Management
and the
"post-industrial"
society
THEODORE LEVITT

As if the world's industrial nations didn't already have enough troubles, we are now offered a new malady that shatters whatever slight faith remains in the meliorating possibilities of abundance. This is to the effect that we are entering a world of economic entropy: The more economically advanced that nations become, the less their living standards will rise—until, finally, those standards begin to fall.

Advanced goods-producing nations, it is said, become goods-saturated and service-hungry. As affluence waxes, the demand for goods wanes—a third family car seems less urgently needed than the second; after one refrigerator, another is a marginal convenience. On the other hand, the demand for travel, education, entertainment, eating out, health care, and other services accelerates both absolutely and relatively. More of the nation's work shifts from the production worker to the lower-level service worker and the upper-level "knowledge worker," whose activities have only limited access to the kinds of industrial and science-based technologies that so profoundly increased productivity in manufacturing and farming in the last hundred years. Hence costs and prices rise more rapidly, and a structural malignancy increasingly creeps into the economy. As we want relatively more of the things
that cost relatively more to produce, the less well-off we shall be-
come. Thus the anomaly of our age: Economic progress "immis-
crizes" itself.

The most sophisticated version of this gloomy prognosis is con-
tained in the account of the coming "post-industrial" society, which elaborately describes the nature and consequences of this structural shift from a production to a service economy. This ac-
count is indeed based on some facts and is, on its face, plausible
enough.

In the past 15 years, the non-goods-producing sector of the United States nonagricultural labor force rose 52 per cent, versus 38 per cent for the goods-producing sector. Civilian government em-
ployment alone rose 148 per cent. While the growing numbers of service and knowledge workers (retail clerks, janitors, repairmen, waiters, scientists, teachers, government employees, and profes-
sonal and technical workers in medicine, health care, law, and the like) plod ingloriously to produce about as much today as they did 20 years ago, the output of industrial workers expands with the help of automated machines, factory systems, cybernetic controls, and fluid processors. As industrial productivity rises, so do industrial wages. Unless the incomes of service workers also rise, they will suffer from the unequal distribution of productiv-
ity gains. But their incomes do rise. In the past 15 years, their real incomes have risen nearly as fast as those of industrial work-
ers—82 per cent versus 94 per cent. Between 1968 and 1973 alone, salaries of federal government employees rose an average of 9.1 per cent a year, salaries of local police and firemen 7.3 per cent a year, and salaries of industrial production workers only 6.6 per cent a year. But since service productivity presumably lags sub-
stantially, rising service wages force everybody to share the con-
sequent inflation and lowered standards of living.

The "post-industrial" society thus seems to be in the malignant grip of its own differential achievements and conflicting desires. Uneven productivity rates and the rapid expansion of the less pro-
ductive sector create a structural "cost-push" inflation. This in turn is inflamed by what Daniel Bell calls a "revolution of entitle-

ments”—the crescive insistence that government should assure everybody a wide range of minimum rights and benefits.

Bell concludes that this "structural . . . problem . . . can be overcome only by somehow finding methods to increase productivity in the service sector." In this conclusion, he is joined by many others. Peter Drucker writes flatly, "The only feasible solution to our economic problem is to raise productivity, and the only way to accomplish this is by raising the productivity of knowledge work"—that is, the work of the upper service ranks, the "managers, engineers, computer programmers, or medical technologists . . . the skilled and semiskilled knowledge workers who are where the growth is and is going to be." Similarly, the President's National Commission on Productivity, made up of practical men of affairs from the upper echelons of business, agriculture, and labor, declared in its 1971 policy statement that "there has been lagging productivity growth within . . . government, the various services, construction, trade, finance, insurance, and real estate" and that their underperformance threatens "a higher standard of living and a better quality of life."

Service productivity

The problem, then, is whether it is possible to make the service economy in the 20th century as productive as manufacturing became in the 19th century. "How can we do it?" Drucker asks, and responds: "No one has any answers . . . ." Most people seem to believe there is no answer. Fortunately there is.

First, however, some moderating propositions: 1) The goods-producing fecundity of industrial society has not been homogeneous—its productive prowess has been exaggerated; 2) the productive advances of the service sector have been widely understated and its potentials badly underestimated; and 3) government employment, the most heavily labor-intensive portion of the service sector, though in explosive growth since 1960, is now visibly headed for both a proportional and an absolute decline. Finally, and this is the heart of the matter: The gloomy account of a low-productivity service economy is rooted in an almost wanton disregard of the historical role and future possibilities of the managerial arts for improving labor productivity.

If these propositions are right, the supposed consequences of the supposedly unique structure of the "post-industrial" society are far less real or worrisome than advertised. Nobody really dis-
agrees about the need for more productivity in the service sector. *Fortunately, we are getting it, we know why, and we know how to get more.*

What is crucially missing in most assessments concerning the possibility of increasing service-sector productivity is any serious consideration of exactly what accounts for the great productivity of the goods-producing industries. We are offered only confident and conventional assertions, based largely on orthodox but unexamined dogma, and very little on any analysis of actual historical situations. Indeed, the conventional "facts" about what produced the magnificent thrusts of productivity in the goods-producing sectors are largely "factoids," merely imaginary as regards historical facts and their relative importance. Overlooked is what I will argue was specifically the most important element in the success of the industrial age—the element of "management."

Ignoring the role of management in the growth of industrial systems *ipso facto* exaggerates the importance of machines and the artifacts of production. Since those machines and artifacts are not presumed to be present or easily usable in service industries today, gloomy conclusions are understandably reached about the future productivity of the expanding service sector, and therefore about the future living standards of the "post-industrial" society.

On the other hand, if the enormous abundance of the industrial age was the product not of new technology but rather of the art of management—that strangely neglected and often rudely dismissed field of activity—then one must consider whether management could also play such a fructifying role in the service economy. I believe that it can—and that evidence on behalf of this thesis is already plentiful.

**The role of management**

Management as a practical art originally developed in the conduct of war. Even today, tables of organization and the language of industrial management derive from the military concepts of "line" and "staff." The industrial revolution gradually adopted and expanded these concepts and procedures. Today management is understood and acknowledged as the unique and central characteristic of that revolution, by those who really know the inner workings of modern industry. Management is *the* primary engine of progress, as progress is generally defined. The crucial importance of management has been eclipsed by the historians' almost
obsessively childlike fascination with the technological artifacts of 19th-century industry and the flamboyant entrepreneurs of that era. But the precise story of how those entrepreneurs rendered those artifacts—the machines, engines, tools, and crude instruments—productive has not yet been properly told to this day. Neither Lewis Mumford nor Max Weber—and certainly not Karl Marx—ever bothered to explore the specific details of the functional roles played by industrial organizers and managers.

The significance of management in the creation and development of the industrial age can perhaps best be understood by noting how long it took for the available technology actually to create that age. Technologically speaking, the industrial age began in Milan around 1335, with the gear-driven time clock. It contained all the mechanical hardware and engineering know-how we associate with the machinery of the industrial revolution in the 19th century. But it took Eli Whitney, in New Haven in 1798, to wrest the available technology from the dead hands of isolated medieval craftsmen and put it into the more productive hands of organized unskilled labor. Whitney's contribution was less technological than managerial. To assemble interchangeable musket parts, he created large-scale factories where there had been one-man shops; he organized, directed, and controlled groups of workers to do with existing technologies what had previously been done singly and alone.

It took over 400 years to go from the clock to the musket factory, and Whitney's contribution was precisely the work of what we call today the "manager." He was also an entrepreneur, but that part of his activity has almost totally obscured a more arduous and encompassing aspect—his role as a serious organizer and manager.

