain skeptical about the UMT scenario. For starters, one can note that the accuracy of existing MT still leaves much to be desired. Where MT systems do better—as in the "travel conversation only" app supported during the 2012 London Olympics by the international consortium U-STAR—they achieve this by excluding in advance those translation tasks that they are unable to perform. This is rather like a chef who promises satisfaction as long as you only want to eat breakfast. Furthermore, even if an MT system were to achieve close to 100 % accuracy, the statistical method builds in its own regressive impoverishment. For the system trains on human-translated corpora of natural languages at

a certain stage of their development. But all stages, in the lives of natural languages, are temporary. As its target languages develop further, the MT system will inevitably become less and less accurate. It can be retrained, on ever-newer corpora. *But the system itself will increasingly have contributed to the corpora that are available online for its own retraining.* Microsoft, we are told, has deployed special algorithms just to allow its proprietary MT system to recognize and avoid its own previous translations. We are not told whether the Microsoft system can recognize or avoid the work of other proprietary MT systems.

Microsoft's response to the problem of retranslation—writing another algorithm, to reduce the gap that has been identified in its pre-existing system of algorithms—is a typical fallacy of MT projects. We might call it the fallacy of the asymptote: the idea that getting ever-closer to solving a given translation problem is almost as good as solving it. But of course, this entirely depends on the nature of the given translation problem. Other familiar fallacies can readily be identified in machine translation discourse. There is a fallacy of adequacy: the idea that a mediocre or partial translation is significantly better than none. This, clearly, depends on what is being translated. There is a fallacy of form: the idea that the stylistic and rhetorical touches of natural language (e.g., metaphor) that are so difficult for MT are not really all that important to the substance of what is being translated. This, to say the least, begs the question. There is a fallacy of scope: the idea that pruning the copiousness of natural language (for example, by deleting exotic characters from Chinese) has a negligible impact on the translations that result. But one simply cannot know this in advance. Finally, there is a fallacy of the microcosm: the idea that MT results obtained within specialized or technical discourses (e.g., "travel conversation,") are just the "first step" toward achieving the same results for the whole of natural language. But this is a fallacy with which we are already very familiar.

All that being said, it would be foolish to assume that UMT will not one day be something we encounter and accept. And this for two reasons. First, it is extremely characteristic of new technologies that they produce the terms of their own success. Horse-riding, for example, would have failed as a technology without the various techniques of equestrian husbandry (catching, coralling, feeding, and so on). But the techniques were only there because of horse-riding. The automobile, centuries later, would have been a technological failure without the various networks of travel infrastructure (highways, service stations, traffic lights, and so on). But

the networks were only there because of the automobile. The shape of technological adoption is a circle, more than a line. In that respect, at least one decisive factor in the success of any new technology must be the extra-technological forces that are determined to inscribe its worldly recursion.

That brings us to the second reason to suppose that universal machine translation may one day become a technology we recognize. The forces of money and power that are behind UMT are simply unprecedented. We are not talking here only about the multi-trillion-dollar valuations of companies like Apple and Google and Microsoft. We are also talking about the massive, profound, and almost universal dependence of twenty-first-century governments and economies and cultures on information technology—*a fortiori*, on the theory that underwrites it. Information, in the technical, computing-science sense, has become the governing logic of the postmodern period. There is, accordingly, massive interest in the success of any new piece of information technology—let alone such a decisive and, so to speak, final piece as UMT. Thus even if UMT does *not* actually conquer its various technical and philosophical obstacles, it may still attain a position where it can declare victory. And there may be very few people left who are able to say, or believe, that it has not actually won.

Let us consider, therefore, what the consequences for the world of natural languages would be, if that world came to incorporate universal machine translation. First and foremost, we can note what the consequences would *not* be. UMT would not mean the end of discrete natural languages, or of the cognitive diversity that they are sometimes said to foster (as in the Sapir-Whorf hypothesis). Quite the contrary: universal bridging between the different natural languages would make it easy to move between them, while leaving the languages discrete. All one would need to do, in order to recover the cognitive topography of a given language, would be to turn off, temporarily, UMT. It is interesting to note, in this respect, that the discourse of machine translation tends to include and recognize a concept of *untranslatability*: a margin or portion of a given natural language that simply cannot be brought over into another. This is consistent with a view of natural languages as demarcating *conceptual schemes* (Donald Davidson's phrase): ways of thought that are beyond ratiocination.[22] Only the UMT system itself, with information as its universal and neutral code, is placed above this sharply variegated cognitive landscape. The borders of natural languages would remain untouched, and might even be reified, by the technological feat of moving over and between them.

Neither would UMT reduce or eliminate the *moral* value that is often associated with linguistic diversity. Quite the contrary, eliminating diversity as a communicative issue would actually allow a full technological management of its moral delicacy. As a matter of fact, an ancillary motif of the encounter between advanced information technology and natural language is digitization of the latter in its lived, and dying, complexity. This is the goal of Google's Endangered Languages Project, for example: to preserve minority languages, even after their speakers die out. Of course, the artificial preservation of dying languages is itself a complete falsification of the life of language in the world. A thousand years ago there was no English, for example, and in the normal course of things there would one day be no English anymore. Informational preservation is about as true to the life of languages as a zoo is to the life of an ecosystem. Nonetheless, UMT, precisely by incorporating the full panoply of linguistic diversity, would have the power to preserve each of its portions. Thus UMT is no more a moral threat than it is a cognitive one.

But at a more profound level—what I would call a hermeneutic level—the effect of UMT could indeed be quite troubling. Lost through UMT would be the fundamental consciousness of dialogue as an encounter with the other *as other*. To speak a natural language, as it has always been, is to move within a world where one is at home; or, perhaps one should say, to experience the world *as* one's home. What makes this such a significant experience is that at the borders of one's language, where one encounters the other, one also, and thereby, experiences the world as *not* one's home. Yet the foreign language that one encounters, and which one recognizes as not one's own, is nonetheless, and by that very token, a language. The problem is not that the other language is outside of being-at-home; the problem, rather, is that the other language is *a being-at-home that one is outside of*. Thus what one gathers from the hermeneutic encounter with an unknown language—a dialogue in which *one does not know how to be*—is a consciousness of the *essential* multiplicity of language-worlds.

But this is a thought, in the legacy of Babel, that it is difficult to think. Indeed, the point in this section is not just to connect a leading horizon of the infosphere back to a Biblical heritage, or to one including the seventeenth-century real-character movement. The point, rather, is that the contemporary infosphere, and thus the culture that it dominates, is working with a concept—language—that has been shaped *in a certain way*. Language, emerging out of the seventeenth century as the matrix of philosophy, thereby also emerges in the shadow of the Tower. It projects

a normative unity from which it is always falling off. The idea of information, the dominant technological idea of our time, is nothing other than the idea of reifying this unity. When the eye of the internet looks out over the linguistic landscape, it sees what Wilkins saw: a wholly unnecessary and entirely problematic dialectical complexity. The job of technoscience, now as then, is clear: it is to exalt those valleys, and make those mountains low. There is no good reason, according to this early-modern and yet still modern view, for human discourse to come in multiple forms, rather than in one.

Welt | *Umwelt*

But on that ruling, it may be necessary to request—however belatedly—a phenomenological voirdire. What if the matrices of human communication, in fact, *have to be* multiple? What if it is precisely *diversity* that determines whether or not there is such a thing as a "language," understood as the central or leading form of such matrices? Perhaps many arguments can be made to this effect. I will present one, which has I think received less attention than it deserves, from the difficult third part of Hans-Georg Gadamer's *Truth and Method*.[23]

Gadamer begins with a distinction between *Welt* (world) and *Umwelt*. The latter is usually translated "environment," but I think "surroundings" is probably better in this case. "Surroundings," for Gadamer, is the world, in its primary or naïve presentation to human freedom. "The world," however, is what humans attain through a free encounter with surroundings—and only in this way can the world, as such, be attained. "Having a world," Gadamer writes, means "comporting oneself" toward surroundings. That means comporting oneself in one way or another; and that means, further, "some capacity for distance from what one encounters."[24] In "rising above" our surroundings—in having the capacity for delay or negation or alteration, vis-à-vis the "rush" (*Andrang*) of worldly data[25]—a human creature rises *into* the world: "not a forsaking of what surrounds him," Gadamer says, "but an alternative positioning toward it: a free and distanced comportment" ("*ein freies, distanziertes Verhalten*").[26] Having the world, in short, means having a *world view*. And having a *world view* is just what it is to have the world.

World view entails world views. This is not only because world-viewers (people) are plural, but also because a *view as such is necessarily one of a number of possible views*. To have the capacity for free and distanced

comportment toward our surroundings—to have a world view—is precisely *not* to have any possible rule for this comportment (other than the rule of no rule). It is precisely *not* knowing which way we are to find; but rather, always having to find our way around, among illimitable ways. Under such conditions, there can be no such thing as a universal or singular way that we do, or are supposed to, find. Rather, the very idea of our having to find our way around is the idea of generating multiple and illimitable possible responses to what we encounter, conceived as a milieu within which our freedom is both empowered and endangered. And so it is for world views, understood as our underdetermined and necessarily variant rising into the world. Only if there are multiple possible ways for us to find can there be such a thing as our finding our way around. Only if there are multiple possible world views can there be *such a thing as* a world view—a having of the world, from amongst all the ways it *can* be had—at all.

