

Information Society

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INTRODUCTION

It has been commonplace for more than a decade now to say that those of us who inhabit advanced societies such as in North America, Japan, and Western Europe live in an "information society." The claim that this is so comes routinely from politicians, educationalists, and industrialists, each of whom have concerns about how best to prepare for and compete in this information age. So familiar now is the term information society that it scarcely seems controversial: It is simply part of the accepted vocabulary of opinion leaders who currently comment on the state of the world, a taken-for-granted backcloth to more pressing issues of policy.

For the purposes of this article, I step back from these more immediate matters deliberately to problematize the notion of the information society. I examine here more precisely than is usual what commentators actually mean when they use the term. As we shall see, when we delve a little, it becomes apparent that the concept is actually vague and imprecise, even of dubious value. Indeed, I shall argue here that the concept information society is inadequate and unhelpful when we try to establish the character of the era in which we live. This suggests, at the least, that a good deal of policy today is premised on somewhat shaky foundations.

We may proceed by distinguishing at least five different definitions of an information society, each of which presents criteria for identifying the new. These criteria are technological, economic, occupational, spatial, and cultural. Let us examine each in turn.

TECHNOLOGICAL

The most common definition of the information society lays emphasis upon spectacular technological innovation. The key idea is that breakthroughs in information processing, storage, and transmission have led to the application of information technologies (IT) in virtually all corners of society. The major concern here is the astonishing reductions in the costs of computers, their prodigious increases in power, and their consequent application any and everywhere. Because it is now economical and feasible to put computers in typewriters, cars,

cookers, watches, factory machines, televisions, kids' toys... it follows that we are certain to experience social upheaval of such magnitude that we shall enter a new era. Many books, magazine articles, and television presentations have encouraged the development of a distinct genre that offers this viewpoint: the "mighty micro" will usher in an entirely new "silicon civilization."

Somewhat more sophisticated versions of this technological route to the information society pay attention to the convergence and imbrication of telecommunications and computing (now termed ICT, information and communications technology). In these instances, the argument runs along the following lines: cheap information processing and storage technologies (computers) lead to their being extensively distributed; one of the major areas thus impacted is telecommunications, notably switching centers which, in being computerized, in effect, merge with the general development of computing and impel still more dramatic improvements of information management and distribution. This unification is especially fortuitous because the widespread dissemination of computers means that, for optimum use, they require connection. In short, the computerization of telecommunications means that it is increasingly the case that computer can be linked to computer: hence, the prospect of links between terminals within and between offices, banks, homes, shops, factories, schools, and the globe itself.

This scenario of networked computers is often compared to the provision of electricity: The "information grid" is seen as analogous to the electrical supply. As the electricity grid links every home, office, factory, and shop to provide energy, so the information grid offers information wherever it is needed. This is, of course, an evolutionary process, but with the spread of an ISDN (integrated services digital network), we have the foundational elements of an "information society." Once established, these information networks become the highways of the modern age, akin to the roads, railways, and canals of the Industrial Age. As the latter were crucial because they carried back and forth the materials and goods that made the Industrial Revolution, so an ISDN will provide the infrastructure supporting the key ingredient of the Postindustrial Society—information. The rapid growth of the Internet appears to bring about precisely this.



Undoubtedly, what we have here is a technological definition of an information society. Whether it is one that envisages this resulting from the impact of dramatically new technological innovations or as the outcome of a more incremental development of ISDN systems, all perceive technology to be the major distinguishing feature of the new order.

It is very tempting to dismiss technological approaches to the information society out of hand. There has been a surfeit of gee-whiz writing that, awed by the pace and magnitude of technological change, tells us that “the Computer Revolution . . . will have an overwhelming and comprehensive impact, affecting every human being on earth in every aspect of his or her life.”^[1] The genre of futurism that adopts this tone is characteristically full of “wake up” warnings, shallow analyses of the substantive realm, and the self-assurance that only the author has understood what most others have yet to comprehend. It presents but a poor case for the validity of technological measures.

Nevertheless, it is a recurrent account, one that appears in a seemingly cyclical manner. During the 1980s, amidst interest in the “microelectronics revolution,” this was offered by the likes of James Martin and Christopher Evans, and it gained much media attention. For a while it went out of fashion, only to return with heady talk of an “information superhighway” in the 1990s and in the breathless prose of MIT (Massachusetts Institute of Technology) researcher Nicholas Negroponte.^[2] However, if the likes of Alvin Toffler, Christopher Evans, and James Martin impel one toward rejection of technological criteria, it has to be acknowledged that very many more serious scholars adopt what is at root a similar approach. In Britain, for example, a much respected school of thought has devised a neo-Schumpeterian approach to change. Combining Schumpeter’s argument that major technological innovations bring about “creative destruction” with Kondratieff’s theme of “long waves” of economic development, these researchers contend that IT represents the establishment of a new epoch. This new “techno-economic paradigm”^[3] constitutes the Information Age that is set to mature early in the first century of the millennium.^[4–6]

Elsewhere, Piore and Sabel^[7,8] have suggested that it is the new technologies that provide the foundation for a radically different way of working—“flexible specialization.” Thanks to communication and computer technologies, and the information edge they give to small firms now able quickly to assess markets and adroitly respond to them, the prospect is for an end to “mass production” and its replacement with customized products made by multiskilled and adaptable craftspeople.

It has to be conceded that, commonsensically, these technological definitions of the information society do

seem appropriate. After all, if it is possible to see a “series of inventions”^[9]—steam power, the internal combustion engine, electricity, the flying shuttle, etc.—as key characteristics of the “industrial society,” then why not accept the virtuoso developments in IT as evidence of a new type of society? As John Naisbitt puts it: “Computer technology is to the information age what mechanization was to the industrial revolution.”^[10] And why not?

Technological definitions of the information society must encounter a number of well-founded objections. These include:

- i) If technology is the main criterion for defining a society, then why not just call the emerging era a “high-tech society” or an “automated age?” Given the variety of possible ways in which one could describe a society in which IT predominates—Silicon Society? Cybernetic Society? Robotic Age?—why choose to designate it an “information society?” If technology is the key, then it is rather hard to see why it should need the prefix information attached. But then again the “technological society” scarcely evokes the idea of a new, or even significantly different, world that an information society does.
- ii) When one reads the literature that tells of profound and portentous changes that new technology is bringing about, one cannot but be struck by its palpable presence. Whether it is learning about the impact of the microelectronics revolution in the home, the consequences of robotics for the factory, or the tidal force of a “third wave” of computers, telecommunications and biotechnology that announce “the death knell of industrialism and the rise of a new civilisation,”^[11] there is a self-evident reality about the hereeness of the new technologies. Since this is so, and each of us can see it with our own eyes, then it does seem obvious that the technologies are valid as distinguishing features of a new society. But when one probes further, one cannot but be struck also by the astonishing vagueness of technology in most of these books. Asking for an empirical measure—In this society now, how much IT is there and how far does this take us toward qualifying for information society status? How much IT is required in order to identify an information society?—asking simply for a usable measure, one becomes aware that a good many of those who emphasize technology are not able to provide us with anything so mundanely real-worldly or testable. It begins to appear, that it is everywhere . . . and nowhere, too. This problem of measurement, and the associated difficulty of stipulating the point on the technological scale at which a society is judged to have entered an information age, is surely central to any



acceptable definition of a distinctively new type of society. It is ignored by popular futurists: The new technologies are announced and it is unproblematically presumed that this announcement in and of itself heralds the information society. This issue is, surprisingly, also bypassed by other scholars who yet assert that IT is the major index of an information society. They are content to describe, in general terms, technological innovations, somehow presuming that this is enough to distinguish the new society. There are, however, serious scholars who are not content with this and find that the issue of measurement causes considerable obstacles to progress. They encounter two particularly awkward problems. First, how does one measure the rate of technological diffusion, and, second, when does a society cease being "industrial" and enter into the "information" category? These are formidably difficult questions, and ones that should make enthusiasts for the information society scenario hesitate. For instance, in Britain, a decade of social science research by PICT (Programme on Information and Communication Technologies), one charged with mapping and measuring the information society, has not as yet produced any definitive ways of meeting its objectives.^[12-14] Certainly, there have been some advances, with several studies charting the diffusion of some IT into factories and offices.^[15] But how is one to assess this diffusion in more general terms: by expenditure on IT (Yet, given the tumbling prices of the new technologies, how is one to differentiate the economic variable from the more central element of information handling capacity?) or by the amount and range of IT introduced? Ought one to center on IT expenditure or on takeup per head, or is it better to examine this on an institutional basis? How is one to quantify the significance of the expansion of microcomputer applications vis-à-vis mainframe systems? And, if one opts to focus on the uptake of IT, just what is to count as a relevant technology? For instance, should video games come before personal computers, networked systems before robotic applications? Further, while one may be able to imagine a time at which some measures of "informatization" will have been developed that gain widespread assent, one will still be left with the serious query: Where along that graph is the break point that separates the information society from the merely "advanced industrial?"

