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- Neil Postman

This issue of **Reprint Mailing** features a transcript (unedited) of
Charlayne Hunter-Gault's conversation with Neil Postman, author of
Technopoly: The Surrender of Culture to Technology *, who chairs the
Department of Communication Arts and Sciences at New York University.
The program was aired on PBS, July 25, 1995. A reprint of Invisible
Technologies (Chapter 8 of *Technopoly)* follows the transcript.

*Vintage Books-Random House, Inc., 1993.

SERIES - CYBERFUTURE

MR. MAC NEIL: Now, the second in a series of conversations on a place called cyberspace. What is it and what does it mean for our lives? Tonight Charlayne Hunter-Gault talks with author and media scholar Neil Postman, who heads the culture and communications department at New York University. One of his books is entitled Technopoly, the Surrender of Culture to Technology.

MS. HUNTER-GAULT: Neil Postman, thank you for joining us. How do you define cyberspace?

NEIL POSTMAN, Media Scholar: Cyberspace is a metaphorical idea which is supposed to be the space where your consciousness is located when you're using computer technology on the Internet, for example, and I'm not entirely sure it's such a useful term, but I think that's what most people mean by it.

MS. HUNTER-GAULT: How does that strike you, I mean, that your consciousness is located somewhere other than in your body?

NEIL POSTMAN: Well, the most interesting thing about the term for me is that it made me begin to think about where one's consciousness is when interacting with other kinds of media, for example, even when you're reading, where, where are you, what is the space in which your consciousness is located, and when you're watching television, where, where are you, who are you, because people say with the Internet, for example, it's a little different in that you're always interacting or most of the time with another person. And when you're in cyberspace, I suppose you can be anyone you want, and I think as this program indicates, it's worth, it's worth talking about because this is a new idea and something very different from face-to-face co-presence with another human being.

MS. HUNTER-GAULT: Do you think this is a good thing, or a bad thing, or you haven't decided?

NEIL POSTMAN: Well, no, I've mostly--(laughing)--I've mostly decided that new technology of this kind or any other kind is a kind of Faustian bargain It always gives us something important but it also takes away something that's important. That's been true of the alphabet and the printing press and telegraphy right up through the computer. For instance, when I hear people talk about the information superhighway, it will become possible to shop at home and bank at home and get your texts at home and get entertainment at home and so on, I often wonder if this doesn't signify the end of any meaningful community life. I mean, when two human beings get together, they're co-present, there is built into it a certain responsibility we have for each other, and when people are co-present in family relationships and other relationships, that responsibility is there. You can't just turn off a person. On the Internet, you can. And I wonder if this doesn't diminish that built-in, human sense of responsibility we have for each other. Then also one wonders about social skills; that after all, talking to someone on the Internet is a different proposition from being in the same room with someone--not in terms of responsibility but just in terms of revealing who you are and discovering who the other person is. As a matter of fact, I'm one of the few people not only that you're likely to interview but maybe ever meet who is opposed to the use of personal computers in school because school, it seems to me, has always largely been about how to learn as part of a group. School has never really been about individualized learning but about how to be socialized as a citizen and as a human being, so that we, we have important rules in school, always emphasizing the fact that one is part of a group. And I worry about the personal computer because it seems, once again to emphasize individualized learning, individualized activity.

MS. HUNTER-GAULT: What images come to your mind when you, when you think about what our lives will be like in cyberspace?

NEIL POSTMAN: Well, the, the worst images are of people who are overloaded with information which they don't know what to do with, have no sense of what is relevant and what is irrelevant, people who become information junkies.

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MS. HUNTER-GAULT: What do you mean? How do you mean that?

NEIL POSTMAN: Well, the problem in the 19th century with information was that we lived in a culture of information scarcity and so humanity addressed that problem beginning with photography and telegraphy and the--in the 1840s. We tried to solve the problem of overcoming the limitations of space, time, and form. And for about a hundred years, we worked on this problem, and we solved it in a spectacular way. And now, by solving that problem, we created a new problem, that people have never experienced before, information glut, information meaninglessness, information incoherence. I mean, if there are children starving in Somalia or any other place, it's not because of insufficient information. And if crime is rampant in the streets in New York and Detroit and Chicago or wherever, it's not because of insufficient information. And if people are getting divorced and mistreating their children and their sexism and racism are blights on our social life, none of that has anything to do with inadequate information. Now, along comes cyberspace and the information superhighway, and everyone seems to have the idea that, ah, here we can do it; if only we can have more access to more information faster and in more diverse forms at long last, we'll be able to solve these problems. And I don't think it has anything to do with it.

MS. HUNTER-GAULT: Do you believe that this--that the fact that people are more connected globally will lead to a greater degree of homogenization of the global society?

