

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changes in Version 1998.10.7

Preface, third paragraph, first sentence

“Connect” changed to “join.”

Chapter 2

The subsection “Subjectivity” now appears before the subsection “Products.”

Changes in Version 1998.10.21

Preface, tenth paragraph

“Again, I was inspired by Ohno’s work. At Toyota, manufacturing engineers play a different role than in traditional batch manufacturing. Instead of designing the most efficient possible manufacturing process for a given set of constraints, they design a relatively crude manufacturing system. They design this system so that it, with their ongoing help, redesigns itself. To do their open-ended job well, they must consider the means and ends of progress more thoroughly than their traditional counterparts do.”

changed to:

“Again, I was inspired by Ohno’s work. At Toyota, manufacturing engineers play a different role than in traditional batch manufacturing. Instead of designing the most efficient possible manufacturing process for a given set of constraints, they design a relatively crude manufacturing system that, with their ongoing help, redesigns itself. To do this open-ended job well, they must consider the means and ends of progress more thoroughly than their traditional counterparts do.”

Chapter 1, “Modern Economics’ Blind Spot,” first paragraph, last sentence

“(Note that this implies a given stock of knowledge.)”

changed to:

“(Note that this implies a given fixed stock of knowledge.)”

Chapter 2, first paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We can think of this potential decision-making process as consisting of two tasks: (1) finding the most effective problem to solve and (2) finding the most efficient solution to a given problem.”

changed to:

“The process of changing our lives for the better begins with finding a problem to solve.”

Chapter 2, “*Excellence*,” first paragraph, last sentence

“Since” changed to “because.”

Chapter 2, “*Subjectivity*,” second paragraph, first sentence

“A corollary of the proposition that all theories are subjective is that **all theories depend** on our belief in the meanings of their concepts.”

changed to:

“A corollary of the proposition that all theories are subjective is that **the tenability of theories depends** on our belief in the meanings of their concepts.”

Changes in Version 1998.10.30

Chapter 1, “*Overview*,” third sentence

“The third and fourth chapters expand on this outline.”

changed to:

“The third takes a muddle-headed (inclusive) look at our ultimate ends and the fourth takes a simple-minded (discriminating) look at the means to them.”

Changes in Version 1998.11.20

Preface, sixth and seventh paragraphs

“Traditional theories of ethics, politics, and economics ultimately rest on a set of metaphysical (unverifiable fundamental) assumptions about human nature. Finding a set that we can all agree on is impossible. Rather than founding a theory on a set of

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

such assumptions, I propose “suspending” a set of theories from a vague description of an ideal end, an end so grand that virtually all of us can agree to accept it as a reasonable approximation of the ultimate end of life. As we discover more about human nature, we can eliminate members of this set. An immediate benefit of this “convergence” strategy is that it provides us with a conceptual framework that can help us find the better “tactical” problems to solve.

“I reconcile ethics and economics by redefining ‘wealth’ and ‘excellence in means.’ To understand fully the new definitions of these two key concepts requires changing one’s world-view. Thomas Kuhn compared this difficult task to trying to see the rabbit instead of the duck, or the interior instead of the exterior of a cube in one of those “trick” drawings that makes sense from either of two radically different perspectives. Until one sees the world from the new perspective, this work will likely seem to be a collection of extended tautologies or a mish-mash of conflicting ideas. However, viewed from the new perspective, it should seem both useful and relatively straightforward.”

changed to:

“Traditional theories of ethics, politics, and economics ultimately rest on a set of metaphysical (unverifiable fundamental) assumptions about human nature. Finding a set that we can all agree on is impossible. Rather than founding a theory on a set of such assumptions, I propose “suspending” a set of theories from a vague description of an ideal end. As we discover more about human nature, we can eliminate members of this set. **Note that this approach works regardless of our current beliefs. Think of how primitive fishermen return home after sunset. Regardless of where they begin, they can find their way by the lights of their village on the horizon.**

“An immediate benefit of this “convergence” strategy is that it provides us with a conceptual framework that can help us find the better “tactical” problems to solve. I reconcile ethics and economics by redefining ‘wealth’ and ‘excellence in means.’ To understand fully the new definitions of these two key concepts requires changing one’s world-view. Thomas Kuhn compared this difficult task to trying to see the rabbit instead of the duck, or the interior instead of the exterior of a cube in one of those “trick” drawings that makes sense from either of two radically different perspectives. Until one sees the world from the new perspective, this work will likely seem to be a collection of extended tautologies or a mish-mash of conflicting ideas. However, viewed from the new perspective, it should seem both useful and relatively straightforward.”

Changes in Version 1998.11.29

Preface, second paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Dilemma” changed to “problem.”

Preface, fourth paragraph, third sentence

“In economies with the potential for rapid change, the potential interactions between ethics (how we progress toward our ultimate ends) and modern economics (how we use scarce resources to satisfy our wants) are too important to ignore.”

changed to:

“In economies with the potential for rapid change, the potential interactions between ethics (**our ultimate ends** and how we progress toward **them**) and modern economics (how we use scarce resources to satisfy our wants) are too important to ignore.”

Chapter 1, sixth paragraph, second sentence

“This can mislead us when we attempt to use this concept in situations in which we solve our immediate problems by creating useful knowledge.”

changed to:

“This **concept** can mislead us when we attempt to use **it** in situations in which we **can** solve our immediate problems by **learning to live more wisely**.”

Chapter 1, “Efficiency and Effectiveness,” fifth paragraph, seventh sentence

“To think clearly about our ultimate ends we need a concept of wealth that concerns what we *need* to achieve these ends.”

changed to:

“To think clearly about **the latter**, we need a concept of wealth that concerns what we *need* to achieve **our ultimate** ends.”

Chapter 3, second paragraph, second sentence

“By itself, this tautological definition is meaningless.”

changed to:

“By itself, this tautology is useless as well as meaningless. “

Chapter 4, third paragraph, first sentence

“Pleasure and pain are mental signals that help guide us to undertake good activities and avoid bad ones.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

changed to:

“Pleasure and pain are mental signals (or absence of mental signals) that help guide us to undertake good activities and avoid bad ones.”

Changes in Version 1998.12.15

Preface, fifth paragraph, last sentence

“For the rest of us, it is a first cut at a plan for living and working together.”

changed to:

“For **all** of us, it is a first cut at a plan for living and working together.”

Chapter 1, “Efficiency and Effectiveness,” first paragraph, last sentence

“Finding” changed to “choosing.”

Chapter 1, “Efficiency and Effectiveness,” first paragraph, footnote

“The distinction between finding solutions to given problems and finding problems to solve is an arbitrary one in that we can break down any problem into subordinate problems. If we are to distinguish between efficiency and effectiveness, we must be careful to distinguish between problems and subordinate problems. We must choose a scale. If we fail to do so, we will become hopelessly confused.”

changed to:

“**Note that** the distinction between finding solutions to given problems and finding problems to solve is an arbitrary one in that we can break down any problem into **smaller** problems. If we are to distinguish between efficiency and effectiveness, we must be careful to distinguish between problems and **smaller**, subordinate problems. We must choose a scale. If we fail to do so, we will become hopelessly confused.”

Chapter 2

“Newtonian mechanics” changed to “Newtonian dynamics” in all.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Changes in Version 1999.06.15

Preface, sixth paragraph, last sentences

“Note that this approach works regardless of our current beliefs. Think of how primitive fishermen return home after sunset. Regardless of where they begin, they can find their way by the lights of their village on the horizon.”

changed to:

“This approach works regardless of our current beliefs. Think of how hikers climb a hill. Regardless of where they begin, they can find their way to the top by heading toward it.”

Chapter 1, sixth paragraph, last sentence

Added the footnote: “Although not generally recognized, the theoretical crisis created by this shortcoming has already arrived. The economics profession has accepted dynamic computer models that involve feedback mechanisms that affect the fitness of economic agents, e.g., Brookings Institution’s “sugarscape” models. Such models concern what economic agents *need* (to become fit) rather than what they *want*. This contradicts the generally accepted belief that economics concerns *wants* rather than *needs*. Accepting these models requires redefining the field of economics.”

Chapter 1, “Modern Economics’ Blind Spot,” third paragraph, fourth sentence

“Between these two extremes lies the most efficient order quantity.”

changed to:

“Between these two extremes lies the most “economic” order quantity.”

Chapter 1, “The Recursionist Approach,” last paragraph, second sentence

Added the footnote: “The implicit model here is that of decision-making under uncertain conditions.”

Chapter 2, “Science as a Process,” fourth paragraph, second sentence

Added the footnote: “When scientists (and others) appear to seek the truth per se, they are actually seeking to satisfy a spiritual need. The next chapter discusses this in greater detail.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Changes in Version 1999.08.25

Title Page

Added the subtitle: “The Reintegration of Ethics and Economics”

Preface, second paragraph, third sentence

“This great benefit introduces an infinite element into economic calculations that changes tractable closed-ended economic models into apparently intractable open-ended ones.”

changed to:

“**The act of creating knowledge adds** an infinite element into economic calculations that changes tractable closed-ended economic models into apparently intractable open-ended ones.”

Preface, second to the last paragraph, last sentence

“I advocate a set of simple-minded theories that explain causation to compliment theories that predict.”

changed to:

“I advocate a **simple-minded theory of means that explains** causation to compliment theories that predict.”

Preface, last paragraph, second sentence

“Whether my set of theories is positive depends on whether it describes (as opposed to prescribes) the internal program that motivates us.”

changed to:

“Whether my **theory of means** is positive depends on whether it describes (as opposed to prescribes) the internal program that motivates us.”

Chapter 1, “Marginalist Economics’ Blind Spot,” first paragraph, last sentences

“‘Efficiency’ means excellence in the use of scarce resources at achieving a given end: the most efficient means *to a given end* is the one that *uses the least valuable scarce resources*. (Note that this implies a given fixed stock of knowledge.)”

changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“‘Efficiency’ means excellence in the use of scarce resources at achieving a given end: the most efficient means to a given end is the one that *uses the least valuable scarce resources*. **Note that this implies a fixed stock of knowledge.**”

Chapter 2, “*Products*,” fourth paragraph, second sentence

“Predictions help us evaluate alternatives: explanations help us find them.”

changed to:

“**In decision tree analysis, predictions help us evaluate decision strategies and explanations help us formulate them. In more common terms,** predictions help us evaluate alternatives and explanations help us find them.”

Chapter 3, “*Reconciliation*,” second paragraph, third and fourth sentences

“First, belief in either the dualist or materialist system is based on faith. We currently have no generally accepted means of disproving either the fundamental materialist or dualist propositions.”

changed to:

“First, belief in either the dualist or materialist system is based on faith **in metaphysical assumptions. By definition,** we currently have no generally accepted means of disproving **these assumptions.**”

Chapter 7

“Statist” changed to “authoritarian” in all.

Chapter 7, “*Control the Money Supply Passively*”

This section was rewritten to emphasize how current monetary policy ignores the potential of learning.

Chapter 7, “*Moral Vision*,” last paragraph, last sentence

“What matters most is not values and behaviors, but vision and concepts.”

changed to:

“**In a rapidly changing world,** what matters most is not values and behaviors, but vision and concepts.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Changes in Version 1999.11.12

Chapter 2, “*Products*,” last paragraph, last sentence

Added the sentence: “Again, we need to explain based not on how *we expect we will act*, but on how *the wise would act*.”

Chapter 4, second footnote, last sentence

“From the recursionist view, the fact that firms are no longer ‘firm’ is not as great a problem as the focus is on decision-making rather than the allocation of scarce resources within a firm.”

changed to:

“From the recursionist view, the focus is on decision-making rather than on how firms allocate scarce resources. The fact that firms are no longer ‘firm’ is not a problem.”

Changes in Version 2000.02.25

Chapter 3, seventh footnote, last sentence

“Since the process leading up to the awakening keeps us from satisfying our needs, it can be seen as an investment in happiness as well as the achievement of the ultimate temporal end of life.”

changed to:

“The process leading up to the awakening, which may keep us from satisfying our needs, can be seen as an investment in happiness as well as the achievement of the ultimate temporal end of life.”

Changes in Version 2000.03.17

Preface, last paragraph, first sentences

“Economists, as scientists, ought to disregard theories if they are not both positive (**as opposed to normative**) and scientific. Whether my theory of means is positive depends on whether it describes (**as opposed to prescribes**) the internal program that motivates us.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was replaced by:

“Economists, as scientists, ought to disregard theories if they are not both positive and scientific. Whether my theory of means is positive depends on whether it describes the internal program that motivates us.”

Chapter 2, “Science as a Process,” second paragraph, first sentence

“This blurring of modern economics and ethics is likely to upset those that view **science as a means of discovering the truth, particularly those who view science and theology as armies fighting over the truth.**”

changed to:

“This blurring of modern economics and ethics is likely to upset those that view **scientific knowledge as the only definite knowledge.**”

Chapter 3, last footnote, first sentence

“Economists, as scientists, need to consider whether recursionist approach to economics outlined in this work is positive.”

was replaced by:

“**The recursionist approach to economics outlined in this work is clearly normative.** Economists, as scientists, need to consider whether **it is also** positive.”

Chapter 7, “Conclusion,” first paragraph

The second sentence, “This is similar to Whitehead’s distinction between the simple-minded and the muddle-headed.”, was eliminated.

The last sentence:

“The basis for this conflict of visions is the fact that decentralized decision-making is better at solving most complex problems.”

was replaced by:

“This conflict is one of vision, of how people perceive the world. The ‘simple-minded’ perceive a world filled with simple problems that are not being solved, hence they desire to give someone who recognizes the problems they see the power to solve them. In contrast, the ‘muddle-headed’ perceive a world filled with complex problems, which are best solved through decentralization.”

Chapter 7, “Conclusion,” last paragraph, last sentence

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

“Conceptual framework” changed to “strategy.”

Changes in Version 2000.04.09

Preface, second to last paragraph, last sentence

“I advocate a simple-minded theory of means that explains causation to compliment theories that predict.”

was replaced by:

“I advocate a simple-minded theory that explains causation to compliment theories that predict.”

Preface, last paragraph, second sentence

“Whether my theory of means is positive depends on whether it describes the internal program that motivates us.”

was replaced by:

“Whether my theory is positive depends on whether it describes the internal program that motivates us.”

Chapter 1, sixth paragraph, footnote

“Brooking Institution’s ‘sugarscape’ models”

changed to:

“the ‘sugarscape’ models of Joshua Epstein and Robert Axtell (Brookings Institution)”

Chapter 2, “The Strategy for Choosing Economic Explanations,” endnote #4

“Northrop, F. S. C., ‘Einstein’s Conception of Science’ in Paul A. Schilpp’s *Albert Einstein: Philosopher-Scientist*, The Library of Living Philosophers Volume VII, (La Salle, Illinois: Open Court, 1949).”

changed to the primary source:

“Einstein, Albert, ‘On the Method of Theoretical Physics’, The Herbert Spencer Lecture delivered at Oxford, June 10, 1933, reprinted in *Ideas and Opinions* (New York: The Modern Library, 1994).”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 4, first paragraph, fourth sentence

“This is followed by ...” was replaced by “Next is”.

Chapter 6, first paragraph, third sentence

“This chapter describes the complex relationship between increasing excellence, economic viscosity (resistance to progress), and economic turbulence (the uneven flow of resources).”

was replaced by:

“This chapter describes the complex relationship between **progress from** increasing excellence, economic viscosity, and economic turbulence.”

Chapter 6, “Progress and Growth”

“Progress and Growth” was changed to: “Progress **versus** Growth”.

Chapter 6, “Progress versus Growth,” second paragraph, last sentence

“those addicted to drugs gain the fortitude to change their life in ways that eliminate their desire for **mind-altering** drugs;”

was replaced by:

“those addicted to **mind-altering** drugs gain the fortitude to change their life in ways that eliminate their desire for drugs;”

Chapter 7, third paragraph

Added the sentence:

“This chapter considers several factors: moral vision, decentralization, lucid culture, and research.”

Changes in Version 2000.05.01

Preface, third paragraph, first sentence

“The source of this problem goes back to Adam Smith.”

was replaced by:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The source of this (reduction related) problem goes back to Adam Smith.”

Preface, last paragraph, fourth sentence

“Where Friedman focuses on how well theories predict, thereby helping us solve given problems, I focus on how well theories help us find better problems to solve.”

was replaced by:

“Where Friedman focuses on how well theories predict, thereby helping us solve given problems, I focus on how well theories help us find problems to solve.”