- iii) Finally, critics object to those who assert that, in a given era, technologies are first invented and then, subsequently, impact on the society, thereby impelling people to respond by adjusting to the new. Technology in these versions is privileged above all else; hence, it comes to identify an entire social

world: the Steam Age, the Age of the Automobile, the Atomic Age.^[16] The central objection here is not that this is unavoidably technologically determinist—in that technology is regarded as the prime social dynamic—and, as such, an oversimplification of processes of change. It most certainly is this, but more important is that it relegates into an entirely separate division social, economic, and political dimensions of technological innovation. These follow from, and are subordinate to, the premier league of technology that appears to be self-perpetuating though it leaves its impress on all aspects of society.

But, it is demonstratively the case that technology is not aloof from the social realm in this way. On the contrary, it is an integral—indeed constitutive—part of the social. For instance, research and development decisions express priorities, and, from these value judgments, particular types of technology are produced (e.g., military projects received substantially more funding than health work for much of the time in the twentieth century West—not surprisingly, a consequence is state-of-the-art weapon systems that dwarf the advances of treatment say of the common cold). Many studies have shown how technologies bear the impress of social values, whether it be in the architectural design of bridges in New York where heights were set that would prevent public transit systems accessing certain areas; the manufacture of cars that testify to the values of private ownership (as opposed to public transport), presumptions about family size (typically two adults, two children), attitudes toward the environment (profligate use of nonrenewable energy alongside pollution), and status symbols (the Porsche, the Mini, the Rover); or the construction of houses that are not just places to live but also expressions of ways of life, prestige and power relations, and preferences for a variety of lifestyles. Again, market power has an obvious influence on what gets manufactured technologically: corporations think of the customers and potential customers prior to production, so it is not surprising that there are limits to what gets made imposed by ability to pay criteria. By the same token, the corporate directors' dictum, "curb costs, increase productivity, and lose heads,"^[17] has an obvious influence on what the engineers produce, thereby confounding the approach of those who presume that technology is the driving force of change.

There is an extensive literature on this issue that does not need to be labored. All that is required is to state the objection to the hypostatization of technology as applied to the issue of defining the information society. How can it be acceptable to take what is regarded as an asocial phenomenon (technology) and assert that this then comes to define the social world when it is demonstrable that the dichotomy is implausible because technology is an integral part of the social world?

ECONOMIC

There is an established subdivision of economics that concerns itself with the “economics of information.” From within this, and indeed as a founder of this specialism, the late Fritz Machlup (1902–1983) devoted much of his professional life to the goal of assessing the size and growth of the information industries. Machlup’s pioneering work, *The Production and Distribution of Knowledge in the United States*,^[18] has been seminal in establishing measures of the information society in economic terms. Machlup attempted to trace the information industries in statistical terms. He distinguished 5 broad industry groups (broken down into 50 sub-branches), namely:

- (i) education (e.g., schools, colleges, libraries).
- (ii) media of communication (e.g., radio, television, advertising).
- (iii) information machines (e.g., computer equipment).
- (iv) information services (e.g., law, insurance, medicine).
- (v) other information activities (e.g., research and development).

Machlup, working with these sort of categories, then attempted to ascribe an economic value to each and to trace its contribution to gross national produce (GNP). If the trend is for these to account for an increased proportion of GNP, then one may claim to chart the emergence through time of an “information economy.” This is just what Machlup proposed in this early study,^[18] which calculated that 29% of the United States’ GNP in 1958 came from the knowledge industries—then a remarkable rate of expansion.

As early as the 1960s, management scholar Peter Drucker was contending that knowledge “has become the foundation of the modern economy” as we have shifted “(f)rom an economy of goods (to)...a knowledge economy.”^[19] Today, it is commonplace to argue that we have evolved into a society where the “distinguishing characteristic...is that knowledge and organisation are the prime creators of wealth.”^[20]

Probably the best known—and certainly the most cited—study of the emergence of an information economy conceived on these lines comes in a nine-volume report from Marc Porat^[21,22] In allocating industries to his five categories, Machlup had adopted catholic definitions of “knowledge production,” broadly including those that created new information and those that communicated it. Porat echoed much of Machlup’s approach in his reliance on government statistical sources to design a computer model of the U.S. economy in the late sixties, but divided the economy between the “primary,” “secondary,” and “noninformation” sectors. This tri-

partite schema stemmed from his identification of a weakness in Machlup’s approach that failed to account for information activities that were disguised from initial examination; for example, because they are an in-house element of other industries. Porat included in the primary information sector all those industries that make available their information in established markets or elsewhere where an economic value can be readily ascribed (e.g., mass media, education, advertising, computer manufacture). Thus:

The primary information sector includes...industries that in some way produce, process, disseminate, or transmit knowledge or messages. The unifying definition is that the goods and services that make up the primary sector must be fundamentally valued for their information producing, processing, or distributing characteristics.^[23]

However, Porat then sought to identify a secondary information sector that would allow him to include in his typology important informational activities such as research and development inside a pharmaceutical company, information produced by government departments for internal consumption, and the library resources of an oil corporation. Thus:

The secondary information sector includes the informational activities of the public bureaucracy and private bureaucracies. The private bureaucracy is that portion of every noninformation form that engages in purely informational activities, such as research and development, planning, control, marketing, and record-keeping... The public bureaucracy includes all the informational functions of the federal, state, and local governments.^[23]

In this way, Porat is able to distinguish the two information sectors, then to consolidate them, separate out the noninformational elements of the economy, and, by re-aggregating national economic statistics, is able to conclude that over 46% of the U.S. GNP is accounted for by the information sector. Ipso facto “The United States is now an information-based economy.” As such, it is an “information society (where) (t)he major arena of economic activity are the information goods and service producers, and the public and private [secondary information sector] bureaucracies.”^[23]

This quantification of the economic significance of information is an impressive achievement. It is not surprising that those convinced of the emergence of an information society have routinely turned to Machlup and especially Porat as authoritative demonstrations of a rising curve of information activity, one set to lead the way to a new age.

However, there are difficulties too with the economics of information approach.^[24] One is that, behind the weighty statistical tables that are resonant of objective demonstration, there is a great deal of hidden interpretation and value judgement as to how to construct



categories and what to include and exclude from the information sector.

In this regard, what is particularly striking is that, in spite of their marked differences, both Machlup and Porat create encompassing categories of the information sector that exaggerate its economic worth. There are reasons to question the worth of at least some of these categories. For example, Machlup includes in his "knowledge industries" the "construction of information buildings," the basis of which presumably is that building for, say a university or a library is distinguishable from construction of warehouses meant to house tea or coffee. But how then is one to allocate the many buildings that, once constructed, change purposes (many university buildings, in the United Kingdom at least, are located in erstwhile domestic houses and stately homes, and one even in a former warehouse)?

Again, Porat is at some pains to identify the "quasi-firm" embedded within a noninformational enterprise. But is it acceptable, from the correct assumption that R&D in a petrochemical company involves informational activity, to separate this from the manufacturing element for statistical purposes? It is surely likely that the activities are blurred, with the R&D section intimately tied to production wings, and any separation for mathematical reasons is unfaithful to its role. More generally, when Porat examines his secondary information sector, he, in fact, splits every industry into the informational and noninformational domains. But such divisions between the thinking and the doing are extraordinarily hard to accept—where does one put operation of computer numerical control systems or the line management functions that are an integral element of production? To be sure, one could say that everything here involves information—and as we shall see, many writers identify the expansion of "managers" and "white collar" work tout court as reason for the coming of an information society—but that is not the point. The objection here is that Porat divides, arbitrarily, within industries, to chart the secondary information sector as opposed to the noninformational realm.

Such objections may not entirely invalidate the findings of Machlup and Porat, and they are not intended to do that, but they are a reminder of the unavoidable intrusion of value judgments in the construction of their statistical tables. As such, they lend support to a healthy skepticism toward ideas of an emergent information economy.

A second difficulty is that the aggregated data inevitably homogenize very disparate economic activities. In the round, it may be possible to say that growth in the economic worth of advertising and television is indicative of an information society, but one is left with an urge to distinguish between informational activities on qualitative grounds. In asking which economically

assessed characteristics are more central, are more strategic, to the emergence of an information society, one is requesting scholars to distinguish between, say information stemming from policy research centers, corporate think tanks, transnational finance houses, manufacturers of 35-mm cameras, software designers, and advertising copywriters.