Now, language, for Gadamer, embodies world view. "Language," Gadamer writes, "maintains no independent existence over and against the world that comes into it."[27] Rather, the world is world "just insofar as it comes into language"; and "language has its own actual existence just insofar as the world presents itself in it."[28] Precisely by holding fast to the insight that language gives us our only access to the world, we see that the world is exactly, and entirely, what we thereby access. Language is the phenomenological form of our free and distanced comportment to our surroundings—our having a world view. But world views, we have said, are ineluctably multiple. Therefore, language, too, is ineluctably multiple. It is a modification of Davidson: There is no such thing as a language—absent, or prior to, or devoid of, multiplicity.

Indeed, Gadamer goes on to argue that the very idea of a language without multiplicity would yield multiplicity, willy-nilly. He makes this argument precisely by inverting the traditional reading of Genesis 11. "When myth speaks of an ur-language," he writes,

> and of the beginning of linguistic confusion … the mythic account stands things on their head. The truth is that man, because he is always-already capable of raising himself above every chance surrounding, and because his speaking brings the world into language, is made free, from the very first, for variety in exercising his linguistic capacity.[29]

Gadamer drives his analysis all the way back to the Biblical presupposition of the Babel story: the Paradisal scene of Genesis, where language,

presumably, was one. The language of Adam is held to give *correct* names to things. This tradition, whether understood as implying "natural" (that is, essential), or arbitrary Adamic names, also of course informs the various seventeenth-century schemes to rationalize communication. But as Gadamer points out, it in no way implies a linguistic *a priori* beyond or before dialectical flux. For precisely by attaining objective unity with some aspect of the world, the Adamic *word*, clearly, would become part of what Gadamer calls surroundings. It would precisely become part of what we can be free and distanced from. At that point, the vector of linguistic multiplicity would simply recommence. The very success of the object-language would be the failure of the object-language. "Freedom from surroundings," Gadamer writes, "is also freedom vis-à-vis the names we give things … This is the [phenomenological] ground for the historical multiplicity with which human speech relates to the one world."[30]

Gadamer gives us no grounds to suppose that the project of overcoming communicative diversity—whether in the seventeenth century, or the twenty-first—is *a priori* impossible. Rather, he gives us grounds for understanding *what kind of project overcoming communicative diversity actually is.* Without multiplicity, Gadamer has argued, there can be no language (the essential form of communication). Nor any world view; for that is what a language provides. But it is only in world view, achieved through "free and distanced comportment to our surroundings," that we have the world. Take away linguistic multiplicity, and you take away world view. Take away world view, and you take away the world. Whether in the early-modern or post-modern contexts, reversing the curse of Babel is usually presented as a technical project for the correction or augmentation of human experience. But if Gadamer is right, it is actually an *ontological* project for the restriction or deletion of human experience. Uni-language, if it could ever actually delete (or seem to delete) the essential multiplicity from our encounter with our surroundings, would thereby delete the kind of encounter through which we can rise out of them. And so, presumably, we would not. Universal language would restrict us to *Umwelt.* In that sense, it would be the end of the world.

The Universal *Essay*: Three More Fallacies

And what might that look like? *How*, if at all, can we understand the idea of ending the world? One of the remarkable things about the current technological moment is that it actually seems to indicate the beginnings of an answer to that lurid phenomenological question. Wearables, we are today

being urged, will tell us if it starts to rain; or if we are running; or if we are unwell. Apps and bots may allow us to get on the bus, or order coffee, or put on a matching outfit. Our musical and other tastes will be satisfied in advance by algorithms that know them better than we do. And so on. We are creating a global matrix, it seems, for the free and distanced comportment of computers. But they, of course, have no such need, or capability. Meanwhile, we are proposing this digital *Umwelt* to be our own promised land. One glimpses, here, how to understand restriction to surroundings, in contradistinction to world.

But one would like to get beyond glimpsing. For that, let us turn back to Wilkins's *Essay*. The technology of the real character, as we have been discussing, is an attempt to re-universalize human communication in the legacy of Babel. Much like the machine-code of MTCI, the real character would function as the speculative sign-system that is reached beyond and below the level of all languages, but fulfilling and universalizing ostensibly linguistic functions from exactly that position. If the hypothesis of the current chapter (and book) is correct, such a technology is likely to be envisioned through a degrading of ontology—that is, of the *world* that the device supposedly makes available. We therefore ought to be able to identify phenomenological dysfunctions, along the lines of Dreyfus/Bar-Hillel's "first step," in the projected technology's conditions of possibility. As with the above critique of UMT, this will *not* yield claims that the technology of the real character could never have been widely adopted. Quite the contrary, it will yield claims about what such adoption would, and perhaps could, have been like. Historical distance, and the closure (long since) of the real-character project, ought to allow these findings to emerge quite clearly. Insofar as they may bear analogy to discourses of the contemporary infosphere, we may then claim to have identified some historical grounds—defined, if restricted—for genuinely critical perspective on the latter.

Fallacy of the Path

Wilkins is quite frank, as we have discussed, about the imperfections of the "received" theory (the quasi-Scholastic ontology) that he uses for his Philosophical Tables. I have argued in earlier chapters that he probably doesn't care all that much about this issue: what matters, for the purposes of the *Essay*, is just getting to a system that will allow speculative (objective, real, para-linguistic) reference. This is supposed to be such a win, for

scientific discourse, that the ontology of the referents can actually be left as an open question. The real character itself should help to answer it, just by being used; and this should allow, in turn, recursive improvement—upgrading—of the character.

One thing is for sure: from the unfair perspective of 350 years, it is clear that the Philosophical Tables need a lot of upgrading. Thunder, for example, Wilkins classes as a species of fire: "the hottest and lightest" of the four ancient Aristotelian elements (57). Earthquake is caused by subterranean wind—another ancient theory, which seventeenth-century Englishmen had had little occasion to revise (58). Honey and wax are both, like the Biblical manna, kinds of dew (54). Whales and porpoises are both classed as fish (132|134). The vulture is not a carrion-eater, but just an eagle with an odd beak (144|146). Under the fourth difference of the genus "Beasts," "rapacious beasts of the cat kind," the first species is the lion. Which is fair enough; but its species-pair is the *bear*—reminding us, I guess, that most Western Europeans of the seventeenth century had had little experience of either (159|161).

Wilkins's biological and medical tables, perhaps unsurprisingly, are a rich source of such eyebrow-raisings. Gangrene is caused by "defect of animal spirits" (220|228). Scurvy, by "sour and secculent humors: or noxious vapors," dispersed into the body from the spleen. Its species-pair is "hypochondriacal vapours" (224|232). The 20th genus of the General Scheme consists of the parts, general, of animate substantive distributed creatures: "General Parts," for short. The first difference of the genus is "contained homogeneous parts": "such kind of fluid Bodies as are distinguishable by their various Consistencies and Uses, and not by any difference of Shape or Figure; because, being liquid, they have no Shape of their own." Species of this difference include milk, sperm, phlegm, blood—the last covering two entirely distinct kinds, crimson and sanguine—and the species-pair "BRAIN, MARROW." This is a "more consistent" liquidity: either "in the Head, the organ of the inward Senses: or in the Cavity of the Bones, for the moistning of them" (175|179). So, on the science of the Tables, brain and marrow need to be considered closely together. Both are semi-liquid, semi-granular, physiological squishinesses. The brain surgeon and the butcher will have much to teach each other.

As I have argued, Wilkins does not need to be very committed to the quasi-Scholastic arrangement of his Philosophical Tables. He does, however, need to be pretty committed to their contents. After all, the whole usefulness of the real character (and here the same point would hold for

the philosophical language) is supposed to be that it enables direct denotation of mental notions. The latter are not expected to reflect things in their underlying truths, but are expected to reflect them in their evidentiary appearances. Thus the Philosophical Tables, as an inventory of the latter, need to be accurate and (as far as possible) comprehensive. We know that Wilkins sought expert collaboration to help him complete the Tables, and in many places it shows: under the genus "Military Relation," for example, we will be able in the real character to denote everything from "bow" to "buckler," "sconce" to "pallisado" (278–89|286–87). Under "Naval Relation," we will be able to distinguish (among other things) "forecastle" from "round-house," "robins" from "sheats" (281–82|289–90). Minerals (as we have mentioned previously) are classed by Wilkins as a sub-category of vegetables—even though, as he notes, "they are not commonly owned and reckoned under this Rank," that is, under the Scholastic theory:

> Yet several learned men have heretofore reduced them hither … because when Mines have seemed to be totally exhausted of them, yet there hath remained behind some kind of Seminal or Spermatic parts, whereby they have in process of time been renewed again, and continued to propagate their kinds. (54)

Wilkins is drawing here on the intense early-modern interest in mining and metallurgy, from which he clearly conceives himself to be presenting cutting-edge findings. Accordingly, the real characters (and philosophical words) for minerals, tokens of advanced period science, will be related to those for plants.

