

# **SILICON SIMULACRA**

## **Post-humans of the Machine Worlds**

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### **Chapter 1**

#### **From Human Nature to Normal People**

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# CHAPTER I

## FROM HUMAN NATURE TO NORMAL PEOPLE

We must improve our concrete experience of persons and things into ... general rules and principles but without being grounded in individual facts and feelings, we shall end as we began, in ignorance.

—William Hazlitt, *The Plain Speaker* (1826)

The efficiency of the great circuits—which we will soon enough all be hooked into and serving—is a direct function of their abstractness.

—Sven Birkerts, *The Gutenberg Elegies* (1994)

Francis Bacon’s aphorism “Knowledge is power” also goes in the other direction: the powerful create knowledge. Just as important and hardly surprising, the knowledge they create serves their interests. Since Biblical times, for example, governments everywhere have taken censuses of their populations to determine who to tax and who to conscript, just as they made maps to determine what lands to tax and where to fight.<sup>1</sup> Social statistics is no different. It was born in the mid-17<sup>th</sup> century as a way to apprehend the new terrain of modernizing society, flourished from the mid-19<sup>th</sup> century onward as a tool in top-down social governance and is today the predominant lens through which governments and businesses conjure us up as citizens and consumers.<sup>2</sup>

This way of perceiving human affairs makes certain assumptions about the world. The discipline's pioneers proudly acknowledged them and championed the new type of knowledge they yielded while contemporary critics loudly disparaged its axioms as well as its outputs. Little has changed. The assumptions upon which the method is based were baked in at birth and still frame us today. This chapter is old news to those familiar with the history of number, but for others a quick look at social statistics' origins reveals what's gained and what's lost in this distinctively modern view of self and society.

In the medieval period, collective life and the individual's place in that life were based on hierarchal social relationships defined by birthright and custom, including royals and their courts, estates and their privileges, lords and their vassals, guilds and their members among others. These relationships were undermined as modernization brought in new ways of deploying capital and organizing trade, new concentrations of populations in cities and new arrangements of production, distribution and consumption. To help governments grasp this new social terrain, two competing schools of fact gathering emerged in the mid-17<sup>th</sup> century: university statistics and political arithmetic.

Strongest in Germany, university statistics was a way of describing the state by tabulating its people, land, wealth and all the other resources available to it. In contrast, political arithmetic, strongest in England, sought to understand the natural order: patterns in births, deaths, marriages and other regularities of human life. This difference in purpose reflected a difference in how the two schools of statistics viewed the relationship between individuals and society.

The university statistics perspective was holistic. In theory, community precedes the individual and is the context from within which individuals emerge. Similarly, in practice, this school argued that the true forces of the state—nationalism, the genius of the people, the love of freedom and others—could not be reduced to individuals or expressed in numerical form. Indeed, much of university statistics was non-quantitative.

Diametrically opposed, the political arithmetic perspective was atomistic. It found solid ground in individuals and aggregated them up into communities. Its first appearance was John Graunt's 1662 presentation to England's Royal Society on London's birth and death rates, an analysis undertaken with the hope of creating an early warning system against bubonic plague. Its philosophical origins appeared a bit earlier in Thomas Hobbes' 1651 *Leviathan*, the founding treatise of English political theory. Borrowing heavily from the new science of physics, Hobbes resolved society into its simplest elements, aggregated individuals. Then, using "principles" of human nature and "laws" of psychology, he composed those elements into a logical whole.<sup>3</sup> Of course, Hobbes' principles and laws reflected his view of his world and the result was bleak: man owes nothing to his fellow men. Worse, individuals are in constant rivalry with and in constant danger from each other, thus necessitating authoritarian rule by monarchs. We got out from under Hobbesian despotism, but it took another century of socio-economic modernization and corresponding philosophizing before John Locke could construct a liberal political philosophy on the basis of "enlightened" self-interest and Adam Smith could do the same for self-regulating markets in the economy. The founding assumption, that the individual precedes the community, was stronger than ever, and in the contest between the two schools of gathering and presenting social facts, political arithmetic prevailed.<sup>4</sup>

In the 19th century this way of apprehending society developed rapidly in two ways. Information gathering shifted from episodic projects to regular monitoring, and its scope expanded to include health, labor conditions, education, delinquency, crime and other "moral statistics" about the lower depths of the new society. It helped answer a need created by the triumph of Enlightenment politics. In the new modern society neither the monarchy, the aristocracy or the clergy had any privileges when making assertions about the world,

for describing what is and what ought to be. Any project for society's reunification or even its tolerably harmonious governance needed a new basis of authority.