The enthusiasm of the information economists to put a price tag on everything has the unfortunate consequence of failing to let us know the really valuable dimensions of the information sector. This search to differentiate between quantitative and qualitative indices of an information society is not pursued by Machlup and Porat, though on a commonsensical level, it is obvious that the 4 million daily sales of the *The Sun* cannot be equated with—still less, be regarded as more informational, though doubtless it is of more economic value—the 400,000 or so circulation of *The Financial Times*. It is a distinction to which we shall return, but one that suggests the possibility that we could have a society in which, as measured by GNP, informational activity is of great weight, but that in terms of the springs of economic, social, and political life, is of little consequence. A nation of couch potatoes and Disney-style pleasure seekers consuming images night and day?

Of course, these economists are concerned solely with developing quantitative measurements of the information sector, so the issue of the qualitative worth of information would be of limited relevance to them. However, even on their, own terms, there are problems. One, mentioned earlier, is the question "at which point on the economic graph does one enter an information society?" When 50% of GNP is dedicated to informational activities? This may seem to be a reasonable point, one at which, in straightforward quantitative terms, information begins to predominate. Sadly for information society theorists, however, we are some distance even from that point. Replication studies of Machlup and Porat lead one to qualify any initial sighting of the new age. In a large scale update of Machlup's study, Rubin and Huber concluded that, in the United States, the contribution of "knowledge industries" to GNP increased from 28.6% to 34.3% between 1958 and 1980, with virtually no change since 1970, this constituting an "extremely modest rate of growth relative to the average rate of growth of other components of total GNP."^[25] These econometric studies scarcely trumpet the arrival of an information society.

OCCUPATIONAL

A popular measure of the emergence of an information society is the one that focuses on occupational change.

Put simply, the contention is that we have achieved an information society when the predominance of occupations is found in information work. That is, the information society has arrived when clerks, teachers, lawyers, and entertainers outnumber coal miners, steelworkers, dockers, and builders. The intellectual groundwork for this conception of the information society was done by Daniel Bell (1919–) in the 1960s, but it is worth stressing that this definition is presently enjoying much popularity as concern has shifted from a technological measure toward an occupational notion. The emphasis here is on enterprising deal makers, people who “think smart” and quickly in a fast-changing world. Reich^[26,27] has called these “symbolic analysts,” those who do the thinking, planning, innovation, and organization of the “new economy.” They may work in the “creative industries” (media, design, arts), consultancy, or general management, but a popular idea is that such information workers are key to future prosperity. What they have in common is high-level education, and, accordingly, a priority is placed by national governments on the capability of their own education systems to produce such people.^[28]

The occupational definition is frequently combined with an economic measure. Porat, for example, whose work we discussed in the previous section, calculated that by the late 1960s, a little under half the U.S. labor force was to be found in the information sector, a growth of almost 500% during a century in which agricultural employment has plummeted and information occupations have massively expanded. Porat connects the growth in economic significance of information with changing occupational patterns as follows:

In 1967, 25.1% of the U.S. GNP originated with the production, processing, and distribution of information goods and services sold on markets. In addition, the purely informational requirements of planning, coordinating, and managing the rest of the economy generated 21.1% of the GNP. These informational activities engaged more than 46% of the work force, which earned over 53% of all labor income. On the strength of these findings, we call ours an “information economy.”^[23]

On the surface, the changing distribution of jobs seems an appropriate measure. After all, it appears obvious that as work that demands physical strength and manual dexterity, such as hewing coal and farming the land, declines to be replaced by more and more manipulation of figures and text, such as in education and large bureaucracies, then so we are entering a new type of society. Today “(o)nly a shrinking minority of the labour force toils in factories... and (t)he labour market is now dominated by information operatives who make their living by virtue of the fact that they possess the information needed to get things done.”^[29]

Most identifiers of an information society draw on occupational changes as indices of the approach of a new age, as many probably as see it in the introduction of new technologies. And, a great number combine the two, regarding new technologies and new informational occupations almost as synonymous. However, it should be noted that the occupational definition is by no means the same as one that identifies an information society by the take-up of new technologies. Many information occupations (e.g., solicitors, teachers) may use little IT, while many distinctly noninformational jobs have been impacted dramatically by new technologies (e.g., factory operatives, supermarket checkout workers).

The shift in the distribution of occupations is at the heart of the most influential theory of the information society. Here Bell^[30] sees, in the emergence of “white collar society” (and, hence, information work) and in the decline of industrial labor changes as profound as the end of class-based political conflict, more communal consciousness and the development of equality between the sexes.

Robins and I^[31] have criticized Bell’s theorization elsewhere, but here it is appropriate to raise some general objections to occupational measures of the information society. A major problem concerns the methodology for allocating workers to particular categories. The end product—a bald statistical figure giving a precise percentage of “information workers”—hides the complex processes by which researchers construct their categories and allocate people to one or another.

Porat, for instance, develops what has become an influential typology to locate occupations that are primarily engaged in the production, processing, or distribution of information. His is a three-fold scheme that encompasses over 400 occupational types that are reported by the U.S. Census and Bureau of Labor Statistics. He explains it as follows:

The first category includes those workers whose output as primary activity is producing and selling knowledge. Included here are scientists, inventors, teachers, librarians, journalists, and authors. The second major class of workers covers those who gather and disseminate information. These workers move information within firms and within markets; they search, coordinate, plan, and process market information. Included here are managers, secretaries, clerks, lawyers, brokers, and typists. The last class includes workers who operate the information machines and technologies that support the previous two activities. Included here are computer operators, telephone installers, and television repairers.^[23]

Jonscher^[32] simplifies this further still, discerning just two sectors of the economy: the first, an “information sector,” is where people whose prime function is creating, processing, and handling information; the second,



a "production sector," is where workers are found who chiefly create, process, and handle physical goods. These distinctions appear reasonable, precise, and empirically valid, but there are difficulties. Not least is something of which Porat is well aware, namely that "(s)tating precisely who is an information worker and who is not is a risky proposition."^[23] Indeed, it is, since every occupation involves a significant degree of information processing and cognition. Porat acknowledges this in his attempt to distinguish noninformational from informational labor on the basis of estimating the degree to which each type is involved with information. In other words, the categorization is a matter of judging the extent to which jobs are informational or not. Crude percentages of information workers thus disguise the fact that they are the outcome of the researcher's estimations. As Porat puts it: when "we assert that certain occupations are primarily engaged in the manipulation of symbols... It is a distinction of degree, not of kind."^[22]

For example, the railway signalman must have a stock of knowledge about tracks and timetables, about roles and routines; he needs to communicate with other signalmen down the line, with station personnel and engine drivers; he is required to "know the block" of his own and other cabins, must keep a precise and comprehensive ledger of all traffic that moves through his area, and has little need of physical strength to pull levers since the advent of modern equipment. Yet, the railway signalman is, doubtless, a manual worker of the Industrial Age. Conversely, the person who comes to repair the photocopier may know little about products other than the one for which he has been trained; may well have to work in hot, dirty, and uncomfortable circumstances; and may need considerable strength to move heavy machinery and replace damaged parts. Yet, he will undoubtedly be classified as an information worker since his work with new age machinery suits Porat's interpretations.

The point to be made here is simple: We need to be skeptical of conclusive figures that are the outcomes of researchers' perceptions of where occupations are to be most appropriately categorized. As a matter of fact, social scientists know very little about the detail and complexity of people's jobs; there are precious few ethnographies that record the stuff of working lives.^[33] And, researchers trying to label information and non-information work are just as much in the dark as the rest of their social science colleagues.

One needs also to beware the oversimplifications that can come from allocating a wide variety of jobs to the same pigeonholes. Miles rightly observes that "(t)he categories of work subsumed under the different headings are often extremely heterogeneous."^[34] When one considers, for example, that Porat's first category (information producers) lumps together opticians, library assis-

tants, composers, paperback writers, university professors, and engineers, while his second (information distributors) subsumes journalists on quality newspapers with deliverers on the street, and when the OECD (Organisation for Overseas Co-operation and Development) puts together as information producers physicists, commodity brokers, and auctioneers, then one may well have doubts about the value of this composition of occupations as a means of identifying social change. Further, what of the diversity of occupations, each with the same title? Librarian, for example, can encompass someone spending much of the day either issuing books for loan or reshelving returns, as well as someone routinely involved in advising academics on the best sources of information for progressing state-of-the-art research. Again, the title journalist covers a range from hacks specializing in the sex lives of celebrities, cub reporters describing local weddings, to feature writers whose work can match the best analyses of university professors. Is it really sensible to lump together such diversity?

Finally, an important consequence of this homogenization is a failure to identify the more strategically central information occupations. While the methodology may provide us with a picture of greater amounts of information work taking place, it does not offer any means of differentiating the most important dimensions of information work. The pursuit of a quantitative measure of information work disguises the possibility that the growth of certain types of information occupation may have particular consequences for social life.

