

# The Soul of Silicon

By George Gilder, September 19, 1997

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Work becomes ever more fruitful and productive to the extent that people become more knowledgeable of the productive potentialities of the earth and more profoundly cognizant of the needs of those for whom their work is done. In our time, in particular, there exists another form of ownership which is becoming no less important than land: the possession of know-how, technology and skill. The wealth of the industrialized nations is based much more on this kind of ownership than on natural resources.

—(On the Hundredth Anniversary of *Rerum Novarum*), *Centesimus Annus*, May 1, 1991.

Published on May 1, 1991, *Centesimus Annus* returns to the themes of a lapidary encyclical of 100 years before, *Rerum Novarum*, which refuted Marxism long before it had refracted into a global plague of tyranny and murder. The critique of socialism, however, did not signify an affirmation of capitalism. The ‘new things’ to which the Pope devoted his attention more than a century ago in *Rerum Novarum* were anything but positive or even new. Published in May 1891, *Rerum Novarum* addressed “the terrible conditions which the new and often violent form of [capitalist] industrialization had reduced great multitudes of people.”

What was really new at the time was not the terrible conditions. It was the survival of unprecedented multitudes of human beings at ever increasing standards of living, together with a new intolerance toward the persistence of conditions of poverty that had previously been accepted as inevitable. The themes of this great encyclical, in fact, were immemorially old: the poverty which we always have with us and the brutality of sinful men in power.

Within ten years, however, would erupt in Europe a profoundly new thing that would permanently change the dimensions of human life and vindicate once again the age old revelations of scripture. That new thing was quantum physics. Although quantum theory is an abstruse and formidable field, its philosophical and theological implications reduce to one shattering effect: the overthrow of matter.

Essentially all previous physics accepted that at the foundation of nature were material particles, as Newton put it, “solid, massy, hard, impenetrable, movable particles... even so very hard, as never to wear or break in pieces; no ordinary power being able to divide what God himself made one in the first creation...[to] compose

bodies of one and the same nature and texture in all ages.” For some two hundred years, excluding the part about God and creation, nearly all leading scientists shared these materialist assumptions, based on sensory models and deterministic logic.

Even if the atom is not seen as ultimate, most scientists fit some other particle into the Newtonian rhetoric, perhaps the quark. At the foundations of the physical world, so it was believed, are physical solids—so-called “building blocks of nature”—that resemble in some way the solids that we see and link together in causal logic like a set of cogs and levers. These solids were deemed to comprise all matter, from atoms and billiard balls to the human brain.

Newton’s great eighteenth-century countryman Adam Smith extended the materialist metaphor to society, contending that the economy itself is a clockwork, a “great machine.” Later Karl Marx applied materialism to the very fabric of political and social ideas, which were deemed mere figments of ownership in physical capital, or of alienation from it. Darwin extended the materialist scheme to the *Origin of Species* and the elaboration of social life. Sigmund Freud and his followers developed a psychological theory of forces and pressures, inhibited or released, built up or fed back, much like the classical mechanics of steam engines.

Ten years after the publication of *Rerum Novarum* these materialist fantasies collapsed. Max Planck showed that Newtonian theory does not apply at the heart of matter itself. The atom, once regarded to be a solid particle, emerged as a baffling convergence of fields and forces that as Richard Feynman put it “behave like nothing that you have any direct experience about...not like waves, [or] like particles...or like anything you have ever seen.” As Max Planck said, the new theory required us “to take the enormous step from the visible and

directly controllable to the invisible sphere, from the macrocosm to the microcosm.” There is no longer anything solid or physically determined in the prevailing theory of the atom. At the root of all the cascading changes of modern economic life—devaluing material resources in technology, business, and geopolitics—is this original overthrow of material solidity in the science of matter itself.

In the last year, the anti-materialist cascade has overthrown the Darwinian theory of biology as well. Just as Newtonian materialism collapsed at the turn of the twentieth century when physicists addressed the microcosm of the atom, so Darwinian materialism is collapsing on the eve of the Twenty First century when biologists address the microcosm of the cell. Leading the charge is Michael Behe, a Catholic molecular biologist from Bethlehem, Pennsylvania, who stresses the “irreducible complexity” of cellular systems.

Behe quotes Darwin: “If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down.” Similarly, the eminent incumbent Darwinian, Richard Dawkins, declares: “Evolution is very possibly not, in actual fact, always gradual. But it must be gradual when it is being used to explain the coming into existence of complicated, apparently designed objects, like eyes. For if it is not gradual in these cases, it ceases to have any explanatory power at all...we are back to miracle, which is a synonym for the total absence of [naturalistic] explanation.”