Into this vacuum stepped two new ways of apprehending the social world—ideology and the social sciences. Both were based on and appealed to reason, quite literally to the power of ideas as ways of seeing and thinking about the world for the tasks of mobilizing people and justifying collective action. Similarly, both relied on and championed the individual, newly released from customary social relationships, as the locus of power, not only for his capability but also for his moral responsibility to be rational. The ideologues focused on both what is and what ought to be, anchoring the latter in the former. The social sciences focused on what is but instead of what ought to be, they aimed more modestly for what could be better.<sup>5</sup> To the new social sciences, no method for apprehending collective life was more important than the new social statistics.

Ostensibly, this form of knowledge was objective. Its champions explicitly contrasted it to the traditional privileges of the elites to render their judgments in matters of social action, including how they measured things. In other words it was valued as much for its impartiality as for its truthfulness.<sup>6</sup> The aspiration to objectivity appeared prior to the birth of social statistics proper and continues to this day. The inventor of the calculus, binary code and much else, Gottfried Wilhelm Leibniz (1646—1716) hoped that one day all human disputes and questions of opinion would be solved by applied mathematics. Three centuries later, a leading champion of “the information society,” sociologist Daniel Bell, would have the same aspiration: “These methods seek to substitute algorithms, that is, decision rules, for judgment.”<sup>7</sup> The reality did not, however, always attain the objectivity that the new social statistics promised. Indeed, that problem—descriptions being (mis)used as evaluations—appeared at the very birth of this new discipline.

Technically, statistically “normal” means mathematically typical, but the 19<sup>th</sup> century moral reformers and social

engineers, who pioneered the use of statistics in public health, sanitation, education, penology and other areas, were all too prone to turn what is into what ought to be. Adolphe Quetelet, a leading 19<sup>th</sup> century champion of social statistics and inventor of *l'homme moyen*—the average man—illustrates how easily the normal became the normative:

Average man, provided he was absolutely defined, could be ... regarded as the model of beauty; whereas more significant deviations from his proportions, his faculties and abilities belonged to the realm of malformations and diseases; whatever was not just dissimilar to these proportions and forms but went beyond these observed extremes would have to be regarded as a monstrosity.<sup>8</sup>

The normal was good and the farther from normal one was, the more deviant one was. Thus, statistical normality and abnormality provided the “scientifically objective” rationale for the new social scientists to classify people as healthy or diseased, sane or insane, adjusted or alienated and so forth. They then prescribed, in some cases imposed, various reforming and improving regimes on those population segments that they found along the tails of their frequency distributions and in the “wrong” boxes of their classification schemes.<sup>9</sup>

Social scientists weren't the only ones who turned is into ought. Ideologues did as well. Those on the left did so explicitly while those on the right did so somewhat covertly. Political conservatives, for example, equated the statistically typical with what is normatively right, creating a self-fulfilling justification for the status quo. Cultural elitists applied a different twist: they saw the statistically normal as mediocrity, thus rationalizing their style of top-down efforts at improvement. Whether explicit or implicit, whether by ideologues or social scientists, whether from the left or the right, whether yesterday or today, the turning of descriptions into evaluations is a superficial problem; it resides in how statistics are

used. The root-level problem with social statistics was, and remains, the assumption that facts and values are separable.

Some asserted that the values that motivate humans—our ideals, aspirations and possibilities—are not observable as facts and excluded them. Others asserted that facts about us—our health, longevity, literacy and welfare—could be apprehended without regard to values and excluded them that way. Either way, social statistics makes the utilitarian promise to treat people as things. Of course, people are things, embodied entities in time and space, just like everything else in the carbon-based world. Our materiality is a matter of fact. It was and remains the particular promise of social statistics, however, to treat humans as things and only as things, achieved largely by bracketing off our qualities as unknowable and thus outside the domain of its quantitative analysis.