I alluded to this distinction when commenting on economic measures of an information society, but it is especially pertinent as regards occupational measures since some commentators seek to characterize an information society in terms of the "primacy of the professions,"^[30] while still others focus on alternative sources of strategically central information occupations. It has to be said that counting the number of information workers in a society tells us nothing about the hierarchies—and associated variations in power and esteem—of these people. For example, it could be argued that the crucial issue has been the growth of computing and telecommunications engineers since these may exercise a decisive influence over the pace of technological innovation. A similar, perhaps even greater, rate of expansion in social workers to handle problems of an aging population, increased family dislocation and juvenile delinquency may have little or nothing to do with an information society, though undoubtedly social workers would be classified with IT engineers as information workers.

Or it may be argued that it is an "inner circle,"^[35–37] of corporate leaders, quite different from their predecessors, which is the most decisive index of the information society. These are people who are empowered by



communicative skills, analytical abilities, foresight, and capacities to formulate strategic policies, who also enjoy privileged educational backgrounds, connections through shared clubs and boardroom affiliations, plus access to sophisticated information and communications technologies. All of this provides them with extraordinary leverage over social, economic, and political affairs at the national and even the international level. They are information specialists but radically different from the run-of-the-mill information workers with whom crude quantitative methodologists would lump them.

Perhaps we can better understand this need to qualitatively distinguish between groups of information workers by reflecting on a recent study by social historian Harold Perkin. In *The Rise of Professional Society*, Perkin argues that the history of Britain since 1880 may be written largely as the rise to preeminence of “professionals” who rule by virtue of “human capital created by education and enhanced by . . . the exclusion of the unqualified.” Perkin contends that certified expertise has been “the organising principle of post-war society,”^[38] the expert displacing once-dominant groups (working class organizations, capitalist entrepreneurs, and the landed aristocracy) and their outdated ideals (of co-operation and solidarity, of property and the market, and of the paternal gentleman) with the professional’s ethos of service, certification, and efficiency. To be sure, professionals within the private sector argue fiercely with those in the public, but Perkin insists that this is an internecine struggle, one within “professional society,” which decisively excludes the nonexpert from serious participation and shares fundamental assumptions (notably the primacy of trained expertise and reward based on merit).

Alvin Gouldner’s discussion of the “new class” provides an interesting complement to Perkin’s. Gouldner identifies a new type of employee that has expanded in the twentieth century, a new class that is “composed of intellectuals and technical intelligentsia,”^[39] who, while in part self-seeking and often subordinate to powerful groups, can also contest the control of established business and party leaders. Despite these potential powers, the new class is itself divided in various ways. A key division is between those who are for the most part technocratic and conformist, and the humanist intellectuals who are critical and emancipatory in orientation. To a large extent, this difference is expressed in the conflicts identified by Perkin between private and public-sector professionals. For instance, we may find that accountants in the private sector are conservative, while there is a propensity for humanistic intellectuals to be radical.

Our main point here is that both Gouldner and Perkin are identifying particular changes within the realm of information work that have especially important conse-

quences for society as a whole. To Gouldner, the new class can provide us with vocabularies to discuss and debate the direction of social change, while to Perkin, the professionals create new ideals for organizing social affairs.

If one is searching for an index of the information society in these thinkers, one will be directed to the quality of the contribution of certain groups. Whether one agrees or not with either of these interpretations, the challenge to definitions of an information society on the basis of a count of raw numbers of information workers should be clear. To thinkers such as Perkin and Gouldner, the quantitative change is not the main issue. Indeed, as a proportion of the population, the groups they lay emphasis upon, while they have expanded, remain distinct minorities. Tiny in the case of Useem’s “inner circle” and more numerous where the growth of professions is identified but never more than 20% or 25% of the workforce.

SPATIAL

This conception of the information society, while it draws on sociology and economics, has at its core the geographer’s distinctive stress on space. Here, the major emphasis is on the information networks that connect locations and, in consequence, have dramatic effects on the organization of time and space. It has become an increasingly popular index of the information society in recent years, largely because of a remarkable trilogy written by Manuel Castells titled *The Information Age (1996–1998)* in which he describes a “network society.”^[40,41]

Goddard^[42] identifies several interrelated elements in the transition to an information society. These include:

- Information is coming to occupy center stage as the “key strategic resource” on which the organization of a world economy is dependent.

The modern world demands the coordination of globally distributed manufacture, planning across and between sovereign states, and marketing throughout continents. What might be called the globalization of enterprise—from production, through distribution, to marketing—means that economic (and other) affairs are increasingly conducted on a world scale. As historian Eric Hobsbawm has observed, especially from the 1960s, a world economy began to come into existence “which actually has no specifiable territorial base or limits,” and by the early 1970s, such a transnational economy became an effective global force. The inexorable logic of this for



the participants, chiefly transnational corporations that are “the dominant forces in the world economy,”^[43] is to develop global strategies and mechanisms to maximize their comparative advantages. Information, or what Peter Dicken calls the “circulation activities” that “connect the various parts of the production system together,”^[43] is axial to these diverse activities, thus of heightened importance in the contemporary world. It follows too that “information management” is of exceptional pertinence and that, as a result, we witness the rapid expansion of information occupations.

- Computer and communications technologies provide the infrastructure that enables information to be processed and distributed. These technologies allow information to be handled on an historically unprecedented scale, to facilitate instantaneous and real-time trading, and to monitor economic, social, and political affairs on a global stage.
- There has been an exceptionally rapid growth of the “tradeable information sector” of the economy, by which Goddard means to highlight the explosive growth of services such as new media (satellite broadcasting, cable, video) and on-line databases providing information on a host of subjects ranging from stock market dealings, commodity prices, patent listings, currency fluctuations, to scientific and technological journal abstracts.

Complementing these developments has been the radical reorganization of the world’s financial system that has resulted in the collapse of traditional boundaries that once separated banking, brokerage, financial services, credit agencies, and the like. Inside this bewildering world of high finance—which few people understand and still fewer appear able to control—circulates, in electronic form, dazzling sums of capital (one estimate suggests there are \$2 trillion Eurodollars in the system, though there were none just over a generation ago^[44]). It might be hard to conceptualize, but it is difficult to underestimate the import of the growth of an integrated global financial market. With sophisticated IT systems now in place, plus the deregulation of stock markets and the abolition of exchange controls, we now have facilities for the continuous and real-time flow of monetary information, for round-the-clock trading in stocks, bonds, and currencies. The scale and speed of these information flows is astonishing. Hutton,^[45] for instance, observes that foreign exchange turnover dwarfs the size of national economies and makes trade flows (a traditional method of measuring national economic activity in terms of import and export levels) appear small in comparison. Thus “the total level of world merchandise trade in 1993 is two-thirds

of US Gross Domestic Production; it will take turnover in the foreign exchange markets less than a fortnight to reach the same total.”^[45]

Courtesy of immediate and effective information processing and exchange economics has become truly global and with this has come about a reduction in the constraints of space. Companies can now develop global strategies for production, storage, and distribution of goods and services; financial interests operate continuously, respond immediately, and traverse the globe. The boundaries erected by geographical location are being pushed further and further back—and with them too the limitations once imposed by time—thanks to the virtuoso ways in which information can be managed and manipulated in the contemporary period.

Such developments emphasize the centrality of information networks linking together locations within and between towns, regions, nations, continents and, indeed, the entire world. As the electricity grid runs throughout an entire nation, extending down to the individual household, so too we may envisage now a “wired society”^[46] operating at the national, international, and global level to provide an “information ring main”^[47] to each home, shop, or office. Increasingly, we are all connected to the network—which itself is expanding its reach and capacities. We come across it personally at many levels: in electronic point of sale terminals in shops and restaurants, in accessing data across continents, in e-mailing colleagues, or in exchanging information on the Internet. We may not personally experience it, but the ‘information grid’ functions still more frantically at the level of international banks, intergovernmental agencies, and corporate relationships.

In many writings, emphasis is put on the technological bases of the information network.^[48] Perhaps predictably then with these accounts of an emerging network society considerable attention is given to advances in and obstacles to the development of an ISDN infrastructure.^[49] However, notwithstanding the importance of technology and actually providing a salutary reminder of the easily neglected centrality of telecommunications to IT developments, most thinkers concerned with the emergence of a “network marketplace” place stress on ways in which networks underline the significance of the flow of information.^[40]

The salient idea here is of information circulating along electronic “highways.” Interestingly, no one has been able to quantify how much and at what rate information must flow along these routes to constitute an information society. In fact, no one has produced reliable figures capable of giving us an overall understanding of information traffic.^[50] We have data on telephone density in relation to population, figures on the expansion of facsimile services, statistics for sales of computer

systems, automated telecommunications exchanges, and so on, but lack a clear picture of the size, capacity, and use of the networks.

