

Michael Rothschild

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Bionomics

ECONOMY AS ECOSYSTEM

“A fascinating mixture of war stories from corporate battles, illustrations from biology, and anecdotes from the history of technology.” —*The Boston Globe*

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ECONOMY
▪ AS ECOSYSTEM ▪



A JOHN MACRAE BOOK

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Praise for *Bionomics*

“Occasionally a book signals a fundamental shift in the way people should think about economics. . . . The book’s greatest impact, however, will come if it helps people understand the pervasive reality of economic forces and how they can be harnessed to achieve prosperity and progress.” —*The Wall Street Journal*

“Michael Rothschild has spun a fascinating mixture of war stories from corporate battles, illustrations from biology, and anecdotes from the history of technology.” —*The Boston Globe*

“This book could well become a classic work. . . . It brings together with great skill the essential findings of modern ecology and evolutionary theory and the general theory of market economy. It is constantly illustrated by good stories and examples.” —**Kenneth E. Boulding**, *Professor Emeritus, University of Colorado, and past president, American Economics Association*

“Bold, original, and highly innovative, *Bionomics* combines economics, biology, and a historical analysis of capitalism to make a powerful case for free enterprise. Mr. Rothschild insists that the economy should be viewed in ecological terms, rather than the mechanical terms of equilibrium economics.” —**Joel Mokyr**, *Professor of Economics and History, Northwestern University*

“*Bionomics* is a stunning interdisciplinary achievement by a brilliantly articulate new advocate of the free market.” —*Fort Worth Morning Star*

For my parents and teachers

PREFACE

The market is not an invention of capitalism. It has existed for centuries. It is an invention of civilization.

—*Mikhail Gorbachev* (June 8, 1990)¹

Capitalism, or the market economy, or the free-enterprise system—whatever you choose to label it—was not planned. Like life on earth, it did not need to be. Capitalism just happened, and it will keep on happening. Quite spontaneously. Capitalism flourishes whenever it is not suppressed, because it is a naturally occurring phenomenon. It is the way human society organizes itself for survival in a world of limited resources.

A capitalist economy can best be comprehended as a living ecosystem. Key phenomena observed in nature—competition, specialization, cooperation, exploitation, learning, growth, and several others—are also central to business life. Moreover, the evolution of the global ecosystem and the emergence of modern industrial society are studded with striking parallels.

Briefly stated, information is the essence of both systems. In the biologic environment, genetic information, recorded in the DNA molecule, is the basis of all life. In the economic environment, technological information, captured in books, blueprints, scientific journals, databases, and the know-how of millions of individuals, is the ultimate source of all economic life.

As mankind's ability to copy and exchange information improved, first with the invention of the printing press and more recently with the creation of the computer, the accumulation of scientific knowledge quickened and then accelerated again. Today, a staggering profusion of companies—from fast-food chains to microchip makers to international

airlines—convert fragments of this vast body of knowledge into goods and services that satisfy human needs and desires. Each organization strives to survive in its niche of the economic ecosystem.

Though the pace of economic change is amazingly rapid, its basic mechanics are remarkably similar to those found in nature. In fact, the chief distinction between the biologic and economic forms of evolution is speed. Technologic change happens roughly one million times as fast as genetic change. Imagine two copies of the same movie being projected onto the left and right halves of a theater screen. With the image on the left zipping by a million times faster, the audience never realizes it's watching the same story.

To make the necessary speed adjustments, the introduction sketches the landmark events in the twin histories of genes and knowledge. Part I elaborates by tracing the development of our present ideas about organic evolution and economic change. For the last two centuries, from Darwin's predecessors to his current disciples, the *idea* of evolutionary change has itself undergone tremendous change. Today's version of Darwin's theory elegantly explains what would otherwise be a bewildering array of contradictory evidence.

By contrast, two centuries after the Industrial Revolution got rolling, economists are still baffled by the forces that propel economic change. To get their models to work, orthodox economists must assume that technology does not change. Unable to shed this absurdity, conventional economic theory has lost all touch with economic reality. Now, with technical innovation accelerating radically, an intimate understanding of the processes of economic change is more crucial than ever. But without an evolutionary perspective borrowed from modern biology, such comprehension is impossible.