Management consists of the rational assessment of a situation and the systematic selection of goals and purposes (what is to be done?); the systematic development of strategies to achieve those goals; the marshalling of the required resources; the rational design, organization, direction, and control of the activities required to attain the selected purposes; and, finally, the motivating and rewarding of people to do the work. Whitney's idea of interchangeable parts for manufacturing muskets might be said—in the profundity of hindsight—to have led "inescapably" to the creation of the mass-production factory. But it was hardly obvious then—nor was it, in fact, a century later. Henry Ford's singular contribution was not that he invented, or even reinvented, the
assembly line. He didn’t—he merely rediscovered it while witnessing the operation of Julius Rosenwald’s Sears, Roebuck mail-order warehouse in Chicago, where roving clerks assembled orders by picking items off the shelves. Ford’s unique insight was that the potential buyer’s real problem was getting enough money to buy a car, and he set out to solve that problem by finding a way to make cars more cheaply. (On the other hand Ford might have invented installment credit to solve the problem—a “solution” that came later.) The solution derived largely from Ford’s seminal re-conceptualization of the engineering of the automobile, making it an assembled rather than a constructed machine. If he had not redesigned the automobile as an assembly of parts, it could not have been manufactured on an assembly line, where the shift from independent craftsmen working alone to unskilled multitudes working together—under highly ordered and closely supervised conditions—helped control quality, productivity, and costs.

The functional rationality which characterizes the cognitive mode of management makes a difference. Technology is not enough. It is one of the great modern mysteries that, although so much is owed by our times to the organizing and productive genius of management, the world must constantly be reminded of this fact, which it seems so obstinately reluctant to learn and believe. And, curiously, it is precisely in the world’s intellectual enclaves—in the universities, and among writers and journalists—that this obstinacy reaches its apex. Somehow, results are presumed to happen as if by immaculate conception. It is well to appreciate what the absence of good management can mean in our daily lives. For example, it is a fact now unanimously acknowledged by those who understand that, after the Arab oil embargo in November 1973, it took only one week of intensive around-the-clock work by the managers of the oil industry to rearrange completely the entire sourcing, shipping, pipelining, and delivery of the world’s oil and petroleum products to get things back on a new, functioning track. I have been told personally by extremely high-placed government officials in Europe, the United States, and Japan that they viewed this as an almost miraculous achievement that none of the governments themselves could conceivably have accomplished. Compare this to the pathetic logistical blunder in late 1975—by Nigerian government officials well trained in economics at the best British universities—that resulted in a massive glut of 120 cement-laden cargo ships in Lagos harbor with no place to dock and no space or little use for their loads.
Or, consider the venerable business of manufacturing textiles and wearing apparel. In 1969, Czechoslovakian labor productivity in these industries was 56 per cent above that of Hungary. For every 100 workers needed to do the job in Hungary, only 69 were needed in Czechoslovakia. Each Czech worker, aided by more machinery than the Hungarian worker, consumed 4,080 kilowatt hours of electricity a year, against 3,108 for the Hungarian worker. But though the Czech worker consumed on the average 31 per cent more electricity, he produced 56 per cent more goods. It is not that the Czech electric machinery was more modern or that there was more of it; it was that the manufacturing process was better managed. Understandably, even though the state rules both economies, the Czech citizen pays less for his clothes than does the Hungarian. In the end, it is the nature and quality of management that makes the real difference.

**Variations in productivity**

In order to assess the possible effects of a shift to a service economy, it is necessary to have a clear picture of the realities of the goods-producing economy.

The amount of capital per employed worker in an industry is an accepted measure of the level of its industrialization. The difference between the value of the materials used and the value of what results from the manufacturing process measures the “productivity” (or “value added”) of those employed in the effort. “Value added” per employed person is the accepted measure of labor productivity. The automobile assembly line is the prototypical example of the productive rewards of replacing human with machine effort. But compared to oil refining, auto manufacturing is a backward industry. In 1972, the United States oil industry used $173,600 in plant, equipment, and other assets for every single one of its workers; the motor vehicle industry used $22,600. The “value added” per oil refinery employee was $41,600; per motor vehicle plant employee it was only $22,400—relatively greater but absolutely less than in refining. In the fabricated-metals industries (which are heavy suppliers of parts and sub-assemblies to the auto, machine-tool, trucking, railroad, and other important technology-based industries), the “value added” per employee was only $18,200. While the investment per fabricated-metals employee was $146,930 lower than in the oil industry, it was also $6,000 less than in the food-manufacturing industry. Ob-
viously, the goods-producing sector of the American economy is neither homogenously capital-intensive nor uniformly productive.

The industrial society we knew prior to World War II, which remains in declining dominance today, was the creation of what Daniel Bell refers to as “inspired tinkerers”—Whitney, McCormick, Ford, Kettering, and even Alexander Graham Bell. They symbolize the triumph of trial-and-error mechanics over raw nature. Now we have the ascendance of science—theoretical knowledge over practical knowledge. Or, so it is claimed. Bell explains: “The science-based industries of the 1970’s—electronics, optics, polymers—begin and end with theoretical knowledge. Consequently... knowledge becomes an extraordinary strategic resource.” There the new productive leverage is supposed to lie, and it does—to a degree. Consider the computer: Starting with Univac in 1952, it is already in its fourth generation. Since 1952, every seven years there has been a tenfold increase in electronic computing speed and productivity. All this is presumed the work of “science.”

But is it that simple? The production of integrated circuits and microprocessors (the heart of the new generation of computer electronics) starts with the design of a desired set of circuits. The design, it is true, ultimately derives from a body of theory, or “pure” knowledge. But the designing itself is laboriously done by engineers at a drawing table. These designs are photographically reduced and reproduced by means of a pattern generator that creates a master mask, which is then multiplied in vast numbers (“chips”) onto single crystal wafers by means of a photorepeater. Yet both the pattern generator and the photorepeater are themselves manufactured singly by skilled craftsmen working in a manner not much different than that of the medieval clock-maker in effort, attention to metal-working precision, and solitary pride. The runners on which the photorepeater’s filming equipment moves are constructed by craftsmen who laboriously grind, sand, and polish metal by hand for days—an effort much like the finishing of the world’s most powerful telescope by technicians from Holland, who entered their apprenticeship at age 14. If you measure productivity by the metal shavings and dust the craftsman produces, he cannot compare even to the unskilled worker of 1856 who operated a pedal-driven mechanical grinding wheel in the McCormick reaper plant in Chicago. Yet such a craftsman—whose education was probably limited to a vocational high school in Muncie, Indiana—is a crucial member of that superlatively efficient, science-based knowledge industry, electronics.
And the manufacturing of the microcircuit chips and microprocessors is by any modern measure the least efficient of industries. A plant is regarded as highly efficient if it yields five per cent usable output out of every batch “cooked” during the first year of a new circuit’s production. In subsequent years, 20 per cent is considered acceptable and 30 per cent stupendous, almost miraculous—the remainder are scrapped. What would we say of Detroit’s technological might if 70 out of every 100 cars coming off the assembly line were scrapped at the factory?

Bell declares that science-based industries “begin and end with theoretical knowledge.” Begin, yes—but not end. Who are considered among the most valued workers in the integrated circuit industry? The handful of people who run the “ovens” that “cook” the chips and microprocessors. They are almost regarded as alchemists, possessing arcane skills that cannot be transmitted by observation or learned by university study. “Learning” is by trial and error, and things often go inexplicably awry, even for the possessors of the secret formulae, carefully recorded in heavily guarded recipe books. No wonder that the most despicable crime in this most “scientific” of knowledge industries is the piracy of a “cooker,” a person whose value derives not from theoretical knowledge or college education, but from the same kind of artful (even “primitive”) tinkering typical of Whitney, McCormick, and Kettering. True, without prior developments in theoretical knowledge, the “cookers” would never have had a chance to learn their practical arts. True also that Dr. Charles Townsend could not have invented the laser without the theoretical knowledge of optics, physics, and advanced electromechanics. The situation now is wholly different than it was in the time of Thomas Edison, who achieved spectacular results although he was not familiar with the works of Michael Faraday and others. Conditions have changed. We are more dependent on knowledge than before. But we ought not exaggerate that dependence.

Though the integrated circuit, the child of theoretical knowledge, is capable of enormous productivity and can be more efficiently produced relative to its performance capabilities than its predecessor, the transistor, its manufacturing process (as well as that of the microprocessor) contradicts the lyrical claims made for the productive advances of the more sophisticated goods-producing industries. Thinking things up is not the same as making things happen. It is not merely that there still are a lot of slips between the cup and the lip. It is simply that though science-
based industries may begin with theoretical knowledge, they do not end with it. Translation of knowledge into results is almost purely a matter of "tinkering"—and, more importantly, a matter of management.