Nevertheless, all observers are aware of a massive increase in transborder data flows, in telecommunications facilities, in communications between computers at every level from home to transnational organization, in exchanges between stock markets and corporate segments, in access to international databases, in telex messages, and in uptake of the Internet. Similarly, there is considerable awareness of increases in the global distribution of mass mediated information: satellite television being the obvious and preeminent example, though one would also have to include news gathering and distribution services in any adequate picture. As Mulgan has it, "the networks carry an unimaginable volume of messages, conversations, images and commands"^[51]

Why much greater volume and velocity of information flows should impel us to think in terms of the constitution of a new type of society returns us to the geographer's special concern with space. All things happen in particular places and at specific times, but the characteristics of space and time have been transformed with the advent of the network society. Where once trade was cumbersome and slow moving across distances, nowadays it can be effected instantaneously with computerized communications technologies; where once corporate activity had to be coordinated by slow-moving letter that took days and even weeks to cross the space that divided the interested parties, nowadays it takes place in real time courtesy of sophisticated telecommunications and video-conference facilities.

A world built on networks calls into question older conceptions of space and power. Where the early market economies grew out of the temporal and spatial regularities of city life, today's are built on the logical or "virtual" regularities of electronic communications, a new geography of nodes and hubs, processing and control centers. The nineteenth century's physical infrastructure of railways, canals, and roads are now overshadowed by the network of computers, cables, and radio links that govern where things go, how they are paid for, and who has access to what.^[51]

In short, the constraints of space have been dramatically limited, though certainly not eliminated. And, simultaneously, time has itself been "shrunk" as contact via computer communications and telecommunications is immediate. This "time/space compression," as Giddens^[52] terms it, provides corporations, governments, and even individuals with hitherto unachievable options.

No one could deny that information networks are an important feature of contemporary societies: Satellites do allow instantaneous communications round the globe; databases can be accessed from Oxford to Los Angeles,

Tokyo, and Paris; facsimile machines and interconnected computer systems are a routine part of modern businesses.

Yet, we may still ask: Why should the presence of networks lead analysts to categorize societies as information economies? And, when we ask this, we encounter the problem of the imprecision of definitions once again. For instance, when is a network a network? Two people speaking to one another by telephone or computer systems transmitting vast data sets through a packet switching exchange? When an office block is "wired" or when terminals in the home can communicate with local banks and shops? The question of what actually constitutes a network is a serious one and it raises problems not only of how to distinguish between different levels of networking but also of how we stipulate a point at which we have entered a network/information society.

Finally, one could argue that information networks have been around for a very long time. From, at very least, the early days of the postal service, through to telegram and telephone facilities, much economic, social, and political life is unthinkable without the establishment of such information networks. Given this long-term dependency and incremental, if accelerated, development, why should it be that in the 1980s commentators began to talk in terms of information societies?

CULTURAL

The final conception of an information society is perhaps the most easily acknowledged, yet the least measured. Each of us is aware, from the pattern of our everyday lives, that there has been an extraordinary increase in the information in social circulation. There is simply a great deal more of it about than ever before.

Television has been in extensive use for well over 40 years in Britain, but now its programming is pretty well round-the-clock, people being able to watch from breakfast time until the early morning. It has expanded from a single channel and discontinuous service to include now five broadcast channels, while digitalization of television, now well advanced, will bring a huge increase of channels within the next decade or so. This has been enhanced to incorporate video technologies, cable and satellite channels, and even computerized information services such as teletext. More recently, an avalanche of computerized games has become attached to Personal Computers and virtual reality products have begun to enter the home. There is very much more radio output available now than even a decade ago, at local, national, and international levels. And radios are no longer fixed in the front room, but spread through the home, in the car, in the office, and, with the walkman, everywhere. Movies



have long been an important part of people's information environment and, indeed, attendances at cinemas have significantly declined. But movies are today very much more prevalent than ever: available still at cinema outlets, broadcast on television, readily borrowed from video rental shops, cheaply purchased from the shelves of chain stores. Walk along any street and it is almost impossible to miss the advertising displays, the billboards, and the window arrangements in shops. Visit any railway or bus station and one cannot but be struck by the widespread availability of paperback books and inexpensive magazines—their subject matter ranging from classical, pulp fiction, middlebrow, to self-therapy—a scale and scope without precedent. In addition, audiotape, compact disc and radio all offer more, and more readily available, music, poetry, drama, humor, and education to the general public. Newspapers are extensively available and a good many new titles fall on our doorsteps as free sheets. Junk mail is delivered daily.

All of this testifies to the fact that we inhabit a media-laden society, but the informational features of our world are more thoroughly penetrative than a short list of television, radio, and other media systems suggests. This sort of listing implies that new media surround us, presenting us with messages to which we may or may not respond. But, in truth, the informational environment is a great deal more intimate, more constitutive of us, than this suggests. One may consider, for example, the informational dimensions of the clothes we wear, the styling of our hair and faces, the very ways in which, nowadays, we work at our image (from body shape to speech, people are intensely aware of the messages they may be projecting and how they feel about themselves in certain clothes, with a particular hairstyle, etc.). A few moment's reflection on the complexities of fashion, the intricacy of the ways in which we design ourselves for everyday presentation, makes one well aware that social intercourse nowadays involves a greater degree of informational content than previously.

To be sure, there has long been adornment of the body, clothing, and makeup being important ways of signaling status, power, and affiliation. But, it is obvious that historically the present age has dramatically heightened the symbolic import of dress and the body. When one considers the lack of range of meaning that characterized the peasant smock that was the apparel of the majority for centuries, and the uniformity of the clothing worn by the industrial working class in and out of work up to the 1950s, then the veritable explosion of meaning in terms of dress since then is remarkable. The availability of cheap and fashionable clothing, the possibilities of affording it, and the accessibility of any amount of groups with similar—and different—lifestyles and cultures (divided by age, gender, race, ethnicity,

affluence, region, etc.) all make one appreciate the informational content even of our bodies.

Homes too are informational laden in an historically singular way. Furniture, layout, and decorative design all express ideas and ideals: the G-plan style, the Laura Ashley settee, the William Morris wallpaper and the mixing of some and all of these according to choice and budget. Certainly, since the days of the Industrial Revolution, homes have signified ways of life—one thinks, for example, of the style of the “respectable” working class of the late Victorian period or the distinctive design of the professional middle classes between the wars. But, it is the explosion in variety in recent decades, and the accessibility of it to a great many, that is most remarkable. With this has come an astonishing vista of signification.

This intrusion of information into the most intimate realms of home, bedroom and body is complemented by the growth of institutions dedicated to investing everyday life with symbolic significance. One thinks of the global advertising business, of publishing empires, of the fashion industry, of worldwide agencies of media production that bring to the domestic scene reflections of our own ways of life and images of other lifestyles, thereby presenting us with alternative meanings that may be absorbed, rejected, and reinterpreted by people, but all the time adding to the vocabulary of the symbolic environment.

Contemporary culture is manifestly more heavily information laden than any of its predecessors. We exist in a media-saturated environment that means that life is quintessentially about symbolization, about exchanging and receiving—or trying to exchange and resisting reception—messages about ourselves and others. It is in acknowledgment of this explosion of signification that many writers conceive of our having entered an information society. They rarely attempt to gauge this development in quantitative terms but rather start from the “obviousness” of our living in a sea of signs, one fuller than at any earlier epoch.

It is not difficult to explain why this should be so. For most of history, people would have lived in relatively fixed conditions with neighbors who would have been well-known to one another since all lived in the same location. Today, life is characteristically one of the interaction of strangers, each with a heightened sense of their individuality and the choices open to them. Nowadays, people live for only a few years in one place before moving on; daily, they make decisions about what to wear, buy, eat, and do from a range that to their forebears would have seemed astonishingly broad; during the day, they are likely to meet others about whom they know little; urban dwelling is the norm. In a world of strangers, it is essential that people have means of communication to reach out to others, to establish their

own identities, and to exchange information. Obviously, the spoken word is central to this, and this vocabulary has expanded over the years, but so too are goods, cars, clothes, and so forth because they provide us with “languages” with which to connect to a changing world.

Into this—the familiar story of a shift from community to association that appears to be accelerating—needs to be placed the spectacular expansion of media technologies^[53] that help produce conditions in which much of life today is experienced symbolically rather than personally encountered: news is not passed from word of mouth by people who know one another, but electronically from around the globe; our work is very often concerned with exchanging symbols with others with whom we do not come into personal contact, but substitute for by writing or telephone communications; our entertainment is more often made by watching a screen than by personally attending a show.