Now, one does not need to know much earth science to know that that is wrong. Neither does one need to be a brain surgeon to know that he does not work on marrow; or a marine biologist to know that whales are not fish. I hasten to add, very loudly, that these observations are no knock against Wilkins. Nobody would expect him to do anything *other* than give a best possible account, on the basis of then-current science, of the things that we seem to find around us in the world. But the interesting issue here is that the *Essay* is supposed to be a system for *improving* knowledge. The Philosophical Tables express the contents of a mid-seventeenth-century science, and the real character is a system (the philosophical language being another) for discourse about those contents. Yet use of the character itself is supposed to allow and enable progress in the very science on

which the character is based. The model is recursive—outputs becoming inputs—with the expectation that running it repeatedly will ratchet significantly upwards, in terms of the whole system's scientific productivity. Eventually, perhaps, the character will become a system for attaining the kind of radically comprehensive and essential science that is necessarily unavailable to Wilkins as he begins his work. And all that is pretty clear. Yet totally unclear is: how?

Imagine, for example, that we are researchers in a world where Wilkins's system has become the basis for inquiry. Accordingly, when we discourse about minerals, for example, we understand ourselves (and others understand us) to be talking about imperfect vegetables. At some point, through the very increase in our knowledge that use of the character has fostered, it becomes evident to us that minerals are *not*, in fact, imperfect vegetables. A moment of this kind, presumably, is archetypal for scientific progress. In a language, such as English, it is pretty easy to formulate a productive statement of the crisis: "Minerals are not imperfect vegetables." Such a statement, which Kant called synthetic, clearly does not resolve anything, but what it does do is lay out clearly what calls for resolution. In the real character, by contrast, and in the philosophical language, the very denotation "minerals" is supposed to *entail* the natural-historical position that is in question. It is not *quite* a definition; that would be more the end of the system than its beginning. Nonetheless, if we have learned Wilkins's system properly, we are going to understand and mean the full reference, and natural-historical richness, of its denotation. The characters and words for minerals bring with them reference to imperfect vegetables. That is part of what, and how, they *mean*. And so, to express our scientific crisis, we are going to have to say something like: "These imperfect-vegetable-items are not imperfect vegetables." Rather than a manifestly productive statement, opening up the problem, we have a near-contradiction, closing it off.

Clearly, Wilkins's system is not conducive to the recursive improvement that the system itself envisions and requires. Not only do the Philosophical Tables, in every field—from biology to sociology, physics to economics—canonize seventeenth-century knowledge; changing or rearranging the latter will be almost impossible, due to the structure of the character (and language). Say, for example, that we come to the realization that whales and porpoises really do not belong in the genus "Fish." We might think of adding a new genus ("Mammals"); but neither Wilkins's real character, nor his philosophical language, leave room for such a major innovation. So let us just say, instead, to minimize the disruption, that we move cetaceans

into the genus "Beasts." "Supernumerary" species, we recall, *are* provided for in Wilkins's system. Now, cetaceans are viviparous (breeding live young); that much we're still clear on. The first five differences of the "Beast" genus are also viviparous, so we have something to go on there. Unfortunately, the established differences are "whole-footed" (i), "cloven-footed" (ii), "not rapacious" (iii), "rapacious (cat-kind)" (iv) and "rapacious (dog-kind)" (v) (156|158). None of these seems an appropriate home for whales or porpoises. So we are going to have to insert another difference. We can call it (in homage to Wilkins's natural-historical untidiness) "fish-kind." To keep things as simple as possible, we can make that the sixth difference. "Oviparous" beasts, the previous sixth difference, will now be number seven. (We have to move it down, because whales and porpoises clearly belong among the first five, viviparous, differences.)

The consequences of this single, simple rearrangement, for the complex interrelations of species that are expressed in the relevant sections of Philosophical Tables and denoted in the character and language, are horrendous. Back in the genus "Fish," "WHALE, PORPOISE" was the first species-pair of the first difference ("Viviparous oblong fish"). If that species moves out, all the rest of the species in that difference have to move up, and get re-numbered. So, suppose that we have put in the mnemonic effort to master the characters for "SAW-FISH, SWORD-FISH": "Fish, first difference, second species." Not any more: now it's "Fish, first difference, *first* species." And so for *all the other* (eight) species in this difference! As for the genus "Beasts," where the species "WHALE, PORPOISE" has gone in our imaginary rearrangement: "Oviparous" beasts, previously the sixth difference, must now all be re-numbered under the seventh. In the previous disposition of the genus, "Beast, sixth difference, first species," meant "TURTLE, TORTOISE." Now, it will mean "WHALE, PORPOISE." And this, again, on a single, minimally disruptive, rearrangement of the Tables. As cases of this kind multiply, we are going repeatedly to have to unlearn and relearn Wilkins's entire system. Previous states of its discourse will not only be falsified; they will actually be unintelligible. For the meaning of text in the character and the language will be liable to total change by the very scientific progress that is supposed to be its goal.

It is notable that the committee of the Royal Society that was struck to recommend the next stage for Wilkins's *Essay* never reported. A second, informal group, springing up around Wilkins's admirer John Aubrey,

achieved little, before petering out. The system of the *Essay,* far from *opening up* the horizon of more and better learning about the world, closes it off. Statements of scientific breakthroughs, in the character (or language), would be tantamount to contradictions in terms. Rearranging the system to accommodate them, moreover, would break the system. In his critique of the twenty-first century infosphere, Jaron Lanier has identified a tendency that he calls "lock-in." Lanier points to a number of instances in which computing devices or systems have been placed on the market based on explicitly provisional code. The expectation is that the code will be improved or swapped out farther down the road. But instead—and precisely if the innovation is successful—the code on which it is predicated becomes buried under so many functionalities, and/or incorporated into so many other systems, that it can scarcely be changed at all. It is locked in.[31] This is a tendency that Wilkins's Philosophical Tables spectacularly (so to speak) exemplify.

Had the real character ever been adopted and deployed, as Wilkins and his admirers hoped, it would *looked and felt,* to period users, like a fantastic enrichment of scientific inquiry, in accordance with the speculative view. Just recall the ecstatic vision of Wilkins's early fan William Simpson! But we can see, with the benefit of history, that the *Essay* would actually have entailed a gross scientific impoverishment. It is like those systems for machine translation, re-training themselves on their own products: the system of the real character would increasingly have made findings that simply articulated the system. Recursive, yes; improving, no. Hubert Dreyfus reminds us how easy it is to suppose, in the cool aura of the infosphere, that a first step entails all the others—when it fact it entails nothing of the kind.[32] Wilkins, very much radiating that aura in its seventeenth-century version, shows us very clearly how easy it is to suppose that we are taking a forward step *at all;* when in fact we may just be moving backward, or side to side, or round and round. In a garden of forking paths, you can walk forever, without leaving.

Fallacy of the Point

A paradox lurks in Wilkins's statements about the imperfection of his system for the real character. On the one hand (as we have seen), he admits its limits. On the other, he validates them. "I am not so vain as to think," he writes in his dedication,

> that I have here completely finished this great undertaking, with all the advantages of which such a design is capable. Nor on the other hand, am I so diffident of this *Essay*, as not to believe it sufficient for the business to which it pretends, namely the distinct expressions of all things and notions that fall under discourse. (sig. a^{v})

That is pretty darned sufficient. If the system of the real character is capable of supporting, "distinctly," all discussion about anything—that is, "all things and notions that fall under discourse"—then it is difficult to understand what "advantages" it lacks. And indeed, Wilkins makes pretty clear, later on, that he has few worries on this score. Concluding the Philosophical Tables, he points out that "there are some kinds of things that are *not capable of being provided for* in a Character and Language, proposed for Universal use." In particular, "all such as are appropriated to particular *Places* or *Times*." And he goes on to state, in detail, what he means:

I. Such as are peculiar to some particular *place* or Nation. As

1. *Titles of Honour*, Duke, Marquess, Earl, Viscount, Baron, Baronet, Knight, Esquire, etc. Which are to be expressed by the several degrees which they belong to in the *Nobilitas Major*, or *Minor*.
2. *Titles of Office* and Place, as Sheriff, Maior, Bailiff, etc. Master, Warden, President, Provost, Principal, Rector, etc. which are all to be expressed by the common notion of *Prefecture*.
3. *Degrees in Professions*, Doctor, Master, Bachelour, Serjeant at Law, Barrister, etc.
4. Law Terms of Tenures, Writ, etc. Copyhold, Freehold, Knights-service, etc. Habeas corpus, nisi prius, Defeasance, Certiorari, Replevin, Supersedeas, Subpoena, etc.
5. To which may be added the several *terms of Heraldry*, as Fess, Chevron, etc. which are not common to all Nations.

II. Such as are continually altering, according to several ages and *times*, As

1. *Vests and Garments*, to which there are every day new names assigned, according as several fashions do arise.
2. *Kinds of Stuffs*, as Baise, Flannel, Serge, Kersey, Grograin, Tammy, Tabby, Sattin, Plush, Velvet, Tiffany, Lawn, Douless, Canvas, Buckrom, etc. Diaper, Damask, etc. which are to be periphrastically expressed by their matter and figure.