Behe shows that the new findings of molecular biology conclusively meet the test of Darwin and Dawkins. We are indeed back to miracle. “Noone at Harvard University, no one at the National Institutes of Health, no member of the National Academy of Sciences, no Nobel prize winner—no one at all can give a detailed account of how the cilium, or vision or blood clotting, or any complex biochemical process might have developed in a Darwinian fashion. But... all these things got here somehow; if not in a Darwinian fashion, then how?” The irreducible complexity of living cells—the fact that they function only with the simultaneous presence of all their parts—indeed signals the absolute failure of the Darwinian model.

As Behe writes, “just as the pleasing shape of a jetliner belies the complexity of its internal organization, so the complexity of life mushrooms as one gets closer to its foundation. The shape of the eye, which Darwin tried to explain, pales in comparison with the interactions of rhodopsin, transducin, arrestin, rhodopsin kinase, and other proteins in the visual cascade. Explaining how the swimming behavior of a whale might be produced

gradually...would be a walk in the park compared to explaining the bacterial swimming system—the flagellum, which requires more than 40 gene parts to function... Astonishingly, science’s own journals contain no explanations...[Strictly speaking], Darwinism is not science.” Like the microcosm of physics unveiled by Planck and his followers, the biological microcosm is irreducibly complex. This means that its phenomena function only in the presence of all their mutually dependent parts and thus could not have evolved in a Darwinian materialist process.

The overthrow of matter in physics and biology requires a return to the social issues that are treated in *Rerum Novarum* and *Centesimus Annus*. All Catholic teaching insists on the inadequacy of materialism as an explanation of life. Today the collapse of materialism in the very science of matter itself vindicates the centrality of Catholic metaphysics. It opens the way for a triumphalist assertion of the primacy of spirit throughout the domains of human existence. The great moldering corpse of modern materialism still overshadows and stultifies academic philosophy and contemporary culture, and its fumes even creep insidiously and pervasively through the corridors and carrels of the leading schools of divinity. The Church stands as the one world institution that upholds the moral and spiritual foundations of scientific truth and extends them to the contentious issues of man in society.

Nowhere is this forte of the Church more relevant than in the realm of political economy. This is the subject of *Centesimus Annus*. In technology, economics, and the politics of nations, wealth in the form of physical resources is steadily declining in value and significance. The powers of mind and spirit are everywhere ascendant over the brute force of things. The true capital of the current capitalist economy is not material. It is moral, intellectual, and spiritual. It is produced less by factories than by families in collaboration with the Church.

This change marks a great historic divide. Dominating previous human history was the movement and manipulation of massive objects against friction and gravity. In the classic image of humanity, Atlas bears the globe on stooped shoulders, or Sisyphus wrestles a huge rock up and endless slope. For long centuries, humans grew rich chiefly by winning control over territory and treasure, slaves and armies. Even the Industrial Revolution depended on regimented physical labor, natural resources, crude energy sources and massive transport facilities. Wealth and power came mainly to the possessor of material things or to the ruler of military forces capable of conquering the physical means of production: land, labor, and capital.

Today, however, the global network of telecommunications carries more valuable goods than all the world's supertankers. Whether in the air or in a wire, the electrons or photons themselves do not travel; they wiggle their charges, causing oscillations that pass through the medium at close to the speed of light. As in waves of water, the wave moves, but the molecules of water stay in the same place. Quantum theory, however, shows that photonic waves do not move through a discernible medium. Thus belied is the analogy to particles or even bullets favored by physics teachers who give primacy to the now conceptually evaporated mass. Wince the age of carrier pigeons and catapults, communications systems have transmitted masses only in the postal services.

The immaterial character of wealth transforms the modes of production. Wealth now comes not to the rulers of slave labor but to the liberators of human creativity, not to the conquerors of land but to the emancipators of mind. Today materialism does not even prevail in the science of matter itself. The atom at the heart of physics is as empty in proportion to the size of its nucleus as the solar system is empty in proportion to the size of the sun. The electrons at the heart of electronics cannot be defined at a particular time and location.

The exemplary technology of the era is the microchip—the computer inscribed on a tiny sliver of processed material. More than any other invention, this device epitomizes the overthrow of matter. Consider a parable of the microchip once told by Gordon Moore, a founding father of Intel corporation and leader of Silicon Valley.

“We needed a substrate for our chip. So we looked at the substrate of the earth itself. It was mostly sand. So we used that.

“We needed a metal conductor for the wires and switches on the chip. We looked at all the metals in the earth and found aluminum was the most abundant. So we used that.

“We needed substances both to protect the chip chemically during manufacture and to insulate it electrically in use. We saw that the silicon in sand mixed with the oxygen in the air to form silicon dioxide—a kind of glass that both protected and insulated the chip at once. So we used that.”

The result is a technology—metal oxide silicon—made of the three most common substances in the earth's crust. The most valuable substance in this fundamental product of the era is the *idea* for the design. The most important force of wealth creation in modern

capitalism is the *caput*. As Michael Novak points out, capitalism is overwhelmingly a *mind*-centered system.