Furthermore, it is easy to appreciate that this world of signification is also characterized by constant change and, accordingly, with persistent shifts and strains in the symbolic environment. Just think of the proliferation of lifestyles nowadays (among students, social classes, the young, family forms, etc.), or reflect on the rapidly changing appeal of intellectual ideas, of musical tastes, and of fashionable “looks,” and consider the innovation, conflicts, misunderstandings, and tumult that this engenders.

Paradoxically, it is perhaps this very explosion of information that leads some writers to announce, as it were, the death of the sign. Blitized by signs all around us, designing ourselves with signs, unable to escape signs wherever we may go, the result is, oddly, a collapse of meaning. As Baudrillard puts it: “there is more and more information, and less and less meaning.”^[54] In this view, signs once had a reference (clothes, for example, signified a given status, the political statement a distinct philosophy, the television news, “what really happened”). However, in this, the postmodern era, we are enmeshed in such a bewildering web of signs that they lose their salience. Signs come from so many directions and are so diverse, fast-changing, and contradictory, that their power to signify is dimmed. In addition, audiences are creative, self-aware, and reflective, so much so that all signs are greeted with skepticism and a quizzical eye, hence, easily inverted, reinterpreted and refracted from their intended meaning. Thus, the notion that signs represent some “reality” apart from themselves loses its credibility. Rather signs are self-referential: they—simulations—are all there is. They are, again to use Baudrillard’s terminology, the “hyper-reality.”

People appreciate this situation readily enough: They deride the poseur who is dressing for effect, but acknowledge that it’s all artifice anyway; they are skeptical

of the politician who “manages” the media and his image through adroit PR (public relations), but accept that the whole affair is a matter of information management and manipulation. Here, it is conceded that people do not hunger for any true signs, because they recognize that there are no longer any truths. In these terms, we have entered an age of “spectacle” in which people realize the artificiality of signs they may be sent (“it’s only the president at his latest photo opportunity,” “it’s news manufacture,” “it’s Jack playing the tough guy”) and in which they also acknowledge the inauthenticity of the signs they use to construct themselves (“I’ll just put on my face,” “there I was adopting the ‘worried parent’ role”).

As a result, signs lose their meaning and people simply take what they like from those they encounter (usually very different meanings than may have been intended at the outset). And then, in putting together signs for their homes, work, and selves, happily revel in their artificiality, “playfully” mixing different images to present no distinct meaning, but instead to derive “pleasure” in the parody or pastiche of, say, combining punk and a 1950s Marilyn Monroe facial style. In this information society, we have then “a set of meanings (that) is communicated (but which) have no meaning.”^[55]

Experientially, this idea of an information society is easily enough recognized, but, as a definition of a new society, it is considerably more wayward than any of the notions we have considered. Given the absence of criteria we might use to measure the growth of signification in recent years, it is difficult to see how students of postmodernism such as Mark Poster can depict the present as one characterized by a novel “mode of information.”^[55] How can we know this other than from our sense that there is more symbolic interplay going on? And on what basis can we distinguish this society from say, that of the 1920s, other than purely as a matter of degree of difference? Those who reflect on the postmodern condition may have interesting things to say about the character of contemporary culture, but, as regards establishing a clear definition of the information society, they are glaringly deficient.

QUALITY AND QUANTITY

Reviewing these varying definitions of the information society, what comes clear is that they are either or both underdeveloped or imprecise. Whether it is a technological, economic, occupational, spatial, or cultural conception, we are left with highly problematical notions of what constitutes, and how to distinguish, an information society.

It is important that we remain aware of these difficulties. Though as a heuristic device, the term information



society might have some value in helping us to explore features of the contemporary world, it is far too inexact to be acceptable as a definitive term. For this reason, though one may readily acknowledge that information plays a critical role in the present age, one has to remain suspicious as regards information society scenarios and maintain skepticism toward the view that information has become the chief distinguishing feature of our times.

Now, however, I want to raise some further difficulties with the language of the information society. The first problem concerns the quantitative versus qualitative measures to which I have already alluded. My earlier concern was chiefly that quantitative approaches failed to distinguish more strategically significant information activity from that which was routine and low-level and that this homogenization was misleading. Here I want to reraise the quality/quantity issue in so far as it bears upon the question of whether the information society marks a break with previous sorts of society.

Most definitions of the information society offer a quantitative measure (numbers of white collar workers, percentage of GNP devoted to information, etc.) and assume that, at some unspecified point, we enter an information society when this begins to predominate. But there are no clear grounds for designating as a new type of society one in which all we witness is greater quantities of information in circulation and storage. If there is just more information, then it is hard to understand why anyone should suggest that we have before us something radically new. This is a point made well by Giddens when he observes that all societies, as soon as they are formed into nation states, are information societies in so far as routine gathering, storage, and control of information about population and resources are essential to their operation.^[56] On this axis, all that differentiates the present era from, say seventeenth-century England, is much greater quantities of information that are amassed, dissembled, and processed. Kumar voices much the same complaint against postindustrial theorists (and postindustrial society is currently synonymous with the concept of an information society): How can they uphold the claim to have identified a postindustrial society when the trends they single out "are extrapolations, intensifications, and clarifications of tendencies which were apparent from the very birth of industrialism?"^[57]

Against this, however, it may be feasible to describe as a new sort of society, one in which it is possible to locate information of a qualitatively different order and function. Moreover, this does not even require that we discover that a majority of the workforce is engaged in information occupations or that the economy generates a specified sum from informational activity. For example, it is theoretically possible to imagine an information

society where only a small minority of information experts hold decisive power. One need look only to the writings of H.G. Wells to conceive of a society in which a "knowledge elite" predominates and the majority, surplus to economic requirement, are condemned to drone-like unemployment. On a quantitative measure, say of occupational patterns, this would not qualify for information society status, but we could feel impelled to so designate it because of the decisive role of information/knowledge to the power structure and direction of social change.

The blunt point is that quantitative measures—simply more information—cannot of themselves identify a break with previous systems, while it is at least theoretically possible to regard small but decisive qualitative changes as marking a system break. After all, just because there are many more automobiles today than 30 years ago does not qualify us to speak of a "car society." But, it is a systemic change that those who write about an information society wish to spotlight, whether it be in the form of Bell's postindustrialism, or in Castells's informational mode of development, or in Poster's mode of information.

What is especially odd is that so many of those who identify an information society as a new type of society do so by presuming that this qualitative change can be defined simply by calculating how much information is in circulation, how many people work in information jobs, and so on. What we have here is the assumption that quantitative increases transform—in unspecified ways—into qualitative changes in the social system.

It is noticeable that those scholars such as Schiller and Harvey who stress the present's continuities with the past, while they acknowledge an increasingly central role played by information, have at the forefront of their minds the need to differentiate between categories of information and the purposes to which it is put. In other words, those who insist that the "informationalized" society is not radically different from the past are at pains to differentiate information on qualitative grounds. For instance, they will examine how information availability has been affected by the application of market criteria and contend that the wealthier sectors of society gain access to particularly high quality information that consolidates their privileges and powers. Yet, while they emphasize these sort of qualitative dimensions of informatization, they do so to highlight continuities of the socioeconomic system. Conversely, those who consider that the information society is a radically different system most often recourse to quantitative indices to demonstrate a profound qualitative change.

Roszak^[58] provides an interesting insight into this paradox in his critique of information society themes. His examination emphasizes the importance of qualitatively distinguishing "information," extending to it what each

of us does on an everyday basis when we differentiate between phenomena such as data, knowledge, experience, and wisdom. Certainly, these are themselves slippery terms, but they are an essential part of our daily lives. In Roszak's view, the present "cult of information" functions to destroy these sort of qualitative distinctions that are the stuff of real life. It does this by insisting that information is a purely quantitative thing subject to statistical measurement. But to achieve calculations of the economic value of the information industries, of the proportion of GNP expended on information activities, of the percentage of national income going to the information professions, and so on, the qualitative dimensions of the subject (Is the information useful? Is it true or false?) are laid aside: "For the information theorist, it does not matter whether we are transmitting a fact, a judgement, a shallow cliché, a deep teaching, a sublime truth, or a nasty obscenity." These qualitative issues are overlooked as information is homogenized and made amenable to numbering: "Information comes to be a purely quantitative measure of communicative exchanges."^[58]

The astonishing thing to Roszak is that along with this quantitative measure of information comes the assertion that more information is profoundly transforming social life. Having produced awesome statistics on information activity by blurring the sort of qualitative distinctions we all make in our daily lives, information society theorists then assert that these trends are set to change qualitatively our entire lives. To Roszak, this is the mythology of "information" talk: The term disguises differences, but in putting all information into one big pot, instead of admitting that what we get is an insipid soup, the perverse suggestion is that we have an elixir. As Roszak says, this may be very useful for those who wish the public to accept unprotestingly change since it seems so uncontentious.