3. *Games* and *Plays*, of which the old ones do continually grow into disuse, and every age produceth new kinds.
4. *Drinks*, The Wines of several Countries, and Grapes, as Malmsey, Muskadell, etc. And so for other made Drink, as Tei, Coffi, Chocolate, Rambuze, Syllabub, etc.
5. *Meats*, as several prepared Dishes, Cullace, Bisk, Oglia, etc. The variety of Breads, Bisket, Cracknel, Bunn, Simnel, etc. Several confections, as Marmalade, Codigny, etc. Confections in Physick, as Diascordium, Mithridate, etc.
6. *Tunes* for Musick, or Dauncing, as Coranto, Galliard, Sarabrand, Jig, Pavan, Almain, etc. And so for the various kinds of Musical Instruments, Sackbut, Hauboy, Cornet, Lute, Theorbo, Viol, Cittern, etc.
7. The names of several *Tools* belonging to Trades, which are not the same in all Nations, and are every day multiplyed.
8. To which may be added the names of divers sects, whether Philosophical, Political, or Religious. (295|303)

It is a second Borgesian encyclopedia: all the categories that *are not*. And this *precisely because* Wilkins's system is supposed to be "for Universal use"!

What he means, of course, is that the real character and philosophical language are meant to drill down to a cognitive and speculative level of fundamental postulates that are shared by all cultures and all periods. This is how the *Essay* can serve as a platform for universal communication, as the character both supports and subsumes the intensional work that is normally done by languages. Nonetheless, and by exactly that token, the system of the *Essay* won't be able to support all surface cultural *textures*, which are as multifarious as the languages that express them. But this is supposed to be to the *credit* of the character. Wilkins states that the "mixed and complicated" cultural significations *may* be expressible in his character and language by paraphrase; and, as we see above, he makes a couple of exemplary suggestions about how to do this (for example, with regard to the titles of honor and of office). But only a couple; for the rest, he shrugs. If the various and even innumerable fabrics and breads and dances and tools of human society and history can be denoted periphrastically in the character, they will be. But if not—not. *They*, and not the philosophical system, will be revealed to be wanting: "not capable" of participating in scientific universality. In the transition to the character, these untranslatable and therefore insignificant phenomena will get left behind, quite properly, as *mere* words.

Wilkins is expressing an attitude toward linguistic richness that is familiar, even cliché, in the ambit of the early Royal Society. The business of "*Metaphor* and *Phraseology*," he writes in his introduction to the *Essay*, "is in all instituted Languages so obvious and so various, that it is needless to give any instances of it" (17). The triviality of figurative speech, moreover, is measured precisely by its non-translatability: "if they were translated *verbatim* into another Tongue," metaphorical utterances would seem "wild and insignificant."

> And though the varieties of Phrases in Language may seem to contribute to the elegance and ornament of Speech; yet, like other affected ornaments, they prejudice the native simplicity of it, and contribute to the disguising of it with false appearances. Besides that, like other things of fashion, they are very changeable, every generation producing new ones; witness the present Age, especially the late times, wherein this grand imposture of Phrases hath almost eaten out solid Knowledge in all professions; such men generally being of most esteem who are skilled in these Canting forms of speech, though in nothing else. (18)

Like many other seventeenth-century Baconians, Wilkins loves to present himself as a hard-science man, smiting effete humanists, who idiotically choose words over things. The attitude goes right back to Bacon's *Advancement of Learning*, and is canonized in the famous motto of the Royal Society: "*Nullius in verba*" (on no verbal authority). In the final phase of the *Essay*, Wilkins goes so far as to trumpet his achievement in producing a philosophical character and language with *as few words as possible*. A language such as Latin, he reckons, makes you learn up to 40,000, but

> In the way here proposed, the words necessary for communication are not three thousand, and those so ordered by the help of natural method, that they may be more easily learned and remembered than a thousand words otherwise disposed of; upon which account they may be reckoned but as one thousand. And as for such rules as are natural to Grammar, they were not charged in the former account, and therefore are not to be allowed for here. (453–54|469–70)

Like a contestant on some Baconian game show, Wilkins bids his vocabulary down: no more than three thousand; maybe no more than one. (And never mind the grammatical terms—they don't count.) Words, *as* words,

need to be rigorously controlled, and as much as possible excluded, in order to protect the philosophical program of the *Essay*. Phrase-making, figures, tropes, similitudes: these are just fine for (spit) "canting forms of speech." But they must be excluded from science. Poetry is not the point.

Now, Wilkins exudes confidence in his ability to distinguish the former from the latter. "Fictitious animals," he notes in the Philosophical Tables, will have no place there. He specifically names the "Syren, or Mermaid, Phoenix, Griffin, Harpy, Ruck, Centaur, Satyr, etc." (121|123). But the list, by definition, cannot be complete; because fictions of this kind are practically infinite—much like those superficial forms of cultures and societies. That is just how it is when you are dealing with "bare names." If necessary, sirens and the rest "may be expressed as Individuals are," that is, through Wilkins's bespoke phonetic alphabet. And the same will go for "that mongrel generation,"

> which many Authors describe, as being begotten betwixt a Pard and a Lioness, being therefore called Leopard, as likewise that other Beast, commonly described by the name of Gulo or Jerf, and that other named Hyaena … Tho the belief of these (as of several other fictitious things) hath been propagated by Orators, upon account of their fitness to be made use of in the way of similitude. (160|162)

Wilkins includes in his Tables some exotic animals that he is pretty sure about (such as the jackal), and at least one that he is not sure he is not sure about—the giraffe, or (as he calls it) "camelopard," "ruminant but not horned" and "having the *longest neck* of any other *Animal*. (if there be really any such *Beast*.)" (157|159). But when he is sure that he's dealing with a natural-historical falsehood—put about by humanists to prettify their speeches—he is sure. If you believe in leopards, or hyenas, you probably write poems where they frolic with satyrs and centaurs. Anybody, Wilkins clearly thinks, can see that.

As they can see this. "Amongst the several *species* of *Animals*," Wilkins writes in that section of the Tables, "there is not any of greater variety in respect of accidental differences, then that of *Dogs*." These are mostly named in accordance with national origins, size, and so on; but that practice just makes them another ripple in the multicultural fabric. That will not do. Dogs instead are scientifically and "chiefly distinguishable," Wilkins writes, "from those uses which men imploy them about." On scientific consideration, the uses, and the kinds of dogs, are:

Delight; LAP-DOGS.
Companying; when they serve only to follow us up and down. CURRS.
Custody of places or things; MASTIFS.
Hunting; either by

Sight; GASE-HOUNDS.
Smell; whether for

Birds; SPANIELS.

Terrestrial; LAND SPANIELS.
Aquatic; WATER SPANIELS.

Beasts; of a

Greater kind; HOUNDS.
Lesser kind; BEAGLES.

Swiftness; and running after

Greater Beasts; GREYHOUNDS.
Lesser Beasts; LURCHERS.

Play; TUMBLERS. (160–61|162–63)

It is meaningless, for Wilkins, to talk about whether a dog is (among other things) golden, or Irish, or French, or red. That's just poetry-talk. But it is highly significant to talk about what kind of dog hunts only aquatic birds; what "tumblers" are; and the difference between "lap-dogs" and "curs." That's science.

The goal here is not to show what Wilkins is doing wrong. It is to show what he is doing right. Any informational system involves and deploys design decisions about what does and does not need to be accommodated by the system. What Wilkins allows us to see, very clearly, is how decisions of this kind are organic, not transcendent, to the system. An operative idea of *what the point is* predetermines the informational capacity for getting *to* the point. In Wilkins's case, this includes a science of dogs by their uses; excludes hyenas and leopards as utterly fictitious; and totally abjures and dismisses any modicum of scientific interest in anything to do with the

human cultural life-world. If any of these choices seem bizarre to us, we need to recognize that *the way Wilkins makes* them is highly familiar. He stands, and speaks, for science: for a superior epistemic authority based on strict observation of the facts, and claiming the right, and duty, to demarcate and depose the latter. That is what the system of the Philosophical Tables is for; that is what the real character and philosophical language articulate. They strongly facilitate getting to the point, precisely by presupposing what the point is.

Fallacy of the Whole

The phenomenology of the real character, as we have discussed, begins at the beginning: Genesis. Approximately half-way through the Philosophical Tables—when he has just finished differentiating and specifying the genus "Beasts" (the 18th of 40)—Wilkins takes us back there. In fact, for a moment he takes us back almost to the very beginning of the beginning. The last difference among the animals is the oviparous (those that lay eggs), and so we conclude the genus with several species of the creature that spoke to Eve in Paradise (Gen. 3): SERPENT; SNAKE, VIPER; and SLOW WORM. But turning the page, we find Wilkins taking up a somewhat later story from Genesis (6–9); the one immediately antecedent to the Tower of Babel episode (Gen. 11). Suspending his Philosophical Tables, without warning or explanation, Wilkins launches into an extraordinary digression on Noah's Ark (162–68|164–72).