That is the root-level limitation in how the lens of statistics apprehends humans: much of what's most important to us, indeed what distinguishes us as human, is pre-scinded as unmeasurable. That, too, was apparent early on; indeed it was part of the rationale for creating the new discipline. Although social statistics saw the individual as the irreducible unit of society and represented the human experience as individuated, it could not, and still cannot, say anything about individuals. Individuals were, and remain, too variable and inconsistent, too complex and diverse to be the basis for any science of the social condition. The very *raison d'être* for creating social statistics was to provide an alternative. Although the individual could not be predicted or even understood, Quetelet's *l'homme moyen* could be.

A rave review of Quetelet's work, by astronomer John Herschel, made explicit all four elements of the new *social* statistics: its aspiration to govern human affairs, its reliance on the model of the physical sciences, its inability to measure what cannot be observed and the categorically social phenomenon that it could measure:

Statistics ... affords the only secure ground on which the truth or falsehood of the theories and hypotheses of that complicated science can be brought to the test. It is not unadvisedly that we use the term Dynamics as applied to the mechanism and movements of the social body, nor is it by any loose metaphor or strained analogy that much of the language of mechanical philosophy finds a parallel meaning in the discussion of such subjects ...

Number, weight, and measure are the foundations of all exact science; neither can any branch of human knowledge be held advanced which does not, in some way or other, frame its theories or correct its practice by reference to these elements.

What astronomical records or meteorological registers are to a rational explanation of the movements of the planets or of the atmosphere, statistical returns are to social and political philosophy. They assign, at determinate intervals, the numerical values of the variables which form the subject matter of its reasonings, or at least of such functions of them as are accessible to direct observation, which it is the business of sound theory so to analyze or combine as to educe from them those deeper-seated elements which enter into the expression of general laws.<sup>10</sup>

In other words, social statistics breaks down the social body into elements that can be numbered, weighed and measured and then proceeds to observe and capture our numerical values on those variables. It sees society as an aggregate of individuals but what it measures is individual *variability*, one observed value per individual along some yardstick of a common attribute. Advanced statistical procedures can turn descriptions into predictions, but again, the method predicts frequencies of behavior among a population of individuals. It can neither explain nor predict behaviors of individuals.

Quite the opposite, the technique of aggregating individuals brackets all the factors—motive, volition, knowledge and intent—that might actually explain, rather than just measure, the individual instance of the behavior under scrutiny.

Privileging measurement over understanding, social statistics did not sit well with two founding fathers of sociology. Auguste Comte (1798—1857) argued that human development follows three paths forward—theological, metaphysical and scientific. Social statistics, by slicing and dicing the human experience, just makes a muddle of what he thought most important in understanding what moves humans.

The criticism by Frédéric Le Play (1806—1882) was even more pointed. An avid quantifier but an ardent opponent of statistics, Le Play's chef d'oeuvre, the six-volume *Les Ouvriers Européens* (*European Workers*) scrutinized the household budgets of 36 representative working-class families across Europe. Following an older analytic tradition, he mixed his quantitative approach with qualitative elements: historical insights, singular facts and considered judgments. Here and elsewhere, he argued that one could learn from representative individuals more about the larger class they represented than from statistics because carefully chosen cases reveal better than mechanistic tabulations how people's needs, pleasures and, most important, their possibilities motivate them.