Chapter 1, “Efficiency and Effectiveness,” fifth paragraph, fifth sentence

“We can err by choosing an inappropriate decision-making method; by poorly choosing habits, decision rules, or subordinate ends; or by poorly identifying, judging, or implementing alternatives.”

was changed to:

“We can err by choosing decision-making methods poorly; by choosing habits, decision rules, or subordinate ends poorly; or by identifying, judging, or implementing alternatives poorly.”

Chapter 2, “Products,” last paragraph, sixth sentence

“In economics, ...” was changed to “Using mainstream economic theories, ...”

Chapter 2, “The Strategy for Choosing Economic Explanations,” last paragraph, second sentence

“Agreeing on an ultimate end is at least as difficult as agreeing on a foundation of metaphysical assumptions.”

was replaced by:

“Agreeing on an ultimate end is at least as difficult as agreeing on a foundation of metaphysical assumptions about human nature.”

Chapter 2, “Science as a Process,” third paragraph, second sentence

“First, it aims at discovering what is useful to accomplish the task at hand rather than trying to get at the truth per se.”

was replaced by:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“First, it aims at discovering what is useful rather than the truth per se.”

Chapter 2, “Science as a Process,” fifth paragraph, first sentence

To maintain parallel structure within the paragraph, the phrase “explain or predict” was changed to “predict or explain.”

Chapter 2, “Science as a Process,” seventh and eighth paragraphs

These two paragraphs were combined into a single paragraph. Further, sentences 2 and 3:

“The pragmatic means of testing tools is to test their performance at the task we want them to perform. **As logical and elegant narratives that explain causation,** philosophical theories are tools for helping us find problems to solve.”

were replaced by:

“Philosophical theories are tools for helping us find problems to solve. The pragmatic means of testing tools is to test their performance at the task we want them to perform.”

Chapter 3, “Eliminating Simplistic Theories,” fourth paragraph

The last two sentences:

“Further, many people find this version of altruism to be selfish, which itself is evidence that this theory is incomplete. (This inadequacy is not limited to humans: news stories of family dogs sacrificing themselves to save the life of a human family member are common.)”

were switched:

“This inadequacy is not limited to humans: news stories of family dogs sacrificing themselves to save the life of a human family member are common. Further, many people find this version of altruism to be selfish, which itself is evidence that this theory is incomplete.”

Chapter 3, “Materialist Ultimate Ends,” twelfth paragraph, last sentence

To maintain a parallel structure within the paragraph, the sentence:

“In response to the suffering of others, ‘ethical mysticism’ evokes sympathy, while ‘magical mysticism’ evokes detachment.”

was replaced by:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“In response to the suffering of others, ‘magical mysticism’ evokes detachment, while ‘ethical mysticism’ evokes sympathy.”

Changes in Version 2000.05.21

Preface, seventh paragraph, first sentence

“An immediate benefit of this “convergence” strategy is that it provides us with a conceptual framework that can help us find the better “tactical” problems to solve.”

changed to:

“An immediate benefit of this “convergence” strategy is that it provides us with a ‘**strategic**’ conceptual framework that can help us find the better ‘tactical’ problems to solve.”

Preface, eighth paragraph, last sentence

“My primary objective is to provide a means for producing insights into the business of life, rather than to provide the insights themselves.”

changed to:

“My primary objective is to provide a means for producing insights into the business of life **rather than the insights themselves.**”

Preface, second to last paragraph, last sentence

“I advocate a simple-minded theory that explains causation to compliment theories that predict.”

changed to:

“I advocate a simple-minded ‘**strategic**’ theory that explains causation to compliment ‘**tactical**’ theories that predict.”

Preface, last paragraph, last sentence

“Examples of such integrating theories are Darwin’s theory of evolution and Wegner’s theory of plate tectonics.”

changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Examples of such integrating, ‘strategic’ theories are Darwin’s theory of evolution and Wegner’s theory of plate tectonics.”

Chapter 2, “Characteristics of Theories,” last paragraph, last sentence

Added the footnote:

“The wiser we are in choosing our ultimate ends and the best means to them, the less we need theories for helping us find better problems to solve. If all of us were perfectly wise (‘angels’), we would need neither governments nor such theories.”

Chapter 2, “The Strategy for Choosing Economic Explanations,” fifth paragraph, fourth sentence

“This definition is inconsistent with a complete decision-oriented approach to economics, which we need if we are to consider knowledge as well as scarce resources.”

was replaced by:

“This definition is inconsistent with a complete decision-oriented approach to economics, which we need if we are to consider **all (cultural as well as technological) knowledge** resources.”

Chapter 2, “Science as a Process,” first paragraph, third sentence

“To those that don’t believe this, it is merely an apology for current culture or the despoiling of the planet for the sake of producing ever more consumer goods.”

was replaced by:

“To **many** that don’t believe this, it is merely an apology for current culture or the despoiling of the planet for the sake of producing ever more consumer goods.”

Chapter 2, “Science as a Process,” second paragraph, first sentence

“This blurring of modern economics and ethics is likely to upset those that view scientific knowledge as the only definite knowledge.”

changed to:

“This blurring of modern economics and ethics is likely to upset those that view scientific knowledge as the only **definitely true** knowledge.”

Chapter 2, “Science as a Process,” fifth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The second set involves the process of expressing our intuitive knowledge as narratives, which we use to predict or explain our sense experiences.”

changed to:

“The second set involves the process of expressing our intuitive knowledge as narratives **that** we use to predict or explain our sense experiences.”

Chapter 8 (“Closing Thoughts”), first paragraph, second sentence

“To think about these interactions, we need a loose theory of means that is based on a set of ultimate ends.”

changed to:

“To think **clearly** about these interactions, we need a loose theory of means that is based on a set of ultimate ends.”

Changes in Version 2000.06.04

Chapter 2, “The Strategy for Choosing Economic Explanations,” fifth paragraph, fourth sentence

“This definition is inconsistent with a complete decision-oriented approach to economics, which we need if we are to consider all (cultural as well as technological) knowledge resources.”

was replaced by:

“This definition is inconsistent with a complete decision-oriented approach to economics, which we need if we are to consider all (**‘ethical’** as well as **‘economic’**) knowledge resources.”

Chapter 3, last footnote

“The recursionist approach to economics outlined in this work is clearly normative. Economists, as scientists, need to consider whether it is also positive. The answer depends on whether reverence for life is part of the internal program that motivates us. Is it our nature to revere life? We may find the answer to this question by looking into ourselves. If we had the divine power to preserve the last spark of life in the universe, regardless of how vile it seems to us, would we choose to do so?”

was replaced by:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This chapter proposed two strategies for eliminating teleonomic theories, theories that describe either our ultimate ends or what we need to achieve our ultimate ends. The “weak” strategy involves eliminating theories based on their correspondence to our perceptions of reality (empirical truth) and general completeness. The “strong” strategy also involves eliminating theories based on a specific criterion, the inclusion of a need for mystical oneness that we can satisfy by revering life. Both processes yield *descriptions*. Adding the *prescription* that we ought to fulfill our internal programs wisely (pursue happiness) changes these positive theories into normative ones.”

Also, the reference was changed from the second to the last paragraph to the last paragraph.

Chapter 4, last paragraph, last sentence

“Whether we like it or not, we are all becoming entrepreneurs in the business of life.”

was replaced by:

“Whether we like it or not, **the information revolution is forcing us to become** entrepreneurs in the business of life.”

Changes in Version 2000.07.08

Preface, sixth paragraph, third sentence

“Rather than founding a theory on a set of such assumptions, I propose ‘suspending’ a set of theories from a vague description of an ideal end.”

was replaced by:

“Rather than founding a theory on a set of such assumptions, I propose ‘suspending’ a set of theories from a vague description of an ideal **ultimate** end.”

Preface, seventh paragraph, first sentence

“An immediate benefit of this ‘convergence’ strategy is that it provides us with a ‘strategic’ conceptual framework that can help us find the better ‘tactical’ problems to solve.”

was replaced by:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“An immediate benefit of this ‘convergence’ strategy is that it provides us with a ‘strategic’ **world-view and related** conceptual framework (**Kuhnsian paradigm**) that can help us find the better ‘tactical’ problems to solve.”

Preface, eighth paragraph, first sentence

“In keeping with Kuhn’s metaphor of conceptual frameworks as pictures...”

was replaced by:

“In keeping with Kuhn’s metaphor of **world-views and related** conceptual frameworks as pictures...”

Chapter 1, “Modern Economics’ Blind Spot,” second paragraph, last sentence

“We can see this clearly in the economic order quantity (EOQ) model.”

was replaced by:

“We can see this clearly in the **marginalist** economic order quantity (EOQ) model.”

Chapter 1, “The Recursionist Approach,” fourth paragraph, fourth sentence

“The first is a conceptual framework that helps us think clearly about our ultimate ends and the best means for achieving them.”

was replaced by:

“The first is a **world-view and related** conceptual framework that helps us think clearly about our ultimate ends and the best means for achieving them.”

Chapter 1, “The Recursionist Approach,” fourth paragraph, last sentence

“Concepts, practical wisdom, trust, and liberty are critical factors in information age economies.”

was replaced by:

“**Vision (and related concepts)**, practical wisdom, trust, and liberty are critical factors in information age economies.”

Chapter 1, “Overview,” first paragraph, fourth sentence

“Taken together, these three chapters provide a conceptual framework for thinking about the information age, a recursionist world-view.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was replaced by:

“Taken together, these three chapters provide **a recursionist world-view, a pre-analytic vision for thinking clearly about information age economies.**”

Chapter 2, “The Strategy for Choosing Economic Theories,” second paragraph, first sentence

“Since the Keynesian revolution, economists have studied their subject on two levels, ‘microeconomics’ and ‘macroeconomics.’”

was replaced by:

“Since the Keynesian revolution, **most** economists have studied their subject on two levels, ‘microeconomics’ and ‘macroeconomics.’”

Chapter 2, “Science as a Process,” first paragraph, third sentence

“To many that don’t believe this, it is merely an apology for current culture or the despoiling of the planet for the sake of producing ever more consumer goods.”

was replaced by:

“To many that don’t believe this, it is merely an apology for current culture or **despoiling** the planet for the sake of producing ever more consumer goods.”

Chapter 2, “Science as a Process,” first paragraph, last sentence

“Whether it is the ability to read, write, calculate, operate a motor vehicle, use a computer, communicate clearly, think logically, or behave continently, useful knowledge does not recognize the boundaries that separate ‘consumption’ from ‘production’ and ‘trade.’”

was replaced by:

“Whether it is the ability to read, write, calculate, operate a motor vehicle, use a computer, **learn quickly**, communicate clearly, think logically, or behave continently, useful knowledge does not recognize the boundaries that separate ‘consumption’ from ‘production’ and ‘trade.’”

Chapter 2, “Summary,” last sentence

“This explanation stands ready to be proven less useful than competing explanations in helping us find problems to solve.”

was replaced by:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This **loose** explanation, **this pre-analytic vision, will stand** ready to be proven less useful than competing explanations in helping us find problems to solve.”

Chapter 4, “*Pleasure and Pain*,” last paragraph, last sentence

“We need practical knowledge of how to act wisely to pursue this virtuous circle.”

was replaced by:

“We need practical **wisdom**, knowledge of how to act wisely, to pursue this virtuous circle.”

Chapter 4, “Profit”

The three paragraphs were simplified and combined into the following:

“Profit is the result of processing inputs into outputs well. From the marginalist perspective, entrepreneurs profit by managing their businesses efficiently. From the recursionist, all of us profit by deciding wisely. Because the money we save from not buying what we don’t need is just as useful to us as the money we receive from trading and producing wisely, the profits that we create by consuming wisely are just as real as those that we create by trading or producing wisely. In the words of Ben Franklin, ‘a penny saved is a penny earned.’ We are all entrepreneurs in the business of life.”

Chapter 7, “Lucid Culture,” tenth paragraph, first sentence

“We are used to thinking about the moral hazards of insurance, people acting foolishly because they are protected by insurance.”

was replaced by:

“We are used to thinking about the moral hazards of insurance, people **choosing to act** foolishly because they are protected by insurance.”

Chapter 8, second paragraph, third sentence

“It does this by providing us a conceptual framework for thinking about our ultimate ends and the best means to them.”

was replaced by:

“It does this by providing us a **world-view and related** conceptual framework for thinking about our ultimate ends and the best means to them.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Changes in Version 2000.12.02

American Foreword

Added a foreword directed to residents of the United States.

Acknowledgments

Added the paragraph:

“Students of F. A. Hayek will recognize the homage I paid him in the dedication. Although I finished my first draft before reading any of his works, I probably owe more to this self-proclaimed member of “the party of life” than to any other economist. Some day I hope to honor him more fully with an essay titled *Why I Am Not A Libertarian*.”

Chapter 1, title

“Introduction”

changed to:

“Strategic Assets”

Throughout book

Changed “tool setting” to “tool-setting.”

Changes in Version 2001.09.17

American Foreword, Afterword

The American Forward was dropped. Much of what it contained was moved to a new Afterword..

Preface, second paragraph

Added the following sentences to the end of the paragraph:

“*We need an economics of knowledge*. Because wisdom is a form of knowledge, an adequate economics of knowledge must be based not on what *people will do*, but on what *the wise would do*. This is not only a radical departure from modern economics but also a radical departure from modern science.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, third paragraph, first sentence

“The source of this (reduction related) problem goes back to Adam Smith.”

changed to:

“The source of modern economics’ problem goes back to Adam Smith, the grandfather of modern economics.”

Preface, last paragraph, last sentence

“Examples of such integrating, “strategic” theories include Darwin’s theory of evolution and Wegner’s theory of plate tectonics.”

changed to:

“Precedents for such a theory include Darwin’s theory of evolution and Wegner’s theory of plate tectonics. I believe that my unified theory ethics and economics is both positive and scientific.”

Acknowledgments, first paragraph

Changed “critiquing” to “criticizing.”

Acknowledgments, second paragraph, second sentence

“Although I finished my first draft before reading any of his works, I probably owe more to this self-proclaimed member of “the party of life” than to any other economist.”

changed to:

“Although I finished my first draft before reading any of his works, I owe more to this self-proclaimed member of “the party of life” than to any other economist.”

Chapter 1, title

“Strategic Assets”

changed back to:

“Introduction”

Chapter 1, “The Recursionist Approach,” third paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Less important decisions ought to be made **by cheaper means**, by habit, standard procedure, or decision rules. The decision to employ these techniques for certain types of decisions is itself a decision, which often warrants formal deliberation.”

changed to:

“Less important decisions ought to be made by habit, standard procedure, or decision rules. The decision to employ these **cheaper means** for certain types of decisions is itself a decision, which often warrants formal deliberation.”

Chapter 2, “*Products*,” last paragraph, last sentence

Dropped the footnote:

“The wiser we are in choosing our ultimate ends and the best means to them, the less we need theories for helping us find better problems to solve. If all of us were perfectly wise (‘angels’), we would need neither governments nor such theories.”

Changes in Version 2001.10.18

Chapter 2, “*Products*,” fifth paragraph, second sentence

“The most obvious problem is how to improve **scheduling**.”

changed to:

“The most obvious problem is **determining** how to improve **sales volume predictions**.”

Chapter 2, “The Strategy for Choosing Economic Explanations,” fifth paragraph, fourth sentence

“This definition is inconsistent with a complete decision-oriented approach to economics, which we need if we are to consider all (“ethical” as well as “economic”) knowledge resources.”

was deleted.

Chapter 2, “Science as a Process,” third paragraph, last sentence

“Standards for the quality of knowledge are themselves beliefs subject to standards, which are beliefs subject to standards, and so on to infinity. As before, we can address this open-ended problem by changing our focus from state to process, specifically, from (the state of) the quality of knowledge to the process of knowing practical things about the world.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

changed to:

“This is consistent with Einstein’s belief that the whole of science is nothing more than a refinement of everyday thinking:”

plus the two paragraph quote from Einstein’s 1936 *Franklin Institute* article, “Reality and Physics.”

Chapter 2, last paragraph, last sentence

“This loose explanation, **this pre-analytic vision, will stand** ready to be proven less useful than competing explanations in helping us find problems to solve.”

changed to:

“ This loose explanation **stands** ready to be proven less useful than competing explanations in helping us find problems to solve.”