Thus, as a conservative advocate of capitalism, I applaud the Pope's critique of the materialist claims of free market economics and the greed of capitalists. Christian truth must necessarily apply to the economic sphere—to all the great ventures of enterprise and production to which most of us devote so much of our time and treasure. Yet capitalism, for all its productivity and creativity, has foundered in its own materialist superstitions and failed to produce or create a compelling argument for its own essential morality. The Pope's willingness to point out this great intellectual failure of capitalism awakened a certain nervousness in me, perhaps analogous to the discomfiture of the young rich man confronted by our Lord. I have a large stake in the intellectual and moral foundations of capitalism and there is no court of appeal beyond the Pope.

The problem began with Adam Smith. Like many present-day intellectuals on the Right, he was charmed by the ways of free markets but disdainful of businessmen. Seldom did they gather but to “conspire against the public interest,” wrote Smith in one of his most famous passages. “Not from benevolence,” he insisted, should one expect one's bread from the baker. It is an alchemy of self-interest—guided by an invisible hand—that is to bring us the benefits of capitalism.

Later, the more mathematical advocates of capitalism would sing of *equilibrium*, a Newtonian dance of equations, as the source of our multiplying loaves. To this day, most conservatives would rather celebrate free markets than applaud a private enterprise. They would rather laud individual freedom than praise the particular free individuals—the entrepreneurs—who make the system work.

This is a vision of capitalism without capitalists. It sees the system as an interplay of interests lifted into equilibrium by an invisible hand and consisting chiefly of invisible men. It is an economics bereft of both man and God. No wonder the Pope finds it offensive.

In response to this free market nirvana, the Left, by contrast, can offer seductive indictments of “monopoly capitalism”...vivid catalogues of “crime in the suites”...grim recitations of “dark satanic mills.” The Left caps off the critique with bizarre tales of predatory “robber barons” as the founding fathers of the system and lineal forebears of its current multinational leaders.

Against this onslaught, the Right usually musters in retort only the evidence that capitalism works to create material wealth and that its associated freedoms are congenial to the self-interest of intellectuals. To the Left's dramatic tapestry of capitalist criminals and

monopolists, robber barons and oil sheiks, in counterpoint to the images of the exploited poor and homeless—to a Leftist repertory of “compassionate socialist leaders,” militant protesters, and austere revolutionary heroes—the Right responds with apostrophes to abstract market processes and the sovereignty of consumers. As the Pope has eloquently maintained, this will not do.

The case for capitalism is necessarily the case for capitalists. It should not be a difficult argument to make. Even the so-called robber barons built the railroad, steel, and oil industries on which American prosperity still partly relies and on which the Third World still heavily subsists. For the first time, the robber barons made it possible for the masses of the poor to hope for an escape from poverty and oppression—and even to dream of wealth. Today, moreover, these great monsters of so-called monopoly capitalism are all beset everywhere with rivals.

In the inexorable logic of capitalism, the monopolists grew by steadily lowering their prices. Finally, the luxuries they once sold to the rich became accessible to the majority of the citizens of the world. The robber barons ended by making automobiles and gasoline and telephones and hamburgers and television sets available to the poor in nearly all capitalist countries.

We have seen, however, that such practical and materialist arguments fail to persuade most Christians, including the Pope. Christianity is not chiefly a materialist faith and does not respect a materialist test. The most telling claim made against capitalism—a charge constantly echoed in Catholic writings, including *Centesimus Annus*—is that the system subsists on selfishness and greed. Accepted by most defenders as well as critics of free enterprise, this assertion of material self interest at the core of capitalism implies the deadly idea that the system violates crucial religious and moral teachings.

The implication is that our wealth springs from some Faustian pact: a deal with the devil by which we gain material benefits in exchange for succumbing to the sin of avarice. By their fruits, you shall know them. Originating in sin, the system bears the fruits of a corrupt and tawdry prosperity that feeds the body and starves the soul in a neon wilderness. The Left even maintains that all too often, amid this glut of shoddy goods, millions of worthy poor go hungry and homeless, while God wanders with them, bearing the cross by crowds of complacent capitalists.

This is the critique that resonates in *Centesimus Annus* and informs the statements of the American Capitalist Bishops. This is the critique that the defenders

of capitalism have so pathetically failed to answer. The critique may be addressed chiefly to the abuses that the public mind associates with capitalism, and not to capitalism itself. But if this important distinction is overlooked or disregarded, the criticism leads churches to abandon their supreme role of moral and spiritual leadership in economic matters, and it makes workers and entrepreneurs ashamed of their labor in satisfying the material wants of mankind. It creates a wasteland in which ignorant armies of clerics and businessmen clash by night. The clerics implicitly demand that the entrepreneurs give up the profits that sustain their businesses, and the businessmen, relegated beyond the bounds of the church, gyrate between sieges of guilt and amoral defiance. Both sides implicitly accept what I have termed the materialist superstition: the idea that wealth comes chiefly from the self-interested manipulation, distribution and consumption of material goods.