After presenting an historical overview of evolutionary change in part I, each of the book's subsequent seven parts explores a single theme crucial to both biologic and economic life. Juxtaposing descriptions of organisms and organizations, these sections of the book are part nature show, part tour of the modern business jungle—with appropriate forays into the world where economics meets politics.

In closing, the postscript fully distinguishes bionomics from social Darwinism and its modern incarnation—human sociobiology. For now, it is enough to say that social Darwinism was a deeply flawed attempt to apply the theory of evolution to human social questions. Ultimately, its perverted logic led to one of the greatest tragedies in human history—the Nazi Holocaust. Because of this horrifying result, biology became a taboo subject for economic thinkers. Many still close their minds to the

idea that the insights of modern biology, properly applied, might explain the complexities of the economy.

In recent years, the notion of a relationship between biology and social questions has become even more confused by the rise of human sociobiology. Human sociobiologists employ far more sophisticated language than old-fashioned social Darwinists, but the core allegation is the same—people are born to behave the way they do. Proponents of human sociobiology see the diversity of human cultures as rooted in differences within the human gene pool. For them, culture does not emanate from the mind, but from the genes.

In sharp contrast, bionomics holds that economic development, and the social change flowing from it, is not shaped by a society's genes, but by its accumulated technical knowledge. Technology, not people, holds center stage in this view of economic life. Indeed, wherever advanced technologies have penetrated, cultural chasms once thought unbridgeable have narrowed to the vanishing point. Europe's current unification is but one example of this common process. Throughout human history, profound cultural change has been driven by the evolution of technological information, not the evolution of genetic information.

The central concept proposed here—that a parallel relationship exists between an ecosystem based on genetic information and an economy derived from technical information—is fundamentally different from that argued by social Darwinists and human sociobiologists. In their view, human culture is not parallel to, but an extension of, human genetic information. For them, the tree of cultural evolution grows from genetic roots. In bionomics, genes and knowledge are not connected; they are parallel. Our genes do not program us to become capitalists. Capitalism is simply the process by which technology evolves.

By way of analogy, bionomics argues that, on a day in–day out basis, biologic and economic life are organized and operate in much the same way. Of course, when an analogy is purely coincidental and superficial, nothing can be learned from it. But if an analogy is close, detailed, and has a sound logical foundation, it may reveal a great deal about the hidden nature of things. The more precise the parallels, the more convincing the analogy becomes.

For the analogy between ecosystem and economy to be useful, it need not be perfect. Street maps are not exact replicas of cities, but they do help us find our way around in unfamiliar territory. Then again, streets are sometimes rerouted and maps occasionally have flaws that cause us to get lost. Though the analogy between genetic and technologic evolution is powerful, it is not perfect.²

The analogy drawn here observes that organizations, like organisms, are built in complex hierarchies. One is made up of cells within tissues within organs within organisms within populations, while the other is comprised of work teams inside departments inside divisions inside businesses inside industries. Some organisms and some organizations, like bacteria and single-person offices, are minuscule but found in huge numbers and varieties, while others, like blue whales and IBM, are massive and few.

To persist, regardless of size, every form of life tends to become specialized, developing a particular way of getting by that only a few direct competitors in its niche can match. Avoiding head-on competition—in the wild and in the marketplace—leads to diversity, which, in turn, promotes interdependence. Mutually beneficial relationships, common among species in nature, are echoed in business, where the vast majority of affiliations are based upon mutual profitability. Taken over time, the twin phenomena of competition and cooperation have yielded the diversity and abundance of the earth's ecosystem in one realm and the complexity and productivity of the global market economy in the other.

The most difficult concept to accept about the natural world is that it runs itself. No conscious force is needed to keep the ecosystem going. Life is a self-organizing phenomenon. From the interplay of hormones in the human body to the expansions and contractions of the great Arctic caribou herds, nature's intricately linked feedback loops automatically maintain a delicate, yet robust balance. Markets perform the same function in the economy. Without central planning, buyers and sellers constantly adjust to changing prices for commodities, capital, and labor. A flexible economic order emerges spontaneously from the chaos of free markets.