At the turn of the 20<sup>th</sup> century, the noted economist Alfred Marshall acknowledged the superiority of le Play's method over a purely statistical view for yielding insights about what actually moved individual consumers but also emphasized that the method required an analyst with le Play's talents. Unfortunately, the analysts working in government and business were "ordinary hands," and if they were to use such an approach, they would likely draw untrustworthy conclusions. A purely statistical view was less insightful but safer:

It may be noted that the method of Le Play's monumental *Les Ouvriers Européens* is the *intensive* study of all the details of the domestic life of a few care-

fully chosen families. To work it well requires a rare combination of judgment in selecting cases, of insight and sympathy in interpreting them. At its best, it is the best of all: but in ordinary hands it is likely to suggest more untrustworthy general conclusions than those obtained by the extensive method of collecting more rapidly very numerous observations, reducing them as far as possible to statistical form, and obtaining broad averages in which inaccuracies and idiosyncrasies may be trusted to counteract one another to some extent.<sup>11</sup>

In the 1920s, when the social research community tried to fill this insight gap by turning to the statistical study of attitudes, the same quantitative technique was used with the same results. Researchers isolated and extracted from their contexts various hopes and fears, laid each out on a linear scale or bipolar continuum, located individuals on such axes and counted up our variability on the attitude. Once again, statistical procedures delivered frequencies and percentages within populations but couldn't explain individuals.<sup>12</sup>

This didn't satisfy marketers, and in the 1940s they and their advertising agencies turned to qualitative research, initially to psychoanalytically inspired motivational research and later to techniques such as focus groups and one-on-one interviews, to get beyond measurement to explanation. The goal of such research methods is not to project findings from a sample onto an entire population but to gain from representative individuals insights about their goals and aspirations, exactly le Play's position a century earlier. The limitation of marketing data, the commercial cousin of social statistics, was reprised in Nicholas Samstag's 1966 essay for *Madison Avenue* magazine, "You Can't Make a Good Advertisement Out of Statistics" and again in 1980 by consumer researcher Morris Holbrook, who mocked the achievements of the data-based approach for its ability to capture everything except what's actually important to us:

Yes, we can build multi-attribute models that predict preference toward toothpaste; we can generate complex multidimensional spaces that represent perceptions of cigarettes; we can construct devilishly clever procedures that trace the acquisition of information on cereal brands; we can—with our bare hands—construct mighty regression analyses that relate detergent usage to 300 life-style variables. In short—when it comes to the factors of least importance to the consumer’s emotional, cultural and spiritual existence—we excel.<sup>13</sup>

Today, both advertising and data-based marketing rely on representative individuals from whom explanations may be acquired as to why consumers may buy, because marketing data cannot get there.

The limitation in using data to apprehend human affairs, then and now, reflects in large part the nature of all data and how all data are constructed. This is the problem of abstraction; that is, creating data about *any* reality requires performing radical surgery on that reality. The procedure for making a datum goes like this:

1. Isolate one particular feature embedded in a larger situation. Then, extract the feature by throwing away the larger situation.
2. Redefine the feature as a variable, the current status of which can be observed as a numerical value.
3. Observe an instance of the variable and record its current value at that moment. .

In short, isolate and extract, redefine and freeze is how a datum is born.

Yale computer scientist David Gelernter, a chief champion of using data and computerized databases to create a “mirror world” of real life, acknowledges but only in passing what this process tosses aside. The creation of every

data model, he writes, “seeks to identify and extract, that is, abstract from the rich and complex interrelationships among entities in the real world, those quantifiable attributes which if managed correctly promise to bring order and structure to that world, omitting whole tangles of facts and perceptions that never get sorted out.”<sup>14</sup> For Gelernter order and structure are the primary goals and are achieved by ignoring the jumbled tangles of human actuality.

No one can question the value of creating data about the world. Our species’ ability to arrange things in rows and columns predates our invention of numbers,<sup>15</sup> and after their invention, human life has required and progressed by counting, measuring and calculating. Data is knowledge in a form that can be combined or divided, compared and contrasted to broaden or narrow the scope over which its possessors assert knowledge, make decisions and achieve impact. Civilization could not exist if we hadn’t cut up the world into manipulatable units and that includes human affairs.

Around the time Francis Bacon said that knowledge is power, his contemporary Galileo Galilei said, “Nature is written in the language of mathematics.” It’s not likely he meant to include human nature, but that aspiration soon appeared in the works of G. W. Leibniz. The 17<sup>th</sup> century German polymath knew well that the process of abstraction cannot be applied everywhere. He made the point with quiet precision in “The Method of Mathematics” in the *Preface to the General Science*:

An ancient saying has it that God created everything according to weight, measure, and number. However, there are many things which cannot be weighed, whatever is not effected by force or power, and anything which is not divisible into parts escapes measurement.