The gap between the scientific origins and the technological practices of the electronics industry is a microcosm of all others. The goods-producing sector is not homogeneously productive on all fronts—not even within given "standard industrial-classification" categories. It may seem permissible to generalize about the differences between goods-producing and service-producing sectors in the rates of productive advances, but such generalization is both unwarranted and misleading. The latest studies, published in 1973, by John W. Kendrick, America's eminent "productivity" scholar, show the following annual rates of productivity increases in United States manufacturing industries between 1948 and 1966: foods, 3.0 per cent; beverages, 2.2 per cent; tobacco, 1.1 per cent; paper, 2.5 per cent; chemicals, 4.9 per cent; stone, clay, glass, 2.4 per cent; primary metals, 1.6 per cent; electric machinery, 3.7 per cent. In a previous study for the period 1899-1953, his calculations showed the following average annual rates of increase: foods, 1.7 per cent; beverages, 1.6 per cent; tobacco, 3.5 per cent; paper, 2.3 per cent; chemicals, 2.9 per cent; stone, clay, glass, 2.6 per cent; primary metals, 1.9 per cent; electric machinery, 2.2 per cent.

Obviously, the rates are not homogenous within manufacturing, or between time periods. And this is the case outside the United States, as well. A 1972 United Nations study showed that the relative productivity per employed person in manufacturing industries exhibited wide variations: In 1969, France was 29.9 per cent above Czechoslovakia; Czechoslovakia 17.8 per cent above Austria; Austria 57 per cent above Hungary. What seems clear is that productivity varies not only among manufacturing industries and nations, but by stages in industrial life cycles as well.

**Utilizing technology**

To speak of the goods-producing sector as more "productive" or more steadily expanding in productive efficiency than the service-producing sector is to enlist a few facts into an excessively encompassing generalization.

Between 1899 and 1953, the average annual productivity increase in the United States railroads was 2.6 per cent; in local transit, 2.5 per cent; in telephone service, 2.0 per cent. Each of
these service industries did better during this half century than industries manufacturing foods, beverages, apparel, lumber products, leather products, primary metals, nonelectric machinery, and furniture.

Though service productivity has generally lagged behind goods productivity, what distinguishes the better-performing service industries is the enormous help they get from technology. The capital invested in America's railroads rose each year (save four) from 1869 to 1931. In 1931, the real (that is, adjusted for price changes) new investment in the railroad industry, in spite of proliferating bankruptcies, was still five per cent above the 1889 figure. The capital invested in the telephone and telegraph industries has risen dramatically each decade from 1879 until today.

Thus the great technological flowering of the industrial sector has also helped the service sector, and in some cases has produced productivity expansion much more dramatic in the latter than in the former. There is no presumption that things will or must be different in the "post-industrial" society. Recent developments are, in fact, quite promising.

Victor R. Fuchs, the leading scholar on the productivity characteristics of service industries, has no trouble confirming that, in the aggregate, the output per man hour in the United States service sector is about half that of the manufacturing sector. But in recent decades, service productivity has actually grown faster than manufacturing. Between 1929 and 1965, the productivity growth of the industrial sector exceeded that of the service sector by an average of only .2 percentage points per year. The service industries are catching up. Indeed, in this same period the growth in two service industries actually exceeded the average of the whole manufacturing sector: transportation was higher by 1.4 percentage points; communications and public utilities, by 2.6 percentage points.

Those two were, of course, heavy beneficiaries of technology. But the technological achievements and possibilities in other service industries are widely unappreciated. Fuchs reports three case studies that help make the point. Consider beauty and barber shops. When the safety razor shifted shaving from the barber shop to the home, the demand for haircuts also declined because men visited barber shops less frequently. This reduced the number of productive hours barbers spent during a given workday and the amount of the average transaction. Since these are indices of "productivity," the measured productivity of barbers declined—though
not their efficiency or actual productivity. In beauty shops there was an opposite trend. With the development of better permanent-wave equipment and hair dyes, these services have increased both transaction size and traffic. The accelerated traffic stimulated the creation of even better and faster equipment and dyes, thus raising productivity and traffic even more. All this has been augmented by single transactions that increasingly combine women’s haircuts and shampoos. Now, with the sudden shift in men’s hair fashions, the frequency of visits by men to barber shops has risen, as has the price of “hair styling”—and consequently the productivity of barber shops.

Assessing mass transit

These examples help explain the peculiar productivity figures in mass transportation. More people per capita now fly more planes, more often than formerly took trains. Both the train and the plane created quantum increases in real efficiency over their respective predecessors. Yet railroad productivity suffers today, as did barbershops for a while, not because these industries work less well but because fewer people patronize them. Indeed, the measuring system systematically underreports the efficiency of railroads, as it does the efficiency of airlines, because it does not account for the value of time and money. Reuben Gronau’s 1970 study for the National Bureau of Economic Research on the value of time in passenger transportation shows that for trips exceeding 176 miles, the time saved in flying relative to train or bus travel, though not measured as a benefit in conventional productivity calculation, adds an enormous increment to the results of that calculation. The plane today (like the train in the past) is thus even more productive in its new applications than is reported, if we include its positive externalities—the time freed for its users’ other concerns and the value of money freed from financing the inventory of in-transit products.

The same is actually true of the relationship between public mass transportation and the private automobile. Productivity in mass transportation has declined because, for the most part, patronage has declined. But when the productivity of its alternative, the automobile, is measured in terms of the benefits perceived by its owners, the automobile clearly becomes more efficient even than a fully utilized subway. Free Transit, an exhaustive preference and attitude study of Boston-area residents by Thomas A.
Domenech and Gerald Kraft, shows the "almost complete insensitivity of [mass] transit's share of the market to such transit-system performance variables as its fare or times [i.e., speed]." The convenience, flexibility, and privacy of the automobile are what is valued, even given the substantially higher per-mile costs. No wonder San Francisco's elegant new BART transit system—quiet, comfortable, spacious, fast, running at frequent regular intervals, and now reasonably reliable; with big, free, well lighted parking lots at suburban stations—is now operating at only 40 per cent of expected revenue, and not getting better.

And no wonder that distinguished transit economist and historian George W. Hilton, in his 1974 study of the Urban Mass Transit Assistance program, said that almost all UMTA experimental programs were a flop. No wonder that in a 1974 referendum, Los Angeles area voters overwhelmingly rejected a proposed new 146-mile mass-transit subway system. What they had—their cars—was better, even conceding the cost of the government support system (roads and police, for example) that "subsidize" the private automobile. (But the motorists are not subsidized. They pay taxes for what they get.) In the end, had the Los Angeles subway been built, its most notable contribution would have been a further reduction in the reported "productivity" rates of the nation's mass-transit statistics. More technology would have produced less reported productivity because of underutilization. The problem with productivity statistics in the service sector is that they so often fail to measure the total benefits (the externalities, like time and convenience) or to account for shifts to new classifications (like from the live theater to the movies), or are distorted by the underutilization that results from the choice of higher-valued, though not always more costly, alternatives.

When it is said that the "post-industrial" or knowledge-worker society can avoid inflation and the cannibalization of its own living standards only by making service somehow as productive as the technology-based and science-based industries, that is not wrong. But there is nothing inherently more productive about technology. If people don't want the output or resist machines per se, the yield of technology will be less, not more.

The "productivity problem"

Nor does it follow that service is inherently less capable of employing the technologies which, on the average, make manu-
facturing more productive than service. We have already noted some cases. On more familiar grounds, consider the movies: They vastly raised the productivity of actors who previously performed on stage, night after night, to a few hundred patrons. The same is true of television versus movies. If our productivity data were assembled in terms of the “entertainment sector”—rather than its separate and descriptively arbitrary components, like “motion pictures” and “theaters”—the reported results would be vastly different. As things stand, the results look terrible, but the reality is pretty good: It is actually not the “theater” or the “movies” that people want, but “entertainment.” The explosive advances that the movies and then television generated in units of entertainment productivity in their very infancy were greater by magnitudes than the increases made by such pioneers of industrial standardization and mass production as the manufacturers of muskets after the Revolutionary War or the manufacturers of army uniforms in the Civil War.