Information smacks of safe neutrality; it is the simple, helpful heaping up of unassailable facts. In that innocent guise, it is the perfect starting point for a technocratic political agenda that wants as little exposure for its objectives as possible. After all, what can anyone say against information?^[58]

Roszak vigorously contests these ways of thinking about information. A result of a diet of statistic upon statistic about the uptake of computers, the data-processing capacities of new technologies, and the creation of digitalized networks, is that people come readily to believe that information is the essential sustenance of the social system. There is so much of this food that it is tempting to agree with those information society theorists who insist that we have entered an entirely new sort of system. But against this "more-quantity-of-information-to-new-quality-of-society" argument Roszak insists that the "master ideas" that underpin our civilization are not

based upon information at all.^[75] Principles such as all men are created equal, my country right or wrong, live and let live, we are all God's children, and do unto others as you would be done by are central ideas of our society—but all come before information.

It is important to say that Roszak is not arguing that these and other master ideas are necessarily correct (in fact a good many are noxious—e.g., all Jews are rich, all women are submissive, blacks have natural athletic ability). But, what he is emphasizing is that ideas, and the necessarily qualitative engagement these entail, take precedence over quantitative approaches to information. And, what he especially objects to is that information society theorists reverse that situation at the same time as they smuggle in the (false) idea that more information is fundamentally transforming the society in which we live.

WHAT IS INFORMATION?

Roszak's rejection of statistical measures leads us to consider perhaps the most significant feature of approaches to the information society. We are led here largely because his advocacy is to reintroduce qualitative judgement into discussions of information. Roszak asks questions like: Is more information necessarily making us a better informed citizenry? Does the availability of more information make us better informed? What sort of information is being generated and stored and what value is this to the wider society? What sort of information occupations are expanding, why, and to what ends?

What is being proposed here is that we insist on examination of the meaning of information. And, this is surely a commonsensical understanding of the term. After all, the first definition of information that springs to mind is the semantic one: Information is meaningful; it has a subject; it is intelligence or instruction about something or someone. If one were to apply this concept of information to an attempt at defining an information society, it would follow that we would be discussing these characteristics of the information. We would be saying that information about these sorts of issues, those areas, that process, are what constitutes the new age. However, it is precisely this commonsensical definition of information that the information society theorists jettison. What is, in fact, abandoned is a notion of information having a semantic content.

The definitions of the information society I have reviewed perceive information in nonmeaningful ways. That is, searching for quantitative evidence of the growth of information, a wide range of thinkers have conceived it in the classic terms of Shannon and Weaver's^[59] information theory. Here, a distinctive definition is used, one that is sharply distinguished from the semantic concept



in common parlance. In this theory, information is a quantity that is measured in "bits" and defined in terms of the probabilities of occurrence of symbols. It is a definition derived from and useful to the communications engineer whose interest is with the storage and transmission of symbols, the minimum index of which is on/off (yes/no or 0/1). This approach allows the otherwise vexatious concept of information to be mathematically tractable, but this is at the price of excluding the equally vexing—yet crucial—issue of meaning and, integral to meaning, the question of the information's quality. On an everyday level, when we receive or exchange information, the prime concerns are its meaning and value: Is it significant, accurate, absurd, interesting, adequate, or helpful? But, in terms of the information theory that underpins so many measures of the explosion of information, these dimensions are irrelevant. Here, information is defined independent of its content, seen as a physical element as much as is energy or matter. As one of the foremost information society devotees put it:

Information exists. It does not need to be perceived to exist. It does not need to be understood to exist. It requires no intelligence to interpret it. It does not have to have meaning to exist. It exists.^[60]

In fact, in these terms, two messages, one that is heavily loaded with meaning and the other that is pure nonsense, can be equivalent. As Roszak says, here "information has come to denote whatever can be coded for transmission through a channel that connects a source with a receiver, regardless of semantic content."^[58] This allows us to quantify information but at the cost of abandonment of its meaning and quality.

If this definition of information is the one that pertains in technological and spatial approaches to the information society (where the quantities stored, processed, and transmitted are indicative of the sort of indexes produced), we come across a similar elision of meaning from economists' definitions. Here it may not be in terms of bits, but at the same time, the semantic qualities are evacuated and replaced by the common denominator of price.^[61]

To the information engineer, the prime concern is with the number of yes/no symbols, to the information economist, it is with their vendibility. But, as the economist moves from consideration of the concept of information to its measurement, what is lost is the heterogeneity that springs from its manifold meanings. The "endeavour to put dollar tags on such things as education, research, and art"^[62] unavoidably abandons the semantic qualities of information. Kenneth Boulding observed thirty years ago that "The bit abstracts completely from the content of information and while it is enormously useful for telephone engineers for purposes of the social system theorist we need a measure which takes account of significance and which would weight, for instance, the gossip of a

teenager rather low and the communications over the hot line between Moscow and Washington rather high."^[63,64] How odd then that economists have responded to the qualitative problem that is the essence of information with a quantitative approach that, reliant on cost and price, is at best "a kind of qualitative guesswork,"^[63,64] "Valuing the invaluable," to adopt Machlup's terminology, means substituting information content with the measuring rod of money. We are then able to produce impressive statistics, but in the process we have lost the notion that information is about something.^[65]

Finally, though culture is quintessentially about meanings, about how and why people live as they do, it is striking that with the celebration of the nonreferential character of symbols by enthusiasts of postmodernism, we have a congruence with communications theory and the economic approach to information. Here, too, we have a fascination with the profusion of information, an expansion so prodigious that it has lost its hold semantically. Symbols are now everywhere and generated all of the time, so much so that their meanings have imploded, hence ceasing to signify.

What is most noteworthy is that information society theorists, having jettisoned meaning from their concept of information in order to produce quantitative measures of its growth, then conclude that such is its increased economic worth, the scale of its generation, or simply the amount of symbols swirling around, that society must encounter profoundly meaningful change. We have, in other words, the assessment of information in nonsocial terms—it just is—but we must adjust to its social consequences. This is a familiar situation to sociologists who often come across assertions that phenomena are aloof from society in their development (notably technology and science) but that carry within them momentous social consequences. It is demonstrably inadequate as an analysis of social change.^[66]

Doubtless being able to quantify the spread of information in general terms has some uses, but it is certainly not sufficient to convince us that, in consequence of an expansion, society has profoundly changed. For any genuine appreciation of what an information society is like, and how different—or similar—it is to other social systems, we must surely examine the meaning and quality of the information. What sort of information has increased? Who has generated what kind of information, for what purposes, and with what consequences?

THEORETICAL KNOWLEDGE

It is tempting to stop this critique here, satisfied to have drawn attention to the peculiarly deracinated notion of

information that plays a pivotal role in conceptions of the information society. However, there is another suggestion, intriguing if imprecise, that can contend that we are on the point of entry into a distinctly novel information society without any need to reflect on the meanings of the information involved. Furthermore, this proposition has it that we need not discover any of the quantitative measures of information expansion (information employees, tradeable information, etc.), because the suggestion is that it is a decisively qualitative change in information that can be pointed to and which marks a break with the past.

From this point of view, an information society is regarded as one in which theoretical knowledge takes on a preeminence that it has hitherto lacked. The theme that unites what is in fact rather a disparate range of thinkers is that, in this information society (though frequently the term knowledge society is preferred, for the obvious reason that it conjures much more than agglomerated bits of information), affairs are organized and arranged in such a way as to prioritize theory.

It is worth noting that Bell^[30] presents this as an “axial principle” of postindustrial society and that, although the weight of his analysis leans toward quantitative increases in service—i.e., information—occupations as indicators of postindustrialism, he is emphatic that “what is radically new today is the codification of theoretical knowledge and its centrality for innovation.”^[67] It is easy enough to understand what Bell means by this when we contrast today’s postindustrialism with its predecessor industrial society.^[76] In the past, it is argued, innovations were made, on the whole, by “inspired and talented tinkers who were indifferent to science and the fundamental laws underlying their investigations.” In contrast to this decidedly practical and problem-solving orientation, it is suggested by Bell that nowadays innovations start from theoretical premises. That is, now that we have arrived at a situation in which it is possible to codify known scientific principles, then our knowledge of these becomes the starting point of action. In this way, what was once dismissed as useless—as just theory—has become the axis of practical innovations.