In the very next sentence, however, he revealed the seductive appeal of number as such to those who would master the universe:

On the other hand, there is nothing which is not subsumable under number. Number is therefore, so to speak, a fundamental metaphysical form, and arithmetic a sort of statics of the universe, in which the powers of things are revealed.

Indeed, he was quite wrapped up in a Faustian ambition to create an algebra of human thought that could understand, resolve and govern human affairs:

It is obvious that if we could find characters or signs suited for expressing all our thoughts as clearly and as exactly as arithmetic expresses numbers or geometry expresses lines, we could do in all matters *insofar as they are subject to reasoning* all that we can do in arithmetic and geometry. For all investigations which depend on reasoning would be carried out by transposing these characters and by a species of calculus.<sup>16</sup>

Despite his skill at devising notational systems, Leibniz didn't make any progress on that score. Nor has anyone since then figured out a way in which data will free us from the responsibility of judgment or, as Daniel Bell hopes, put an end to ideology and other contestations. The language of mathematics is sufficient for measuring nature because phenomena like heat, speed and gravity don't have hopes and dreams, but when applied to human affairs, as in social statistics and its descendants, there's just too much about what makes us tick that is not "subject to reasoning" and that data cannot capture.

Specifically, data cannot capture our qualities or our possibilities. Isaiah Berlin was among many philosophers who argued that our "purposes, motives, acts of will, decisions, doubts, hesitations, thoughts, hopes, fears, desires and so forth...are among the ways that we distinguish human beings from the rest of nature." Ernst Bloch was among many

philosophers who argued that the observable is not our only reality "The presence which is usually called reality," he wrote, "is surrounded by a tremendously greater ocean of objectively real possibility ... We live surrounded by possibility, not merely by presence. In the prison of mere presence we could not even move nor even breathe." An anonymous versifier combined both limitations in a simple analogy:

In modern thought (if not in fact)  
Nothing is that doesn't act.  
So that is reckoned wisdom which  
Describes the scratch but not the itch.<sup>17</sup>

Counting how often we scratch is essential to human life, but however precise and predictive our counting, it doesn't explain the itch. The itch is what we omit when we turn away from the unmeasurables of human nature and focus on counting how often we scratch.

It is easy to overstate the power of data. The 20<sup>th</sup> century economist Joseph Schumpeter, for example, saw our increasingly quantitative habits of mind, once established in and by the economy, commence "upon a conqueror's career subjugating—rationalizing—man's tools and philosophies, his medical practice, his picture of the cosmos, his outlook on life, everything in fact including his concepts of beauty and justice and his spiritual ambitions."<sup>18</sup> Schumpeter and others credit data with capabilities it doesn't have. The concepts and ambitions that have impelled and enabled humankind, individually and collectively, to give our lives meaningful direction cannot be stated exactly and cannot be captured as data. As data becomes the predominant lens for understanding and action in human affairs, it doesn't so much subjugate or rationalize; it just pushes off the stage those cultural traditions that do express our qualities and our possibilities.<sup>19</sup> It's a surreptitious coercion into cultural amnesia.

Certainly, our qualities and possibilities don't come with us as we assimilate into the datascape. In the great circuits



we are integrated as always-on transceivers in a continuous two-way flow of data that feeds a pervasive system of reciprocally governing humans and machines that informs decision making about the made and natural environments in which we live. The vision of Joel de Rosney is typical:

This hybrid life, at once biological, mechanical and electronic, is still coming into being before our very eyes. And we are its cells. In a still unconscious way, we are contributing to the invention of its metabolism, its circulation and its nervous system. We call them economies, markets, roads, communications, networks and electronic highways, but they are the organs and vital systems of an emerging super-organism.<sup>20</sup>

Constructing human affairs in terms a machine can read has proven hugely effective in optimizing the status quo, always yielding something a little bit better over the course of time, and without question this data-based leviathan will continue to increase our efficiency and effectiveness in instrumental action. But whatever is pulsing along these circuits doesn't include much of what counts most to humans.