The moral core of capitalism is the essential altruism of enterprise. The anthropological evidence shows that the system begins not with the greed that provokes tribal wars, but with the *gifts* that *prevent* them. Capitalism begins not with taking but with giving. The tribal capitalists were not warriors or predators; they were the feast givers, the potlatchers, and the mumis—the so called big men who transcended the constraints of barter by simply making offerings to their neighbors.

Such gifts, ubiquitous in the anthropological literature, imposed implicit debts on their recipients, who tried to reciprocate with gifts in return. Thus were extended and accelerated the processes of exchange that had been stalled in the intricacies of predetermined trading or in the conflicts of a precapitalist zero-sum mentality. In a zero-sum game a gain for one player can only come at the expense of a loss for another. In voluntary capitalist exchanges, both participants emerge better off than they were earlier, or else they would not have willingly made the exchange.

The most successful gifts are those that are most profitable—that is, gifts that are worth much more to the recipient than to the donor. The most successful givers, therefore, are the most altruistic, the most responsive to the desires of others. In the most rewarding and catalytic gifts, the giver fulfills an unknown, unexpressed, or even unconscious need in a surprising way. The recipient is startled and gratified by the inspired and unexpected sympathy of the giver, and is thus eager to repay him. In order to repay him, however, the receiver must come to understand the giver. Thus, the contest of gifts can lead to an expansion of human sympathies.

The circle of giving (the profits of the economy) will grow as long as the gifts are consistently valued more by

the receivers than by the givers. In deciding what new goods to assemble or create, the givers must therefore be willing to focus on the needs of others more than on their own. They must be willing to forgo their own immediate gratification in order to produce goods of value to others.

Capitalism today still thrives on the same principles of imaginative giving in conditions of freedom. A gift is defined not by the absence of *any* return, but by the absence of a *predetermined* return. Unlike socialist investments, investments under capitalism are analogous to gifts, in that the returns are not preordained and depend for success entirely on understanding the needs of others.

Just as successful gifts are normally valued more by their recipients than by their donors, investments succeed only if their resulting products are valued more by the potential purchasers than by the producers.

This difference—the increase in value imparted by the process of production and exchange—is the profit engendered by the system. Profit is an index of the altruism of a product—a measure of the extent to which an investment reflects an accurate understanding of the needs of others and a suppression of the immediate needs and desires of the producer.

Egocentric producers, oriented more to self-expression than toward the service of others, often claim special virtue and demand public subsidies for their unwanted output—whether of alternative energy, excess butter, unintelligible poems and music, or undesired personal counseling services. They disdain businessmen for their “other-direction” (as David Riesman, the American sociologist put it long ago). But it is these market oriented entrepreneurs who are willing to sacrifice their own interests and self-expression in order to serve others.

Even then, profits reflect not a mere calculation of the demonstrated needs of others, but an inspired guess about their future. Profits are residual gains beyond the predictable gains. If gains are surely predictable, they are bid away—and the capitalist will merely earn interest, which in many countries rarely exceeds inflation and taxes.

In fact, the owners of most of the large companies in Europe in recent years have gained no net profits at all, adjusted for inflation on their stock holding over most of the last two decades. That is why labor unions almost uniformly oppose profit-sharing plans in the kinds of large companies that many critics see as representative of capitalism.

Large companies, however, often are the sclerotic face of capitalism in decline, seeking government favors

to replace the profits they no longer can earn by serving others. The heart of the system must always be giving, not taking, or the body will run down and rot.

The altruism of the capitalist goes further. Not only must the entrepreneur comprehend the wants of others; he must also collaborate with others in his business. And most of all, he must wish that others succeed. The businessman must be full of optimism and hope for his potential customers. He must want them to prosper.

Above all, he must want the poor to prosper, if only because the poor always comprise the world’s largest untapped market. He must begin by saving—by forgoing personal consumption in order to serve others. And he must hope for and celebrate the successes of others.

The spirit of enterprise is generous and optimistic about human nature. “Give and you will be given unto” is its fundamental theme. Altruism—an orientation toward the needs of others—is its moral and commercial compass. The argument that capitalism is a valuable system chiefly because it recognizes and exploits human greed and rapacity is the opposite of the truth.

Greed, in fact, impels people to seek first their own comfort and security. The truly self-interested man most often turns to government to give him the benefits he lacked the moral discipline to earn on his own by serving others. He follows his own hungers at the expense of his family and leaves them on the dole. Consumer demands, whether avaricious or just, are impotent to impel growth without disciplined, creative, and essentially moral producers of new value. All effective demand ultimately derives from supply; a society’s income cannot exceed its output. The output of valuable goods depends not on lechery, prurience, lust, and license but on thrift, sacrifice, altruism, creativity, trust, and faith.