Again, it is not difficult to find illustrations of this “change in the character of knowledge itself.”^[30] For instance, Alan Turing’s paper, “On Computable Numbers” (1937), sets out mathematical principles that underpin later applications in computer science; the development of integrated circuits that enabled the “microelectronics revolution” to get under way in the late 1970s was founded on known principles of solid-state physics; and innovations in areas as diverse as compact disc technology and nuclear energy were reliant on theoretical breakthroughs that were regarded initially as without practical consequences. It is rather difficult to think of technological applications nowadays that do not hinge on

theoretical knowledge, whether it is calculating the needs of households for water supply, building a bridge, or estimating energy needs in a particular area. Not surprisingly, perhaps, we find historian Eric Hobsbawm confirming Bell’s perception, concluding that during this century, “the theorists (have been) in the driving seat . . . telling the practitioners what they were to look for and should find in the light of their theories.”^[68]

Bell takes his argument for the “primacy of theoretical knowledge” considerably further, to suggest that it is preeminent not only in the realm of technological innovation, but even in social and political affairs. For instance, governments today introduce policies based on theoretical models of the economy. These may be variable—Keynesian, monetarist, supply side, and so forth—but each of them are theories that are the foundations that underpin day-to-day decisions ministers may make in response to practical exigencies. Again, we can see emerging major concerns with environmental consequences of policies. The response is, arguably, not just to respond to a particularly pressing problem (say, an oil spillage), but to act, increasingly, on the basis of theoretical models of the ecosystem’s sustainability. To be sure, such models are at present inchoate and unrefined, but they and other instances help us to appreciate that, while theoretical knowledge does not have to be true in any absolute sense, it does play a decisive part in life in the late twentieth century.

Theoretical knowledge is undeniably an arresting idea, one that does, *prima facie* define a new type of society that hinges on the generation and use of information/knowledge. If theory is at the point of initiation of developments, in contrast to one-time practical demands, then such knowledge could be said to herald a new sort of society. Moreover, we are not talking here merely of more white-collar workers or more bits of information being produced but of a new foundational principle of social life.

Nonetheless, a major difficulty with this notion is defining with any precision what is meant by theoretical knowledge. Theory evokes abstract and generalizable rules, laws, and procedures, and, with this, there can be agreement that advances, especially in scientific knowledge, have resulted in their codification in texts that are learned by would-be practitioners and that, in turn, become integrated into their practical work. This principle can reasonably be thought to be at the heart of research and development projects at the forefront of innovations, but it is clearly in evidence, too, in a large range of professions such as architecture, building, handling of food, and even the design of much clothing.

However, there are those who would extend the notion of theoretical knowledge to encompass a much vaster range, all of which could be cited as evidence of a



knowledge-based society. Here, for example, one might include the training of many white-collar employees in law, social services, accountancy, etc., as evidence of the primacy of knowledge in the contemporary world. Indeed, one might also choose to argue that the whole of higher education, at the least, is concerned with transmitting theoretical knowledge. After all, it is a common refrain that the rapid transition to mass higher education (with about 30% of the age group attending universities) has been required by the need to equip appropriately very large numbers of people to operate successfully in the knowledge society.^[69] Such knowledge as is transmitted is undoubtedly codified and generally abstracted from practical applications, and it is even generalizable, though it is surely of a different order of magnitude to the theoretical knowledge expounded in sciences such as chemistry and physics.

Stehr,^[70] proposing that we now inhabit a knowledge society, does extend the definition of theory in such a way, arguing that nowadays knowledge has come to be constitutive of the way that we live. Recourse to theoretical knowledge is now central to virtually everything that we do, from designing new technologies, producing everyday artifacts,^[71] to making sense of our own lives when we draw upon large repositories of knowledge to help us better understand our own location. Here, we are surely extending the idea of theoretical knowledge a very great deal, but it is helpful in so far as Stehr does echo themes in the stimulating and original work of social theorist Anthony Giddens that merit some comment. Stehr^[70] proposes a three-fold typology of the development of knowledge, meaningful (the Enlightenment ideal of knowledge for better understanding), productive (knowledge applied to industry), to action (where knowledge is intimately connected to production with, for example, the inclusion of intelligent devices, and where it influences the performance of one's everyday activities). This latter form of knowledge appears close to Giddens's emphasis on what he refers to as the intensified reflexivity of 'late modern' existence. What Giddens highlights here is that, and increasingly, modernity has been a story of people's release from the strictures of nature and restrictive forms of community where it appeared that one had to do what one did as it was a matter of fate, toward individuals and groups making choices about their own and collective destinies in circumstances of "manufactured uncertainty." That is, the world increasingly is not bounded by fixed and unchangeable limits, but is rather recognized as malleable and the outcome of human decisions. A requisite of this is heightened self and collective interrogation, otherwise reflexivity, though this is not to be perceived as some trend toward self-absorption. Quite the contrary, it is premised on openness to ideas, information, and theories from very diverse

realms, which are examined and incorporated as circumstances and people so decide.

A key point here is that a posttraditional^[72,73] society that is characterized by intensified reflexivity of actors and institutions hinges on information/knowledge. Of course, some of this is local and particular (one's biography reflected upon, a company carefully scrutinizing its customer records), but a great deal is also abstract, emanating especially from electronic media and from other, notably educational, institutions. If one accepts Giddens's argument that we do inhabit a world of "high modernity" in which reflexivity is much more pronounced than hitherto, then it is feasible to conceive of this as heightening the import of information and knowledge in contemporary life. A world of choices, for both organizations and individuals, is reliant on the availability and generation of detailed and rich information. If one follows Giddens's contention that ours is an era of intensified reflexivity on the basis of which we forge our material, as well as psychical conditions, then it follows that this will sustain and will demand a complex and deep information environment. It is perhaps not quite the same sort of theoretical knowledge as that which Bell has proposed, but, in so far as it is frequently abstract and codified, then it could find inclusion in a suitably widened category.

Nevertheless, there are reasons why we should hesitate to depict any novel information society in these terms. Not least is that Giddens himself is reluctant to do so. While he does emphasize that a "world of intensified reflexivity is a world of clever people,"^[73] he is unwilling to present this as other than an extension of long-term trends, hence as a high modern era rather than a postmodern or postindustrial epoch. Life today is certainly more information intensive, but this is not sufficient to justify projections that it represents an entirely new sort of society.

In addition, Giddens has also raised serious doubts about the novelty of theoretical knowledge. Several years ago, he observed that "there is nothing which is specifically new in the application of 'theoretical knowledge'... Indeed... rationality of technique... is the primary factor which from the beginning has distinguished industrialism from all preceding forms of social order."^[74] This being so, we return to the problem of designating as novel today's society in which theoretical knowledge is prevalent. Further, Giddens's objection begs the key question: Just what, precisely, do commentators mean by theoretical knowledge? It is clear, from the quotation above, that Giddens feels that the classical sociologist Max Weber's conception of formal rationality that underpins purposive action (most famously manifested in the growth of bureaucratic structures) might apply in one definition. After all, it involves abstract and

codifiable principles, rules, and regulations (the entire bureaucratic machine), as well as requiring, from participants, command of abstract knowledge (how the system works). Theoretical knowledge, in these terms, is not much more than learning the rules and procedures of how bureaucracies function. If so, then one is forced also to ask what is especially new about this.

This leads us to the wider complaint about the imprecision of the term theoretical knowledge. If, for instance, the primacy of theoretical knowledge is taken to refer to known scientific principles (the boiling point of water, the conductivity of elements, etc.) that are codified in texts, then this is one matter. However, if theoretical knowledge is taken to include hypothetical models such as the relation between inflation and unemployment or social class and educational opportunity, then this surely is quite another. Again, if theoretical knowledge is conceived as the primacy of research and development funds and teams in modern innovations, then this is another matter too. And if theoretical knowledge is perceived as the prominence in modern life of expert systems that operate services like the water and sewerage systems, airlines, and retail organizations, then this is another thing again. Alternatively, if theoretical knowledge is to be understood as a trend toward very much more intensified reflexivity among individuals and institutions, on the basis of which they then shape their future courses of action, then this is another thing again. Finally, if the rise of theoretical knowledge is to be chartered by the spread of educational certification—a common strategy—then this is to introduce still another significantly different definition.

In view of such ambiguities of definition, at best, one can conclude that theoretical knowledge may be more in evidence than hitherto, but that it is a far cry from this to conclude either that it is the preeminent force in society or that it marks a decisive turning point in history.

CONCLUSION

This article has focused on the criteria used by those who depict an information society. Each has been found wanting, chiefly because they forward inappropriate quantitative measures that cannot, in themselves, identify a qualitative change from one type of society to another. It was further demonstrated that conceptions of the information society operated with variable—but uniformly nonsemantic—definitions of information, whether it was conceived as so many bits, or so much economic worth, or as an explosion of signs. Such notions of information, all of which ignore its meaning/content, were useful in that they facilitate quantification, but they are

unacceptable when it comes to suggesting that we are witnessing the emergence of a qualitatively new information society. Finally, the distinctively qualitative notion, that the primacy of theoretical knowledge is the distinguishing feature of the information/knowledge society was considered. While it has an initial appeal, the term was too vague and imprecise to persuade that the undoubted expansion of some forms of theoretical knowledge signal a new type of society.

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