Alfred North Whitehead warned against “the taking as real of something, whether a physical thing or a scientific conception, that has been abstracted from reality for special purposes of thought,”<sup>21</sup> and it applies here, to the hypothetical “persons” populating the datascape. Reducing ourselves into versions that a machine can read explains why the outcomes of this crunching and processing don't and can't satisfy us at certain levels: ersatz versions of us go in, and ersatz answers about us come out. At the same time, the ersatz inputs and outputs still advance the commercial and administrative purposes of those who built, own and operate the apparatus.

Although these limitations of social statistics were baked in at birth, this way of apprehending human affairs took on the large-scale proportions of a technology in the Heideggerian

sense in the 1970s when marketing, the function responsible for managing the demand side of supply and demand, embraced the use of data on a broad scale and with ever-greater sophistication. The enabling factors were the rapid drop in the price of computing processing power for businesses and the availability of machine-readable household- and individual-level data. But the cause was an epochal shift in the economy to which we now turn.

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#### Notes

1 The first half of Otis Dudley Duncan, *Notes on Social Measurement: Historical and Critical* (New York: Russell Sage Foundation, 1984) is an easy, almost breezy history of social measurement from Homer and Herodotus to the modern period. Harold Innis, *The Bias of Communication* (Toronto: University of Toronto Press, 1951) explores the role of data collection in “territorial management” in early civilizations; Armand Mattelart, *The Invention of Communication* (Minneapolis: University of Minnesota Press, 1996) does the same for France, Germany and England in the 19th and 20th centuries.

2 For histories of statistics and probability, none are better than Ian Hacking, *The Emergence of Probability: A Philosophical Study of Early Ideas about Probability, Induction and Statistical Inference* (Cambridge, UK: Cambridge University Press, 1975) and *The Taming of Chance* (New York: Cambridge University Press, 1990).

3 J.W.N. Watkins, “Philosophy and Politics in Hobbes,” *Philosophical Quarterly*, vol. v (1959), 125—146 explains Hobbes' reliance on the physical sciences.

4 In the United States, political arithmetic triumphed with the seventh federal census of 1850. For the first time, statistics on the nation were reported not by families but by individuals and went

beyond enumeration to include facts on social and economic life: on agriculture and industry, schools and colleges, churches, libraries, newspapers, pauperism, crime and wages. To put this in context, James Madison had been rebuffed for even suggesting that the 1790 census document the differences among the country's agricultural, commercial and manufacturing interests. See Patricia Cline Cohen, *A Calculating People: The Spread of Numeracy in Early America* (New York: Routledge, 1999), 159—164.

5 Alvin W. Gouldner, *The Dialectic of Ideology and Technology: The Origins, Grammar and Future of Ideology* (New York: Oxford University Press, 1982), 23—67 compares social science and ideology as new ways of apprehending the world and mobilizing action that emerged in the 19th century.

6 Witold Kula, *Measures and Men* (Princeton: Princeton University Press, 1986) recounts how elites measured things before measurement was standardized. Theodore M. Porter, "Objectivity as Standardization: The Rhetoric of Impersonality in Measurement, Statistics and Cost-Benefit Analysis" in Allan Megill, ed. *Rethinking Objectivity* (Durham, NC: Duke University Press, 1994), 197—238, especially 206—210, explains the new "fairness."

7 Daniel Bell, "The Social Framework of the Information Society," in Michael I. Dertouzos and Joel Moses, eds., *The Computer Age: A Twenty-Year View* (Cambridge, MA: MIT Press, 1979), 167.

8 Quoted in Wolfgang Pircher, "Tours Through the Back-Country of Imperfectly Informed Society" in Jennifer Daryl Slack and Fred Fejes, eds., *The Ideology of the Information Age* (Norwood, NJ: Ablex Publishing Company, 1987), 69.