Changes in Version 2001.10.23

Preface

Added the paragraph and quote:

“Futurists Alvin and Heidi Toffler see the failure of modern economic theories to consider knowledge adequately more of a missed opportunity than a threat. In a *Wall Street Journal* article dated October 13, 1994, they wrote:

‘The Republicans are basically right when they urge us to take maximum advantage of the dynamism and creativity that market economics make possible. But they, too, remain prisoners of Second Wave economics. For example, *even the free-market economists on whom Republicans rely have failed, as yet, to come to terms with the new role and inexhaustibility of knowledge.*’ (Emphasis added.)”

Preface, third paragraph, last sentence

“This is not only a radical departure from modern economics but also a radical departure from **modern science.**”

changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This is not only a radical departure from modern economics but also a radical departure from **what modern economists deem to be science.**”

Preface, eighth paragraph, second sentence

Deleted: “(Kuhnsian paradigm).”

Preface, tenth paragraph, first sentence

“At Toyota, manufacturing engineers play a different role than in traditional **batch** manufacturing.”

changed to:

“At Toyota, manufacturing engineers play a different role than in traditional manufacturing.”

Chapter 2, “*Products*,” third paragraph, last sentence

“(Physicists currently seek better means of explaining, theories of what lies “beneath” or “behind” quantum mechanics, e.g., superstring theory, rather than better means of predicting what quantum mechanics predicts.)”

changed to:

“Physicists currently seek better means of explaining, theories of what lies “beneath” or “behind” quantum mechanics, e.g., superstring theory, rather than better means of predicting what quantum mechanics predicts.”

Chapter 2, “*Products*,” fourth paragraph, second and third sentences

“**In decision tree analysis, predictions help us evaluate decision strategies and explanations help us formulate them. In more common terms,** predictions help us evaluate alternatives and explanations help us find them.”

changed to:

“**P**redictions help us evaluate alternatives and explanations help us find them.”

Chapter 4, “*Pursuing Happiness*,” first paragraph, last sentence

“Not surprisingly, the world’s Alexanders prefer Aristotle’s ethics, while its Einsteins prefer Spinoza’s.”

moved to the end of the fourth paragraph.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Version 2001.10.30

Chapter 1, paragraph six, last sentence

“The further we go into the information age with its ever-increasing potential for learning, the more costly this shortcoming becomes.”

changed to:

“**As we shall see**, the further we go into the information age with its ever-increasing potential for learning, the more costly this shortcoming becomes.”

Chapter 2, “Subjectivity”, first paragraph, last sentence

“Because what we conceive depends on **who we are**, all theories are subjective.”

changed to:

“Because what we conceive depends on **the conceptual frameworks that we use to conceive the world**, all theories are subjective.”

Afterword, first paragraph, fourth sentence

“When I discuss it with business and military leaders that topic is the importance of culture and strategic vision in ‘fast’ organizations.”

changed to:

“When I discuss it with business and military leaders that topic is the importance of culture and strategic vision in ‘fast’ organizations, **especially the need to improve OODA loop performance with strategic asset building loops.**”

Version 2001.11.06

Acknowledgments, first paragraph

Changed Howard Sherman’s acknowledgment to reflect that he is no longer the Santa Fe Institute’s official unofficial philosopher. Added the acknowledgment to Gordon Douglass. Split the paragraph in two.

Acknowledgments, second (now third) paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Some day I hope to honor him more fully with an essay titled *Why I Am Not a Libertarian*.”

changed to:

“Some day I hope to honor him more fully with an essay titled *Why I Am Not a Libertarian* to compliment his essay, *Why I Am Not a Conservative*.”

Chapters 3-7, endnotes 7-25 (web version only)

Corrected endnote reference mistake introduced in Version 10.10.18 with the insertion of the Einstein quote about science and everyday thinking.

Version 2001.11.11

Preface, third paragraph, third sentence

“The act of creating knowledge adds an infinite element into economic calculations that changes tractable closed-ended economic models into **apparently** intractable open-ended ones.”

changed to:

“The act of creating knowledge adds an infinite element into economic calculations that changes tractable closed-ended economic models into **mathematically** intractable open-ended ones.”

Chapter 1, second footnote, second sentence

“The economics profession has accepted dynamic computer models that involve **feedback mechanisms that affect** the fitness of economic agents, e.g., the ‘sugarscape’ models of Joshua Epstein and Robert Axtell (Brookings Institution).”

changed to:

“**Many economists have** already accepted dynamic computer models that involve the fitness of economic agents.”

Chapter 1, “Modern Economics’ Blind Spot,” last paragraph, last sentence

Added the footnote:

“Applying a learning curve to a marginalist economic model is not new. Kenneth Arrow did it in his 1962 American Economic Review article, *The Implications of*

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Learning by Doing. There can be little doubt that the widespread failure to abandon the EOQ model for the rapid tool setting model for another two decades cost many tens of billions of dollars, perhaps more. What does this say about the relationship between economists and the people who use their products? How can economists get “closer” to their customers, the people who use their theories and the concepts derived from their theories? Finding a problem is like finding a diamond. Without a problem to solve, there can be no improvement.”

Chapter 1, “Efficiency and Effectiveness,” first paragraph, first sentence

Added the sentence:

“In the EOQ model example above, the problem concerns the unstated assumption that the best means is the most ‘efficient’ means.”

Chapter 1, “Efficiency and Effectiveness,” fourth paragraph, second sentence

“The **infinite renewability** of knowledge makes it impossible to know exactly how it will be used in the future, which makes it impossible to measure its value by measuring the value of the resources it replaces.”

changed to:

“The **inexhaustibility** of knowledge makes it impossible to know exactly how it will be used in the future, which makes it impossible to measure its value by measuring the value of the resources it replaces.”

Chapter 4, “*Practical Wisdom*,” second paragraph, first sentence

“Like other forms of useful knowledge, practical wisdom is an **infinitely renewable** resource.”

changed to:

“Like other forms of useful knowledge, practical wisdom is an **inexhaustible** resource.”

Version 2001.11.21

Chapter 2, *Products*, fourth paragraph, last sentence

Added the footnote:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The meaning of ‘explanation of causation’ is problematic. The common sense approach taken here is to define it functionally. An explanation of causation is knowledge that helps us find problems to solve. Thus, the statement ‘Theories that explain causation help us find problems to solve.’ is true by definition.”

Chapter 2, Science as a Process, fourth paragraph, first sentence

Dropped the footnote:

“When scientists (and others) appear to seek the truth per se, they are actually seeking to satisfy a spiritual need. The next chapter discusses this in greater detail.”

Chapter 2, Summary, second sentence

“We can tighten this loose explanation by eliminating members of this set of theories and by learning more about complex adaptive systems.”

changed to:

“**Collectively**, we can tighten this loose explanation by eliminating members of this set of theories and by learning more about complex adaptive systems.”

Chapter 3, third footnote

“Atheists may choose to substitute ‘nothingness’ for ‘infinite Being’ when thinking about magical mysticism and ‘being’ for ‘infinite Being’ when thinking about ethical mysticism.”

changed to:

“Those troubled by Schweitzer’s argument for the normative end of reverence for life, which is based on the existence of the need for ‘mystical oneness,’ can reach essentially the same conclusion by using Rawl’s argument.”

Chapter 4, throughout

Eliminated quotation marks around several words, e.g., “misconception,” “fixed,” and “variable.”

Chapter 7, third paragraph, last sentence

“This chapter considers several factors: moral vision, decentralization, lucid culture, and research.”

changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This chapter considers several factors: moral vision, decentralization, **just taxation**, lucid culture, and research.”

Chapter 7

Added the “Just Taxation” section.

Version 2001.11.26

Preface, last paragraph, second sentence

“Whether **my theory** is positive depends on whether it describes the internal programs that motivate us.”

changed to:

“Whether **recursionist economics** is positive depends on whether it describes the internal programs that motivate us.”

Preface, last paragraph, second sentence

“I **believe** that **my unified theory of ethics and** economics is both positive and scientific.”

changed to:

“I **argue** that **recursionist** economics is both positive and scientific.”

Chapter 2, *The Strategy for Choosing Economic Explanations*, first paragraph, second sentence

Dropped the footnote:

“In complex adaptive systems such as economies, as (logical) time horizons lengthen, the value of accurate explanation rises relative to that of accurate prediction. We can think about this in terms of adaptation to a changing environment in which prediction concerns fitness to the environment at the beginning of the period (knowing how to solve our problems as we currently conceive them) and explanation concerns the ability to adapt to changing conditions (knowing how to find better problems to solve). As the time horizon increases, the value of adaptability (explanation) rises relative to the value of initial fitness (prediction).”

Chapter 3, *Eliminating Simplistic Theories*, ninth paragraph, second sentence

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

“Following its prescription, we are likely to do more harm than good.”

changed to:

“Pursuing it, we are likely to do more harm than good.”

Chapter 7, *Consider Incentives and Enforcement Costs*, third paragraph, sixth sentence

Added the footnote:

“This can be as blatant as tyrants terrorizing their subjects in order to maintain power or as subtle as the head of a drug regulatory agency pursuing bureaucratic interests. By inventing reasons to reject drugs with significant “off-label” use and by excessively preferring Type 1 (rejecting what should be accepted) to Type 2 (accepting what should be rejected) errors, the myopic bureaucrat can silently slaughter on a scale surpassed only by history’s worst tyrants.”

Afterword, first paragraph, last sentence

“With economists, it is how teleonomic theories can be both positive and normative, an arcane philosophical argument with the potential to open ethics to scientific inquiry.”

changed to:

“With economists, it is how teleonomic theories can be both positive and normative.”

Version 2002.01.26

Acknowledgments

Reworked Sherman’s acknowledgment by adding material about pragmatism. Added Steve Brophy to the list.

Preface, last paragraph, second sentence

“Whether recursionist economics is positive depends on whether it describes the internal programs that motivate us.”

was changed to:

“Whether my approach to economics is positive depends on whether it describes the internal programs that motivate us.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, last paragraph, last two sentences

“Precedents for such a theory include Darwin’s theory of evolution and Wegner’s theory of plate tectonics. I argue that recursionist economics is both positive and scientific.”

was changed to:

“Precedents for such an approach include Darwin’s theory of evolution and Wegner’s theory of plate tectonics. I argue that it is both positive and scientific.”

Printed version, all chapters

Converted footnotes to endnotes. Combined Taiichi Ohno footnote and endnote into one endnote.

Chapter 1, sixth footnote

Integrated the sixth footnote into the main text. Added a closing sentence:

“Our imperfect decision-making embeds pockets of ignorance into our culture and technology. The classic example is formation of a speculative bubble, where investors embed ignorance in the form of foolishly high asset valuations. A less recognized example is the establishment of an unhealthy, unsafe, or unjust tradition, which can endure long after members of the culture realize that it is foolish. We muddle forward not only by adapting to new knowledge but also by correcting past mistakes.”

Chapter 1, seventh footnote

Dropped the footnote:

“The implicit model here is that of decision-making under uncertain conditions.”

Chapter 2, fourth footnote

Dropped the last sentence:

“The minimum empirical standard for usefulness at helping us find problems to solve is empirical truth.”

Chapter 5, *Good People*

Tightened up the introduction, body, and conclusion.

Chapter 6, Progress versus Growth

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

The example in paragraphs two and three was moved to the introduction and rewritten. Simplified remaining paragraph. Dropped second footnote.

Version 2002.02.18

Preface

Removed quotation marks around ‘suspending,’ ‘convergence,’ ‘trick,’ ‘tactical,’ ‘strategic’ and ‘Just-In-Time Manufacturing’ in all paragraphs.

Chapter 1, fifth paragraph, last sentence

“Adherents of this mathematical tour de force, which **neoclassical (mainstream marginalist)** economists call ‘general equilibrium theory,’ believe that it explains Smith’s ‘invisible hand.’”

was replaced by:

“Adherents of this mathematical tour de force, which economists call ‘general equilibrium theory,’ believe that it explains Smith’s ‘invisible hand.’”

Chapter 1, first footnote (printed endnote 1)

“For simplicity, all future references to ‘scarce resources’ will refer to non-knowledge scarce resources.”

was replaced by the following text:

“For **both simplicity and to avoid debate over whether knowledge not yet in use is ‘scarce,’** all future references to ‘scarce resources’ will refer to non-knowledge scarce resources.”

Chapter 1, third footnote (printed endnote 5)

“For decades, the EOQ model was taught in economics, engineering, and business school courses. It formed the core of the most advanced Western batch production control systems of the nineteen seventies and eighties (MRP systems). In recent years, the rapid tool-setting model, which is one of the pillars of Just-In-Time (JIT) manufacturing, has largely displaced it.”

was replaced by the following text:

“which is at the heart of Material Requirements Planning (MRP) systems, the most advanced Western production systems of the nineteen seventies and eighties.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 1, fifth footnote (printed endnote 6)

“Note that the distinction between finding solutions to given problems and finding problems to solve is an arbitrary one in that we can break down any problem into smaller problems. If we are to distinguish between efficiency and effectiveness, we must be careful to distinguish between problems and smaller, subordinate problems. We must choose a scale. If we fail to do so, we will become hopelessly confused.”

was replaced by the following new paragraph:

“Before moving on, it is important to note that the distinction between efficiency and effectiveness varies with the scale of the problems we are discussing. The situation is essentially the same as distinguishing between tactics and strategy. Colonels deal with bigger problems than lieutenants. A problem that a colonel considers to be tactical a lieutenant may consider to be strategic. To make sure there is no misunderstanding, military officers use the mission to define the scale. Similarly, we must agree on a scale when distinguishing between efficiency and effectiveness. The scale of the recursionist approach outlined in this book is that of ‘microeconomics.’ Thus, the larger problems of ‘macroeconomics’ are strategic rather than tactical. As we shall see in later chapters, this has major implications for how we think about ‘macroeconomics.’”

Also, changed the lead sentence of the next paragraph,

“This concept of excellence in means recognizes that we can choose to invest scarce resources to obtain additional knowledge, which may lead us to choose a better problem to solve.”

to:

“This **managerial** concept of excellence in means recognizes that we can choose to invest scarce resources to obtain additional knowledge, which may lead us to choose a better problem to solve.”

Chapter 1, Overview, sixth sentence

“The final two chapters discuss **what modern economists consider to be** ‘macroeconomic’ issues.”

was replaced by:

“The final two chapters discuss ‘macroeconomic’ issues.”

Chapter 2, first footnote (printed endnote 7)

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Here, ‘objectivity’ means the independence of the observer and the observed rather than the observer’s lack of interest in the results of the observation. The reason for this more stringent definition is that there is a recursive relationship between what we perceive and what we conceive. It is not simply that what we perceive influences how we conceive, but that what we conceive influences what we perceive. What we conceive influences what is “noise” to our senses. Our “perceptual filters” may eliminate “noise” without us being aware of it. Even the most disinterested observer may be biased.”

was replaced by the following new paragraph:

“Here, ‘objectivity’ means the independence of the observer and the observed rather than the observer’s lack of interest in the results of the observation. The reason for this more stringent definition is that there is a recursive relationship between what we perceive and what we conceive. It is not simply that what we perceive influences how we conceive, but that what we conceive influences what we perceive. What we conceive influences what is “noise” to our senses. Our senses may eliminate “noise” without us being aware of it. Even the most disinterested observer may be biased.*”

plus the following endnote:

“* A classic example of the recursive relationship between conception and perception is the way we learn to categorize phonetic sounds in the first few months of life. In learning how to listen to our native languages, we sacrifice some ability to differentiate between foreign sounds. For example, Japanese adults exposed to the English sounds ‘la’ and ‘ra’ as infants can perceive the difference between these sounds. Those not exposed have difficulty doing so.”

Chapter 2, fourth footnote (printed endnote 14)

“An empirically true theory is one that corresponds to our sensations of reality. To be useful at helping us find problems to solve, philosophical theories must be empirically true.”

was replaced by the following new paragraph at the end of the section:

“Finally, note that the usefulness of this concept of science depends on our definition of usefulness. Useful for what? What is, or ought to be, the task at hand? What are our ultimate ends? The next chapter addresses these questions.”

Chapter 2, last paragraph, first sentence

Removed quotation marks around ‘suspended,’ and ‘founded.’