NEIL POSTMAN: Here's the puzzle about that, Charlayne. When everyone was--when McLuhan talked about the world becoming a global village and, and when people ask, as you did, about how connections can be made, everyone seemed to think that the world would become in, in some good sense more homogenous. But we seem to be experiencing the opposite. I mean, all over the world, we see a kind of reversion to tribalism. People are going back to their tribal roots in order to find a sense of identity. I mean, we see it in Russia, in Yugoslavia, in Canada, in the United States, I mean, in our own country. Why is that every group now not only is more aware of its own grievances but seems to want its own education? You know, we want an Afro-centric curriculum and a Korean-centric curriculum, and a Greek-centered curriculum. What is it about all this globalization of communication that is making people return to more--to smaller units of identity? It's a puzzlement.

MS. HUNTER-GAULT: Well, what do you think the people, society should be doing to try and anticipate these negatives and be able to do something about them?

NEIL POSTMAN: I think they should--everyone should be sensitive to certain questions. For example, when a new--confronted with a new technology, whether it's a cellular phone or high definition television or cyberspace or Internet, the question--one question should be: What is the problem to which this technology is a solution? And the second question would be: Whose problem is it actually? And the third question would be: If there is a legitimate problem here that is solved by the technology, what other problems will be created by my using this technology? About six months ago, I bought a new Honda Accord, and the salesman told me that it had cruise control. And I asked him, "What is the problem to which cruise control is the solution?" By the way, there's an extra charge for cruise control. And he said no one had ever asked him that before but then he said, "Well, it's the problem of keeping your foot on the gas." And I said, "Well, I've been driving for 35 years. I've never found that to be a problem." I mean, am I using this technology, or is it using me, because in a technological culture, it is very easy to be swept up in the enthusiasm for technology, and of course, all the technophiles around, all the people who adore technology and are promoting it everywhere you turn.

MS. HUNTER-GAULT: Well, Neil Postman, thank you for all of your cautions.

NEIL POSTMAN: Thank you.

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Invisible Technologies

If we define ideology as a set of assumptions of which we are barely conscious but which nonetheless directs our efforts to give shape and coherence to the world, then our most powerful ideological instrument is the technology of language itself. Language is pure ideology. It instructs us not only in the names of things but, more important, in what things can be named. It divides the world into subjects and objects. It denotes what events shall be regarded as processes, and what events, things. It instructs us about time, space, and number, and forms our ideas of how we stand in relation to nature and to each other. In English grammar, for example, there are always subjects who act, and verbs which are their actions, and objects which are acted upon. It is a rather aggressive grammar, which makes it difficult for those of us who must use it to think of the world as benign. We are obliged to know the world as made up of things pushing against, and often attacking, one another.

Of course, most of us, most of the time, are unaware of how language does its work. We live deep within the boundaries of our linguistic assumptions and have little sense of how the world looks to those who speak a vastly different tongue. We tend to assume that everyone sees the world in the same way, irrespective of differences in language. Only occasionally is this illusion challenged, as when the differences between linguistic ideologies become noticeable by one who has command over two languages that differ greatly in their structure and history. For example, several years ago, Susumu Tonegawa, winner of the 1987 Nobel Prize in Medicine, was quoted in the newspaper *Yomiuri* as saying that the Japanese language does not foster clarity or effective understanding in scientific research. Addressing his countrymen from his post as a professor at MIT in Cambridge, Massachusetts, he said, "We should consider changing our thinking process in the field of science by trying to reason in English." It should be noted that he was not saying that English is better than Japanese; only that English is better than Japanese for the purposes of scientific research, which is a way of saying that English (and other Western languages) have a particular ideological bias that Japanese does not. We call that ideological bias "the scientific outlook." If the scientific outlook seems natural to you, as it does to me, it is because our language makes it appear so. What we think of as reasoning is determined by the character of our language. To reason in Japanese is apparently not the same thing as to reason in English or Italian or German.

To put it simply, like any important piece of machinery— television or the computer, for example—language has an ideological agenda that is apt to be hidden from view. In the case of language, that agenda is so deeply integrated into our personalities and world-view that a special effort and, often, special training are required to detect its presence. Unlike television or the computer, language appears to be not an extension of our powers but simply a natural expression of who and what we are. This is the great secret of language: Because it comes from

inside us, we believe it to be a direct, unedited, unbiased, apolitical expression of how the world really is. A machine, on the other hand, is outside of us, clearly created by us, modifiable by us, even discardable by us; it is easier to see how a machine re-creates the world in its own image. But in many respects, a sentence functions very much like a machine, and this is nowhere more obvious than in the sentences we call questions.

As an example of what I mean, let us take a "fill-in" question, which I shall require you to answer exactly if you wish full credit:

Thomas Jefferson died in the year ———.

Suppose we now rephrase the question in multiple-choice form:

Thomas Jefferson died in the year (a) 1788 (b) 1826 (c) 1926 (d) 1809.