The “productivity problem” of the service industries is actually being “solved” more rapidly than it originally was in the goods-producing industries. As we have seen, it took over 400 years to go from the clock to Eli Whitney’s musket factory. By that standard, the “productivity problem” in manufacturing took a very long time to get “solved.” By contrast, the very first commercially produced computer instantly replaced the hand labor of thousands of inefficient and erratic office workers employed in the weekly preparation of corporate payrolls. But the resultant productivity improvements in this service activity did not appear in the statistics. They were buried (and still are) in the gross figures of the industries for which such payrolls are prepared.

The computer is an example of the substitution of productivity-enhancing technology for low-productivity service workers. Other examples are the substitution of coffee-vending machines for waitresses, automatic check-cashing machines for bank tellers, self-operated travel-insurance machines for clerks. In numerous other cases, technology enhances the productivity of people rather than totally substituting for them: typewriters to replace quills and ink; electroencephalograms (and now, electronic brain scanners) to increase the speed and accuracy of neurologists, neurosurgeons, and neuroradiologists; detergents and motorized equipment to increase the productivity, improve the quality of work, and alleviate the burden of scrubwomen; electric tools and electronic diagnostic equipment to speed up, lessen, and improve the work of the auto
repairman; credit cards to substitute a single credit decision for the many elaborate, costly, repetitive, labor-intensive, and often dignity-destroying activities and decisions that retail purchases and bank loans formerly entailed. Even that most celebrated and isolated knowledge worker, the scholar, now has at his disposal a computerized research service that provides in minutes a perfect hard-copy citation of every professional journal reference of every single publication by, say, Daniel Patrick Moynihan. If Moynihan were a chemist, the scholar could also get an abstract of every listed citation. This miracle comes through the courtesy of Lockheed Information Services, a subsidiary of the aeronautics company whose recent bout with bankruptcy was so gleefully cheered by so many condescending scholars. Examples proliferate everywhere, accounting in part for the productivity increases regularly reported in most service activities.

The new service fecundity

The industrialization of service is still in its infancy. Perhaps the most important aspect of this process, however, is hidden. While computers, credit cards, electric hair dryers, electric hand tools, typewriters, and the like have already produced substantial productivity gains, the involvement of an entirely different facet of industrialization is even more promising—the use of manufacturing rationality, what we now call management, in the service sector. The power tools, jigs, machines, electronic controls, turbines, chemical processors, and all the knowledge that created them do not in themselves explain the productivity of manufacturing. More important is how all these are managed. Only recently has this kind of management systematically entered into the service industries.

For over a century, historians and economists have emphasized inventions and machines to explain economic development—conceptually combining these in the taxonomy of “land, labor, and capital,” and later adding the notions of an “acquisitive spirit” and a “congenial state.” What has been neglected, except in the disparaged netherlands of business literature, is an account of the rational management of economic processes. Although management has occasionally been treated by respected thinkers such as Max Weber, it has been regarded as a separate sociological topic, under the subheading of “bureaucracy.” Yet, as we have seen, what makes scientific knowledge, inventions, and machines productive
is not their mere existence, but how they are used—how they are directed, organized, and managed in a complex manufacturing setting.

Bell does not, of course, ignore this point, but he does not note its primordial importance. Indeed, he seldom even uses the word “management.” (It appears mostly peripherally, in casual footnotes quoting trivialities by Lenin and Frederick W. Taylor.) When the word is occasionally used, it is as a passive noun (like “scientist”) rather than as a functional discipline (like “science”). The closest Bell comes to a serious recognition of the managerial function is in a solitary one-line reference to “professional administrators”—significant in itself, because if management is anything, it is not administration. Management selects ends and means; it organizes, plans, directs, controls, and motivates. Administration merely executes.

When facts and logic push Bell’s analysis into the general vicinity of managerial activities, his description substitutes strained circumspection for practical familiarity: Historically, according to Bell, “productivity, as a concept, became possible only through a new ‘supporting system’ which dictated the placement of machines in a new way. To put the matter less abstractly, modern industrial society is a product of two ‘new men,’ the engineer and the economist.” Bell writes that the engineer designs and arranges machines in the “one best way,” while “the economist introduces a calculus of monetary costs, within a framework of relative prices, as a means of finding the most appropriate mix of men and machines in the organization of production.”

It is not disrespectful to suggest that no known economist of any academic stature ever came within even telescopic range of the practical labor of production. The economist came after, not before the industrial system. Yet Bell asserts more than once the putative priority of the economist’s view in the history of industrial affairs: “With economics comes a rational division of labor, specialization of functions, complementarity of relations, the use of production functions . . . programming . . . etc.” Historically, this puts the cart before the horse. Adam Smith first wrote about such notions in 1776, but they were drawn from his observations of what already existed. It is surely significant that Smith’s Wealth of Nations begins on the very first page not with theories or prescriptions, but with the description of the division of labor in pin-making—an enterprise already in existence, the result not of the theories of an economist, but of the imagination and enterprise
of a practical manufacturer who simply did what seemed sensible. Linking economics and economists to the success of the industrial system while completely ignoring the work of organizers and managers describes not history, but instead our own tendency to elevate formal conceptual schemes over plain labor.

I hope to show that the involvement of management in the service sector will substantially alter the conclusions suggested by the concept of the “post-industrial” society. The conspicuous absence in the service sector of the manufacturing mode of thought described by Adam Smith—this practical rationality we call management—accounts for much of the historic lag of the service sector behind the industrial sector and, indeed, the lag of some industrial societies behind others. This conspicuous absence in history has been matched only by scholarly neglect of the subject of management. Yet some examples will illustrate how management, which is itself a technology—though a “soft” technology, it is nonetheless a conscious routine of establishing purposes, goals, and priorities, and a rational system for getting results—is being “rediscovered” and employed to vastly raise the productivity of the service sector.

“Fast food” technology

Take the case of food. Most of us buy most of it in the supermarket—a part of the retailing branch of the service sector. It represents an enormous advance in productivity over the corner grocery store, where a single clerk filled an order one item at a time while the customer waited. The supermarket substitutes fast and efficient self-service for the slow, inefficient, and often erratic clerk. The customer is a cooperating agent in the production process—and this is also the case with laundromats, cafeterias, and, more traditionally, schools and churches, where study and prayer by the “customers” of education and religion help produce the products themselves.

The supermarket is obviously more efficient than its predecessor. Interestingly, it models the automotive assembly line. The final product (in this case, the parcel of purchased goods) is assembled from the product inventory of the store, just as a car is assembled from the parts inventory of the factory. Though the customer does most of the production work, customer satisfaction is higher. The supermarket is a triumph of entrepreneurship and management over immemorial custom.
On the other hand, take the case of food that is eaten out. Consider McDonald's. Few of today's successful new commercial ventures have antecedents that are more humble and less glamorous. Yet the thriving nationwide chain of McDonald's hamburger outlets is a supreme example of the application of manufacturing and industrial systems in a service industry. From 1961 to 1974, McDonald's annual sales rose from $54 million to $729 million. During this remarkable ascent, the White Tower chain, whose name had been practically synonymous throughout the land with low-priced, quick-service hamburgers, practically vanished.

The explanation of the thundering success of McDonald's is not a purely fiscal one—e.g., the argument that it is financed by independent local entrepreneurs who bring to their operations a quality of commitment and energy not commonly found among hired workers. Nor is it a purely geographical one—e.g., the argument that each outlet draws its patronage from a relatively small area, thus enabling the number of outlets to multiply easily and quickly. The relevant explanation must deal with the central question of why each individual McDonald's outlet is so predictably successful, why each is so certain to attract so many repeat customers.

Most important are the customer-satisfying consequences of the carefully controlled execution of each outlet's central function—the rapid delivery of a uniform, high-quality mix of low-priced prepared foods in an environment of cleanliness, order, and cheerful courtesy. The systematic substitution of equipment for people, the carefully planned positioning and use of technology, and the meticulous management and use of labor enable McDonald's to attract and hold patronage to a degree no predecessor or imitator has managed to duplicate.