Needless to say, this thinking bears little resemblance to conventional economics. Two centuries of economic thought, both capitalist and socialist, are based on the concept of "economy as machine" rather than "economy as ecosystem." Nonetheless, history has demonstrated that no economy behaves like a simple, cyclical machine. Like ecosystems, economies are spectacularly complex and endlessly adaptable.

Consequently, it is bionomics—which studies economic relations among organisms and their environments—that offers the best vantage point for a total rethinking of the received economic wisdom. Sprinkled throughout the book, wherever appropriate, the bionomic approach is distinguished from those of traditional capitalists and socialists. But the acid test for any economic view is not how it differs from its predecessors, but how it would work if applied in the "real world."

As such, the closing chapters in parts II through VIII rely on the bionomic perspective to assess several of today's most pressing—and seemingly unrelated—economic questions: Why does America save and invest too little? How did Japan grab world economic leadership from the United States? Why did America lose the War on Poverty? Why does pollution get worse even as we spend more to stop it? Why are so many of America's public schools so awful? Why *exactly* did capitalism flourish while socialism collapsed? And, more important, given the underlying bionomic forces at work, which new policies can harness these forces and provide genuine solutions to these dilemmas?

For readers ideologically wedded to either end of the political spectrum, the answers to these questions will be disconcerting. While certainly not “pro” socialist, the argument made here is not “pro” capitalist in any conventional way. It regards capitalism as the inevitable, natural state of human economic affairs. Being for or against a natural phenomenon is a waste of time and mental energy. Like it or not, the sun rises in the east. Meaningful economic issues always boil down to, given that capitalism exists, how can it be made better?

In short, this book calls for a profound change in our expectations of government, for a new understanding of how it can and cannot be used to foster prosperity. Bionomics does not deny the need for a social safety net, but it compels a rethinking of the net's design. The traditional notion of government's economic role—pushing the buttons and twisting the dials of society's economic machinery—is replaced by a vision of government as the astute cultivator of society's economic ecosystem, patiently nurturing the natural processes of growth.

Bionomics is not a new “theory”—some new doctrine or ideology. There's already been entirely too much of that. Instead, this book offers a fresh new perspective, a new way of observing the facts before us. When you adjust the focus on a microscope, blurry images pop into vivid detail. In all its marvelous complexity and beauty, a world invisible to the naked eye suddenly becomes intelligible.

In a way, the bionomic perspective is an infinitely adjustable *macro*-scope—an instrument for the mind's eye—able to scan the panorama of the global economy or zoom in on its finest details. It is an observational technique that, once learned, comes easily. Complexities that confound traditional approaches yield to its insights. At a time of stunning change in the world, when the inadequacies of long-accepted points of view have become obvious, a new way of looking at old problems may be just what is needed.

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San Rafael, California
May 1990

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INTRODUCTION: GENES AND KNOWLEDGE

A hen is only an egg's way of making another egg.
—*Samuel Butler* (1885)¹

Stripped to its core, a living organism is nothing more than the packet of information recorded in its genes. And yet, if the very essence of life is information, one has to wonder why a column of numbers or a line of words isn't alive. Obviously, when digits or letters are arranged in a particular sequence, they convey information. But just as clearly, information, in and of itself, is not alive.

Genetic information is special because it alone can make copies of itself. This remarkable ability is the basis of all the other differences that distinguish the living from the nonliving. Even a crystal of table salt is a form of information. Its sodium and chlorine atoms are arranged in a precise order, but a salt crystal cannot duplicate itself. Of all the substances on earth, only DNA, the molecule that carries genetic information, can orchestrate its own replication.

DNA's capacity to self-copy, as well as its ability to encode information, stems from its peculiar shape. First described in 1953 by James Watson and Francis Crick, the structure of the DNA (deoxyribonucleic acid) molecule is a double helix, a shape that looks like a long ladder twisted into a corkscrew. Each rung is a letter in a chemical alphabet limited to just four symbols. Arranged in varying but exact sequences, incredibly long strings of these four letters spell out the instructions for building and operating all living things. Every organism that has ever lived on this planet, from the greatest dinosaurs to the tiniest viruses, is a product of information recorded in its own particular version of the DNA molecule.²