He claims to be making a necessary point about methodology and authority. It is important to keep in mind, he urges, "that great difference which there is betwixt those opinions and apprehensions which are occasioned by a more general and confused view of things, and those which proceed from a more distinct consideration of them as they are reduced into order." People may think that they mostly know what they are looking at, when they are looking at the world. Natural philosophers—scientists, as we now would say—know better. "He that looks upon the Starrs," Wilkins remarks, "as they are confusedly scattered up and down in the Firmament,"

> will think them to be (as they are sometimes stiled) innumerable, of so vast a multitude, as not to be determined to any set number: but when all these Starrs are distinctly reduced into particular constellations, and described by their several places, magnitudes and names, it appears, that of those that

> are visible to the naked eye, there are but few more than a thousand in the whole Firmament, and but a little more than half so many to be seen at once in any Hemisphere, taking in the minuter kinds of them, even to six degrees of magnitude. (162|164)

"Billions and billions of stars," the late Carl Sagan loved to intone. Wilkins's version? "Thousands—at most." Innumerability, impressions of plenitude, vastness, and so on: these are, for Wilkins, fundamentally *stupid* ideas. They are examples of what he calls "prejudice": pre-judgment, unthinking bias. It is notable that, when it comes to fundamental enumerations of what is really *out there*, Wilkins still prefers (in the mid-1660s) a standard of naked eye observation over anything that might be revealed, or seem to be revealed, by telescopes. Probably, he makes this move because the epistemic status of instrumentation (and perhaps especially of lenses) would raise questions with which he is not presently concerned to deal. His main goal, evidently directed *de haut en bas* toward readers who are *not* necessarily brilliant and well-connected natural philosophers, is just to clear up and forestall "confusion." This means getting us to recognize that the cosmos, though it may fill us with naïve awe, is actually a lot smaller and simpler than it appears.

And so is the earth beneath our feet. "He that should put the Question," Wilkins says briskly,

> how many sorts of beasts, or birds, etc. there are in the world, would be answered, even by such as are otherwise knowing and learned men, that there are so many hundreds of them, as could not be enumerated; whereas upon a distinct inquiry into all such as are yet known, and have been described by credible Authors, it will appear that they are much fewer than is commonly imagined, not a hundred sorts of Beasts, nor two hundred of Birds. (162|164)

Wilkins's tidy, even dismissive idea of biodiversity seems especially strange, insofar as it runs counter to some natural-historical vectors of the early-modern period. Much like those post-Babel languages, revealing their profusion ever-more both at home and abroad, flora and fauna often seemed to present an insuperable challenge to categorization. Exotic species, brought to the European consciousness from the two hundred-year-old encounter with the Americas—and the even older encounter with the Far East—stretched and strained classificatory schemes that

reached back to Aristotle. Meanwhile, a new attention to field work, and the period's obsession with "curiosities," provided a local, intensive analogue to the exotic and expansive cornucopia. Wilkins himself, in places of the Philosophical Tables (especially with regard to the herbs and plants), seems to complain about the interminability of his task. But in the Ark digression, he lets us know very firmly that he has pulled himself together. The tediousness of the Tables is, indeed, tedious. It is only a matter of counting, up to a few hundred; until one bumps against the wall of an epistemic container.

Now, Wilkins raises this whole issue, ostensibly, to defend the literal truth—the detailed, historical factuality—of the Ark story. According to Genesis 6, Noah's craft, built to divine specifications, was "three hundred cubits in length, fifty in breadth, and thirty in height." These dimensions had to contain, for the year-long duration of the flood, two (and in some cases seven) of every animal, bird and "creeping" species in the world. Fish (a very interesting exception) were assumed to have been just fine with a planetary inundation; but Wilkins does reckon that the Ark would have needed room for amphibians. All these creatures would have required, not only lodging, but also provision, for an entire year; which, in the case of the predators, would also have meant taking along a lot of extra animal passengers (not meant to make it to the end of the voyage). "Some hereticks of old," accordingly, "and some Atheistical scoffers in these later times," have considered the Ark story to be "utterly impossible." Others, "learned and judicious men," but "less versed in Philosophy and Mathematicks" (Wilkins cites Origen, and St. Augustine) "have been put to miserable shifts" to defend its literal truth: dodging and equivocating about how big a "cubit" is, for example (163|165). Wilkins will have none of it. He sets out to prove, mathematically and straightforwardly, that the Ark as specified in Genesis was more than big enough for its purposes.

After a dense, six-page discussion—including a table of all the animals that went on board, reconstruction of the Ark's internal arrangements, careful consideration of its external design (he reckons it would not have needed a keel), and calculation of its logistics—Wilkins concludes that: "Upon the whole matter, it doth of the two, appear more difficult to assign a sufficient number and bulk of necessary things, to answer the capacity of the *Ark*, rather than to find sufficient room for those several species of *Animals* already known." In other words, it was if anything too big, not too little. Genesis 6–9, therefore, "which some Atheistical irreligious men make use of, as an argument against the Scripture, ought

rather to be esteemed a most rational confirmation of the truth and divine authority of it":

> Especially if it be well considered, that in those first and ruder ages of the World, when men were less versed in Arts and Philosophy, and therefore probably more obnoxious to vulgar prejudices than now they are, yet the capacity and proportions of the *Ark* are so well adjusted to the things it was to contain; whereas if it had been a meer humane invention, 'tis most probable, that it would have been contrived according to those wild apprehensions, which (as I said before) do naturally arise from a more confused and general view of things, as much *too big*, as now such men are apt to think it too little, for those ends and purposes to which it was designed. (168|172)

And with that, Wilkins resumes his Philosophical Tables (taking up the genus of "Parts Peculiar"), as though nothing has happened.

What has? It is striking that Wilkins, while naming authorities who assert a literal reading of the Ark story (Buteo and Columella, in addition to Augustine), leaves his anti-literalist "heretics"—also "atheistical scoffers," and, for good measure, "atheistical irreligious men"—anonymous. They are important enough to get roundly, huffily, and repeatedly refuted; but not enough to get named. This is quite inconsistent with the (shall we say) robust traditions of seventeenth-century polemic. Moreover, and as we have discussed, literal or "historical" readings of Bible stories are actually normative in the seventeenth century. (There is, accordingly, less than no reason to think that Wilkins, a bishop, is not genuinely committed to this section of his text.) Wilkins's unnamed yet dreadfully, dangerously wrong doubters of Genesis, we may infer, are straw men. This puts a very interesting light on Wilkins's reductive account of biodiversity. Ostensibly, it is supposed to defend the literal understanding of Genesis 6–9. But that scarcely needs to be defended. The alternative possibility is the obverse: that the literal understanding of Genesis 6–9 is supposed to defend Wilkins's reductive account of biodiversity.

And one can see why he wants to do that. The Philosophical Tables, as we have discussed, are supposed to provide a complete (more or less) ontology of "the things and notions to which marks or names are to be assigned." In effect, that is, an inventory of reality—of *res* (those worthy of the name). To be sure, Wilkins's system is supposed to be open to correction and augmentation. But even granted all necessary upgrades, the

result would be nothing more or less than an improved version of what Wilkins has already achieved. The *Essay*, in short, is supposed to be the book of the world. The obvious question that arises is: isn't there too much world? This is the question that the Ark digression answers, negatively. After all, zoology can seem as stupefyingly copious as any other area of the knowable cosmos. The profusion of birds and beasts, so lovingly captured in period art based on Genesis, is emblematic for the apparent superabundance of nature as a whole. All the kinds of animals—"unclean" by two, "clean" by seven, plus their provender, some of it also living, for an entire year— fit into a single, measured, finite, man-made craft. The result, in Wilkins's vision, isn't overwhelming, or overburdened—stuffed, like one of the planes or trains or automobiles of the 1960s children's book author Richard Scarry. Rather, the Ark, is tidy, orderly—and, above all, capacious. On this voyage, there was *room to spare*.

"Though it be most probable," Wilkins writes, "that the several varieties of Beeves [such as bison and buffalo] be not distinct species from *Bull, Sheep*, and *Goat* … Yet I have *ex abundanti* to prevent all cavilling, allowed them to be distinct species, and each of them to be clean Beasts, and consequently such as were to be received in by sevens" (164–65|166–67). The Ark will not only accommodate various large ungulates who may not deserve to be there; it will accommodate them in numbers (sevens, not twos) that they may not even merit. Maritime animals, Wilkins goes on (such as seals and sea-turtles), might with full natural-historical justice be left off the boat. Never mind—"there would be room enough for them" on board, anyway (165|167). Exegetically, there is good reason to think that vegetarianism was universal among beasts until after the flood. But "a captious Adversary" might insist otherwise; so Wilkins will give up that ground, and gladly cater live meat for the Ark's (alleged) carnivores (165|167). And so on. Always, in this discussion, Wilkins rounds up, not down, takes the larger unit over the smaller, accepts rather than refuses the worst-case scenario offered by his "cavilling," "captious," and entirely apostrophic opponent. And always, the dimensions of the Ark, under these relentlessly unfavorable dialectical conditions—and extrapolated via nothing more than a little ordinary arithmetic—turn out to be "more than sufficient" for its stated purpose.