Giving, beginning within the family and extending outward into the society, is the moral center of the system. It does not succeed by allowing the leading capitalists to revel in riches; if they hoard their wealth the system tends to fail. It succeeds by inducing the capitalist continually to give his wealth back to the system in the form of new gifts and investments.

The Christian foundations of capitalism go still deeper. For contrary to the usual notion, capitalism is profoundly antimaterialistic. Capitalists thrive largely to the extent that they partake of the gifts of the spirit, which come from the Church. An amoral and tawdry capitalism bespeaks a failure of the churches more than a failure in the economy.

Walter Lippmann, a columnist and a great American political philosopher, approached this truth in a book called *The Good Society* written during the Great

Depression of the 1930s. Speaking of the rise of industrial capitalism, he wrote: "For the first time in human history," an economic system had emerged that gave men "a way of producing wealth in which the good fortune of other multiplied their own." At long last, he declared, "the golden rule was economically sound," and "for the first time men could conceive a social order in which the ancient moral aspiration of liberty, fraternity, and equality was consistent with the abolition of poverty and the increase of wealth."

Lippmann continued: "Until the division of labor had begun to make men dependent on the free collaboration of other men, the worldly policy was to be predatory. The claims of the spirit were otherworldly. So it was not until the industrial revolution had altered the traditional mode of life that the vista was opened at the end of which men could see the possibility of that Good society on this earth. At long last the ancient schism between the world and the spirit, between self-interest and disinterestedness, was potentially closed."

The belief that the good fortune of others is also finally one's own does not come easily or invariably to the human mind. It is, however, the golden rule of economics, a key to peace and prosperity, a source of the gifts of progress. It is the absolutely crucial Christian source of wealth creation.

The optimism of the entrepreneurial investor is always in a sense irrational. In a free society, he has no way to force a market for his goods, and people have every right to deem them worthless. His investments therefore must spring not only from a spirit of altruism or charity, but also from a commitment of hope and faith.

Government planning assumes that the future can be predicted and controlled. But as the British economist George Shackle has written, "What has a world where knowledge is already complete and everything is known to do with a world where choice is about the future but knowledge is only about the past?"

From the point of view of past knowledge, the entrepreneur usually seems a fool. Throughout history, most of the key inventions have been scorned by the experts in the field. The vast majority of new investments in unexplored fields or untried products always fail. Of all the plausible new inventions, fewer than one percent are brought into production; of all the books that are written, only a small proportion is published, and perhaps only ten percent of these would be said to compensate the writer for his time and effort. Yet such "irrational" investments, such waste of creative energies, are the secret of capitalist success and the source

of human triumph, against all Malthusian odds, over the centuries.

A rationalist intellectual may be reluctant to depend on a fundamentally irrational process like capitalism, which subsists on optimism and faith, for the very survival of human civilization. He instead will prefer to rely on planning and control and physical collateral.

Above all, the rationalist intellectual will fear the multiplication of human lives on this earth, for he will see the earth as a limited material system and he will see each new baby as a mouth rather than as a mind. He will see humans as problems to be solved or overcome rather than as opportunities for love and creativity. He will count up the numbers, compare them with the material reserves and resources, and predict the decline and fall of the race. He will advocate the hoarding of material wealth and its redistribution, rather than the emancipation of people on the frontiers of new creation.

The problem is that the secular intellectual is a man of little faith. This lack of faith manifests itself in the idolatrous worship of material things. Like a pygmy in the jungle worshipping the trees, the intellectual tends to reject the reality of anything he cannot see and feel. Wealth is believed to consist in things.

Through all the centuries of man, there has recurred this same morbid misunderstanding of the nature of wealth and the wealth of nations. Always, wealth is seen as something solid and calculable: to be seized and held, clutched and hoarded, measured and inventoried, amassed and monopolized. In the age of imperialism, it was imagined to consist in land and the armies which could acquire it; in the mercantilist era, it was recognized as bullion, gained through a favorable balance of trade; in every period, men have fawned over gems and glitter; in the modern age, fossil fuels and strategic minerals have seemed to be the open sesame, but seekers of wealth still fumble for gold and baubles, and so called real estate as well.

All bespeak the materialist superstition, a fixation of Leftists, but a shibboleth also for much of the intelligentsia of capitalism: the idea that wealth is material and collectible, finite and definable, subject to measurement and inventory, to entropy and exhaustion.

Particularly in this era, however, wealth consists not of things but of thoughts. An entrepreneur does not *find* value in a new product, or pool or oil, or computer design. He *brings* value to what was previously seen as worthless. And this value springs from his own *values*: his courage, ingenuity, diligence, and faith. The most valuable products of today largely consist in ideas of enormous complexity inscribed on silicon microchips.