Consider the remarkable ingenuity of the system, which is worth examining in some detail. To start with the obvious: Raw hamburger patties are carefully premeasured and prepackaged in a capital-intensive central commissary, thus leaving neither the franchisee nor his employees any discretion as to size, quality, or consistency. This kind of carefully controlled attention is given to all McDonald's products and activities. Each outlet's storage and preparation space and related facilities are expressly designed for, and limited to, a predetermined mix of products: There is no space for any food, beverage, or service that was not designed into the system at the outset. There is not even a sandwich knife or a decent place to keep it. Thus the owner has no discretion
regarding what he can sell—not because of contractual limitations, but because of facilities limitations. And the employees have virtually no discretion regarding how to prepare and serve products. McDonald's restaurants are factories in the field—designed and equipped to do only what the planners intended, nothing more or less.

Discretion is the enemy of order, of standardization, and in this case, of quality. An automobile assembly line worker who has discretion and latitude might possibly produce a more personalized car, but it would certainly be less reliable. The elaborate care taken in designing the automobile, making its components, and structuring and controlling the assembly line is what produces quality cars at low prices—with extraordinary functional reliability, considering that the average new assembly line produces more than one completely ready-to-drive car every single minute of its operation. McDonald's operates precisely the same way. Like Henry Ford's Model T, McDonald's owes much of its success to the conscious design of an industrial system productive enough to offer abundance and quality at bargain-basement, customer-attracting prices. That was its original goal and that has been its spectacular achievement. It was no accident.

The McDonald's "machine"

To understand and appreciate the McDonald's revolution in service, consider the handling of that uniquely plebian American delicacy, french-fried potatoes. French fries quickly become soggy and unappetizing; to be crisp and tasty, they must be freshly made just before eating. McDonald's provides its outlets with precut, partially-cooked frozen potatoes that can be quickly finished in a deep-fry facility on the premises. That is the first step in the process of industrialization, just as Detroit provides the assembly line worker with parts and tools.

The McDonald's fryer is neither so large that it produces too many french fries at one time (thus allowing them to become stale or soggy) nor so small that it requires frequent and costly frying. The fryer is emptied onto a wide, flat tray adjacent to the service counter. This location is crucial. Since the practice of McDonald's is to create an impression of abundance and generosity by slightly overfilling each bag of french fries, the tray's location next to the service counter prevents spillage from reaching the floor. Spillage creates not only danger underfoot, but also
an unattractive appearance that causes the employees to become accustomed to an unclean environment. Once a store is unclean in one area, standards fall rapidly, and the store becomes unclean and the food unappetizing.

While McDonald's aims for an impression of abundance, excessive overfilling could be very costly for a company that annually buys potatoes almost by the trainload. A systematic bias that puts into each bag even a half ounce more than is intended could have visibly depressing effects on the company's earnings. Further, excessive time spent at the tray by the employees could create a cumulative service bottleneck at the counter.

McDonald's therefore developed a special wide-mouthed scoop with a narrow funnel in its handle. The counter employee picks up the scoop and inserts the handle end into a wall clip containing the bags; a single bag then adheres to the handle. In one continuous movement, the employee fills the scoop with potatoes, and then fills the bag—with the exact amount its designers intended—by lifting the scoop toward the ceiling, so that the potatoes funnel through the handle into the attached bag, which is automatically disengaged by the weight of the contents. The bag then comes to a steady rest, on its flat bottom, on the counter.

Nothing can go wrong—the employee never soils his hands, the floor remains clean, dry, and safe, and the quantity is controlled. Best of all, the customer gets a visibly generous portion with great speed, the employee remains efficient and cheerful, and the general impression is one of extravagantly good service.

Consider other aspects of the technology of McDonald's. The tissue to wrap each hamburger is color-coded to denote the mix of condiments. Heated reservoirs hold preprepared hamburgers for rush demand. Frying surfaces have spatter guards to prevent soiling of the cooks' uniforms. Nothing is left to chance or the employees' discretion.

The entire system is engineered and executed according to a tight technological discipline that ensures fast, clean, reliable service in an atmosphere that gives the modestly paid employees a sense of pride and dignity. In spite of the crunch of eager customers, no employee looks or acts harassed, and therefore no harassment is communicated to the customers.

But McDonald's goes even further. Customers may be discouraged from entering if the building looks unappealing from the outside; hence considerable care goes into the design and appearance of the establishment. Some things, however, the architect can-
not control, especially at a restaurant where people eat in their parked cars and are likely to drop hamburger wrappings and empty beverage cartons on the ground. McDonald's has anticipated the problem: Its blacktop parking lots are dotted like a checkerboard with numerous large, highly visible trash cans, whose purpose is impossible to ignore. Even the sloppiest customer would be embarrassed to drop his trash on the ground. But, just in case someone does, the larger McDonald's outlets have motorized sweepers for quick and easy cleanup. Employees are much more eager to clean the parking lot by riding a motorized sweeper than by using a nail on a stick.

McDonald's has created a highly sophisticated piece of service technology by applying the manufacturing mode of managerial thought to a labor-intensive service situation. If a machine is a piece of equipment with the capability of producing a predictably standardized, customer-satisfying output while minimizing the operating discretion of its attendant, that is what a McDonald's outlet is. It produces, with the help of totally unskilled machine tenders, a fairly sophisticated, reliable product at great speed and low cost.

McDonald's represents the industrialization of service—applying, through management, the same systematic modes of analysis, design, organization, and control that are commonplace in manufacturing. These more than anything account for its success. We have already noted the relationship in beauty shops between productivity and demand, and demand and product innovation. The same is true of McDonald's: The control of production and quality through careful systems design creates the demand that justifies the managerial expense, which in turn improves the McDonald's "machine" and expands its commercial domain—to the greater glory of productivity statistics in the food-service sector.

Managerial rationality

Precisely the same sort of applied rationality has been used to improve the distribution and service of industrial products. In 1961, the Building Controls and Components Group of Honeywell, Inc.—the nation's largest producer of heating and air-conditioning thermostats and control devices—did a major part of its business in replacement controls (the "aftermarket"). These were sold through heating and air-conditioning distributors, who then supplied plumbers and other installation and repair specialists. At that time, Hon-
Honeywell's product line consisted of nearly 18,000 separate catalog parts and pieces. The company had nearly 5,000 distributor accounts, none of which could economically carry a full line of these items. Honeywell therefore maintained nearly a hundred fully-stocked field warehouses that offered immediate delivery to distributors. The result was that distributors frequently sold to plumbers parts that they did not themselves have in stock. They either sent plumbers to nearby Honeywell warehouses for pickup, or picked up parts themselves and delivered them directly to the plumbers. The costs of carrying these inventories were enormous, but were considered a normal expense of doing business.

Then Honeywell made a daring move—it announced its new Tradeline Policy. It would close all warehouses, and all parts would have to be stocked by the distributors. The original equipment, however, had been redesigned in the meantime to use 300 standard, interchangeable parts—interchangeable for most Honeywell controls, and also for many of its major competitors. Moreover, each package was clearly imprinted to show exactly which products made by Honeywell or its competitors the contents were compatible with.

By closing its own warehouses, Honeywell obviously shifted the inventory carrying costs to its distributors. But instead of imposing new burdens on them, the new interchangeable products enabled distributors to carry substantially lower inventories, particularly by cutting down the need for stocking the replacement parts for competitors' products, which the distributors could nonetheless continue to service. Thus they were able to offer their customers faster service at lower costs. Repairs, moreover, could be done more easily and more cheaply.

Honeywell's replacement-market share almost doubled, its original-equipment share rose by nearly 50 per cent, and its trade inventory carrying costs were cut to zero. Whereas previously nearly 90 per cent of Honeywell's replacement sales were scattered among 4,000 distributors, within 10 years after the introduction of the new policy, the same proportion—but of a doubled volume—was concentrated among only about 900 vastly more effective distributors.

What was considered an inescapably labor-intensive problem was solved by the scrupulous application of manufacturing managerial methods. Motivation, hard work, personalization, training, and merchandising incentives were replaced by a revised selection of goals and purposes—not raising sales but creating conditions which
would make distributors want to expand their dealings with Honeywell at substantially reduced costs to Honeywell itself. The basic management decision to focus with imagination on the service problems and needs of the company’s distributors and their customers was the starting point. Service became faster, easier, and cheaper not because of good administration, but because of superb management.