Which of these two questions is easier to answer? I assume you will agree with me that the second question is easier unless you happen to know precisely the year of Jefferson's death, in which case neither question is difficult. However, for most of us who know only roughly when Jefferson lived, Question Two has arranged matters so that our chances of "knowing" the answer are greatly increased. Students will always be "smarter" when answering a multiple-choice test than when answering a "fill-in" test, even when the subject matter is the same. A question, even of the simplest kind, is not and can never be unbiased. I am not, in this context, referring to the common accusation that a particular test is "culturally biased." Of course questions can be culturally biased. (Why, for example, should anyone be asked about Thomas Jefferson at all, let alone when he died?) My purpose is to say that the structure of any question is as devoid of neutrality as is its content. The form of a question may ease our way or pose obstacles. Or, when even slightly altered, it may generate antithetical answers, as in the case of the two priests who, being unsure if it was permissible to smoke and

pray at the same time, wrote to the Pope for a definitive answer. One priest phrased the question "Is it permissible to smoke while praying?" and was told it is not, since prayer should be the focus of one's whole attention; the other priest asked if it is permissible to pray while smoking and was told that it is, since it is always appropriate to pray. The form of a question may even block us from seeing solutions to problems that become visible through a different question. Consider the following story, whose authenticity is questionable but not, I think, its point:

Once upon a time, in a village in what is now Lithuania, there arose an unusual problem. A curious disease afflicted many of the townspeople. It was mostly fatal (though not always), and its onset was signaled by the victim's lapsing into a deathlike coma. Medical science not being quite so advanced as it is now, there was no definite way of knowing if the victim was actually dead when burial appeared seemly. As a result, the townspeople feared that several of their relatives had already been buried alive and that a similar fate might await them. How to overcome this uncertainty was their dilemma.

One group of people suggested that the coffins be well stocked with water and food and that a small air vent be drilled into them, just in case one of the "dead" happened to be alive. This was expensive to do but seemed more than worth the trouble. A second group, however, came up with a less expensive and more efficient idea. Each coffin would have a twelve-inch stake affixed to the inside of the coffin lid, exactly at the level of the heart. Then, when the coffin was closed, all uncertainty would cease.

The story does not indicate which solution was chosen, but for my purposes the choice is irrelevant. What is important to note is that different solutions were generated by different questions. The first solution was an answer to the question, How can we make sure that we do not bury people who are still

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alive? The second was an answer to the question, How can we make sure that everyone we bury is dead?

Questions, then, are like computers or television or stethoscopes or lie detectors, in that they are mechanisms that give direction to our thoughts, generate new ideas, venerate old ones, expose facts, or hide them. In this chapter, I wish to consider mechanisms that act like machines but are not normally thought of as part of Technopoly's repertoire. I must call attention to them precisely because they are so often overlooked. For all practical purposes, they may be considered technologies— technologies in disguise, perhaps, but technologies all the same.

Aside from language itself, I don't suppose there is a clearer example of a technology that doesn't look like one than the mathematical sign known as zero. A brief word about it may help to illuminate later examples.

The zero made its way from India to Europe in the tenth century. By the thirteenth century, it had taken hold of Western consciousness. (It was unknown to the Romans and the classical Greeks, although analogous concepts were known to Babylonian mathematicians of the Hellenistic period.) Without the zero, you will find it difficult to perform any of the calculations that are quite simple to do with it. If you should try multiplying MMMMMM by MMDCXXVI, you will have this point confirmed. I have been told, by the way, that such a calculation *can* be done, but the process is so laborious that the task is unlikely to be completed, a truth that did not escape the notice of medieval mathematicians. There is, in fact, no evidence that Roman numerals were ever used, or intended to be used, for calculation. For that purpose, mathematicians used an abacus, and between the tenth and thirteenth centuries, a struggle of sorts took place between abacists, who wrote Roman numerals but calculated with the abacus, and algorists, who used Hindu numerals employing the zero sign. The objection raised by the abacists was that the zero registered the *absence* of a power of

ten, which no Roman numeral did, and which struck them as philosophically and perhaps aesthetically offensive. After all, the zero is a sign that affects values of numerals wherever it occurs but has no value in itself. It is a sign about signs, whose very etymology, via "cipher" from the Hindu word for "void," suggests the idea of "nothingness." To the abacists, it was a bizarre idea to have a sign marking "nothing," and I fear that I would have sided with the abacists.

I speak of the zero for two reasons: First, to underscore that it is a kind of technology that makes both possible and easy certain kinds of thoughts which, without it, would remain inaccessible to the average person. If it does not exactly have an ideology, it contains, at least, an idea. I have previously alluded to the technology of using letters or numbers to grade students' papers, and to the Greek discovery of the technology of alphabetization: like the use of zero, these are examples of how symbols may function like machines in creating new mind-sets and therefore new conceptions of reality. Second, the use of the zero and, of course, the Hindu numbering system of which it was a part made possible a sophisticated mathematics which, in turn, led to one of the most powerful technologies now in use: statistics.