When scientists can inscribe whole new worlds on grains of sand, the value of particular territories and resources plummets. More than ever before in history, wealth is metaphysical rather than material. The “limits to growth” that supposedly dictate population controls are merely the new frontiers of progress. From the awesome reaches of the universe to the microelectronic galaxies of inner space, from microbiology to laser photonics, the world opens its portals, sloughs off limits and boundaries, and overcomes the “closing circles” of ecological expertise with ever widening spirals of possibility.

None the less, the experts are afraid. They know they are living in an era—they dare say it—of unprecedented perils: of scarcity, pollution, famine, and plague. In fact, these so called crises are unprecedented chiefly in their possibility of being overcome by the continuing advance of capitalism.

Why is it that as real human possibilities expand almost boundlessly, many intellectuals feel only new pangs of claustrophobia? While science and enterprise open vast new panoramas of opportunity, our established authorities fell in horror to all available caves and cages, like so many aborigines, terrified by freedom and change. From the demographic and ecological penitentiaries in which they have confined themselves, and wish to incarcerate mankind, they can find hope only in halting progress, possibility only in limiting population, and gaiety and freedom chiefly in the glum sweats and sterility’s of “liberated” sensuality.

These intellectuals, of course, are absolutely sincere in their claustrophobic testimonies. Their morbid anxieties about “nonrenewable” resources, “finite” reserves, the “limits of growth,” and the “closing circles of nature all bespeak the predicament of any mortal worshiper of matter and flesh. Matter is nonrenewable, flesh is finite and exhaustible, youth is fleeting and beset by natural laws and depletions of energy. The contemporary intellectual, denying God, is in a trap, and he projects his entrapment onto the world in a kind of secular suicide. But the world is not entrapped; man is not finite; the human mind is not bound in material brain.

Like most of the hype and hysterics of modern intellectuals (for instance, the population crisis, the energy crisis, or the pollution crisis), the crisis of the day is most deeply a religious disorder, a failure of faith. It can be overcome chiefly by worship: by a recognition that beyond the darkness and opacity of our material entrapment is a realm of redemptive spirit, reachable through that interplay of faith and fact which some call science, other poetry, but which is most truly grasped as forms of prayer.

Beyond the long labyrinths of thing and the multifarious carrels of fact, the inspired explorer can finally break out into the mansions of providential mind. He then sees the limits of the culture of thanatopsis: the dismal mazes of sense and flesh, the vain hoards of sterile wealth. He can stand at last with wild surmise on the frontiers of matter where life and God again begin, and see a world renewed and shining with possibility.

Where your treasure is your heart is also. It is Marxism and statism that are based on the materialist superstition, that believe in the treasure of things. It is capitalism that is based on the treasure of ideas and spirit. To the extent that capitalists are predatory and materialistic, hoarding and miserly, hedonistic and prodigal—they betray the essence of enterprise and balk its growth.

The fable of Midas, the king who turned everything to gold until he had nothing to eat, is not the story of the perils and contradictions of capitalist wealth. It is the tale of the pitfalls of materialism itself. The real capitalists have the anti-Midas touch, turning the hoards of gold and liquidity, through an alchemy of creative spirit, into productive capital and real wealth. The foundation of wealth is always giving, not taking. The deepest truth of capitalism is faith, hope, and love.

Christian intellectuals, in their understandable frustration at the prevalence of vice in *Vanity Fair*, often blame capitalism. But capitalism is not the problem. The problem is secular hedonism.

To the extent capitalists produce depraved goods, they destroy the moral conditions of capitalist progress—they undermine the families from which all true natural resources flow. It is largely liberal culture that refuses to ban pornography, or effectively suppress vice, or uphold the moral values of family life.

The value of a nation’s goods stems from the values of its people. If the churches more confidently and effectively evangelized for their own moral and religious values rather than for socialist and materialist fantasies, depraved capitalists could not easily make money off the vices of others, and society would become more righteously prosperous. Profits from vice are spurious in a capitalist society because they undermine the faith and trust, the hope and charity, on which real growth and progress depend.

The central truths of Christianity are vital to capital. The crucial capital of the system is not the physical accumulation of natural resources and machines, but the metaphysical capital of human life. The most essential capitalist act—the very paradigm of giving or investing without a predetermined outcome—is the bearing, raising and educating of children. Above all, in advanced

societies where child labor is rare, children entail a prolonged and precarious commitment of work and wealth, love and faith, with no assurance of future return. They require elaborate decades of expensive preparation before they can make their own contributions to the society, negative or positive; and all too often, at least in the view of the parents, they turn out wrong. In fact, Ann Landers' famous poll suggested that 70 percent of mothers felt betrayed by their children and, given the choice, would not bear them again.

Parents are the ultimate entrepreneurs, and, as with all entrepreneurs, the odds are against them. But all human progress—of businesses and families as well as societies—depends on an entrepreneurial willingness to defy the odds. It is in the nuclear family that the most crucial process of capitalist defiance and faith is centered.