Similar thinking is now being used in commercial fields—e.g., by the Transamerica Title Insurance Corporation, in its industrialization of the formerly complex, one-to-one, labor-intensive activities needed to deliver low-cost, accurate, property-title searches and guarantees to its clients.

These examples of the industrialization of service through the application of managerial rationality—McDonald’s, credit cards, supermarkets, Transamerica, and others—are neither trivial nor exceptional, selectively plucked out of an otherwise drab reality to suggest speculative possibilities with limited probabilities. They illustrate possibilities that have for the service sector today the same irrepressible potential (even inevitability) that was once characteristic of pin-making, which Adam Smith used as an example in 1776 to illustrate the division of labor—and all that it implied for manufacturing.

Production versus performance

The historic absence of industrial modes of managerial thought largely accounts for the sluggishness of so many service industries. There is a reason for that absence, and it is well to understand it.

The word “service” evokes time-worn images of personal min-  
istration and attendance. Its etymological brethren are “servile” and “servitude.” “Service” generally refers to deeds performed personally (and humbly) for another. It carries historical connotations of obedience, subordination, and subjugation; or of charity, gallantry, and selflessness. In these contexts, people serve because they want to (as in the priestly and political professions) or because they have to (as in slavery, or such roles of attendance as waiter, maid, bellboy, or cleaning lady).

In the higher-status service occupations, such as in the church and the army, one customarily behaves ritualistically, not rationally. In the lower-status service occupations, one simply obeys. In neither is independent thinking presumed a requisite of the job. The most that could therefore be expected in the way of im-
provements is that, like Avis, service workers would try harder. They would exert more animal effort to do better what they are already doing. They are impotently tethered to ancient, pre-industrial modes of thought.

In manufacturing, by contrast, the orientation is toward the efficient production of results, not toward ritual or attendance on others. Relationships are strictly businesslike, with fewer invidious social connotations of rank or self. In the manufacturing cognitive mode, the search for improvement seldom focuses on ways to improve personal performance in present tasks, but rather on discovering entirely new ways of performing present tasks, or better yet, on actually changing the tasks themselves. The manufacturing routine is not to think of the greater exertion of animal energies (working physically harder, as the slave), of greater commitment (being more devout or loyal, as the priest), or of greater dependency (being more obsequious, as the butler). Instead, it involves the greater exertion of the mind. In its simplest form, the question is what kinds of tools, old or new, what different materials, or what kinds of skills, processes, organizational rearrangements, incentives, controls, and audits might be enlisted to improve greatly the intended outcome. Often, the problem is turned inside out: Does the intended outcome really correspond to the problems its users are trying to solve? Might the problem be redefined, or the tool redesigned to make it faster or cheaper, while improving its quality and effectiveness? In short, manufacturing looks for solutions inside the very tasks to be done and problems to be solved—not simply the manufacturing task, but also the user's problems. That is precisely what Henry Ford did so successfully. He turned the problem inside out, converting a costly constructed machine into an inexpensive assembled one, converting a class market into a mass market.

Contrast the cognitive modes of manufacturing with the service industries, where solutions are sought not inside the tasks, but in their performance. Until very recently, inherited attitudes and ancient cognitive modes sought impotently for possible improvement in the skills and attitudes of the performers of service, rather than for possible redefinition or redesign of service itself.

Manufacturing has outperformed service because it has for a long time thought technocratically and managerially about its functions. Service has lagged because it has thought humanistically. Since all of us are human, and none machines, that is an unappetizing pill to swallow. Yet regardless of what we would like,
it is inescapable that as long as we think in largely humanistic rather than technocratic terms, the service sector of the modern economy will forever lag. So long as we view service as invariably personal—as something performed entirely by personal effort or by the dedication of individuals for the direct benefit of other individuals—it prevents us from seeking alternatives to the use of people. It prevents us from redesigning the tasks themselves; from entertaining revised purposes; from creating new plans, tools, processes, systems, organizations, or controls; perhaps, even, from eliminating the conditions that created the problems in the first place.

**Productive prototypes**

To improve the quality and efficiency of service takes the kind of technocratic thinking that in other fields has replaced the high cost and erratic elegance of the artisan with the low cost and predictable munificence of the manufacturer. This is now rapidly happening, thought not without frequent setbacks, stemming generally from elegant technocrats who promise too much, too soon. (Not everybody wants to eat at McDonald’s, though it sometimes looks like it. Not everything is equally accessible to industrial rationality—though more is than meets the casual eye.) There are now over 1,400 Mr. Minit shoe-repair shops in continental Europe that, through a total redesign of shoe-repair equipment and operations layout, resole a pair of shoes at phenomenally low prices in less than five minutes—without dust or noise—while the customer waits in quiet comfort inside the department store or specialty store where these operations are generally located. The Damon Corporation operates 125 pathological clinics throughout the nation that, with the help of modern machines, 125 salaried M.D.’s, 22 Ph.D.’s, and 1,400 medical technologists, perform a wide range of diagnostic tests that formerly required patients to visit several doctors and clinics, at costs in time and money several times greater.

But the industrialization of health care is not limited to diagnostics. During World War II, the Kaiser Foundation established the nation’s first “health maintenance organization” (HMO), providing low, prepaid, outpatient medical services at clinics manned by almost every conceivable kind of medical specialist—highly paid, salaried employees freed from all the troublesome administrative details of ordinary practice. They work full time and only in their specialties, and are occupied full time during regularly scheduled
40-hour work weeks. There are now hundreds of such HMO’s—mostly operated as profit-making firms. Large prepaid membership rolls facilitate economies of scale and sound management, which in turn produce a full range of high-convenience, top-quality medical services at rock-bottom costs.

As for hospitalization, industrialization has also had an impact through specialization. In 1970, the nation’s first “ambulatory surgical facility” (ASF) was established in Phoenix, Arizona. There are now over 100 such facilities in the country. The typical ASF is capable of performing some 125 low-risk operations on healthy, low-risk patients. The patient comes in, undergoes tests and surgery, rests, and goes home—all in one day. At the profit-making Northwest Surgicare facility in a suburb of Chicago, a tonsillectomy costs $169. At the non-profit Michael Reese Hospital in Chicago, it costs $548. The Metropolitan Life Insurance Company, which now honors the claims of 22 ASF’s under group life insurance policies, estimates savings of $1 million in the last three years.

Lawyers have access to computerized legal search systems. In greater popularity are the new so-called “boutique” law services that specialize in providing conventional searches, and only that—they do not practice law. Significantly, this is the same kind of specialization that explains why General Motors does not make its own tires, windows, or various other parts: It is a “manufacturing” corporation whose manual work consists heavily of assembling what it has bought—like Sears, Roebuck when it fills a mail order. Or like the American Express Company, with its wide line of packaged travel tours, produced and managed by others—a supermarket of tours fully explained in a regularly published book, in clear, technicolor detail. Travelers know what they’ll get, the exact cost—and everything is prearranged, including options to permit custom-tailored vacations, not unlike buying a “customized” car by ordering options in the showroom. And how much simpler and cheaper such a travel service is than the alternative—agonized and costly travel arrangements made by yourself, or by a travel agent whose reliability is questionable, knowledge limited, and avarice limitless.

The limits of industrialization

The industrialization of the service-sector industries, and hence the enhancement of their productivity, is just now crawling out of infancy and seems on its way to adolescence. As in adolescence,
there will surely be much abortive experimentation and trauma—but many industries will grow and prosper. Some already have. Knowledge, the most transferable of all resources, seems finally on the verge of making its greatest contribution to our living standards, not so much by the invention of things for the service sector to use as by the reconsideration of goals and purposes and the application of rational calculation, systems, and routines and by the use of management in their direction and control. The "post-industrial" society already has some productive prototypes, and McDonald's is not the only one.