Chapter 3, first footnote (printed endnote 16)

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Materialists may question why we should bother to reconcile materialism with dualism. The short answer is that dualist theories can be useful in pursuing our ultimate ends. The long one involves discussion of the limited usefulness of standards of theoretical beauty, e.g., Occam’s razor. Too much faith in these standards tends to make us accept theories that we ought to reject. On the other hand, too little tends to cause us to reject theories that we ought to accept, including some that are morally abhorrent, e.g., the racial theories of National Socialism. Understanding dualism helps us develop a generally acceptable rule for rejecting morally abhorrent theories, which lowers the negative consequences of accepting theories of ultimate ends based on their beauty. In short, adding an ethical test lowers the negative consequences of accepting “ugly” theories. Think of the process of buying fish. If we only judge fish by the way it looks, we are likely to reject more fish on the basis of how it looks than if we are able to judge it on both the way it looks and how it smells. Adding the process of judging fish by its smell lowers the negative consequences of accepting it by its looks.”

was inserted as a new paragraph.”

Chapter 3, second footnote (printed endnote 18)

“In considering the reasonableness of Maslow’s theory, we must take care not to confuse what need actually causes a behavior with what need we usually associate with that behavior. For example, many venture capitalists favor companies founded by recently divorced entrepreneurs because they tend to throw themselves completely into their work. These venture capitalists hope to sell their stakes before the entrepreneurs burn themselves out. Recently divorced “workaholic” entrepreneurs try to satisfy their need for love with an activity that temporarily masks their need for love but which satisfies their need for esteem and self-actualization. The casual observer can easily confuse the need that we usually associate with building a company (esteem and self-actualization) with the entrepreneur’s actual need (love).”

was deleted.

Chapter 3, third footnote (printed endnote 20)

“Those troubled by Schweitzer’s argument for the normative end of reverence for life, which is based on the existence of the need for “mystical oneness,” can reach essentially the same conclusion by using Rawl’s argument.”

was deleted.

Chapter 3, fourth footnote (printed endnote 26)

“We see this manifest in ancient Hinduism’s failure to explain adequately how merit (karma), which concerns our relationship with the infinite Being, relates to worldly duty (dharma), which concerns our relationship with life. The result was a concept of

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

justice in which people's roles in their society are fixed at birth. Clearly, this means of allocating labor is a tremendous hindrance to progress toward our ultimate ends."

was inserted as text.

Chapter 3, sixth footnote (printed endnote 29)

"This recursive agreement between generations is similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. The question is, how much sacrifice is enough?"

was deleted. The following sentence:

"The sixth and seventh chapters discuss this in greater detail."

was changed to:

"This agreement between generations is similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. The sixth and seventh chapters discuss this in greater detail."

Chapter 3, *Reconciliation*, second paragraph, last sentence

"Both materialists and dualists can agree with Schweitzer's proposition that "all that is ethical goes back to a single principle of morality, namely the maintenance of life at its highest level, and the furtherance of life."

was changed to:

"Both materialists and dualists can agree on Schweitzer's normative end of reverence for life."

Chapter 3, Summary

"This chapter began by proposing a tautological definition of ultimate ends, which can accept a variety of teleonomic theories. Disagreement over metaphysical assumptions and the complexity of the subject makes it difficult to eliminate theoretical candidates. However, given that we are complex adaptive systems consisting of many elements, each seeking to satisfy its needs, we can eliminate many simplistic theoretical candidates. And given that our needs form a hierarchy and that we accept Schweitzer's emotional argument that at the top of this hierarchy is the need for "mystical oneness," we can eliminate unethical theories. What remains is a set of theories that deserve our tolerance. This tolerance is based on our ignorance of our ultimate ends and of the best means to them, rather than on the presumed right to do as we please."

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This chapter proposed two means of eliminating teleonomic theories, theories that describe either our ultimate ends or what we need to achieve our ultimate ends. The weak one involves eliminating theories based on their correspondence to our perceptions of reality (empirical truth) and general completeness. The strong one also involves eliminating theories inconsistent with the normative end of reverence for life. What remains is a set of theories that deserve our tolerance. This tolerance is based on our ignorance of our ultimate ends and of the best means to them, rather than on the presumed right to do as we please.”

Chapter 3, last footnote (printed endnote 31)

“This chapter proposed two strategies for eliminating teleonomic theories, theories that describe either our ultimate ends or what we need to achieve our ultimate ends. The “weak” strategy involves eliminating theories based on their correspondence to our perceptions of reality (empirical truth) and general completeness. The “strong” strategy also involves eliminating theories based on a specific criterion, the inclusion of a need for mystical oneness that we can satisfy by revering life. Both processes yield *descriptions*. Adding the *prescription* that we ought to fulfill our internal programs wisely (pursue happiness) changes these positive theories into normative ones.”

was changed to:

“Both **elimination** processes yield descriptions. Adding the prescription that we ought to fulfill our internal programs wisely, that is, pursue happiness, changes these positive theories into normative ones.”

Chapter 5, first footnote (printed endnote 37)

“Unless otherwise noted, all future references to JIT manufacturing will refer to Toyota’s version.”

was inserted as text in parentheses.

Chapter 6

Combined the old introduction and first section, Progress versus Growth, into a new introduction.

Chapter 6, first footnote (printed endnote 41)

“Economists recognize two major technical problems in measuring what they measure. The first is having to measure means rather than ends when measuring services. According to such measurement, the value of a service is proportional to what we must pay for it. Thus, hiring a surgical team to remove a brain tumor for twenty thousand dollars is twice as productive as hiring the same team to do the same

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

surgery for ten thousand dollars. The second problem is measuring the quality of goods and services, which involves making subjective assessments of value. For example, economists must assess how much more valuable surgery to remove a brain tumor performed today is than that performed twenty years ago. Attempting to measure economic progress broadens and deepens these two technical problems. Since all consumer goods and services are means to a good life rather than ends in themselves, the problem of measuring means rather than ends is universal. Worse, assessing the value of human action according to how well it satisfies our needs is more difficult than assessing the value of a good or service according to more concrete criteria.”

was incorporated into the new introduction.

Chapter 7, introduction, first paragraph

“According to popular belief, the normative end of government is satisfying its citizens’ wants. Inevitably, the policies arising from attempts to satisfy these wants hinder progress toward our ultimate ends. Examples of such hindrance abound: agricultural set-asides and quotas that encourage the clearing of tropical rain forests for agricultural production, barriers to trade and corporate welfare programs that waste resources, employment regulations that keep people from working and keep those with jobs from moving to better ones, insurance laws that create moral hazards in the name of social justice, and tax policies that encourage imprudent behavior.”

was deleted.

Chapter 7, introduction, second and third paragraphs

“From the recursionist perspective, the normative end of government is promoting progress by administering justice, which is a matter of **increasing** the quality of decision-making. To **improve the quality of decision-making**, governments must have a strategy **for deciding** who makes what decisions under what incentives.”

“**There are those that aim at promoting progress and those that aim at preserving the status quo. At the beginning of the information age, the former are divided, with one group favoring a centralized approach to decision strategy and the other a decentralized one. The centralized approach involves giving officials the power to decide what is best for the rest of us. We might label this the “government of the future” strategy for its similarity to General Motors’ “factory of the future” program of the nineteen eighties. In contrast, the decentralized approach relies on average people making their own decisions, which corresponds to Toyota’s production system. Because the problem of promoting progress is even more amenable to decentralization than the problem of building cars, we can expect the latter, “learning” decision strategy to prevail. What constitutes a good “learning” strategy? This chapter considers several factors: moral vision, decentralization, just taxation, lucid culture, and research.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“From the recursionist perspective, the normative end of government is promoting progress by administering justice, which is a matter of **continuously improving** the quality of decision-making. **To do this well**, governments must have a “**learning strategy**” **that decides** who makes what decisions under what incentives. What constitutes a good learning strategy? This chapter considers several factors: moral vision, decentralization, just taxation, lucid culture, and research.”

Chapter 7, first footnote (printed endnote 46)

“We tend to pursue a virtuous circle that increases the pace of change. We accumulate most of our wealth by substituting useful knowledge for scarce resources, which involves making changes to our means of living. As we change our means of living, we tend to accumulate capital that lowers the cost of change, e.g., information processing technology, trust, and practical wisdom. Lowering the cost of change allows us to change more quickly and easily. If we choose wisely, we realize this potential by choosing to accumulate more wealth, including more capital that lowers the cost of change.”

was deleted.

Chapter 7, third footnote (printed endnote 48)

“**From the macroeconomic perspective, economies adapt to stress.** Monetary authorities have a role in producing an environment that is conducive to adaptation. The question is whether they should modify the stress of progress. Should economies adapt to the stress of progress or the stress of progress modified by monetary authorities? In the long run, who is better able to adapt to the stress of progress, economic agents or monetary authorities?”

was deleted. The two sentences preceding the footnote were changed from:

“**The wise choice for monetary authorities is** to choose the policy that increases the quality of decision-making most efficiently. When monetary authorities exercise discretion, they shift stress from one area of the economy to another and from the present to the future.”

to:

“**Monetary authorities ought** to choose the policy that increases the quality of decision-making most efficiently. When monetary authorities exercise discretion, they shift stress from one area of the economy to another and from the present to the future.”

Chapter 7, *Consider Incentives and Enforcement Costs*, third paragraph, sixth sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Public officials have private agendas.”

was changed to:

“Public officials have private **and bureaucratic** agendas.”

Chapter 7, Conclusion, first paragraph, first sentence

“Economist Thomas Sowell observes that those that view the world as being simple **(in that it has few trade-offs)** tend to support centralization and those that view it as complex **(in that it has many trade-offs)** tend to support decentralization.”

was changed to:

“Economist Thomas Sowell observes that those that view the world as being **relatively** simple tend to support centralization and those that view it as **relatively** complex tend to support decentralization.”

Version 2002.02.24

Entire book

Removed double quotation marks around ‘microeconomics’ and ‘macroeconomics.’

Preface, ninth paragraph

Added the following paragraph:

“Switching between two conceptual frameworks can be confusing. Words and phrases that have a particular meaning in one conceptual framework can have a different meaning, or no meaning at all, in the other. To make it easier for readers to understand my meaning, I've used the following conventions. When I use a term as a term, I enclose it in single quotation marks (‘’), and when I use a term to denote one of several meanings, I enclose it in double quotation marks (“”). Thus, ‘wealth’ is the term we use to define the end of economics and “wealth” is a particular definition of this term. Further, I italicize the first use of unfamiliar terms.”

Chapter 1, second paragraph, last sentence

“Smith envisioned economies as systems, driven by people seeking to satisfy their wants and desires, **that organize themselves as if guided by an ‘invisible hand.’**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was replaced by:

“Smith envisioned economies as **self-organized** systems driven by people seeking to satisfy their wants and desires.”

Chapter 1, third paragraph

Removed double quotation marks around ‘marginalist revolution’ and ‘shocked.’

Chapter 1, fifth paragraph, first sentence

“Prior to 1935, most marginalist economists believed that **Smith’s ‘invisible hand’** would guide economies toward full employment.”

was changed to:

“Prior to 1935, most marginalist economists believed that **market forces** would guide economies toward full employment.”

Chapter 1, fifth paragraph, last sentences

“Today, one group of Keynes’s followers, the Neo-Keynsians, believes that market forces tend toward full employment, but move too slowly. Another, the Post-Keynsians, believes that economies do not tend toward full employment. Both groups recommend that governments intervene in markets to maintain high employment and so promote economic growth and social stability.”

was deleted.

Chapter 1, sixth paragraph

“In recent years, marginalist economists completed the work of Walrás by providing a complete and rigorous mathematical description of the conditions that cause an economic model to return to an equilibrium in which it is impossible to make one person better off without making another worse off.”

was combined with the fifth paragraph.

Chapter 1, sixth paragraph, last sentence

“Adherents of this mathematical tour de force, which economists call general equilibrium theory, believe that it explains Smith’s ‘invisible hand.’”

was deleted.

Chapter 1, Efficiency and Effectiveness, first paragraph, second sentence

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Removed double quotation marks around ‘managerial.’

Chapter 1, Efficiency and Effectiveness, fourth paragraph, last sentence

Removed double quotation marks around ‘community.’

Chapter 1, Efficiency and Effectiveness, sixth paragraph, first sentence

“Third, the end of economics must change, **which** is to say that the meaning of ‘wealth’ must change if it is to remain the term that we use to describe what we seek.”

was changed to:

“Third, the end of economics must change. **This** is to say that the meaning of ‘wealth’ must change if it is to remain the term that we use to describe what we seek.”

Chapter 1, Efficiency and Effectiveness, sixth paragraph, second to the last sentence

“To think clearly about the latter, we need a concept of wealth that concerns what we *need* to achieve our ultimate ends.”

was changed to:

“To think clearly about the latter, we need a concept of wealth that concerns what we *need in order* to achieve our ultimate ends.”

Chapter 1, The Recursionist Approach, first paragraph, fourth sentence

Replaced double quotation marks around ‘1’ with single quotation marks.

Chapter 2, Subjectivity, second paragraph, fifth and sixth sentences

“**O**ur senses may eliminate ‘noise’ without us being aware of it. Further, our senses may eliminate ‘noise’ without us being aware of it.”

was changed to:

“**F**urther, our senses may eliminate noise without us being aware of it. Further, our senses may eliminate noise without us being aware of it.”

Chapter 2, Subjectivity, last paragraph, last sentence

“Because we are not always familiar with what is potentially most useful to us, we would be foolish to discard theories based on how **familiar they are, on their apparent objectivity.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Because we are not always familiar with what is potentially most useful to us, we would be foolish to discard theories based on how **objective they seem to us.**”

Chapter 2, *Products*, second paragraph, second sentence

Replaced double quotation marks around ‘deterministic chaotic systems’ with italics.

Chapter 2, The Strategy for Choosing Economic Explanations, first paragraph, second sentence

Removed double quotation marks around ‘long-term.’

Chapter 2, The Strategy for Choosing Economic Explanations, third paragraph, third sentence

Changed “neoclassical” to “mainstream marginalist” in all.

Chapter 2, The Strategy for Choosing Economic Explanations, last paragraph, last sentence

Removed double quotation marks around ‘core.’

Chapter 2, Science as a Process, last paragraph

“Finally, note that the usefulness of this concept of science depends on our definition of usefulness.”

was changed to:

“Finally, note that the usefulness of this concept of science depends on our definition of ‘usefulness.’”

Chapter 3

Removed double quotation marks around ‘socket,’ ‘selfish gene theory,’ ‘positive rights Postmodernism,’ and ‘naïve Trinitarianism.’ Replaced double quotation marks around ‘normative’ and ‘temporal’ with italics.

Chapter 3, Eliminating Simplistic Theories, fourth paragraph, last sentence

“Further, many people find this version of altruism to be selfish, which itself is evidence that this theory is incomplete.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Further, many people find this version of altruism to be selfish; which itself is evidence that this theory is incomplete.”

Chapter 3, Eliminating Unethical Theories, second paragraph

“Materialists may question why we should bother to reconcile materialism with dualism. The short answer is that dualist theories can be useful in pursuing our ultimate ends. The long one involves discussion of the limited usefulness of standards of theoretical beauty, e.g., Occam’s razor. Too much faith in these standards tends to make us accept theories that we ought to reject. On the other hand, too little tends to cause us to reject theories that we ought to accept, including some that are morally abhorrent, e.g., the racial theories of National Socialism. Understanding dualism helps us develop a generally acceptable rule for rejecting morally abhorrent theories, which lowers the negative consequences of accepting theories of ultimate ends based on their beauty. In short, adding an ethical test lowers the negative consequences of accepting ‘ugly’ theories. Think of the process of buying fish. If we only judge fish by the way it looks, we are likely to reject more fish on the basis of how it looks than if we are able to judge it on both the way it looks and how it smells. Adding the process of judging fish by its smell lowers the negative consequences of accepting it by its looks.”

was changed to:

“Some philosophers and scientists may question the need to eliminate unethical theories, preferring instead to rely solely on eliminating theories based on standards of theoretical beauty, e.g., Occam’s razor. Think of the process of buying fish. If we only judge fish by the way it looks, we are likely to reject more fish on the basis of how it looks than if we are able to judge it on both the way it looks and how it smells. Adding the process of judging fish by its smell lowers the negative consequences of accepting it by its looks. Similarly, rejecting morally abhorrent theories lowers the negative consequences of accepting theories of ultimate ends based on their beauty.”