Here emerge the most indispensable acts of capital formation: the psychology of giving, saving, and sacrifice, in behalf of an unknown future, embodied in a specific child—a balky bundle of possibilities, which will yield its social reward even further into time than the most foresighted business plan.

Thus the Pope is completely consonant with capitalism when he denounces materialism. Materialism is the perennial enemy—and temptation—of capitalism.

The Pope is right in supporting a broad ownership of the multinational means of production, and he is right to denounce the exploitation of the many by the few in a class society. But modern corporations with their millions of free customers and shareholders (many of them workers with pension funds), diffuse the control and benefits of production more widely and concretely than any bureaucracy of socialism or any United Nations commission.

Capitalist systems not assign some 85 percent of income to labor and comprise millions of small businesses that are owned by their leading workers. It is small firms, in free economies, that have impelled the vast increase in human wealth and destroyed the class society, while class war persists virulently between bureaucrats and proletarians in every socialist state.

If the Church is truly concerned with the material problem of world hunger and poverty, it should temper its own efforts at distributing food and instead promote the moral and spiritual conditions of capitalist farming. Wherever entrepreneurship is extended to the production of food—from China to Bangladesh—people begin feeding themselves. Wherever government rules, famine and dependency spread.

Most of all the Pope is correct in exalting equality. As Tom Bethell, a brilliant Catholic writer in Washington, has pointed out, equality *before the law* is

the central prerequisite of capitalist prosperity. Without equality before the law, private property cannot be preserved from the powerful, and the free exchanges of capitalism cannot take place. In order to *give*, you first must be able to *own*. In a stratified society where the powerful control the law, the entrepreneurial challenge of established businesses cannot happen. Capitalism thrives because it defends equally the property rights of all. Thus it constantly benefits from the creative surprises of the poor.

In America today, many of the most creative and successful new companies emerge from the ideas and sacrifices of unlettered men. Very often, these men are penniless immigrants without personal charm or even mastery of English; they do not even have high school diplomas to show. But they work 16 hours a day and eventually outdo all the credentialled powers and principalities of the world.

Because leading entrepreneurs are rarely elegant, tall, eloquent, or well educated, they do not often impress academics or aristocrats and do not always spend their money in fashionable pursuits. But capitalism is the only economic system in which the last regularly become first by serving others in humble ways.

Intellectuals and others certified as “first” by schools and professional societies rebel at a system that rewards such a motley and improbably crew as the world's entrepreneurs with wealth beyond that of the kings of old. But his continual uprising of the wretched of the earth is the redeeming miracle of capitalist wealth. It is made possible only by the principle of equality before the law. And as Bethell maintains, equality before the law tends to crumble into various class privileges—unless it is sanctified by a belief in equality before God. The Pope's constant stress on the position of the poor is thus a source of replenishment for capitalism, not an attack on it.

If I may be so bold, I would suggest in fact that the Pope may see that the worldly society of his dreams must be entrepreneurial and capitalistic. Although many capitalist fail to fulfill the essential values of the system, the problem of free economies is not the nature of their economics but their corruption by a secular hedonist and amoral culture.

Capitalism is suffering from the increasing betrayal of its moral, spiritual and religious foundation by churches and schools, by preachers and politicians who believe that the paramount natural laws of giving and faith are irrelevant to the great dramas of human creativity and production, science and art.

The problem is a crisis of religion. Too many clerics have renounced the claims of the spirit in favor of inept

ventures of materialism and social politics, thus depriving capitalism of its indispensable moral rules and roots and spreading famine and poverty in the name of social justice.

As the late Monsignor Escriva writes: “Don’t forget that charity, more than in giving, consists in understanding.” Understanding is hard. But it is the arduous first step in successful charity. Giving requires a hard-earned understanding of others. That is the chief insight that the experience of capitalism offers the Church. Indeed it is the very genius of capitalism that it recognizes the difficulty of successful giving, and understand the hard work and sacrifice entailed by the mandate of Christian altruism.

To give without hurting is hard. Excessively “generous” welfare or foreign aid, for example, hurts its recipients, demoralizing them or reducing them to an addictive dependency that can ruin their lives. The anonymous private donation may be a good thing in itself. As an example for others, it may foster an outgoing and generous spirit in the community. But as a rule of society, it is best if the givers are given unto, if they seek some form of voluntary reciprocation. Then, the spirit of giving spreads, and wealth gravitates toward those who are most likely to give it back and are most capable of using it for the benefit of others—in short, toward those whose gifts evoke the greatest returns.

Even the most indigent families will do better under a system of free enterprise and investment than under an excessively “compassionate” dole that asks no return. The understanding of the law of reciprocity—that one must supply in order to demand, save in order to invest, and consider others in order to serve oneself—is crucial to all life in society.