Statistics makes possible new perceptions and realities by making visible large-scale patterns. Its uses in science are too well known to warrant notice here, except to remark that if, as the physicists tell us, the world is made up of probabilities at the level of subatomic particles, then statistics is the only means by which to describe its operations. Indeed, the uncertainty principle ensures that in the nature of things physics is unable to do more than make statistical predictions.

Of course, it is possible that physicists conceive of the world as probabilistic *because* statistics was invented. But that is not the question I wish to pursue here. A more practical question is, To what extent has statistics been allowed entry to places

where it does not belong? Technopoly, by definition, grants free rein to any technology, and we would expect that no limits have been placed on the use of statistics. We would expect correctly.

Perhaps the most abusive example is found in the work of Francis Galton, who was born in 1822, died in 1911, and therefore lived during the richest period of technological invention. He may be thought of as one of the Founding Fathers of Technopoly. Galton is also known as the founder of "eugenics," a term he coined, which means the "science" of arranging marriage and family so as to produce the best possible offspring based on the hereditary characteristics of the parents. He believed that anything could be measured and that statistical procedures, in particular, were the technology that could open the pathway to real knowledge about every form of human behavior. The next time you watch a televised beauty contest in which women are ranked numerically, you should remember Francis Galton, whose pathological romance with numbers originated this form of idiocy. Being unsatisfied with vagueness about where the most "beauty" was to be found, he constructed a "beauty map" of the British Isles. As he told us, he classified "the girls I passed in streets or elsewhere as attractive, indifferent, or repellent." He then proved statistically that London had the most beautiful girls, Aberdeen the ugliest; this no doubt made it awkward for Galton to spend his vacation in Scotland. If this were not enough, he also invented a method for quantifying boredom (by counting the number of fidgets) and even proposed a statistical inquiry for determining the efficacy of prayer.

But Galton's main interest was in demonstrating, statistically, the inheritance of intelligence. To that end, he established a laboratory at the International Exposition of 1884, where for threepence people could have their skulls measured and receive Galton's assessment of their intelligence. Apparently, a visitor received no extra credit for demanding his or her money back, which would surely have been a sign of intelligence. We can be sure that not many did, since Galton was considered a major intellect of his day. In fact, Lewis Terman, the man most responsible for promoting IQ tests in America, calculated that Galton's IQ was more than 200. Terman, who fancied making such estimates of the dead, ranked Charles Darwin (Galton's cousin, incidentally) at a mere 135, and poor Copernicus somewhere between 100 and 110.[1]

For a definitive history and analysis of the malignant role played by statistics in the "measurement" of intelligence, I refer the reader to Stephen Jay Gould's brilliant book *The Mismeasure of Man*. Here, I will only cite three points made by Gould, which I believe are sufficient to convince anyone with a higher IQ than Copernicus of the dangers of abusing statistics.

The first problem is called reification, which means converting an abstract idea (mostly, a word) into a thing. In this context, reification works in the following way: We use the word "intelligence" to refer to a variety of human capabilities of which we approve. There is no such thing as "intelligence." It is a word, not a thing, and a word of a very high order of abstraction. But if we believe it to be a thing like the pancreas or liver, then we will believe scientific procedures can locate it and measure it.

The second problem is ranking. Ranking requires a criterion for assigning individuals to their place in a single series. As Gould remarks, what better criterion can be used than an objective number? In the ranking of intelligence, we therefore assume that intelligence is not only a thing, but a single thing, located in the brain, and accessible to the assignment of a number. It is as if "beauty" were determined to inhere in the size of a woman's breasts. Then all we would have to do is measure breasts and rank each woman accordingly; and we would have an "objective" measure of "beauty."

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The third point is that in doing this, we would have formulated our question "Who is the fairest of all?" in a restricted and biased way. And yet this would go unnoticed, because, as Gould writes, "The mystique of science proclaims that numbers are the ultimate test of objectivity." This means that the way we have defined the concept will recede from our consciousness—that is, its fundamental subjectivity will become invisible, and the objective number itself will become reified. One would think that such a process would appear ridiculous on the breast of it, especially since, by believing it, we must conclude that Dolly Parton is objectively proved to be more beautiful than Audrey Hepburn. Or, in the case of intelligence, that Galton had twice as much of it as Copernicus.