Chapter 3, *Materialist Ultimate Ends*, first paragraph, third sentence

“Therefore, we can safely assume that our nature is fixed, which is the foundation of humanistic ethics.”

was changed to:

“We can safely assume that our nature is fixed. This is the foundation of humanistic ethics.”

Chapter 4, first paragraph

“This chapter outlines a crude theory that holds true for all members of the set of teleonomic theories described in the last chapter. It provides us with a means of thinking about how we use knowledge and scarce resources to pursue happiness,

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

which helps us find better problems to solve. **It** begins with an outline of excellence in consumption, which describes the pursuit of happiness. Next is an outline of excellence of trade, which emphasizes current misconceptions about trade, **and** excellence in production, which emphasizes the complex relationships between excellence in production, trade, and consumption. The chapter ends with a reminder that the focus of recursionist economics is on individuals rather than organizations.”

was changed to:

“This chapter outlines a crude theory that holds true for all members of the set of teleonomic theories described in the last chapter. **This strategic theory** provides us with a means of thinking about how we use knowledge and scarce resources to pursue happiness, which helps us find better problems to solve.

“**The chapter** begins with an outline of excellence in consumption, which describes the pursuit of happiness. Next is an outline of excellence of trade, which emphasizes current misconceptions about trade. **Following that is a brief discussion of** excellence in production, which emphasizes the complex relationships between excellence in production, trade, and consumption. The chapter ends with a reminder that the focus of recursionist economics is **on processes rather than states of the world and** on individuals rather than organizations.”

Chapter 4, Excellence in Consumption, first paragraph, first three sentences

“Recursionist ethics differs markedly from utilitarianism, the ethical base of the **neoclassical** economics. From the utilitarian perspective, winning a fortune in the lottery will automatically lead to a good life, and so it is unequivocally good. From the **recursionist** view, it can be bad if the winner is foolish, as would be the case if the winner were an alcoholic that would use the money to pursue his or her self-destructive habit.”

was changed to:

“Recursionist **economics’ humanistic** ethics differs markedly from utilitarianism, the ethical base of the **marginalist** economics. From the utilitarian perspective, winning a fortune in the lottery will automatically lead to a good life, and so it is unequivocally good. From the **humanistic** view, it can be bad if the winner is foolish, as would be the case if the winner were an alcoholic that would use the money to pursue his or her self-destructive habit.”

Chapter 4, *Pleasure and Pain*, third paragraph, first sentence

Double quotation marks changed to single quotation marks.

Chapter 4, Excellence in Trade, second paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Replaced double quotation marks around ‘fluid’ with italics.

Chapter 4, *The Effect of the Information Revolution*, first paragraph, sixth sentence

Removed double quotation marks around ‘virtual.’

Chapter 5, *Efficiency Frontier*, first paragraph, first sentence

Replaced double quotation marks around ‘efficiency frontier’ with italics.

Chapter 5, *Manufacturing Complexity*, first paragraph, second sentence

Replaced double quotation marks around ‘production link’ with italics.

Chapter 5, *Batch Size*, last paragraph, first sentence

Replaced double quotation marks around ‘batch production’ with italics.

Chapter 5, *Organization, Procedures, and Tools*, second paragraph, last sentence

Replaced double quotation marks around ‘multimachine manning’ with italics.

Chapter 5, *Organization, Procedures, and Tools*, sixth paragraph, first two sentences

Replaced double quotation marks around ‘autonomous,’ ‘automation with a human touch,’ and ‘autonomation’ with italics.

Chapter 5, *Organization, Procedures, and Tools*, eighth paragraph, second sentence

Italicized ‘fool-proofing.’

Chapter 5, *Organization, Procedures, and Tools*, last paragraph, last sentence

Replaced double quotation marks around ‘kaizen’ with italics.

Chapter 5, *Production Links*, last paragraph, last sentence

Removed double quotation marks around ‘pull.’ Italicized ‘pull system.’

Chapter 5, *Knowledge Induction*, last paragraph

Replaced double quotation marks around ‘five whys’ with italics. Replaced “why” with “Why?”

Chapter 5, *A Dynamic Perspective*, first paragraph, third from last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Removed double quotation marks around ‘efficiency frontier.’

Chapter 6, fourth paragraph

“There are two major technical problems in measuring aggregate production. The first concerns measuring the value of inputs rather than outputs when measuring services. According to this logic, hiring a surgical team to remove a brain tumor for twenty thousand dollars is twice as valuable as hiring the same team to do the same surgery for ten thousand dollars. The second concerns measuring changes in quality of goods and services. How much more valuable is the average personal computer manufactured today than one manufactured ten years ago? The potential for rapid learning exacerbates both problems. **Because** all consumer goods and services are means to a good life rather than ends in themselves, the problem of measuring means rather than ends is universal. Worse, assessing the value of human action according to how well it satisfies our needs is more difficult than assessing the value of a good or service according to more concrete criteria.”

was changed to:

“There are two major technical problems in measuring aggregate production. The first concerns measuring the value of inputs rather than outputs when measuring services. According to this logic, hiring a surgical team to remove a brain tumor for twenty thousand dollars is twice as valuable as hiring the same team to do the same surgery for ten thousand dollars. The second concerns measuring changes in quality of goods and services. How much more valuable is the average personal computer manufactured today than one manufactured ten years ago?

“**Whether economists choose to recognize it or not, the information revolution’s ever increasing** potential for rapid learning exacerbates both **of these measurement** problems. **All** consumer goods and services are means to a good life rather than ends in themselves. **Thus**, the problem of measuring **inputs rather than outputs** is universal. Worse, assessing the value of human action according to how well it satisfies our needs is more difficult than assessing the value of a good or service according to more concrete criteria.”

Chapter 6, Increasing Excellence, third paragraph, third sentence

Removed double quotation marks around ‘shock.’

Chapter 6, Economic Turbulence, third paragraph, second sentence

“Capturing the benefit of reducing turbulence **can** require trading with those hurt by it.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Capturing the benefit of reducing turbulence **may** require trading with those hurt by it.”

Chapter 6, Avalanche Catastrophes, first two paragraphs

“An economic “avalanche” catastrophe is a form of economic turbulence that involves the sudden **failure of a large segment of an economy due to the sudden** release of economic stress. **This stress may be something that has been building for decades, such as that which caused the collapse of the Soviet Union. It also may be something that has happened relatively quickly, such as that which caused the collapse of the word processing hardware industry, the fall of Wang, CPT, and others.**

“Because avalanches concern the release of **stored** stress, when adaptation is complete and immediate, no avalanches **can** occur. Fluid water dripping onto a flat surface will never cause an avalanche. In contrast, grains of sand do not completely and immediately adapt. Dropping grains on the same spot will create a “self-organized” sand pile. As each new grain falls on the spot, some previously fallen grains will shift their positions. Usually so few grains shift that the partial adaptation is almost imperceptible, but occasionally there is an avalanche. Because economies do not completely and immediately adapt, they too are subject to avalanches.”

was changed to:

“Economic avalanche catastrophes are **turbulent events** that involve the sudden release of economic stress. **Examples include the collapse of the Soviet Union and the ‘.com’ speculative bubble.** Because avalanches concern the release of stress, when adaptation is complete and immediate, no avalanches **will** occur. **Unlike grains of sand, ball bearings falling on a plane will never create an avalanche catastrophe.**”

Chapter 6, Avalanche Catastrophes, third paragraph

Replaced double quotation marks around ‘self-organized criticality,’ ‘subcritical,’ and ‘supercritical’ with italics.

Chapter 6, A Simple (Simplistic?) Model of Progress and Turbulence, first paragraph, last sentence

“We can imagine a free **market** economy consisting of people seeking happiness.”

was changed to:

“We can imagine a **freely evolving** economy consisting of people seeking happiness.”

Chapter 7

Changed “free market” to “libertarian” in all.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 7, first paragraph, fourth sentence

“To do this well, governments must have a “learning strategy” **that decides** who makes what decisions under what incentives.”

was changed to:

“To do this well, governments must have a learning strategy **to help decide** who makes what decisions under what incentives.”

Chapter 7, Control the Money Supply Passively, second paragraph, fourth sentence

Deleted “elevated.”

Chapter 7, Consider Incentives and Enforcement Costs, third paragraph, sixth sentence

Deleted the endnote:

“This can be as blatant as tyrants terrorizing their subjects in order to maintain power or as subtle as the head of a drug regulatory agency pursuing bureaucratic interests. By inventing reasons to reject drugs with significant “off-label” use and by excessively preferring Type 1 (rejecting what should be accepted) to Type 2 (accepting what should be rejected) errors, the myopic bureaucrat can silently slaughter on a scale surpassed only by history’s worst tyrants.”

Chapter 7, Consider Incentives and Enforcement Costs, last paragraph, first sentence

Removed double quotation marks around ‘cookbook.’

Chapter 7, Lucid Culture

Dropped double quotation marks around ‘learning’ in the eighth paragraph and ‘break’ in the ninth.

Chapter 7, Research

Dropped the Research section. Changed last line in introduction to reflect this change.

Chapter 8, first paragraph, last sentence

“Over time, we can tighten this loose theory by eliminating members of this set and by discovering more about complex adaptive systems.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Over time, we can tighten this loose theory by eliminating members of this set and by discovering more about **this** complex adaptive system.”

Chapter 8, second paragraph, first sentence

“This **loose** theory differs markedly from current economic theories.”

was changed to:

“This loose **strategic** theory differs markedly from current (**tactical**) economic theories.”

Version 2002.03.04

Preface, last paragraph, last sentence

Changed “it” to “my approach.”

Chapter 1, The Recursionist Approach, third paragraph

“Our imperfect decision-making embeds pockets of ignorance into our **culture and technology**. The classic example is formation of a speculative bubble, **where investors** embed ignorance in the form of foolishly high asset valuations. A less recognized example is the establishment of an unhealthy, unsafe, or unjust tradition, which can endure long after members of the culture realize that it is foolish. We muddle forward not only by **adapting to new** knowledge but also by correcting past mistakes.”

was changed to:

“Our imperfect decision-making embeds pockets of ignorance into our **markets, technology, and culture**. The classic example is formation of a speculative bubble, **in which we** embed ignorance in the form of foolishly high asset valuations. **We also embed ignorance in the form of** unhealthy, unsafe, or unjust cultural traditions, which can endure long after **we recognize their foolishness**. We muddle forward not only by **creating** knowledge but also by correcting past mistakes.”

Chapter 2, Science as a Process, sixth paragraph, third sentence

“A major characteristic of beautiful theories is their ability to explain much using few primary concepts and relations.”

was changed to:

“A major characteristic of beautiful theories is their ability to explain much **while** using few primary concepts and relations.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Science as a Process, last paragraph

“Finally, note that the usefulness of this concept of science depends on our definition of ‘usefulness.’ Useful for what? What is, or ought to be, the task at hand? What are our ultimate ends? The next chapter addresses these questions.”

was deleted.

Chapter 2, Summary

“This chapter proposed a loose explanation of means suspended from a set of theories that define our ultimate ends, rather than founded on a set of metaphysical assumptions about human nature. Collectively, we can tighten this loose explanation by eliminating members of this set of theories and by learning more about complex adaptive systems. This loose explanation stands ready to be proven less useful than competing explanations in helping us find problems to solve.”

was changed to:

“This chapter proposed a loose explanation of means suspended from a set of ultimate ends. This explanation stands ready to be proven less useful than competing explanations in helping us find problems to solve. The next two chapters describe how we can tighten this loose theory of means to our ultimate ends.”

Chapter 3, Eliminating Simplistic Theories, sixth paragraph, first three sentences

“The problem with this world-view is that we live in a material world. Because the essence of postmodernism is doubt about theories and belief systems, it cannot logically provide a theoretical framework to address practical problems that arise from the material world. This leaves only ad hoc solutions.”

was changed to:

“The problem with this world-view is that we live in a material world, not a world constructed entirely of our beliefs. We need a theoretical framework to address practical problems that arise from the material world.”

Chapter 3, Dualist Worldly Ends, second paragraph, fourth sentence

Added the endnote:

“Adler, Mortimer, *Ten Philosophical Mistakes*, (New York, Collier Books, 1985), 137.”

Chapter 3, third footnote

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Added:

“Because our internal programming includes programming to fulfill our programming, the statement that we ought to fulfill our programming (pursue happiness) is positive as well as normative. For more on this apparent contradiction of David Hume’s dictum as well as on the nature of happiness, read part two of Mortimer Adler’s book, *Ten Philosophical Mistakes*.”

Chapter 5, second paragraph, second sentence

“As shown in the rapid tool-setting example, when the potential for learning is great, manufacturing excellence requires creating **of** knowledge **even** at the cost of lowering current ‘production.’”

was changed to:

“As shown in the rapid tool-setting example, when the potential for learning is great, manufacturing excellence requires creating knowledge at the cost of lowering current ‘production.’”

Chapter 6, sixth paragraph, sixth and seventh sentences

“These include practical wisdom, trust, leisure skills, **and most production and trade technology**. Macroeconomic policies that aim at promoting growth **discourage** learning.”

was changed to:

“These include practical wisdom, trust, leisure skills, **trading methods, and much production technology**. Macroeconomic policies that aim at promoting growth **encourage growth at the expense of** learning.”

Chapter 6, *Economic Fluidity*, sixth paragraph, second sentence

“The Italian clothing industry has showed the rest of the world how to use **recent advances in information processing and manufacturing** technology to respond **to changes in demand much more quickly**.”

was changed to:

“The Italian clothing industry has showed the rest of the world how to respond **much more quickly to changes in demand**.”

Chapter 6, *Economic Fluidity*, seventh paragraph, fourth sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Successful decentralization requires that top management trusts others to choose wisely **and** that decision-makers trust their bosses to judge them on the quality of their decisions.”

was changed to:

“Successful decentralization requires that top management trusts others to choose wisely. **It also requires** that decision-makers trust their bosses to judge them on the quality of their decisions.”

Chapter 6, Economic Turbulence, first paragraph, second sentence

“**Because we combine resources to produce other resources,** the turbulent flow of one resource tends to create turbulent flow of **other** resources.”

was changed to:

“**T**he turbulent flow of one resource tends to create turbulent flow of **related** resources.”

Chapter 6, Economic Turbulence, second paragraph, first sentence

“Poor decision-making creates turbulence in the flows **s** of resources.”

was changed to:

“Poor decision-making creates turbulence in the flow of resources.”

Chapter 6, Economic Turbulence, second paragraph, last two sentences

“Similarly, if firms **facing a temporary rise in costs decide not to raise their products’ prices, progress occurs with a minimum of turbulence. But if they mistakenly believe the rise is permanent and raise their prices,** transient inflation will be more severe. Again, the worse the decision, the greater economic turbulence is likely to be.”

was changed to:

“Similarly, if firms **with published product prices foolishly raise their prices due to the mistaken belief that a temporary rise in input prices is permanent,** transient inflation will be more severe. Again, the worse the decision, the greater economic turbulence is likely to be.”

Chapter 6, Avalanche Catastrophes, first paragraph

“Economic avalanche catastrophes are turbulent events that involve the sudden release of economic stress. Examples include the collapse of the Soviet Union and the **“.com”**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

speculative bubble. **Because avalanches concern the release of stored stress, when adaptation is complete and immediate, no avalanches will occur. Unlike grains of sand, ball bearings falling on a plane will never create an avalanche catastrophe.**

was changed to:

“Economic avalanche catastrophes are turbulent events that involve the sudden release of **stored** economic stress. Examples include the collapse of the Soviet Union and the **dot.com** speculative bubble. **When** adjustment is complete and immediate, no avalanches will occur. **Ball bearings falling on a plane make complete and immediate adjustments and so will never create an avalanche.**”

Chapter 7, first paragraph, first sentence

“From the recursionist perspective, the normative end of government is promoting progress by administering justice, which is a matter of continuously improving the quality of decision-making.”

was changed to:

“From the recursionist perspective **put forth in this work**, the normative end of government is promoting progress by administering justice, which is a matter of continuously improving the quality of decision-making.”

Chapter 7, first paragraph, last sentence

“This chapter considers several factors: **moral vision, decentralization**, just taxation, and lucid culture.”

was changed to:

“This chapter considers several factors: **freedom, moral vision**, just taxation, and lucid culture.”

Chapter 7, Moral Vision

Moved section to behind **Decentralization**.