There is a similarly excess capacity in the Philosophical Tables. As we have noted, each of Wilkins's 40 fundamental genera is first of all divided into differences. Initially, Wilkins tells us that there will be up to six dif-

ferences per genus; in the event, we find that the effective maximum is actually nine, and this is also supported by Wilkins's system for noting the differences in his character. Nonetheless, a number of Wilkins's genera fall short of nine differences, in the Philosophical Tables; a few (for example the metals) fall short of six. Species, subdividing differences, are again supposed to be listed by nines; but a number of Wilkins's differences are divided into only eight, or seven, or even as few as four species. And *even if* the nine species of any given difference, or the nine differences of any given genus, were to get maxed out, perhaps in some future version of the Tables, we could in principle instantly double (or triple) the relevant area of capacity, merely adding a second, or third, species-mark or difference-mark to denote those "supernumerary" entities.

If we count all Wilkins's zoological "species" in his somewhat bespoke sense of that term—but counting both members of his species-pairs—we arrive at a total of 81 kinds of animals, 146 of birds in the current Philosophical Tables. Thus Wilkins's comment, "not a hundred sorts of Beasts, nor two hundred of Birds," is not rhetorical. It is a summary statement about those genera, as he has just finished specifying them, for scientific purposes. His point is not just that nature is non-diverse. His point is that the *Essay* expresses, and easily accommodates, the real level of diversity that nature actually exhibits. As currently constituted, the Philosophical Tables have a capacity of 40 genera x nine differences x nine species = 81 × 40 = 3240 entries. This capacity, as we have just discussed, is not filled. Yet its full potential version, supposing second and third ranks of all differences and species, is almost ten times larger: 40 genera × (9[3] differences) × (9[3] species) = 40 × 27 × 27 = 29,160 entries. The species of the 1668 Tables, given this full capacity, are just rattling around like a few rats on a cruise ship. What's more, and as we have noted, Wilkins takes the view that, if anything, even the Tables as currently constituted are probably *over*-populated. When you get right down to it, the Philosophical Tables are massively overdetermined for the natural-historical, classificatory work they are supposed to do. Wilkins recognizes that his system may need to be tweaked or rearranged in light of new discoveries. But he probably thinks it will *never* become obsolete, swamped or overwhelmed by data. The *Essay*, like the Ark, will easily, even roomily, and for as long as it needs to, contain and organize its natural-historical world.

Of course, Wilkins's account of cosmological richness, to our eyes, is almost incalculably *under*-determined. His remark about the stars is the spectacular moment in this case. And yet the *way* in which Wilkins

delivers his account, again, is familiar. He presents himself as defending a set of empirical facts, inductively determined, that are non-obvious at first glance, yet totally inescapable after intelligent examination. In other words: Wilkins presents himself as speaking on behalf of science. To be sure, his idea of *what the science is* in this area may make us raise our eyebrows. But precisely if we do, we need to note Wilkins's own eye-roll at the confusions of the unlearned—us, from his point of view. For we are among those people who think the stars are numbered on orders of 10^9, not 10^3; animals and birds on 10^3, not 10^1. Wilkins's use of scripture should not distract or confuse us, in this regard; as a number of scholars have shown, the unique authority of the Bible was entirely productive for the analogous authority of modern natural science, as this began to develop in the early-modern period. And, in any case, Wilkins *claims* to be *defending* the truth of Genesis 6–9; not appealing to it. As a systematic, professional, and progressive investigator of nature, supported by mathematics and experimentation, and operating at the very center and pinnacle of seventeenth-century English intellectual life, Wilkins is there to tell us what is and is not a serious view of nature. If we find his account bizarre, then, on his view, we just don't understand what knowledge looks like—or sounds like. Nothing could be more consistent with the dogmatic assertions of scientific authority in our own age.

The kind of technical achievement that Wilkins is presenting is familiar, too. As a listing of everything (everything real, anyway), the Philosophical Tables constitute the encyclopedic base over which the real character ranges, and within which it refers. In a word, a database. For that matter, the Tables constitute an omnibus or union encyclopedia—a listing of listings—drawn from the work of numerous associates and confederates, and purporting to support reference within more-or-less any conceivable area of scientific discourse. In a phrase, a universal database. To be sure, and as we have repeatedly noted, the version that arrives on your desk, in the *Essay* of 1668, is not necessarily its final form. But—again—the final form, if and when it does arrive, will be nothing other than an upgraded version of the one on your desk in 1668. The encyclopedic impulse is strong in the early-modern period, and Wilkins's is by no means the first attempt to list everything worth listing—defeating the empirical multiplicity of the world with the hermeneutic unity of a text. But it isn't the last such attempt, either. Reaching back before Wilkins to Bacon and Aldrovandi—to the Domesday Book, to the Bible, to the clay tablets of Sumer—the universalizing impulse also reaches forward, via Linnaeus and

Brittanica, to the modern science and technology of what we now call information. Google, Bing, Wolfram Alpha: powerful and transformative attempts to bring unity to the infosphere. There can be little doubt that yet greater attempts await—if they have not already been made, by the time you're reading this book.

Now, a universal database, presumably, involves a claim of redundancy to the world that it represents. If you have the database, you have the world, informationally speaking. Otherwise, it isn't universal. No doubt, on exactly that account, universality is still, typically, just a marketing claim. Nonetheless, the whole tendency of our encounter with information technology is to obscure that point—as any pre-Google person watching a post-Google person doing library research can attest. Moreover, we can easily conceive of, and even point to, limited universalities—databases that achieve redundancy relative to a specific slice or sector of the world. Once upon a time, for example, if a literary scholar wanted to read a rare old book, s/he had to travel to a research library that held a copy of it. That professional procedure began to crumble, in the second half of the twentieth century, with the proliferation of microfilm and photographic facsimiles. Since then, it has been completely swept away by online databases such as EEBO and Google Books. Nobody travels farther than their laptop, anymore, to read materials of this kind. And this, in many ways, is a very good thing. Indeed, from a certain perspective (the perspective of the database itself), it is very clear that the copies of books that have been digitized could just as well be discarded or destroyed—saving a lot of library budget. After all, securing the rare-book world, through the infinite reproducibility of digitization, was the whole point of that process. And, more to the point, it works.

And what of the world *kurz*, or *tout court*? What if we imagine its wholescale replication through a truly universal database—tantamount to experience, its "virtual," digital copy? This is a fantasy not far removed from the wilder visions of the twenty-first-century infosphere. Indeed, if a database traditionally is just a compendium of information about things—an invitation and guide for seeking out the things themselves—this changes completely once the things themselves can plausibly be theorized *as* information. For then, anything and everything just is a certain constituted data-site (of MTCI), much like a text, which one can indeed access and possess through digital mechanisms and transmissions. Strikingly, at the turn of the current century, this fantasy was still one from which our culture recoiled. It was the premise of the *Matrix* movies, in which Keanu

Reeves and Carrie-Ann Moss battled buggy aliens who had suspended our brains in digital vats, and our consciousness in virtual reality. But today, as we approach the third decade of the century, this dystopian vision has somehow become utopian. It is the vision of the Singularity, receiving and preserving and augmenting our consciousness through an apocalyptic upload. And perhaps there is much to be said for that. As Kurzweil points out, we die; but data doesn't. If we could upload our consciousness into the infosphere, and equip it with a haptic sensorium, we could live as long as the net does—effectively, forever. Kurzweil-world, or so he profoundly and passionately believes, will one day become redundant to the Kurzweil-database. All he has to do—all any of has to do—is stay alive until the great day dawns. The Singularity is the telos of the informational compendium. That is, redundancy of the world to its universal representation.

We are looking here, I would like to argue, at an idea that has both Wilkins and scripture in its heritage. Inserted into the pages of Wilkins's digression is a magnificent engraving of the Ark; above it, a cross-section shows the disposition of the higher animals in their stalls (166) (see Fig. 4).[33] The craft is massive, like a great floating barn. Its single door and window, both decreed in Scripture, are the only variations in its monolithic structure. We need to remember, in looking at this object, that the seventeenth century had no conception of evolution (that we would easily recognize), or, for that matter, any idea of how ancient is primordial history. Any kind of creature in the contemporary world (apart from those fish, who were in the waters outside it) was there on the Ark, just as it had been there in Paradise. In looking at the Ark, we are looking at a worldly compendium. The world of animals, the world of bugs, the world of birds, the world of men—all conceivable sentiences *of* the world: all are saved, uniquely, in that container. Without it, there is nothing. *Everything is in there*. Emblematically, the Ark *is* the world.

Except that it isn't. Rather, it is precisely a marker and proof and record and enforcement of a state of affairs where the world *is not*. In *Paradise Lost*, almost exactly contemporaneous with Wilkins's *Essay*, the archangel Michael gives the newly-fallen Adam a vision of the flood—the last in a series of immediate misfortunes that are to flow from original sin. As the waters recede, the angel pauses: "Betwixt the world destroyed and world restored" (12.3). There, exactly there, we find the Ark. *Only* because the world has been destroyed is it "hull on the flood." Only until the world is renewed will it continue to float. As in the Babel story, what matters here is not the moral or religious, but the phenomenological, teaching

and influence of the scripture. In the case of Genesis 11, this has to do with a universality that is taken as normative for language. In the case of Genesis 6–9, it has to do with a universality that is taken as teleological for information. It would have been pretty good, after all, if Noah had saved even just himself and his family from God's angry rain—the story of Noah's Raft. Better if they had had a dog and a cat and a parrot and a few bugs along—Noah's Boat. But the ultimate version, and the one that the scripture hands down, is the one in which they save exemplars of everything that walks or flies. The Ark, copying the original world, is the original world-copy. It is the very idea of the database; and of the tendency of databases toward universality.