Nonetheless, in Technopoly all this is taken very seriously, albeit not without a few protests. After a lifetime of working in the field of intelligence measurement, E. L. Thorndike observed that intelligence tests suffer from three small defects: "Just what they measure is not known; how far it is proper to add, subtract, multiply, divide, and compute ratios with the measures obtained is not known; just what the measures signify concerning intellect is not known."[2] In other words, those who administer intelligence tests quite literally do not know what they are doing. That is why David McClelland remarked, "Psychologists should be ashamed of themselves for promoting a view of general intelligence that has engendered such a testing program." Joseph Weizenbaum summed it up by saying, "Few 'scientific' concepts have so thoroughly muddled the thinking of both scientists and the general public as that of the 'intelligence quotient' or 'IQ.' The idea that intelligence can be quantitatively measured along a single linear scale has caused untold harm to our society in general, and to education in particular."[3]

Gould has documented some of this harm, and Howard Gardner has tried to alleviate it (in his book *Frames of Mind*). But Technopoly resists such reproaches, because it needs to believe

that science is an entirely objective enterprise. Lacking a lucid set of ethics and having rejected tradition, Technopoly searches for a source of authority and finds it in the idea of statistical objectivity.

This quest is especially evident not only in our efforts to determine precisely how smart people are but also in our attempts to find out precisely how smart *groups* of people are. Aside from the fact that the procedures used do not and *cannot* give such an answer, one must ask, Of what earthly use is it to declare that one group of people is smarter than another? Suppose it is shown that according to objective measures Asians have more "intelligence" than Caucasians, or that Caucasians have more than African-Americans. Then what? Of what use is this information to, say, a teacher or an employer? Is the teacher or employer to assume that a particular Asian is smarter than a particular African-American? Or even that six Asians are smarter than six African-Americans? Obviously not. And yet who knows? We must keep in mind the story of the statistician who drowned while trying to wade across a river with an average depth of four feet. That is to say, in a culture that reveres statistics, we can never be sure what sort of nonsense will lodge in people's heads.

The only plausible answer to the question why we use statistics for such measurements is that it is done for sociopolitical reasons whose essential malignancy is disguised by the cover of "scientific inquiry." If we believe that blacks are dumber than whites, and that this is not merely our opinion but is confirmed by objective measures, then we can believe we have an irreproachable authority for making decisions about the allocation of resources. This is how, in Technopoly, science is used to make democracy "rational."

Polling is still another way. Just as statistics has spawned a huge testing industry, it has done the same for the polling of "public opinion." One may concede, at the start, that there are

some uses of polling that may be said to be reliable, especially if the case involves a greatly restricted question such as, Do you plan to vote for X or Y? But to say a procedure is reliable is not to say it is useful. The question is as yet undecided whether knowledge of voter trends during a political campaign enriches or demeans the electoral process. But when polls are used to guide public policy, we have a different sort of issue altogether.

I have been in the presence of a group of United States congressmen who were gathered to discuss, over a period of two days, what might be done to make the future of America more survivable and, if possible, more humane. Ten consultants were called upon to offer perspectives and advice. Eight of them were pollsters. They spoke of the "trends" their polling uncovered; for example, that people were no longer interested in the women's movement, did not regard environmental issues as of paramount importance, did not think the "drug problem" was getting worse, and so on. It was apparent, at once, that these polling results would become the basis of how the congressmen thought the future should be managed. The ideas the congressmen had (all men, by the way) receded to the background. Their own perceptions, instincts, insights, and experience paled into irrelevance. Confronted by "social scientists," they were inclined to do what the "trends" suggested would satisfy the populace.[4]

It is not unreasonable to argue that the polling of public opinion puts democracy on a sound and scientific footing. If our political leaders are supposed to represent us, they must have some information about what we "believe." In principle, there is no problem here. The problems lie elsewhere, and there are at least four of them.

The first has to do with the forms of the questions that are put to the public. I refer the reader to the matter of whether it is proper to smoke and pray at the same time. Or, to take a more realistic example: If we ask people whether they think it accept-

able for the environment to continue to be polluted, we are likely to come up with answers quite different from those generated by the question, Do you think the protection of the environment is of paramount importance? Or, Do you think safety in the streets is more important than environmental protection? The public's "opinion" on almost any issue will be a function of the question asked. (I might point out that in the seminar held by the congressmen, not one asked a question about the questions. They were interested in results, not in how these were obtained, and it did not seem to occur to them that the results and how they are obtained are inseparable.)

Typically, pollsters ask questions that will elicit yes or no answers. Is it necessary to point out that such answers do not give a robust meaning to the phrase "public opinion"? Were you, for example, to answer "No" to the question "Do you think the drug problem can be reduced by government programs?" one would hardly know much of interest or value about your opinion. But allowing you to speak or write at length on the matter would, of course, rule out using statistics. The point is that the use of statistics in polling changes the meaning of "public opinion" as dramatically as television changes the meaning of "political debate." In the American Technopoly, public opinion is a yes or no answer to an unexamined question.