Chapter 7, Decentralization

Renamed the section to “**Freedom**.”

Moved *Control the Money Supply Passively* to the end of the section.

Chapter 7, Freedom, first paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The following **outlines** three prescriptions for decentralizing decision-making, **which are familiar to libertarian economists.**”

was changed to:

“**The JIT example highlighted the benefits of decentralized decision-making.** The following **describes** three prescriptions for decentralizing decision-making.”

Chapter 7, *Consider Incentives and Enforcement Costs*, sixth paragraph, second sentence

Removed the double quotation marks around ‘emergency.’

Chapter 7, *Control the Money Supply Passively*, first two paragraphs

“From the recursionist perspective, the purpose of economic policy is to improve the quality of decision-making.”

“When people decide wisely, they relieve economic stress. They also tend to learn through experience. Those who focus on the former view the task of monetary authorities as being similar to that of ski patrols in preventing major avalanches and forest rangers in preventing major forest fires. The goal is to prevent the accumulation of potential energy (snow mass on mountains and tinder in forests). This occasionally requires initiating events that release potential energy (avalanches and forest fires). Similarly, monetary authorities occasionally may need to initiate minor recessions in order to prevent major ones. Such thinking ignores the potential benefit of learning through experience.”

were deleted.

Chapter 7, *Moral Vision*, first paragraph

“Successful **decision-making in any organization** requires a means of coordinating decisions. **In decentralized organizations, such coordination** requires a common vision. Only a foolish manager delegates decision-making authority without first explaining what is expected of subordinates. Similarly, only a foolish government decentralizes decision-making authority without explaining what is expected of its citizens. **If a government is just, its function is to help its citizens pursue happiness. The first and foremost action of a just government should be to provide** a moral vision of how to pursue happiness in an **open (freely evolving)** society.”

was changed to:

“Successful **decentralization** requires a common vision. Only a foolish manager delegates decision-making authority without first explaining what is expected of subordinates. Similarly, only a foolish government decentralizes decision-making

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

authority without explaining what is expected of its citizens. A just government provides its citizens with a moral vision of how to pursue happiness in a freely **progressing** society.”

Chapter 7, Moral Vision, last paragraph, last sentence

“In a **rapidly changing world**, what matters most is not values and behaviors, but vision and concepts.”

was changed to:

“In **information age economies**, what matters most is not values and behaviors, but vision and concepts.”

Chapter 7, Just Taxation, last paragraph, last sentence

“High on this list are income taxes, which discourage **using** knowledge and taking risks.”

was changed to:

“High on this list are income taxes, which discourage **acquiring** knowledge and taking risks.”

Version 2002.03.09

Printed version

Converted explanatory endnotes back to footnotes.

Preface, eleventh paragraph, second sentence

“At Toyota, manufacturing engineers play a different role than in traditional manufacturing.”

was changed to:

“At Toyota, manufacturing engineers play a different role than **they do** in traditional manufacturing.”

Chapter 1, The Recursionist Approach, third paragraph, fourth sentence

Inserted the sentence:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Skin tanning, body piercing, sumo wrestling, slavery, and countless forms of conspicuous consumption spring to mind.”

Chapter 1, The Recursionist Approach, fourth paragraph, first sentence

“Formal decision-making processes consist of four basic operations: (1) finding a problem to solve, (2) identifying alternative solutions to the chosen problem, (3) selecting an alternative, and (4) implementing the selected alternative.”

was changed to:

“Decision scientists tell us that formal decision-making processes consist of four basic operations: (1) finding a problem to solve, (2) identifying alternative solutions to the chosen problem, (3) selecting an alternative, and (4) implementing the selected alternative.”

Chapter 2, Subjectivity, second paragraph

“Here, ‘objectivity’ means the independence of the observer and the observed rather than the observer’s lack of interest in the results of the observation. The reason for this more stringent definition is that there is a recursive relationship between what we perceive and what we conceive. It is not simply that what we perceive influences how we conceive, but that what we conceive influences what we perceive. What we conceive influences what is noise to our senses. Further, our senses may eliminate noise without us being aware of it. Even the most disinterested observer may be biased.”

was deleted.

Chapter 2, Subjectivity, first paragraph, last sentence, footnote

“A classic example of the recursive relationship between conception and perception is the way we learn to categorize phonetic sounds in the first few months of life. In learning how to listen to our native languages, we sacrifice some ability to differentiate between foreign sounds. For example, Japanese adults exposed to the English sounds ‘la’ and ‘ra’ as infants can perceive the difference between these sounds. Those not exposed have difficulty doing so.”

was changed to:

“Here, ‘objectivity’ means the independence of the observer and the observed rather than the observer’s lack of interest in the results of the observation. The reason for this more stringent definition is that there is a recursive relationship between what we perceive and what we conceive. It is not simply that what we perceive influences how we conceive, but that what we conceive influences what we perceive. A classic example of the recursive relationship between conception and perception is the way

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

we learn to categorize phonetic sounds in the first few months of life. In learning how to listen to our native languages, we sacrifice some ability to differentiate between foreign sounds. For example, Japanese adults exposed to the English sounds ‘la’ and ‘ra’ as infants can perceive the difference between these sounds. Those not exposed have difficulty doing so. **Even the most disinterested observer may be biased.**”

Chapter 2, The Strategy for Choosing Economic Explanations, third paragraph, first sentence

“The obvious candidate to explain economies is modern Austrian economics, which seeks to explain human action. ”

was changed to:

“One small but increasingly influential group of marginalist economists, the modern Austrian school, seeks to explain what happens in economies.”

Chapter 2, The Strategy for Choosing Economic Explanations, last paragraph, last sentence

“Applying the modern Austrian school’s deductive method to the question of how we turn consumer goods into progress toward our ultimate ends appears to require making controversial metaphysical (**unverifiable fundamental**) assumptions about human nature. The most important of these concerns whether an immaterial part of us survives the death of our bodies.”

was changed to:

“Applying the modern Austrian school’s deductive method to the question of how we turn consumer goods into progress toward our ultimate ends appears to require making controversial metaphysical assumptions about human nature. The most important of these **unverifiable fundamental assumptions** concerns whether an immaterial part of us survives the death of our bodies.”

Chapter 2, The Strategy for Choosing Economic Explanations, last paragraph, last sentence

“As we learn more, we can eliminate members of this set **of theories** without having to change our core theory of means.”

was changed to:

“As we learn more, we can eliminate members of this set without having to change our core theory of means.”

Chapter 2, Summary

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This chapter proposed a **loose explanation** of means suspended from a set of ultimate ends. This explanation stands ready to be proven less useful than competing explanations in helping us find problems to solve. **The next two chapters describe how we can tighten this loose theory of means to our ultimate ends.**”

was changed to:

“This chapter proposed a **strategy for progress, which involves defining and gradually tightening a loose theory of means to our ultimate ends. This loose theory of means consists of a core theory** of means suspended from a set of ultimate ends. This explanation stands ready to be proved less useful than competing explanations in helping us find better problems to solve.”

Chapter 3, first three paragraphs

“The previous chapter proposed a loose theory of means suspended from a set of ultimate ends. We can tighten this loose theory by eliminating members of this set. The major difficulty in doing so is agreeing on metaphysical assumptions about human nature. The most important such assumption concerns whether our minds and bodies are separate and distinct. The *materialist* view is that they are not, which is to say that all of our elements die when our bodies die. The *dualist* view is that they are, which allows the possibility that a part or parts of us survive the deaths of our bodies. This possibility casts doubt on the materialist truism that the ultimate end of life is a good life.

“We can avoid most of the metaphysical problems associated with this recursionist approach to economics by defining ultimate ends tautologically: our ultimate ends are the ends that we achieve when we satisfy our needs and our needs are those things that we need to achieve our ultimate ends. By itself, this tautology is useless as well as meaningless. However, it can act as a socket for accepting theories that define either our ultimate ends or what we need to achieve them. This driver / tool head approach isolates the core “economic” theory (the driver) from the “ethical” theories used to define ultimate ends (the tool heads). If one “ethical” theory proves to be false or inadequate, we can choose another without revising the “economic” theory. This allows us to make the problem of defining our ultimate ends part of the problem that we must solve.

“Although this socket works with most theories that aim at explaining our ultimate ends or needs, it does not work with all of them. As we shall see in the next chapter, recursionist economics assumes that we are motivated to satisfy our needs. All *teleonomic* theories, theories that look to an internal program or programs to explain our ends, pass this test.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The previous chapter proposed a loose theory of means consisting of a core theory of means suspended from a set of ultimate ends. We can tighten this loose theory by tightening the core theory of means. We can also tighten it by eliminating members from the set of ultimate ends. We do so by eliminating members of the set of all *teleonomic* theories.* This chapter proposes means of eliminating simplistic and unethical theories from this set of theories.

“Some philosophers and scientists may question the need to eliminate unethical theories. They need to think about the process of buying fish. If we only judge fish by the way it looks, we are likely to reject more fish on the basis of how it looks than if we are able to judge it on both the way it looks and how it smells. Adding the process of judging fish by its smell lowers the negative consequences of accepting it by its looks. Similarly, rejecting unethical theories lowers the negative consequences of accepting teleonomic theories based on their theoretical beauty.”

Plus the footnote:

“For this strategy to work, the core theory of means and the theories that define ultimate ends must both fit together and work together. We can insure that the theories fit together by defining our ultimate ends and the means to them tautologically: *our ultimate ends are the ends that we achieve when we satisfy our needs and our needs are those things that we need to achieve our ultimate ends*. We can insure they work together by assuming that we are motivated to achieve our ultimate ends. All *teleonomic theories*, theories that look to an internal program or programs to explain our ultimate ends, meet these conditions.”

Chapter 3, Eliminating Simplistic Theories, first paragraph, first sentence

“We can begin **reducing the number of theoretical candidates for the set of** teleonomic theories that define ultimate ends by eliminating misleadingly incomplete **models of human nature.**”

was changed to:

“Beautiful theories are simple without being too simple. We can begin eliminating teleonomic theories by eliminating **simplistic ones.**”

Chapter 3, Eliminating Simplistic Theories, first paragraph, fifth sentence

Added the sentence:

“They too often fail to help us find the most effective problem to solve.”

Chapter 3, Eliminating Simplistic Theories, last paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“However, to be included in the set of theories that explain our needs we must explain not only altruism but also a (usefully) complete range of human motivations.”

was changed to:

“However, it fails to consider a usefully complete range of human motivations and so too often fails to find the most effective problem to solve.”

Chapter 3, Eliminating Unethical Theories, first two paragraphs

“If we can agree on what our highest ethical end is, then we have another means of eliminating **theoretical candidates**. **A major reason that such agreement is difficult is that dualists believe in otherworldly ends and materialists do not.** The following explores the materialist view of the good life, goes on to explore dualist worldly ends, and finishes by reconciling the materialist and dualist views. If we accept this pragmatic reconciliation, then we will have another means of **eliminating theoretical candidates.**”

“**Some philosophers and scientists may question the need to eliminate unethical theories, preferring instead to rely solely on eliminating theories based on standards of theoretical beauty, e.g., Occam’s razor. Think of the process of buying fish. If we only judge fish by the way it looks, we are likely to reject more fish on the basis of how it looks than if we are able to judge it on both the way it looks and how it smells. Adding the process of judging fish by its smell lowers the negative consequences of accepting it by its looks. Similarly, rejecting morally abhorrent theories lowers the negative consequences of accepting theories of ultimate ends based on their beauty.**”

was changed to:

“If we can agree on what our highest ethical end is, then we have another means of eliminating **teleonomic theories**. The major difficulty in doing so is agreeing on metaphysical assumptions about human nature. **The most important such assumption concerns whether our minds and bodies are separate and distinct. The *materialist* view is that they are not, which is to say that all of our elements die when our bodies die. The *dualist* view is that they are, which allows the possibility that a part or parts of us survive the deaths of our bodies. This possibility casts doubt on the materialist truism that the ultimate end of life is a good life.**

“The following explores the materialist view of the good life, goes on to explore dualist worldly ends, and finishes by reconciling the materialist and dualist views. If we accept this pragmatic reconciliation, then we will have another means of **tightening our loose theory of means.**”

Chapter 3, Summary, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This chapter proposed two means of eliminating teleonomic theories, theories that describe either our ultimate ends or what we need to achieve our ultimate ends. The weak one involves eliminating theories based on their correspondence to our perceptions of reality (empirical truth) and general completeness. The strong one also involves eliminating theories inconsistent with the normative end of reverence for life.*** What remains is a set of theories that deserve our tolerance. This tolerance is based on our ignorance of our ultimate ends and of the best means to them, rather than on the presumed right to do as we please.”

was changed to:

“This chapter proposed two means of eliminating teleonomic theories. The first involves eliminating theories based on their correspondence to our perceptions of reality and general completeness. The second involves eliminating theories inconsistent with the normative end of reverence for life.*** What remains is a set of theories that deserve our tolerance. This tolerance is based on our ignorance of our ultimate ends and of the best means to them, rather than on the presumed right to do as we please.”

Chapter 4, first two paragraphs

“This chapter outlines a crude theory that holds true for all members of the set of teleonomic theories described in the last chapter. This strategic theory provides us with a means of thinking about how we use knowledge and scarce resources to pursue happiness, which helps us find better problems to solve.

“The chapter begins with an outline of excellence in consumption, which describes the pursuit of happiness. Next is an outline of excellence of trade, which emphasizes current misconceptions about trade. Following that is a brief discussion of excellence in production, which emphasizes the complex relationships between excellence in production, trade, and consumption. The chapter ends with a reminder that the focus of recursionist economics is on processes rather than states of the world and on individuals rather than organizations.”

was changed to:

“This chapter outlines the core theory of means. It begins with an outline of excellence in consumption, which describes the pursuit of happiness. Next is an outline of excellence of trade, which emphasizes current misconceptions about trade. Following that is a brief discussion of excellence in production, which emphasizes the complex relationships between excellence in production, trade, and consumption. The chapter ends with a reminder that the focus of recursionist economics is on processes rather than states of the world and on individuals rather than organizations.”

Chapter 8, first paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“To think clearly about these interactions, we need a loose theory of means that is based on a set of ultimate ends. Over time, we can tighten this loose theory by eliminating members of this set and by discovering more about this complex adaptive system.”

was changed to:

“To progress readily, we need a loose theory of means suspended from a set of ultimate ends. Over time, we can tighten this loose theory by discovering more about our ultimate ends and the best means to them.”

Afterword

Removed double quotation marks around ‘strategic,’ ‘tactical,’ ‘nanny state,’ and ‘radical center.’

Afterword, second to last paragraph, last sentence.

Removed ‘true’ in front of ‘conservative’ and ‘libertarian.’

Version 2002.03.12

Reorganization

Changed **Just In Time Manufacturing** from chapter 5 to chapter 2. Changed Chapter 1’s Overview to reflect this change. Also inserted an **Overview** section to Chapter 2 by moving three paragraphs, save the last sentence in the third paragraph, from Chapter 4’s *Three Misconceptions* subsection.

Preface, eighth paragraph

“In keeping with Kuhn’s metaphor of world-views and related conceptual frameworks as pictures, I have drawn a Chinese landscape — an outline of major features with just enough detail to make them recognizable. My hope is that this minimalist approach will make it easier for readers to recognize the unfamiliar scene and that subsequent viewings will allow them to fill in the expanses with images from their own experiences. My primary objective is to provide a means for producing insights into the business of life rather than the insights themselves.”

was deleted.

Chapter 1, Overview, first paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“To think clearly about these interactions, we need a loose theory of means that is based on a set of ultimate ends. Over time, we can tighten this loose theory by eliminating members of this set and by discovering more about this complex adaptive system.”

was changed to:

“To progress readily, we need a loose theory of means suspended from a set of ultimate ends. Over time, we can tighten this loose theory by discovering more about our ultimate ends and the best means to them.”

Chapter 2, A Dynamic Perspective, last paragraph, last sentence

Added the sentence:

“They thrived by learning wisely.”

Chapter 3, first paragraph, first three sentences

“Every waking moment offers us the opportunity to change the course of our lives for the better. The process of changing our lives for the better begins with finding a problem to solve. This chapter proposes a strategy for selecting theories to help us find more effective problems to solve.”

was changed to:

“Toyota’s strategy for learning to manufacture ever more wisely involves slowly tightening a loose production system. This chapter outlines a strategy for learning to live ever more wisely, which involves slowly tightening a loose theory of means to our ultimate ends.”