9 The perils in applying classification schemes to people are explored in Ian Hacking, "Making People Up," in Thomas C. Heller et al., eds., *Reconstructing Individualism: Autonomy, Individuality and the Self in Western Thought* (Stanford: Stanford University Press, 1986), 222—236 and Geoffrey C. Bowker and Susan Leigh Starr,

*Sorting Things Out: Classification and Its Consequences* (Cambridge, MA: The MIT Press, 1999).

10 Quoted in Duncan, 97.

11 Alfred Marshall, *Principles of Economics* [1890] (London: Macmillan, 1920), 116.

12 Gard Gigerenzer et al., *The Empire of Chance: How Probability Changed Science and Everyday Life* (Cambridge, UK: Cambridge University Press, 1989), 251—255 and Donald Fleming, "Attitude: The History of a Concept," *Perspectives in American History* 1 (1967), 287—265 explore the efforts to quantify attitudes. Duncan, 172—176, reviews the technical challenges, the most important of which persist to this day.

13 Morris B. Holbrook, "Introduction: The Esthetic Imperative in Consumer Research," in Elizabeth C. Hirschman and Morris B. Holbrook, eds., *Symbolic Consumer Behavior* (Ann Arbor: Association for Consumer Research, 1980), 36. Jan S. Slater, "Qualitative Research in Advertising" in John Philip Jones, ed., *How Advertising Works: The Role of Research* (Thousand Oaks, CA: Sage Publications, 1988), 121—135 explains the role and offers a good review of qualitative research techniques.

14 David Gelertner, *Mirror Worlds: or the Day Software Puts the Universe in a Shoebox... How It Will Happen and What It Will Mean* (New York: Oxford University Press, 1991). It's worth noting that data can measure but not explain change either. A datum is created when a variable is observed and its present status recorded as a value, but there's nothing in-between the points of data that explains the change in status from one moment to the next.

15 Jack Goody, *The Domestication of the Savage Mind* (London: Cambridge University Press, 1978), 52—112.

16 G.W. Leibniz, “The Method of Mathematics” in Roger Bishop Jones, trans., *Preface to the General Science*, [www.rbjones.com/rbj-pub/philos/classics/leibniz/meth\\_math.htm](http://www.rbjones.com/rbj-pub/philos/classics/leibniz/meth_math.htm).

17 Isaiah Berlin, *Vico & Herder: Two Studies in the History of Ideas* (New York: Vintage, 1977) 22; Ernst Bloch, “Man (sic) as Possibility,” *Cross Currents*, vol. 18 (1968), 273—283. The source of the anonymous quatrain is Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964), 25.

18 Joseph Schumpeter, *Capitalism, Socialism and Democracy* (New York: Harper & Row, 1942), 124.

19 The classic statement of this concern by a computer scientist is Joseph Weizenbaum, *Computer Power and Human Reason: From Judgment to Calculation* (San Francisco: W.H. Freeman & Company, 1976).

20 Joel de Rosnay, *The Symbiotic Man: A New Understanding of the Organization of Life and a Vision of the Future* (New York: McGraw-Hill, 2000), xxii—xxiii.

21 Alfred North Whitehead, *Science and the Modern World* (New York: Macmillan, 1925), 79.

## CHAPTER 2

### BEING DIFFERENT FROM THE JONESES

We are just statistics, born to consume resources.

—Horace, *Epistles* I.2

For every man alone thinks he hath got  
To be a Phoenix, and that then can be  
None of that kind which he is but he.

—John Donne, *First Anniversarie* (1611)

Quaker Oats cereal, Ivory soap, Nabisco crackers and many other consumer goods we know well were introduced to American households during the last decades of the 19<sup>th</sup> century. They were products of the Industrial Revolution, a transformation in the use of energy that yielded mechanized factories, the railroad grid and telegraphy. They became national brands with the advent of mass media. That milestone is usually marked by the passage of the Postal Act of 1879, which gave magazines low-cost mailing privileges, but its business model took a while longer to gel. In 1893, Frank Munsey realized that reducing the price of *Munsey’s Magazine* to below cost would attract a much larger circulation, which in turn would attract much more advertiser spending. He figured correctly: the increased advertiser revenue far exceeded the decreased reader revenue and generated large profits. And that’s how advertising-supported mass media was born.