Second, the technique of polling promotes the assumption that an opinion is a thing inside people that can be exactly located and extracted by the pollster's questions. But there is an alternative point of view, of which we might say, it is what Jefferson had in mind. An opinion is not a momentary thing but a process of thinking, shaped by the continuous acquisition of knowledge and the activity of questioning, discussion, and debate. A question may "invite" an opinion, but it also may modify and recast it; we might better say that people do not exactly "have" opinions but are, rather, involved in "opinioning." That an opinion is conceived of as a measurable thing

falsifies the process by which people, in fact, do their opinion-ing; and how people do their opinioning goes to the heart of the meaning of a democratic society. Polling tells us nothing about this, and tends to hide the process from our view.

Which leads to the third point. Generally, polling ignores what people know about the subjects they are queried on. In a culture that is not obsessed with measuring and ranking things, this omission would probably be regarded as bizarre. But let us imagine what we would think of opinion polls if the questions came in pairs, indicating what people "believe" and what they "know" about the subject. If I may make up some figures, let us suppose we read the following: "The latest poll indicates that 72 percent of the American public believes we should withdraw economic aid from Nicaragua. Of those who expressed this opinion, 28 percent thought Nicaragua was in central Asia, 18 percent thought it was an island near New Zealand, and 27.4 percent believed that 'Africans should help themselves,' obvi-ously confusing Nicaragua with Nigeria. Moreover, of those polled, 61.8 percent did not know that we give economic aid to Nicaragua, and 23 percent did not know what 'economic aid' means." Were pollsters inclined to provide such information, the prestige and power of polling would be considerably re-duced. Perhaps even congressmen, confronted by massive igno-rance, would invest their own understandings with greater trust.

The fourth problem with polling is that it shifts the locus of responsibility between political leaders and their constituents. It is true enough that congressmen are supposed to represent the interests of their constituents. But it is also true that congress-men are expected to use their own judgment about what is in the public's best interests. For this, they must consult their own experience and knowledge. Before the ascendance of polling, political leaders, though never indifferent to the opinions of their constituents, were largely judged on their capacity to make decisions based on such wisdom as they possessed; that is,

political leaders were responsible for the decisions they made. With the refinement and extension of the polling process, they are under increasing pressure to forgo deciding anything for themselves and to defer to the opinions of the voters, no matter how ill-informed and shortsighted those opinions might be.

We can see this process of responsibility-shift even more clearly in the case of the statistically based ratings of television shows. The definition of a "good" television show has become purely and simply a matter of its having high ratings. A "bad" show has low ratings. The responsibility of a television writer, therefore, begins and ends with his or her ability to create a show that many millions of viewers will watch. The writer, in a word, is entirely responsible to the audience. There is no need for the writer to consult tradition, aesthetic standards, thematic plausibility, refinements of taste, or even plain comprehensibil-ity. The iron rule of public opinion is all that matters. Television executives are fond of claiming that their medium is the most democratic institution in America: a plebiscite is held every week to determine which programs will survive. This claim is given added weight by a second claim: creative artists have never been indifferent to the preferences and opinions of their audiences. Writers, for example, write *for* people, for their ap-probation and understanding. But writers also write for them-selves and because they have something they want to say, not always because readers have something they want to hear. By giving constant deference to public preferences, polling changes the motivation of writers; their entire effort is to increase "the numbers." Popular literature now depends more than ever on the wishes of the audience, not the creativity of the artist.

Before leaving the subject of the technology of statistics, I must call attention to the fact that statistics creates an enormous amount of completely useless information, which compounds the always difficult task of locating that which is useful to a culture. This is more than a case of "information-overload." It is

a matter of "information-trivia," which has the effect of placing all information on an equal level. No one has expressed this misuse of a technology better than the *New Yorker* magazine cartoonist Mankoff. Showing an attentive man watching television news, Mankoff has the newscaster saying, "A preliminary census report indicates that for the first time in our nation's history female anthropologists outnumber male professional golfers." When statistics and computers are joined, volumes of garbage are generated in public discourse. Those who have watched television sports programs will know that Mankoff's cartoon is, in fact, less of a parody than a documentary. Useless, meaningless statistics flood the attention of the viewer. Sportscasters call them "graphics" in an effort to suggest that the information, graphically presented, is a vital supplement to the action of the game. For example: "Since 1984, the Buffalo Bills have won only two games in which they were four points ahead with less than six minutes to play." Or this: "In only 17 percent of the times he has pitched at Shea Stadium has Dwight Gooden struck out the third and fourth hitters less than three times when they came to bat with more than one runner on base."[5] What is one to do with this or to make of it? And yet there seems to be a market for useless information. Those who read *USA Today*, for example, are offered on the front page of each issue an idiotic statistic of the day that looks something like this: "The four leading states in banana consumption from 1980 through 1989 are Kansas, North Dakota, Wyoming, and Louisiana. Oddly, Nevada, which was ninth in 1989, fell to twenty-sixth last year, which is exactly where it ranks in kiwi consumption."[6]

It is surprising how frequently such blather will serve as the backbone of conversations which are essentially meaningless. I have heard New Yorkers, with a triumphant flourish, offer out-of-towners the statistic that New York City is only eighth in the nation in per-capita violent crimes and then decline to go outside because it was past 6:00 p.m.