Chapter 4, second paragraph

“Some philosophers and scientists may question the need to eliminate unethical theories. They need to think about the process of buying fish. If we only judge fish by the way it looks, we are likely to reject more fish on the basis of how it looks than if we are able to judge it on both the way it looks and how it smells. Adding the process of judging fish by its smell lowers the negative consequences of accepting it by its looks. Similarly, adding the process of judging theories on ethical grounds lowers the negative consequences of accepting them for their beauty.”

was deleted.

Chapter 4, Eliminating Simplistic Theories, first paragraph, first sentence

“Beautiful theories are simple without being too simple.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

was changed to:

“Beautiful theories are simple **but not** too simple.”

Chapter 4, Eliminating Simplistic Theories, tenth paragraph, last sentence

“**The classic** example of this harmful form of charity is giving money to **an alcoholic** who has not yet committed to stop **drinking**.”

was changed to:

“**A good** example of this harmful form of charity is giving money to an **addict** who has not yet committed to stop **using drugs**.”

Version 2002.03.14

Preface, first paragraph, last two sentences

“**His prescription is for us to develop** a conceptual framework that recognizes our fallibility. **A conceptual framework that** explicitly recognizes the scarcity of knowledge as well as non-knowledge resources **would fill this prescription**.”

was changed to:

“**He calls for** a conceptual framework that recognizes our fallibility. **In economic terms, he calls for** explicitly recognizing the scarcity of knowledge as well as non-knowledge resources.”

Preface, sixth paragraph, fifth and sixth sentences

Started new paragraph. Changed:

“I see **our** problem as one of progressing toward our ultimate ends *and of learning how to progress toward our ultimate ends ever more efficiently*. I also envision a means for all of us, working together, to solve this problem.”

to:

“I see **intelligent beings’ ethical/economic/political** problem as one of progressing toward our ultimate ends *and of learning how to progress toward our ultimate ends ever more efficiently*. I also envision a means for all of us, working together, to solve this problem.”

Preface, eighth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Traditional theories of ethics, politics, and economics ultimately rest on a set of **metaphysical** (unverifiable fundamental) assumptions about human nature.”

was changed to:

“Traditional theories of ethics, politics, and economics ultimately rest on a set of unverifiable fundamental assumptions about human nature.”

Preface, second to last paragraph, last two sentences

“In this most cited economics paper, Friedman advocates (what Whitehead would call) “simple-minded” theories that predict **what will happen in economies**. I advocate a simple-minded **strategic** theory that explains causation **to** compliment tactical theories that predict.”

was changed to:

“In this most cited economics paper, Friedman advocates what Whitehead would call “simple-minded” theories that predict. **Theories that predict help us solve given problems**. I advocate a simple-minded theory that explains causation. **Theories that explain causation help us find better problems to solve. My *strategic* theory that explains what happens in economies compliments *tactical* theories that predict what will happen in markets.**”

Chapter 1, first paragraph

Started new paragraph between fifth and sixth sentences. Changed eighth sentence:

“For example, once a railroad company has laid its track, changing **to a superior** distance between rails is very expensive.”

to:

“For example, once a railroad company has laid its track, changing the distance between rails is very expensive. **Rarely does the benefit of changing this distance warrant doing so.**”

Chapter 1, (old) second paragraph, last sentence

“For Smith, ‘wealth’ meant consumer goods and the resources for producing consumer goods, where consumer goods are those goods and services that we buy to satisfy our wants and desires.”

to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“For Smith, the end of economics was the consumption of goods and services that we buy to satisfy our wants and desires. Thus, ‘wealth’ meant consumer goods and the resources for producing consumer goods.”

Chapter 1, (old) fourth paragraph, second and third sentences

“In that year, John Maynard Keynes published his *General Theory of Employment, Interest, and Money*, which argued that flaws in the way that markets work could or would lead to long-term unemployment. In recent years, marginalist economists completed the work of Walrás by providing a complete and rigorous mathematical description of the conditions that cause an economic model to return to an equilibrium in which it is impossible to make one person better off without making another worse off.”

to:

“In that year, John Maynard Keynes published his *General Theory of Employment, Interest, and Money*, which argued that flaws in the way that markets work either could or would lead to long-term unemployment. Keynes’s theory effectively split the discipline in to macroeconomics, the study of entire economies, and microeconomics, the study of individual firms, households, and consumers.”

Chapter 1, Marginalist Economics’ Blind Spot, third paragraph, last sentence

“This quantity maximizes the net benefit of holding inventory *for our current knowledge of how to set up.*”

was changed to:

“ This quantity maximizes the net benefit of holding inventory *for our current knowledge of how to set up tools.*”

Chapter 1, Marginalist Economics’ Blind Spot, last paragraph, fourth sentence

“Competitors that” was changed to: “competitors who.”

Chapter 1, Efficiency and Effectiveness, second paragraph, last two sentences

“Thus, the larger problems of macroeconomics are strategic rather than tactical. As we shall see in later chapters, this has major implications for how we think about macroeconomics.”

was deleted.

Chapter 1, Overview, fourth sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The fourth takes a muddle-headed (inclusive) look at our ultimate ends and the fifth takes a simple-minded (discriminating) look at the means to them.”

was changed to:

“The fourth takes an inclusive (‘muddle-headed’) look at our ultimate ends and the fifth takes a discriminating (‘simple-minded’) look at the means to them.”

Chapter 3, *Subjectivity*, first paragraph

“Theories are conceptual models of sensory experience. Concepts are tools that focus our attention on certain characteristics of objects by ignoring other characteristics. We can conceive of the world in many ways. Because concepts do not capture fully what we can perceive, what we conceive depends on the concepts that we use to describe what we perceive. Because what we conceive depends on the conceptual frameworks that we use to conceive the world, all theories are subjective.”

was changed to:

“Concepts are tools that focus our attention on certain characteristics of objects by ignoring other characteristics. We can conceive of the world in many ways. What we conceive depends on the concepts that we use to describe what we perceive. Because what we conceive depends on the concepts we use, all conceptual models, which is to say all theories, are subjective.”

Chapter 3, The Strategy for Choosing Economic Explanations, first paragraph

“All of us need a theory that explains to help us decide what to want. This is particularly true for those of us living in knowledge-based economies, where the pace of change often makes the long-term a matter of months rather than years. Developing such a theory involves choosing a level of abstraction, which is a matter of finding objects that we can predict or explain. We can study subjects on more than one such level. For example, we can study matter and energy on a subatomic scale with quantum mechanics, a molecular scale with chemistry, a human scale with Newtonian dynamics, or a cosmic scale with relativity theory. Which of these is best depends on what we are trying to do.”

was changed to:

“All of us need to decide what to want. Theories that explain causation can help us decide wisely. Developing theories involves choosing a level of abstraction, which is a matter of finding objects that we can predict or explain. We can study subjects on more than one such level. For example, we can study matter and energy on a subatomic scale with quantum mechanics, a molecular scale with chemistry, a human scale with Newtonian dynamics, or a cosmic scale with relativity theory. Which scale is best depends on what we are trying to do.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3, Science as a Process, first paragraph, second sentence

“To those that” was changed to: “to those who.”

Chapter 3, Science as a Process, first paragraph, third sentence

“To many that” was changed to: “to many who.”

Chapter 3, Science as a Process, second paragraph, first sentence

“Those that” was changed to: “those who.”

Chapter 3, Science as a Process, third paragraph, second sentence

“First, it aims at discovering what is useful rather than the truth per se.”

was changed to:

“First, rather than aiming at discovering the truth per se, it aims at discovering the useful.”

Chapter 3, Science as a Process, third paragraph

“The proposed **concept of science is much more modest than this. First, rather than aiming at discovering the truth per se, it aims at discovering the useful. Second, it focuses on the process of knowing rather than on the quality of knowledge produced. This is consistent with Einstein’s belief that ‘the whole of science is nothing more than a refinement of everyday thinking:’**

“It has often been said, and certainly not without justification, that the man of science is a poor philosopher. Why, then, should it not be the right thing for the physicist to let the philosopher do the philosophizing? Such might indeed be the right thing at a time when the physicist believes he has at his disposal a rigid system of fundamental concepts and fundamental laws which are so well established that waves of doubt cannot reach them; but, it cannot be right at a time when the very foundations of physics itself have become problematic as they are now. At a time like the present, when experience forces us to seek a newer and more solid foundation, the physicist cannot simply surrender to the philosopher the critical contemplation of the theoretical foundations; for, he himself knows best, and feels more surely where the shoe pinches. In looking for a new foundation, he must try to make clear in his own mind just how far the concepts which he uses are justified, and are necessities.”

was changed to:

“The proposed **strategy** refines everyday thinking. This is consistent with Einstein’s **conception of science:**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3, Science as a Process, second and third to last paragraph

“As the Venn diagram shows, the set of narratives (2) is a subset of the set of products of intuition (1); the set of philosophical theories (3) and the set of scientific theories that predict (5) are subsets of the set of narratives (2); and the set of scientific theories that explain (4) is a subset of the set of philosophical theories (3).

“From this process-oriented perspective, the difference between science (4 and 5) and narration (2), both refinements (subsets) of intuition (1), is not as great as Russell would have us believe.”

were deleted. Also, the Venn diagram was moved forward four paragraphs.

Chapter 3, Science as a Process, last paragraph, first two sentences

“This concept of science allows us to distinguish easily between *how we know* (intuition, narration, philosophy, and science) and *what we know* (astronomy, religion, chemistry, botany, history, etc.). In theory, we can explain what happens in economies scientifically.”

was changed to:

“This concept of science allows us to explain what happens in economies scientifically.”

Chapter 6, second paragraph, fourth sentence

“Aggregate production would fall and unemployment and inflation would rise.”

was changed to:

“Economists would record an immediate fall in aggregate production and rise in unemployment and inflation.”

Chapter 6, Introduction, fifth paragraph, first sentence

“Whether economists choose to recognize it or not, the information revolution’s ever increasing potential for rapid learning exacerbates both of these measurement problems.”

was changed to:

“The information revolution’s ever increasing potential for rapid learning exacerbates both of these measurement problems.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Version 2002.04.06

Title Page, Afterword

Changed “Scott Harris” to “Scott M. Harris” after discovering the existence of economist (Richard) Scott Harris.

Chapter 1, Modern Economics Blind Spot, last paragraph, last sentence

Dropped the footnote:

“Applying a learning curve to a marginalist economic model is not new. Kenneth Arrow did it in his 1962 American Economic Review article, *The Implications of Learning by Doing*. There can be little doubt that the widespread failure to abandon the EOQ model for the rapid tool setting model for another two decades cost many tens of billions of dollars, perhaps more. What does this say about the relationship between economists and the people who use their products? How can economists get closer to their customers, the people who use their theories and the concepts derived from their theories? Finding a problem is like finding a diamond. Without a problem to solve, there can be no improvement.”

Chapter 1, Efficiency and Effectiveness, second paragraph

“**Before moving on, it is important to note** that the distinction between efficiency and effectiveness varies with the scale of the problems being considered. The focus here is on the problems of individual economic agents. The scale is that of microeconomics.”

was converted into the following footnote at the end of the first paragraph:

“**Note** that the distinction between efficiency and effectiveness varies with the scale of the problems being considered. The focus here is on the problems of individual economic agents. The scale is that of microeconomics.”

Chapter 1, Efficiency and Effectiveness, third paragraph, first two sentences

“This managerial concept of excellence in means recognizes that we can **choose to invest scarce resources to obtain additional knowledge, which may lead us to choose a better problem to solve**. Rather than making the “best” use of scarce resources **for a given stock of knowledge**, it makes the “best” use of **available knowledge and scarce resources**.”

was changed to:

“This managerial concept of excellence in means recognizes that we can **learn**. Rather than making the best use of scarce resources *for a given stock of knowledge*, it makes the best use of **scarce resources and available knowledge**.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Introduction, first paragraph, second sentence

“Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to illustrate the potential virtuous circle **between** the division of labor and the expansion of market size.”

was changed to:

“Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to illustrate the potential virtuous circle **involving** the division of labor and the expansion of market size.”

Chapter 2, last paragraph, last sentence

Added the following Summary:

“Traditional manufacturing aims at producing efficiently. JIT manufacturing aims at producing ever more wisely. This difference is manifest in the practice of allowing any production line worker to stop an entire line in order to solve a pressing problem. To traditional manufacturers, this practice is irrational. To JIT manufacturers, it is common sense.”

Chapter 3, Introduction, first two subsections

Moved *Excellence* to behind *Subjectivity*..

Chapter 3, *Subjectivity*, first paragraph, last two sentences

“Because what we conceive depends on the concepts that we use, all conceptual models, **which is to say** all theories, are subjective.* We would be foolish to discard theories based on how **objective** they seem to us.”

was changed to:

“Because what we conceive depends on the concepts that we use, all conceptual models, **hence** all theories, are subjective.* We would be foolish to discard theories based on how **subjective** they seem to us.”

Chapter 3, The Strategy for Choosing Economic Explanations, second and third paragraphs

“Developing theories involves choosing a level of abstraction, which is a matter of finding objects that we can predict or explain. We can study subjects on more than one such level. For example, we can study matter and energy on a subatomic scale with quantum mechanics, a molecular scale with chemistry, a human scale with Newtonian

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

dynamics, or a cosmic scale with relativity theory. Which scale is best depends on what we are trying to do.

“Since the Keynesian revolution, most economists have studied their subject on two levels, microeconomics and macroeconomics. This split is a partial one in that these two approaches share the same basic conceptual framework and the same focus on prediction. The information revolution has created the need for a new, more complete split. We need theories that explain what happens in economies, to complement marginalist theories that predict what will happen in markets.”

were deleted.

Chapter 4, Introduction, first paragraph, last sentence

“This chapter proposes means of eliminating simplistic and unethical theories **from this set of theories.**”

was changed to:

“This chapter proposes means of eliminating simplistic and unethical **teleonomic** theories.”

Chapter 5, *Pleasure and Pain*, third paragraph, last sentence

“Pain (in acting) is anything that **impedes our becoming absorbed** in activity.”

was changed to:

“Pain (in acting) is anything that **interferes with losing ourselves** in activity.”

Chapter 5, *Pleasure and Pain*, eighth paragraph, second sentence

“**Masters** swimmers find pleasure in swimming.”

was changed to:

“**Recreational** swimmers find pleasure in swimming.”

Chapter 5, *Pleasure and Pain*, ninth paragraph, second and third sentences

“Further, finding pleasure in an activity can improve the performance of that activity. Becoming absorbed in swimming can help **us** swim **better**. **Our** performance usually suffers when something painful, such as a sore shoulder, interferes with **our** swimming. Similarly, becoming absorbed in thinking makes it easier to solve problems. We are usually less able to solve a problem if something painful, such as a headache, impedes **our** thinking.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Further, finding pleasure in an activity can improve the performance of that activity. Becoming absorbed in swimming can help **competitive swimmers** swim **faster**. Performance usually suffers when something painful, such as a sore shoulder, interferes with **becoming absorbed in** swimming. Similarly, becoming absorbed in thinking makes it easier to solve problems. We are usually less able to solve a problem if something painful, such as a headache, impedes **losing ourselves in** thinking.”

Chapter 5, *Three Common Misconceptions*, first paragraph, last sentence

“Early American failures to achieve similar results warn us that this impressive means of inducing knowledge requires **a dynamic world-view**.”

was changed to:

“Early American failures to achieve similar results warn us that this impressive means of inducing knowledge requires **recognizing the possibility of improving the means of trade**.”

Chapter 5, *Excellence in Production*, first paragraph, last sentence

“Such joint production requires **both** people that have the practical wisdom to think of better ways to produce **and** trading relationships that support the exchange of sensitive information. **Specifically**, managers must trust their employees with valuable information about products, processes, customers, and suppliers, and employees must trust managers with information that potentially replaces their services.”

was changed to:

“Such joint production requires people that have the practical wisdom to think of better ways to produce. **It also requires** trading relationships that support the exchange of sensitive information. **Managers** must trust their employees with valuable information about products, processes, customers, and suppliers, and employees must trust managers with information that potentially replaces their **current** services.”