But some things are less easily managed than others. The demand for many service activities—food service, banking, retailing, amusement places, and the like—often fluctuates widely at particular hours of the day and among days of the week. During nonpeak times there is usually idle capacity. If demand were spaced out, it might substantially raise productivity; however, that cannot be easily managed. Entertainment places and some restaurants try to manage it by differential pricing—reduced prices for Wednesday night movies, reduced midweek prices at ski resorts, ladies' day specials at ball games, "happy hour" bargain drinks that start at 3:00 p.m. Moreover, many people are in service because it offers more opportunities for self-employment—professional occupations, retailing, repair. Self-employment is over twice as common in service as in the rest of the economy. Where self-employment is the main motivation, managerial efficiency takes a back seat, or at least not the driver's seat. The owner is less likely to make capital-intensive or management-intensive improvements than the professional manager with a different set of motivations. Where "freedom" is traded for income, productivity will probably lag. Victor Fuchs' studies show that within the same service sectors, worker productivity is higher in firms with employees than in firms where the proprietor (and possibly his family) do all the work. In part, the difference is the result of economies of scale—bigger firms are less likely to be proprietor-operated. In part, it reflects the superiority of the professionally managed enterprise. Since there will always be those who would rather earn less than work for others, the superior productivity of competitors will never destroy all those who are less efficient. Small corner grocery stores, small repair shops, and small accounting offices survive, even though their self-employed owners often work for incomes piteously exploitative on a per-hour basis, and generally small also on an absolute basis. This is seldom possible in manufacturing.
Service-sector productivity will therefore, on the average, remain lower than goods-producing productivity, even when service becomes more industrialized. But it is not the hopeless structural case it is widely believed to be. Not even in government.

The special case of government

Over 18 per cent of the American employed work force is now in government—federal, state, local. That is 14.3 million out of a 1974 employed work force of 78.3 million. Government is the most heavily labor-intensive portion of the service sector. It is correct to give it special attention for two reasons: Little of its work is assumed to have access to the productivity-improving technology of the goods-producing industries; and it is assumed to be incorrigibly resistant to reduction in size—indeed, it is assumed to be continually expanding. Neither assumption may, however, be completely justified.

First, nobody knows what the productivity of government really is. The experts cannot even agree how to measure it. The result, unbelievable but true, is the official assumption that the productivity of government work neither rises nor falls; the reported data thus show no productivity changes, year in and year out. Second, if productivity can rise in finance, insurance, and real estate management—as it did between 1929 and 1961 (lagging behind the average increase of the total economy by only .26 per cent)—then it can rise in government, where the nature of the work is often very similar. Third, the notion that government work (or, for that matter, white-collar work) can be managed and rationalized just as can blue-collar work, is relatively new. Frederick W. Taylor made his original time-and-motion studies on workers hauling slag and limestone for Midvale Steel Company in Pennsylvania in 1881. What eventually resulted were “scientific management,” piecework compensation, and much more that has vastly raised the productivity of manufacturing. Now that white-collar workers (in and out of government) have conceded their proletarian status by joining labor unions, they have opened the gates to similar managerial intrusions in their own work. It was not until 1975 that a manual was written on how to use Taylor’s 94-year-old methods to enhance productivity in government and service organizations—and then it was the Japanese who published it. It was not until the adoption

---

of the “Federal Reorganization Plan No. 2” of 1970 that the federal government was required to pay some official attention to developing the managerial skills of its civil-service executives. Now each manager in civil service “supergrades” 16 to 28 must receive at least one week of formal management training. Middle managers in grades 13 to 15 are now required to receive two weeks. That is a beginning; unfortunately, it involves only the federal government. Of the nation’s 14.3 million nonmilitary governmental employees, 11.6 million are in local governments.

The spectacle of an ever-increasing number of government employees is, in fact, duplicated in the entire service sector. Between 1950 and 1974, the number of employed service workers rose 90 per cent, of goods-producing workers only 34 per cent. Indeed, as a proportion of the total labor force, service employment has been rising without interruption since 1880. (Though not uniformly: The proportion for the railroads started falling in 1947; the proportion for real estate in 1974 was even with that of 1956). The difference is that the proportion for government has risen faster than any other—up from 13 per cent of the employed labor force in 1950 to 18 per cent now. This increase has come largely from three sources: from the rising role of government in national affairs that started with the Great Depression; from the increase in the permanent military establishment (both in uniform and out) that resulted from the beginning of the cold war in 1948 and the subsequent buildup for the Korean war in 1951; but mostly from the “New Frontier” and “Great Society” programs that started in 1961 at the federal level, and then quickly spread through all levels of government.

There is a special argument about government. It is widely believed that government employment is uniquely resistant to reduction, for several reasons: 1) The public wants increasingly more public services; 2) the “military-industrial complex” and generalized xenophobia will keep armaments spending up; 3) the government is run by its permanent cadre who insure their own permanence; and 4) civil service employment and seniority rules are equivalent to employment guarantees—i.e., even if labor-saving technologies and systems were available, the high-seniority officials (those with the most power) will be the last to go and the last to change, for age and inertia are on their side. If white-collar work is ever sufficiently rationalized to raise efficiency and cut employment, government will take at least a generation longer to do likewise. Government will always necessarily lag.
The third and fourth reasons are essentially the same, and probably about as true in government as elsewhere. Even private industry has a seniority system, institutionalized in the lower-level and middle-level white-collar ranks, rationalized in the upper ranks, and veiled behind a windy rhetoric tough-mindedly claiming the opposite. More things often happen where they are not supposed to happen than where they are.

The second reason—the persistence of high military spending—is contradicted by all of history. In fact, military spending is now declining and has always ultimately declined. United States defense outlays fell from 8.4 per cent of GNP in 1946 (at its peak in 1968 during the Vietnam War it was 9.4 per cent) to 5.9 per cent in 1974. In 1975 outlays were—in constant dollars—below the levels of the early 1960's.

The “democratic distemper”

As for the first reason, the analysis of Samuel P. Huntington is especially useful. He refers to the “democratic distemper” of the 1960's—the simultaneous increase in the demand for and the actual amount of government activity on the one hand, and the decline of government authority on the other. During what Huntington calls the “democratic surge” of the 1960's, one opinion poll after another showed that public confidence in the leadership of the President, the Congress, the Supreme Court, and the military declined almost in proportion to the expansion of their activities. Though the public wanted more government, and was passionately involved in getting more, the more it got, the less it liked what it got. While the authority of government has been restored somewhat in the 1970's, it still lacks the authority it had in the 1950's. The general faith in the capacity of government to achieve many of the democratic, liberal, and egalitarian goals generated by the “democratic surge” of the 1960's is in tatters. Expanding upon Huntington, we can say that the disillusionment probably began about 1969, principally among the liberal intellectuals in the universities. In their introductory essay to The Public Interest (Winter 1974) special issue on the “Great Society,” Eli Ginzberg and Robert M. Solow, both sensitive and ardent advocates of a more benign society and supporters of a more meliorative state, wrote regarding the programs of the 1960's that “the attack that was finally launched by the conservatives was

---

3 “The Democratic Distemper,” The Public Interest, No. 41 (Fall 1975), pp. 9-38.
if anything overdue. But more surprising was the growing disillusionment and despair of many of the social architects of these intervention programs and of the constituencies for which they spoke."

Intellectuals understandably believe that what they write has some effect, sooner or later. In the past, egalitarianism and the expansion of government services have enjoyed their advocacy. In time, the public followed. Now the public again follows—this time, leadership in the opposite direction. No matter, however, who leads and who follows, the direction seems clear. Historic precedent is, furthermore, on the side of a reversal of attitudes. Huntington notes:

During periods of rapid social change . . . democratic and egalitarian values of the American creed are reaffirmed. The intensity of belief during such "creedal passion periods" leads to the challenging of established authority and to major efforts to change governmental structure to accord more fully with those values. In this respect . . . the democratic surge of the 1960's shares many characteristics with the comparable egalitarian and reform movements of the Jacksonian and Progressive eras. Those "surges," like the contemporary one, also occurred during periods of realignment between party and governmental institutions on the one hand, and social forces on the other. The slogans, goals, values, and targets of all these movements are strikingly similar. Consequently, the implication of this analysis is that in due course the democratic surge and the resulting dual disposition in government will be moderated.