Now, one thing we can learn and retain from the scripture, and from Wilkins's treatment of it, is that *non-identity* with the world is actually the essential premise of the database function. The sober box of the Ark engraving is precisely *not* an attempt to give a picture of the world; and we might compare, in this respect, the many rich early-modern artistic representations of Adam and Eve and the animals in Paradise by Reubens and Titian and others. In Gadamer's terms, the world of the Ark—in its finiteness, its conclusiveness, its suspension, its regulation—is not only distinct from, but non-equivalent to, the world as such. The Ark-world, the original database, can only be *Umwelt*: a certain set of surroundings, a certain immediate horizon, vis-à-vis which we may or may not be able to rise into the world. Performing this ontological transition, as we have discussed via Gadamer's analysis, requires a capacity for openness, for illimitability and unpredictability of our exposure to other horizons, within which we may be able to attain and deploy "free and distanced comportment." And that, clearly, is inconsistent with the database-world. Here, contents, purposes, and interrelations are determined and mapped in advance. They have to be; that is the whole point. Only if they do not rock the boat, but follow its pre-determined roles and procedures, will the passengers actually make it from world to world. When they do, when they disembark, they will clearly emerge anew into a capacity, a potential, for free and distanced encounters and expansions. But it is also possible that the surroundings they have so far preserved will *overwrite* the world where they have been deposited.

The outcome is determined, presumably, by how the database-world itself is understood. Is it a bridge, a raft, a portal—a way to get back *to* the world? Or is it, rather, a container, a repository, a frame—a way to improve upon, even reveal, the world? Does ontology produce technology, or

technology ontology? The Singularity, clearly, is consistent with the latter kind of vision. And so, I would argue, is Wilkins's *Essay*, with the account of Noah's Ark serving as its glowing summation. Wilkins seizes upon the Ark, as an emblem for his own work, precisely because of the ontological *sufficiency* that it entails. *Containing* the world, with room to spare, and even with room to spare within that room: this is the idea he emphasizes, and claims as his warrant. Indeed, and as we have discussed, the overcapacity of the Philosophical Tables is so extraordinary that it is difficult to imagine any eventual exit for inquiry from Wilkins's intellectual box. It is precisely the system of the *Essay*, the parsimony and rigor of the Philosophical Tables, that leads to the requisite vision of nature. But this vision is then offered, or rather, asserted, as simply what nature is. Wilkins has tailored his ontology to fit his technology, while convincing himself (as tends to happen) that the fit was really there all along. This is what he then tries to explain to his readers. If we are unconvinced—if, to put it bluntly, we find it a good thing that the *Umwelt* of the *Essay* never came to be accepted as a universal container for our understanding of the world—then we have had a productive and even a precious reaction to Wilkins's informational horizon. For then we are placed in a position, on a basis of historical example, to ask what the masters of our own databases are trying to tell us today about the analogous relationship between the infosphere and our being. Wilkins, certainly, is trying to tell us that if we doubt that the whole world is contained, and will always be contained, within the *Essay*, that simply proves how desperately we need to learn and use his system. Further refusal or recalcitrance on our part can only prompt a stronger insistence on his, leading to an end-point of enforcement on the one hand, or silencing on the other.

Final Conclusion: The Circularity

At the beginning of writing this book, I observed that any prospective marker for the limit of the infosphere tends to get overwhelmed by expansion of the latter. Here, at the end, I can offer this book itself as an example. In my introduction (as the reader may recall), I talked briefly about the twenty-first-century resurgence of AI research, after the "AI winter" of the 1980s and 1990s. I contrasted the new program to "AI as [Hubert] Dreyfus encountered it in the early 70s—what is now called GOFAI (Good Old-Fashioned AI)":

> New-fashioned AI is a much nimbler and more modest affair—operating around the edges, as it were, of Dreyfus's critique. A major desideratum of twenty-first-century robotics, for example, is the so-called "emergent" effect: intelligent or pseudo-intelligent behavior occurring, or seeming to occur, in the spontaneous interaction between the parts of a robotic system. The evidence, if one can call it that, for emergent behavior is precisely if the system's creator *can't quite explain it.* It is the AI equivalent of ghostbusting—a long way from the proactive confidence of GOFAI.

That was a couple of years ago; and I think it was still true, then. But I don't think it's true now. New new-fashioned AI is distinctly old-school. As discussed in the opening to this chapter, hardly a day goes by anymore without a report about a new robot, a new "smart" device, a new "intelligent" digital system that is supposed to change pretty much everything. In data analytics and health care, AI products are already being brought to market. In transport and law and many other fields, they are said to be just around the corner. Evidently, the statistical methods that have given new life to MT are also relevant here. AI systems and devices—like the conversational androids being produced by the roboticist David Hanson, or Google's champion-level Go-playing program (AlphaGo)—are combining big data with massive computing power to determine the most statistically favored moves and responses in any given case. And the results, clearly, are remarkable. As I have pointed out (without, it seems, entirely taking my own advice), it is foolish to predict where this or any other vector of the infosphere will or will not lead. What we can note is that, in 2016, developed-world culture seems to have started to take AI *for granted*.

At the same time—and this is truly strange—our culture seems to be taking AI for *not yet* granted. The very excitement that each new development causes is indexical, in this regard. Nobody claims or supposes that the excitement is *not* warranted. Nobody claims or supposes that AI is a done deal. Computers can now drive, beat chess and Jeopardy! and Go champions, and hold up their end of a compelling conversation—pretty much murdering the famous Turing Test. Ten years ago, that would have sounded a lot like the Singularity. But not even Kurzweil claims that that's what we are hearing today. Apple's Siri, and other digital assistants, which constituted a very exciting and cutting-edge technology just a few years ago, are today ubiquitous. But nobody supposes that these functions are anything other than a fancy voice-interface, with a few jokes coded in, for a web search engine. (The film *Her*, in which Joaquin Phoenix falls in love

with the caring voice of his operating system, is so 2013.) In *Ex machina* (2015), a geeky coder is confronted with a beautiful, sensual, brilliant, curious, frustrated, female, robot. Going well beyond answering questions that are put to her (à la Watson, ca. 2011), she asks them of her interlocutor, while expressing complex hopes and dreams about her own continued existence. Yet the whole question of the movie is whether or not she *is* intelligent! We seem to be in a situation, circa 2016, where artificial intelligence both is, and is not, intelligible.

Perhaps a way to decode this state of affairs is to observe quite simply that we do not yet have AI. We only have a set of capabilities—limited, though very impressive— that are marketing themselves in terms of that traditional projection of the infosphere. And indeed, at the point where project meets reality, a number of very interesting facets of the AI idea are being illuminated at the present time. Boston Dynamics, a robotics company heavily supported by the US military, recently stopped building artificial mules. These, it turns out, are significantly more complex to procure and operate than are their non-artificial analogs. The Google car, while performing for the most part uneventfully, has been reported as struggling with situations on the road where it has to make a *judgment call*. This is not the same, evidently, as making a decision based on rules. Microsoft, very recently (at time of writing) launched an AI chatbot on Twitter (Tay.ai) that was supposed to learn how to converse—about current events, ideas, politics, you name it—from its interactions. Unfortunately, the bot got targeted, in its first 24 hours, by juvenile monkeywrenchers; from whom it learned racism, genocide, and violations of Godwin's Law. Astonishingly, the statistics of what is *mostly* said do not necessarily indicate what *should* be said. The very success of current AI technologies seems to be leading them toward an encounter with their limits.

But also toward a way to overcome them. Microsoft's response to the train-wreck of Tay.ai, in this regard, has been extremely interesting. The company has articulated its failure by contrast with the success of its Chinese chatbot, which has already been up and tweeting for several years. This it has put down to different cultural norms. The "norms" in question, of course, have to do with the nature of public speech in the People's Republic of China, which is rigorously controlled and policed, especially online. But this closed conversation, which suits a chatbot, is then presented by Microsoft as nothing other than a version of the open conversation that doesn't. The bot works just great; it's our way of talking that doesn't. Google has recently called on lawmakers in California and

other US states to change motor vehicle laws that impede self-driving cars. The latter, one might point out, were supposed to succeed at an activity that was already there, just as it was: driving, safely and legally, from place to place, along road networks. But now the company is demanding, explicitly, that the nature of the activity be changed, just precisely in such a way that will allow their technology to "succeed" at it. *Driving* has to change so that computers can drive. Boston Dynamics recently released a remarkable video showing its humanoid robots putting things on shelves, getting knocked over and getting back up again, and even opening doors and leaving rooms (an oldie but a goodie, for roboticists). You have to watch the video several times before you notice that the surfaces and objects with which the robots successfully interact are decorated with QR codes; which, presumably, are part of the interaction. So what we're watching is not exactly a robot opening a door and exiting. Rather, we're watching a robot opening a door that has been prepared in just such a way as to allow a robot to open a door and exit, and exiting. The worldly activity that the device supposedly conquers has actually been customized to the requirements of the device.