I do not say, of course, that all such statistical statements are useless. If we learn that one out of every four black males between the ages of twenty and thirty has spent some time in prison, and that the nation's expenditure for the education of black children is 23 percent less than it is for white children, we may have some statistical facts that will help us to see a cause-and-effect relationship, and thereby suggest a course of action. But statistics, like any other technology, has a tendency to run out of control, to occupy more of our mental space than it warrants, to invade realms of discourse where it can only wreak havoc. When it is out of control, statistics buries in a heap of trivia what is necessary to know.

And there is another point, which in fact is the core of this chapter. Some technologies come in disguise. Rudyard Kipling called them "technologies in repose." They do not look like technologies, and because of that they do their work, for good or ill, without much criticism or even awareness. This applies not only to IQ tests and to polls and to all systems of ranking and grading but to credit cards, accounting procedures, and achievement tests. It applies in the educational world to what are called "academic courses," as well. A course is a technology for learning. I have "taught" about two hundred of them and do not know why each one lasts exactly fifteen weeks, or why each meeting lasts exactly one hour and fifty minutes. If the answer is that this is done for administrative convenience, then a course is a fraudulent technology. It is put forward as a desirable structure for learning when in fact it is only a structure for allocating space, for convenient record-keeping, and for control of faculty time. The point is that the origin of and raison d'être for a course are concealed from us. We come to believe it exists for one reason when it exists for quite another. One characteristic of those who live in a Technopoly is that they are largely unaware of both the origins and the effects of their technologies.[7]

Perhaps the most interesting example of such lack of awareness is the widespread belief that modern business invented the technology of management. Management is a system of power and control designed to make maximum use of relevant knowledge, the hierarchical organization of human abilities, and the flow of information from bottom to top and back again. It is generally assumed that management was created by business enterprises as a rational response to the economic and technological demands of the Industrial Revolution. But research by Alfred Chandler, Sidney Pollard, and especially Keith Hoskin and Richard Macve reveals a quite different picture and leads to a startling conclusion: modern business did not invent management; management invented modern business.[8]

The most likely place for management to have originated is, of course, in Great Britain in the late eighteenth and early nineteenth centuries. But there is no evidence that British industry knew anything about management as late as 1830, nor did there exist anything approximating a "managerial class." Management was created in the United States "out of the blue," as Hoskin and Macve say. It was not a creation of any obvious needs of American industry, which was only a marginal force in the world economy in the mid-nineteenth century. The roots of management may be traced to a new educational system, introduced in 1817 to the United States Military Academy by the academy's fourth superintendent, Sylvanus Thayer. Thayer made two innovations. The first, borrowed from the Ecole Polytechnique in Paris, was to grade examinations by giving numerical marks. As I have previously noted, the grading of student papers originated in Cambridge University toward the end of the eighteenth century, and the practice was taken up by several schools on the Continent. Thayer's use of this technology is probably the first instance of it in America. As every teacher knows, the numerical mark changes the entire experience and meaning of learning. It introduces a fierce competition among students by providing sharply differentiated symbols of success and failure. Grading provides an "objective" measure of human performance and creates the unshakable illusion that accurate calculations can be made of worthiness. The human being becomes, to use Michel Foucault's phrase, "a calculable person."

Thayer's second innovation, apparently his own invention, was a line-and-staff system. He divided the academy into two divisions, each organized hierarchically. As Hoskin and Macve describe it: "Daily, weekly and monthly reports were required, all in writing. There were continual relays of written communication and command, going from the bottom to the top of each line, before being consolidated and passed to the central 'Staff Office.'" Thayer rejected the traditional leader's role of direct, visible command. He ruled indirectly through the medium of written reports, charts, memos, personnel files, etc., not unlike the way a modern CEO functions.

We do not know how most of the two hundred cadets at the academy reacted to Thayer's new system (which Hoskin and Macve term the "grammatocentric principle," meaning that everything was organized around the use of writing). But we do know that two of them, Daniel Tyler and George Whistler, were impressed. Both were in the graduating class of 1819, and took with them their lieutenant's rank and Thayer's general approach to organizations.

Daniel Tyler, working at the Springfield Armory, did a time-and-motion study in 1832 (sixty years before Frederick Taylor's "scientific management" got under way) and established objectively based norms of production for every job in the armory. Workers were kept under surveillance, and their actual productivity was measured against the established productivity norms. Tyler also introduced quality control and inventory accounting. The result of all these methods was a dramatic increase in productivity and decrease in costs.