True generosity is not soft or sentimental. It consists not in “giveaways” but in responsible giving. It has little to do with the often lazy or degenerate “good works” of the gullible, all the protests and programs of “social change” and equality urged by the sterile and predatory Left. Much of the world’s most valuable and generous work comes from the labor and sacrifice of ordinary citizens, supporting their families, building small businesses, performing useful services, continually giving back their earnings in the practical cause of human betterment, and thus doing the work of God.

Capitalism transforms the gift impulse into a disciplined process of creative investment based on a continuing and inspired analysis of the needs of others. The investor cannot be fundamentally selfish. A truly self-centered capitalist will eschew the very initiatives—the risky but redemptive ventures of innovation—that, being untested and unproven, depend most on an

imaginative understanding of the world beyond himself and a generous and purposeful commitment to it.

According to Adam Smith, selfishness and greed lead—as by an invisible hand—to a growing and prosperous capitalism. But the truth is contrary to his brilliant insight. The fact is that the greedy or self-centered man seeks first his own comfort and security, and pressures the state to give it to him—by taking from others what he has not earned himself. Greed, therefore, leads not to capitalism but to socialism. As by an invisible hand, self-interest impels a society to an ever larger welfare state, which ends by extinguishing the faith, hope and charity of Christian capitalism.

That is why the Pope must continue to lash out at contemporary capitalism for its materialism and immorality. But the system can save itself not by becoming socialistic, but by adhering more truly to the essential laws of the altruism of enterprise.

I quote the words of Monsignor Escriva in his homily “In Joseph’s Workshop” where our Lord chose to work for the first Thirty years of his life: “As the motto of your work, I can give you this one: If you want to be useful, serve. For in the first place, in order to do things properly, you must know how to do them... It’s not enough to want to do good; we must know how to do it.”

This is the know-how that is the prime source of wealth in the modern economy. It is based on faith, hope, and charity. And it is tempered with spiritual discipline. It is the way, as Michael Novak has put it, we can respond to the mandate of our creator, who made us in his own image, to be creative.

The sanctification of work is a prime mission of the Church. I believe that this is the paramount gift of the church to this diurnal world. When work is sanctified, it becomes the work of God and it obeys the laws of God. Serving others and serving God in useful enterprise is the secret of prosperity and freedom.

In conclusion, let us return to the quantum revelation in its correspondence with scripture. Scientists no longer see the foundation of all matter as Newton did, as inert, blind, impenetrable, blank particles. Rather physicists now agree that matter derives from waves, fields, and probabilities. To comprehend nature, we have to stop thinking of the world as basically material and begin imagining it as a manifestation of divine consciousness, suffused with sparks of informative energy.

The fundamental entities in quantum theory are wave-particles, a profound paradox that was first launched in 1887 when Albert Michelson and E.W. Morley did their famous experiments that showed that

there is no ether in the universe. Until the experiments of Michelson and Morley, the fundamental belief was that the universe is filled with solid matter, which would be needed as the medium through which light waves could propagate. Earlier experiments had demonstrated conclusively that light is a wave; it was assumed, therefore, that there must be a material medium through which the waves of light could travel. By dispelling the notion of ether as the luminiferous medium bearing light, Michelson and Morley effectively banished most of the matter from the universe.

In the quantum revelation of science, light emerged as an esoteric paradox of waves without substance traveling at a fixed speed in relation to a medium without substance. In 1905, in a Nobel Prize-winning paper, Albert Einstein declared that if there was no ether, light could not be a wave. It had nothing to wave through. Extending the insight of Max Planck, Einstein said that light consisted of quanta—packets of energy—that he called photons. Although said to be “particles,” photons possess no mass and observe the equations of wave motion developed by James Clerk Maxwell in the 1860’s. They seemed to be a cross between a wave and a particle.

In the beginning was the word, the idea. By crashing into the inner sanctums of the material world, into the microcosm, mankind overcame the regnant superstitions of matter and regained contact with the primal powers of mind and spirit. Those new powers have rendered obsolete all the materialist fantasies of the past: the notion that by comprehending things, one could understand thought, and that by controlling things, one could rule the world. The quantum era is the epoch of free men and women scaling the hierarchies of faith and truth seeking the sources of light.

In this unifying search is the secret of reconciliation of science with religion. The quantum vision finds at the very foundations of the firmament a cross of light. Combining a particle and a wave, it joins the definite to the infinite, a point of mass to an eternal radiance.

What else would a Christian expect to find at the foundations of the world. In this light, we can comprehend the paradox of the brain and the mind, the temporal and the divine, flesh and the word, freedom and fatality. By this light we can even find the truth. But we cannot see through it. In science and technology, religion and economics, we can triumph only by understanding that truth is a paradoxical and redemptive cross at the heart of light and life, radiant in the microcosm and in the world. And all Satan’s powers cannot prevail against it.