Each of these cases shows the same pattern—the same shape, even. It is a begging of the question, a sleight of hand, in the relationship between the informational system and the area of life to which it is supposed to be sufficient. Far from a straightforward operation of the device within the world, the world is called upon to customize itself to the device's operation. In a sense, this is consistent with a Heideggerian account of what emerges when any new tool bids to alter our lives: it's not just a new object in our midst, but a *new kind of midst*, within which we are then compelled to find both objects and ourselves.[34] But what is remarkable about the current moment is that it is advocates of the technology *themselves* that are calling for a phenomenological shift—and not by way of critiquing, but enforcing, the next technological advent. A decade ago, when it introduced new data-enabled ID cards, the Chinese government also mandated a list of approved *hanzì* (characters) from which given names, to go on the cards, could thenceforward be selected. The cards could not handle exotic or obscure *hanzì*; so exotic and obscure *hanzì* had to go. Far from an informational system miraculously extending itself to the scope and shape of the Chinese language, the Chinese language had to restrict itself to the capacities and requirements of the informational system. Not the Singularity; the Circularity.

This is the pattern, I have been arguing, that also emerges from close examination of Wilkins's *Essay*. Wilkins claims to be offering a technology that extends itself, very remarkably, to the scope and shape of ontology. But as we have seen, he actually calls upon ontology to be customized, understood, in just such a way as to suit the capacities and requirements of his technology. The Philosophical Tables cannot handle a world of innumerable or exotic or undiscovered species; so innumerable and exotic and undiscovered species have to be ruled no part of the world, which the Philosophical Tables then can and does handle. A cosmos understood as transcendent to finite enumeration would be fatal to Wilkins's project; so the project decrees that the cosmos can*not* be understood, but only *mis*understood, that way. If a real character has to manage poetry, or imaginary entities, or titles, or varying cultural practices, it will become overburdened. So a real character doesn't have to manage any of those things—they are simply not part of the world, considered as the aggregate of what matters. Again and again, Wilkins customizes the worldly areas where his invention is to operate in just such a way that will allow its operation. And if there are areas where it just can't—well, they are not part of the world at all.

So this is the final conclusion of this book. Wilkins's *Essay towards a Real Character* is a seventeenth-century avatar of a pattern of technological adoption that is waxing very strong in the infosphere of the present day. We have learned from earlier chapters that there was a great deal of enthusiasm for Wilkins's achievement in the latter part of the seventeenth century; if it failed as a market technology, this was not for want of early-adopting fans. We have also learned, I hope, what adoption of the *Essay* might actually have been like, for knowledge and discourse in the seventeenth century and thereafter. At issue here is not so much the deictic non-conversation satirized by Swift, as the objective non-questioning valorized by Wilkins. The world of the Philosophical Tables, a world of a thousand stars and a hundred birds, where a whale is a fish and an eagle is a vulture and a ship has sails and fire is an element, would have been canonized and established, more or less permanently, by adoption of the *Essay*. To be sure, given that the world of the Philosophical Tables is *not*—as far as we can tell—the world, it would have experienced frictions and remainders of the kind that have always beset systematic sciences and transformative technologies. But these would, or at least could, have been dealt with in advance by the kind of question-begging meta-theory that we are calling The Circularity.

A lot of technological adoption, presumably, has to do with money and power, and there can be no question (as we have discussed above) that multiple technologies that we now consider entirely normative have benefited from and been enforced by these pragmatic and pitiless forces—pushing them around and around the social and political track, until they attain escape velocity, and make the circle look like a line. Wilkins's real character, in the event, didn't have enough backers to get to that point. The question of our age is whether the bots and apps and AIs of the infosphere—which are backed by more concentrated money and power than has ever existed—will meet the same fate.

You tell me.

Notes

1. For this concept see (among innumerable Ted Talks, YouTube videos, Wikipedia pages, and *Wired* interviews) Ray Kurzweil, *The Singularity is Near* (New York: Viking, 2005). See also http://spectrum.ieee.org/static/singularity ; and http://singularityu.org.
2. On the ubiquity of exegetic literalism as a background for natural-philosophical dispute in the seventeenth century, see J.D. Fleming, "Making Sense of Science and the Literal: Modern Semantics, Early-Modern Hermeneutics" in Kevin Killeen and Peter Forshaw (eds), *The Word and the World*, 45–60.
3. See i.a. Keven Killeen, *Biblical Scholarship, Science and Politics in Early Modern England: Thomas Browne and the Thorny Place of Knowledge* (Farnham, UK: Ashgate, 2009) and Killeen and Forshaw (eds), *The Word and the World*; Peter Harrison, *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press, 2007) and *The Bible, Protestantism, and the Rise of Natural Science* (Cambridge: Cambridge University Press, 1998); Stephen Gaukroger, *The Emergence of a Scientific Culture: Science and the Shaping of Modernity, 1210–1685* (Oxford: Oxford University Press, 2006); and Lindberg and Numbers (eds), *God and Nature*. See also William Poole, "Francis Lodwick's Creation: Theology and Natural Philosophy in the Early Royal Society" *Journal of the History of Ideas* 66.2 (2005): 245–63.
4. See Cram and Maat (eds), *George Dalgarno on Universal Language*, 403.

5. See Lewis, *Language*, 14–22; Jonathan Sawday, "The Fortunes of Babel: Technology, History, and Genesis," in Killeen and Forshaw (eds), *The Word and the World*, 191–214; and Paul Cornelius, *Languages in Seventeenth- and Early Eighteenth-Century Imaginary Voyages* (Geneva: Droz, 1965), 1–40.
6. Lewis, *Language, Mind and Nature*, 2–3; Maat, Philosophical, 11. On the perennial nature of claims about the decline of Latin, see. Françoise Waquet, *Le Latin, ou, L'Empire d'un signe: XVIe-XXe Siècle* (Paris: A. Michel, 1998).
7. John Milton, *Paradise Lost* ed. David Scott Kastan (Indianapolis: Hackett, 2005), 12.56–61. Subsequent references in body of my text.
8. See Lewis, *Language*, 110–45; and Cornelius, *Languages*, 7–26.
9. Webster, *Academiarum*, 24.
10. Cram and Maat (eds), *George Dalgarno on Universal Language*, 89–90.
11. Cram and Maat (eds), *George Dalgarno on Universal Language*, 149.
12. Beck, *The universal character,* "To His Friend the Author of the Universal Character, upon His Design," ll. 13–14.
13. Beck, *The universal character,* "To My Intimate and Ingenious Friend Mr. Beck, upon His Universal Character, Serving for All Languages," ll. 3–4.
14. Francis Godwin, *The man in the moone or A discourse of a voyage thither* (London, 1638), 15.
15. Wilkins, *Mercury*, 3.
16. Warren Weaver, "Foreword: The New Tower," in William N. Locke and A. Donald Booth (eds), *Machine Translation of Languages* (Cambridge, MA: MIT Press, 1957), v–vii.
17. See Barry Smith, "Ontology," in Floridi (ed.), *The Blackwell Guide to the Philosophy of Computing*, 155–66.
18. Ibid., 159.
19. Weaver, "Translation," in Locke and Booth (eds), *Machine Translation*, 15–23; 23.
20. See Dreyfus, *What Computers Still Can't Do*, 1–150.
21. See Y. Wilks, *Machine Translation: Its Scope and Limits* (New York: Springer, 2008). A concerted attempt to achieve Universal Machine Translation (UMT) is being mounted by the multi-institutional and international consortium USTAR: see http://www.ustar-consortium.com/index.html. USTAR offered an allegedly universal translation smartphone app –albeit one limited to "travel conversation" topics—at

the 2012 London Olympics. Two formally basic but regularly updated websites devoted to machine translation research are http://www.statmt.org/ and http://www.mt-archive.info/.

22. See Donald Davidson, "On the very idea of a conceptual scheme," *Inquiries into Truth and Interpretation* (Oxford: Clarendon, 2001), 183–98.
23. Hans-Georg Gadamer, "Sprache als Welterfahrung," in *Wahrheit und Methode* (Tübingen: J.C.B. Mohr, 1990), 442–60. My translations. I am very grateful to D.G. Marshall for checking and, in several places, correcting them. See also Gadamer, "Language as Experience of the World," in *Truth and Method*, 2nd rev. ed., trans. rev. J. Weinsheimer and D.G. Marshall (New York: Continuum, 1989), 438–55.
24. Gadamer, "Sprache," 447.
25. Ibid., 448.
26. Ibid.
27. Ibid., 447.
28. Ibid.
29. Ibid., 448.
30. Ibid.
31. See Lanier, *You are not a gadget: a manifesto* (New York: Knopf, 2010).
32. See Introduction, above.
33. The Ark engraving is not visible (remaining folded-over) in the Google Books copy of the *Essay*.
34. For a very lucid discussion, see Simon Glendinning, "Heidegger," in Berys Gaut and Dominic McIver Lopes (eds), *The Routledge Companion to Aesthetics* (London and New York: Routledge, 2001), 107–118.

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