There is already a clear reduction in political activity (though not so much in political noise) in the nation, and it is not simply that an unpopular war is over and a distrusted President is out. Most people increasingly seem to feel that things haven't worked, and that the costs have gone out of sight. Finally, the plight of New York City has made things bad enough that everybody not just accepts but insists upon limits, and reductions. Michael Dukakis, an attractive and intelligent liberal Democrat elected Governor of Massachusetts in 1974 on a traditionally liberal ticket, made a tough-minded pronouncement within three weeks of taking office that said, in essence, "We can't afford it. Things haven't worked. We will cut back, and the budget will be balanced." In eight months he had cut 8,000 from the welfare rolls, reduced state employment, and just about balanced the budget.

Anyone who reads the political commentaries and public sentiments in the local newspapers, and hears what is said on the public streets, in the offices and factories, and at local government meetings, cannot escape the accumulating evidence of a repudiation of
governmental efficacy. People simply want less government and want it to try nothing new—save, perhaps, fiscal policies to prop up the economy and a program of national health insurance. Those are central to their lives—all the rest is suspect, unless people are direct beneficiaries of a particular largesse. And even then, the sentiment for "getting mine" is weakening. Indeed, it is not clear that there ever was wide support for all the "Great Society" programs now in such shambles.

The meaning seems clear enough. The percentage of the total employed labor force in government—now 18 per cent—is decreasing, as it did in the Eisenhower years, not only because the labor force is now expanding, but because government employment is shrinking absolutely. This will certainly moderate whatever structural tendency exists toward declining rates of productivity, slower economic growth, and rising inflation.

**Possibilities for progress**

Most government services certainly are different, functionally and qualitatively, from most private-sector services. The technology of management—or management as a form of knowledge—is less easily accessible to some service activities than to others. To that extent, the attempt to expand productivity in the service sector will be more difficult and less rewarding in many cases than in most of the goods-producing sector. The work of the surgeon may be facilitated by better equipment and organization in the operating room, but he can hardly do two appendectomies in the time it has always taken him to do one. The government interviewer at the unemployment compensation application office is not likely to have access to the productivity-improving technologies that created the applicant before him.

On the other hand, there may be more possibilities than meet the casual eye. It is noteworthy, for example, that a large proportion of the continually increasing number of applications for credit cards and small loans are "processed" not by time-consuming personal interviews or application reviews, but by simple, fast (not even computerized), one-page credit-scoring forms. The score coefficients that measure credit-worthiness on these applications are developed through statistically sophisticated sensitivity analysis; the "cutoff" and "acceptance" points are determined with the help of Bayesian statistics. Significantly, this rapid scoring system was the development not of banks, finance companies, department stores, petroleum
companies, or the American Express Company, but of rank outsiders, trained in systems analysis, who recognized and capitalized on an opportunity to make a dollar—knowledge workers who created a service company to enhance the productivity of other service companies.

Though such a development has made “interviewing” for credit purposes more productive than interviewing for unemployment purposes, it seems unlikely that the same sort of mechanization, no matter how efficient, will be readily tolerated at the unemployment office. Just as there are differences between types of service industries, so there are differences in their susceptibility to industrialization. Technical possibility is not equivalent to practical acceptability.

But to say this is to concede nothing. We saw that the goods-producing industries have not been homogenously productive—ranging on an annual growth basis, between 1948 and 1966, from 1.1 per cent for the manufacturing of tobacco products to 4.9 per cent for chemicals. So also in service—between 1939 and 1963 from .6 per cent annually for barbershops to 3.3 per cent annually for auto repairs.

The theory of the “post-industrial” society conjures frightening apprehensions about the future—a structural transformation leading to reduced productivity and heightened inflation. Substantively, however, this has almost nothing to do with the rise of the knowledge worker, as is claimed. When goods-producing industries outproduced the service industries in the 19th century and the first half of the 20th century, the absence of theoretical or science-based knowledge did not keep the “tinkerers” from making their Brobdingnagian progress. Only by assuming that theoretical knowledge will necessarily be more productive in the future than practical knowledge (“tinkering”) has been in the past is there any basis for asserting that the difference in the kind of knowledge per se will produce a vast new difference in productivity between the goods and service industries.

Nothing in actual experience would comfortably lead one to this conclusion. It has now been over 25 years since fusion physics was proved theoretically feasible; over 10 years since it was proved practically feasible in the laboratory. But widespread safe use is decades distant—all it takes in the meanwhile to make it work is practical technologists—“tinkerers,” if you will.

Similarly, Dennis Gabor received the Nobel Prize for his development of holography just after World War II. In the early 1960's, the
RCA Corporation, with all the vast resources at its command, made a concerted effort to produce a commercially acceptable holographic film and motion picture-making process. The prize was huge: all of Eastman Kodak, all of the Hollywood and television tape market, the entire still- and motion-picture camera market, and an entirely new market calculated in the billions—low-priced home television tape players and tape cassettes. Ten years and several hundred millions of dollars later, the effort, for all practical purposes, was scrapped. It began with theoretical knowledge, but it floundered on the failure of economically justifiable practicality—"tinkering," if you will. The engineers and technicians, blessed with assorted university degrees and masterships in toolmaking, and working day and night under ideal conditions with superb facilities at Princeton, New Jersey, failed—just as John F. Kettering, also a master toolmaker, failed so miserably in the 1920's to create his dream of an entirely revolutionary alternative to the carburetor. Two generations later, scientists at General Motors had meanwhile replaced Kettering, with no results. The most they have been able to do is to use a microprocessor to monitor and improve the mechanical mixing of fuel and air in the same old carburetor.

The knowledge required to create holography is based on science and theory, constructed step by step from the accumulation of other science and theory. And although modern science-based industries may begin with scientific theory, if they are characterized in practice by any one thing, it is precisely not that their results were attained through, or end with, theory. "The "tinkerers" are more necessary now than ever. The "cookers" in micro-circuit production are the rule, not the exception, in science-based industries.

The practice of management

The rise of science-based industries and the importance of the knowledge worker have no structurally unique significance or effects. What is significant is that in the more advanced societies, abundance and affluence create proportionately increased demands for things less easily produced under the conditions of mass-production efficiency. But the recent increased demand for handcrafted artifacts—from "folk" jewelry to "antique" executive desks—tells us that even in the goods-producing industries mass-production efficiency does not exhaust all the public's oscillating wants.

Increasingly more of what is wanted, however, are services. As in the case of beauty shops, credit cards, hamburgers, aftermarket
repairs of thermostats, medicine, or law, it is reasonable to assume that when markets expand the managerial imagination will apply its own kind of special knowledge to raise productivity.

Whatever else may have changed, the "post-industrial" society is not "post" in the sense that expanding bursts of industrialization are past. Industrialization is more than inventions, machines, and amassed technology. Among the growing proportion of "knowledge workers" are not just engineers, scientists, and technicians, but more importantly, managers. The fleeting references to managers in the literature of the "post-industrial" society are but grudging concessions. What is assumed to be decisive is the expanding scientific elite, with its "systematic development of research and the creation of [disproportionately productive] science-based industries" that are presumed to help produce profound structural imbalances in our society. This lyrical account of science overlooks the fact that science-based industries were "created," "developed," and made "systematic" by somebody, that the "joining of science to invention, principally through the organization of research and development efforts" still depends, heavily and inescapably, on the practical labors of honest "tinkerers"—and above all on the work of managers who identify problems and opportunities, define goals and purposes, select means, marshal resources, motivate, energize, direct, measure, control, and reward the performance of people.

All that management did in the past to make technology and abundance possible in the goods-producing industries, and all it is now doing to help convert scientific knowledge into the practical output of technological systems—all this is now in ascendancy in the non-goods-producing industries. Something of what can be achieved has already been described. More is surely on the way.

Management is a crucial element of society. If society is indeed going to be "post-industrial," the only recent emergence of the managerial arts in the expanding sectors of society suggests the likelihood that these sectors will enjoy the same productivity-improving results in the years ahead that the industrial sectors did in years past. The predicted apocalypse of structural imbalances that will "immiserize" progress is a misperception of the future. It neglects or fails to account for precisely what, in the end, makes economic progress possible—the practice of management.