Meanwhile, George Whistler (incidentally, the father of James Whistler and therefore the husband of "Whistler's Mother"), having become the chief engineer of the Western Railroad, developed a managerial system in 1839 that would have made Sylvanus Thayer proud. He organized the railroad along hierarchical lines, beginning with a central staff office, descending to regional managers and then local managers. He employed, to great effect, the grammatocentric principle, which he had no doubt learned well at the academy when serving in the staff office as cadet staff sergeant major.

The principles of calculability and grammatocentrism are, of course, the foundation of modern systems of management. Calculability led inevitably to such ideas as detailed accounting systems, inventory control, and productivity norms. Grammatocentrism promoted the idea that the best way to run a business is to know it through reports of those lower down the line. One manages, in other words, by the "numbers" and by being removed from the everyday realities of production.

It is worth saying that the basic structure of business management originated in nonbusiness contexts. Still, it did not take very long for American businesses to begin to adopt the principles of Thayer, Tyler, and Whistler, and by doing so they created what we now think of as a modern corporation. Indeed, management defines what we mean by a corporation, and has led John Kenneth Galbraith to remark in *The New Industrial State*: "More perhaps than machinery, massive and complex business organizations are the tangible manifestation of advanced technology."

There are two reasons why the case of management is instructive. First, as suggested by Galbraith, management, like the zero, statistics, IQ measurement, grading papers, or polling, functions as does any technology. It is not made up of mechanical parts, of course. It is made up of procedures and rules designed to standardize behavior. We may call any such system of procedures and rules a technique; and there is nothing to fear from techniques, unless, like so much of our machinery, they become autonomous. There's the rub. In a Technopoly, we tend to believe that only through the autonomy of techniques (and machinery) can we achieve our goals. This idea is all the more

dangerous because no one can reasonably object to the rational use of techniques to achieve human purposes. Indeed, I am not disputing that the technique known as management may be the best way for modern business to conduct its affairs. We are technical creatures, and through our predilection for and our ability to create techniques we achieve high levels of clarity and efficiency. As I said earlier, language itself is a kind of technique—an invisible technology—and through it we achieve more than clarity and efficiency. We achieve humanity—or inhumanity. The question with language, as with any other technique or machine, is and always has been, Who is to be the master? Will we control it, or will it control us? The argument, in short, is not with technique. The argument is with the triumph of technique, with techniques that become sanctified and rule out the possibilities of other ones. Technique, like any other technology, tends to function independently of the system it serves. It becomes autonomous, in the manner of a robot that no longer obeys its master.

Second, management is an important example of how an "invisible technology" works subversively but powerfully to create a new way of doing things, a classic instance of the tail wagging the dog. It is entirely possible for business and other institutions to operate without a highly technicalized management structure, however hard for us to imagine. We have grown so accustomed to it that we are near to believing management is an aspect of the natural order of things, just as students and teachers have come to believe that education would be impossible without the structure of a college "course." And politicians believe they would be adrift without the assistance of public-opinion polling. When a method of doing things becomes so deeply associated with an institution that we no longer know which came first—the method or the institution—then it is difficult to change the institution or even to imagine alternative methods for achieving its purposes.

And so it is necessary to understand where our techniques come from and what they are good for; we must make them visible so that they may be restored to our sovereignty. In the next chapter, I hope to do this with the intricate and vast ensemble of techniques I call Scientism.

1. Cited in Gould, p. 75. I am indebted to Gould's wonderful book for providing a concise history of the search to quantify intelligence.

2. *The National Elementary Principal*, March/April 1975.

3. Weizenbaum, p. 203.

4. The occasion, in the spring of 1990, was a retreat outside of Washington, D.C. The group of twenty-three Democratic congressmen was led by Richard Gephardt.

5. I have, of course, made up these ridiculous statistics. The point is, it doesn't matter.

6. See the preceding note.

7. An interesting example of the tyranny of statistics is in the decision made by the College Board (on November 1, 1990) that its Scholastic Aptitude Test will not include asking students to write an essay. To determine the student's ability to write, the SAT will continue to use a multiple-choice test that measures one's ability to memorize rules of grammar, spelling, and punctuation. It would seem reasonable—wouldn't it?—that the best way to find out how well someone writes is to ask him or her to write something. But in Technopoly reason is a strange and wondrous thing. For a documentation of all of this, see the January 16, 1991, issue of *The Chronicle of Higher Education*.

8. See Keith W. Hoskin and Richard H. Macve, "The Genesis of Accountability: The West Point Connections," in *Accounting Organizations and Society*, vol. 13, no. 1 (1988), pp. 37–73. I am especially indebted to these scholars for their account of the development of modern systems of management.

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P. O. Box 5012, Santa Barbara, CA. 93150-5012

Mary Laucks
8708 NE. 20th St.
Bellevue, WA. 98004

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