Chapter 7, *Conclusion*, first paragraph, last two sentences

“The **‘simple-minded’** perceive a world filled with simple problems that are not being solved, hence they desire to give someone who recognizes the problems they see the power to solve them. In contrast, the **‘muddle-headed’** perceive a world filled with complex problems, which are best solved through decentralization.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The **centralizers** perceive a world filled with simple problems that are not being solved, hence they desire to give someone who recognizes the problems they see the power to solve them. In contrast, the **decentralizers** perceive a world filled with complex problems, which are best solved through decentralization.”

Version 2002.04.10

Chapter 2, Introduction

Moved paragraphs on subjectivity down to below paragraphs on products. Rewrote section to eliminate subsection headings (Subjectivity, Excellence, and Products). This involved deleting the last line of the first paragraph, emphasizing the first line of the first sentence of what had been the opening paragraphs of the Excellence and Products subsections, and adding the opening sentence, “Theories are subjective.” to what had been the Subjectivity subsection.

Chapter 2, Introduction, first (now second) footnote, last paragraph

“Dismissing theories that use the marginalist concept of excellence in means leaves us with an apparently simple explanation of prices: *prices are a consensus of economic agents’ beliefs about value as revealed by their actions*. Marginalist economists currently use this when extending their analysis to capital assets, the value of which depends on investors’ expectations and risk preferences.”

was deleted.

Version 2002.04.16

Preface, fifth paragraph, third sentence

“In economies with the potential for rapid change, the potential interactions between **ethics (our ultimate ends and how we progress toward them) and modern economics (how we use scarce resources to satisfy our wants)** are too important to ignore.”

was changed to:

“In economies with the potential for rapid change, the potential interactions between **ethics and modern economics, between the studies of how we progress toward our ultimate ends and how we use scarce resources to satisfy our wants,** are too important to ignore.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Preface, seventh paragraph, second sentence

“I also envision a means for all of us **intelligent beings**, working together, to solve this problem.”

was changed to:

“I also envision a means for all of us, working together, to solve this problem.”

Version 2002.04.25

Preface, first paragraph

Inserted the following paragraph:

“Economists once aspired to be worldly philosophers, literally lovers of useful knowledge. Had the economics profession remained faithful to this calling, modern economics would be the science of useful knowledge. The phrase ‘economics of knowledge’ would be redundant, not radical. Unhappily, it is not.”

Preface, sixth paragraph, first two sentences

“Smith’s great simplification **is fundamental to how nearly all economists understand their subject. However, it** tends to blind us to many of the opportunities of the information age.”

was changed to:

“Smith’s great simplification tends to blind us to many of the opportunities of the information age.”

Preface, eighth paragraph

The paragraph was recombined with the preceding paragraph. The two last sentences:

“For academics, this strategy is an outline for a research program. For all of us, it is a first cut at a plan for living and working together.”

were deleted.

Seventh chapter, Just Taxation, second paragraph, fourth through last sentences

“For example, the United States **currently spends a large portion of its military budget protecting oil supplies in politically unstable parts of the world. A slowly escalating**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

tax on oil would induce knowledge that replaces oil with tolerable turbulence. The justification is the same as it is for knowledge induction in JIT manufacturing, sacrificing some current production in order to become more productive.”

was made into a new paragraph. It was also changed to:

“For example, the United States can induce new useful knowledge that replaces oil with tolerable turbulence by slowly escalating taxes on oil. In addition to lowering the demand for oil, this will provide an example of inducing new knowledge by means of just taxation. Over time, lowering the demand for oil and providing an example of inducing new knowledge will reduce the risk of war over oil.”

Version 2002.05.11

Acknowledgments, first paragraph, last two sentences

“The first is Fredrick Sontag, who inspired me and countless other Pomona College students and alumni. He was extremely generous with his time when I needed it most.”

was changed to:

“The first is Fredrick Sontag, Pomona College’s much beloved professor of philosophy and theology. Fred was extremely generous with his time when I needed it most.”

Acknowledgments, fourth paragraph, second sentence

“My senior year in college I took an independent study course in human capital theory from Gordon, which focused on Gary Becker’s pioneering work and Lester Thurow’s criticisms of it.”

was changed to:

“My senior year in college I took an independent study course in human capital theory from Gordon. The core of the course was Gary Becker’s pioneering work and Lester Thurow’s criticisms of it.”

Acknowledgments, fourth paragraph, fifth sentence

“Gordon apparently recognized that my inability to produce the required term paper was due more to profound frustration and confusion than to sloth.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Gordon apparently recognized that my inability to produce the required term paper was **more due** to profound frustration and confusion than to sloth.”

Chapter 7, *Control the Money Supply Passively*, first paragraph, last two sentences

“Of the four **combinations** created by these two choices, the **most centralized is the current practice of controlling the price of money actively. The most decentralized approach** is to control the money supply passively.”

was changed to:

“Of the four **alternatives** created by these two choices, the most decentralized is to control the money supply passively.”

Chapter 7, *Control the Money Supply Passively*, second paragraph, first sentence

“The case for controlling the money supply passively is not that it **minimizes turbulence or even that it** yields better decisions in the short run, but that it yields better decisions in the long run.”

was changed to:

“The case for controlling the money supply passively is not that it yields better decisions in the short run, but that it yields better decisions in the long run.”

Version 2002.05.15

Acknowledgments, second paragraph, third sentence

“In it I found a form of pragmatism (searching for useful truth) more palatable to modern intellectuals and intelligent laymen than **that of** William James (recognizing truth by its usefulness).”

was changed to:

“In it I found a form of pragmatism (searching for useful truth) more palatable to modern intellectuals and intelligent laymen than **the popular interpretation of** William James’s **pragmatism** (recognizing truth by its usefulness).”

Chapter 5, *Dualist Worldly Ends*, sixth paragraph, second sentence

“Examples include Mayan ball games that culminated in the ritual beheading of the captain of the **winning** team, Jainist suicide by starvation, and Japanese kamikaze.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Examples include Mayan ball games that culminated in the ritual beheading of the captain of the **losing** team, Jainist suicide by starvation, and Japanese kamikaze.”

Chapter 6, Introduction, fourth paragraph, last sentence

“How much more valuable is **the average** personal computer **manufactured** today than **one manufactured** ten years ago?”

was changed to:

“How much more valuable is **a three thousand dollar** personal computer **purchased** today than **a similarly priced personal computer** purchased ten years ago?”

Version 2002.05.22

Chapter 4

“Misleadingly simplistic” implies an ultimate end. The common sense based ultimate end implied in “Eliminating Simplistic Theories” was replaced by the explicitly defined ultimate end of reverence for life. To accomplish this in the most straightforward manner, the section titled “Eliminating Simplistic Theories” was moved to the end of the chapter. The section titled “Eliminating Unethical Theories” was reorganized. The introductory paragraphs were moved into the chapter introduction. The the three subsections, “*Materialist Ultimate Ends*,” “*Dualist Worldly Ends*,” and “*Reconciliation*,” were promoted. This reorganization required making changes throughout the chapter.

Chapter 4, Introduction, first paragraph, second and third sentences

“We can tighten this loose theory by **tightening the core theory of means**. **We can also tighten it by** eliminating members from the set of ultimate ends.”

was changed to:

“We can tighten this loose theory by eliminating members from the set of ultimate ends.”

Chapter 4, Introduction, first paragraph, last sentence

“This chapter proposes means of eliminating **simplistic and unethical** teleonomic theories.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was deleted.

Chapter 4, Introduction, second paragraph, first sentences

“If we can agree on what our highest ethical end is, then we can develop a powerful means of eliminating teleonomic theories. The major difficulty in doing so is agreeing on metaphysical assumptions about human nature.”

was changed to:

“The major difficulty in developing means of eliminating teleonomic theories is agreeing on metaphysical assumptions about human nature.”

Chapter 4, Introduction, third paragraph

“The following explores the materialist view of the good life, goes on to explore dualist worldly ends, and finishes by reconciling the materialist and dualist views. If we accept this pragmatic reconciliation, then we will have another means of tightening our loose theory of means.”

was changed to:

“This chapter proposes a pragmatic means of reconciling the materialist and dualist views. It then uses this reconciliation to develop a powerful means of eliminating teleonomic theories.”

Chapter 4, Dualist Worldly Ends, twelfth paragraph, second sentence

Added the following footnote:

“Although most of us identify this metaphysic with Christianity, belief in a three element Godhead is common among mystics of all major religions. This Godhead consists of an unchanging Absolute, which is usually envisioned as being male, His creative spirit, which manifests itself as the Universe and is usually envisioned as being female, and a divine element within us, which is our true self. Where Christians after the Council of Nicaea speak of the Father and Son (Logos), Sufis speak of Haqq and Khalq, Kabbalists of En Sof and Sefirot; Chan (Zen) Buddhists of Hsin (Kokoro) and Nien (Nen); and Taoists of Tao and Teh. The Vedas tell of Prajapati and Prthivi; the Upanishads of Brahman and Maya; and the Psalms of Jahveh and Chokmah. For more on this read Hindu mystic S. Abhayananda’s book, *History of Mysticism: The Unchanging Testament*, (Olympia, WA: Atma Books, 1996), particularly page 387.”

This required renumbering endnotes 8-25. It also required changing the footnote symbols in the online version.

Chapter 4, Reconciliation, first paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“If we seek what is *true*, the materialist and dualist belief systems are irreconcilable:”

was changed to:

“If we seek what is *true* in the way that modern economists use this term, the materialist and dualist belief systems are irreconcilable:”

Chapter 4, Eliminating Simplistic Theories, first paragraph, second through fourth sentences

“We can begin eliminating teleonomic theories by eliminating simplistic ones. To help us identify such theories, we can think of ourselves as complex adaptive systems consisting of individual elements, each having its own set of needs. This suggests that we should eliminate theories that are based on a single element or type of element.”

was changed to:

“To help us identify simplistic teleonomic theories, we can think of ourselves as complex adaptive systems consisting of individual elements, each having its own set of needs. This suggests that we should eliminate theories that are based on a single element, type of element, or level of abstraction.”

Chapter 4, Eliminating Simplistic Theories, eighth paragraph

Deleted the following sentences and corresponding endnote:

“Although most of us identify this metaphysic with Christianity, belief in a three element Godhead is common among mystics of all major religions. This Godhead consists of an unchanging Absolute, which is usually envisioned as being male, His creative spirit, which manifests itself as the Universe and is usually envisioned as being female, and a divine element within us, which is our true self. Where Christians after the Council of Nicaea speak of the Father and Son (Logos), Sufis speak of Haqq and Khalq, Kabbalists of En Sof and Sefirot; Chan (Zen) Buddhists of Hsin (Kokoro) and Nien (Nen); and Taoists of Tao and Teh. The Vedas tell of Prajapati and Prthivi; the Upanishads of Brahman and Maya; and the Psalms of Jahveh and Chokmah.”

Chapter 4, Summary, first paragraph, first three sentences

“This chapter proposed two means of eliminating teleonomic theories. The first involves eliminating theories based on their correspondence to our perceptions of reality and general completeness. The second involves eliminating theories inconsistent with the normative end of reverence for life.”

was changed to:

“This chapter proposed a pragmatic means of eliminating teleonomic theories.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 4, Summary, footnote, first sentence

“Both processes yield descriptions.”

was changed to:

“Teleonomic theories are descriptions.”

Version 2002.05.27

Preface, ninth paragraph, second sentence

Inserted the sentence:

“Providing such a framework is the first step in any plan for working and living together.”

Began new paragraph after inserted sentence.

Chapter 4, Introduction, second paragraph:

Inserted the following paragraph:

“For the time being, we can safely assume that we, intelligent beings capable of using the knowledge that we create in order to achieve our ultimate ends, are all human. Modern biology tells us that life is a complex adaptive system in which everything is changing. Fortunately, human beliefs and behaviors change many orders of magnitude faster than human genetics. We can safely assume that human nature is fixed. This is the foundation of all humanistic ethical theories, all theories about human ultimate ends and the best means to them, that are based on teleonomic theories.”

Chapter 4, Introduction, (former) third paragraph, first sentence:

“This chapter provides (1) a general description of set of materialist teleonomic theories, (2) a general description of 'humanistic' dualist worldly ends, and (3) a pragmatic reconciliation of these two logically incompatible sets of teleonomic theories.”

Chapter 4, Materialist Ultimate Ends, first paragraph

“Modern biology tells us that life is a complex adaptive system in which everything is changing. However, we know that what we human beings think and do changes much more quickly than our genetics. We can safely assume that our nature is fixed. This is the foundation of humanistic ethics.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was deleted.

Chapter 4, Materialist Ultimate Ends, third footnote

“Anything less than complete ignorance will introduce bias. For example, if we simply imagine that we were born into our current society, we will tend to ignore the potential affect of our behavior on members of other human societies, future generations of humans, and non-human life. Whenever we are tempted to use ‘social justice’ we should consider substituting either ‘tribal justice’ or ‘justice’ depending on what we mean to say.”

was changed to:

“Anything less than complete ignorance will introduce bias. For example, if we simply imagine that we were born into our current society, we will tend to ignore the potential affect of our behavior on members of other human societies, future generations of humans, and non-human life. **Using Rawls’s means, we can argue that incomplete forms of “ethical mysticism” permit unjust predation and exploitation. We also can argue that they permit unjust limitations on cooperation. The most obvious examples are restrictions on “foreign” trade. These limit cooperation with living members of other societies. Less obvious are actions that effectively limit cooperation with future generations. Justice requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Each generation must seek to maximize the amount of progress for the turbulence it can bear. Each generation must ask itself, “If not now, when? If not us, who?” Shielding a favored group from change violates this agreement. “Social justice” is not the highest form of justice.** Whenever we are tempted to use ‘social justice’ we should consider substituting either ‘tribal justice’ or ‘justice’ depending on what we mean to say.”

Chapter 4, Materialist Ultimate Ends, fifth through third paragraphs from the end

“Given this theory of justice, we can say that incomplete forms of “ethical mysticism” permit unjust predation and exploitation. We also can say that they unjustly limit cooperation, which retards the creation and application of useful knowledge. The most obvious example of this is restrictions on “foreign” trade, which limit cooperation with living members of other societies.

“Less obvious, incomplete forms of “ethical mysticism” restrict cooperation with future generations of intelligent life. Consider the communitarian concept of justice. By protecting the status quo, communitarians raise the cost of change, which unjustly retards the implementation of new knowledge.

“Justice requires that we seek not to minimize turbulence in the flow of economic resources but to maximize the amount of progress for the turbulence that we can bear. This recursive agreement between generations is similar in form and spirit to the

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. The sixth and seventh chapters discuss this in greater detail.”

were deleted.

Chapter 4, Dualist Worldly Ends, seventh paragraph, second sentence

“**Assuming** that we cannot agree that any of us have the ability to communicate with beings familiar with the afterlife, we cannot test these beliefs.”

was changed to:

“**Given** that we cannot agree that any of us have the ability to communicate with beings familiar with the afterlife, we cannot test these beliefs.”

Chapter 8, second paragraph, second to last sentence

“It tells us that we should judge the interventions of governments rather than the actions of individuals and that we should err on the side of **not passing just interventions** rather than **passing unjust ones**.”

was changed to:

“It tells us that we should judge the interventions of governments rather than the actions of individuals and that we should err on the side of not **intervening justly** rather than **intervening unjustly**. **Like physicians, governments should first do no harm**.”

Version 2002.06.01

Chapter 4, Introduction, first paragraph, last sentence

Moved the clause:

“providing such a framework is the first step in any plan for working and living together.”

from the last sentence of the footnote to the reference sentence. Also eliminated the italics from *teleonomic theories* in the footnote.

Chapter 4, Introduction, footnote, second paragraph, first sentence

“The major difficulty in developing means of eliminating teleonomic theories is agreeing on metaphysical assumptions about **human** nature.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“The major difficulty in developing means of eliminating teleonomic theories is agreeing on metaphysical assumptions about **our** nature.”

Chapter 4, Introduction, footnote, last paragraph

“This chapter proposes a pragmatic means of reconciling **the** materialist and dualist **views**. It then uses this reconciliation to develop **a powerful** means of eliminating **teleonomic** theories.”

was changed to:

“This chapter proposes a pragmatic means of reconciling materialist and dualist **teleonomic theories**. It then uses this reconciliation to develop means of eliminating **unethical and simplistic** theories.”

Chapter 4, Materialist Ultimate Ends and Dualist Worldly Ends

These two sections were demoted to subsections of a new section, **Reconciling Teleonomic Theories**. They were also renamed **Secular Humanist Ultimate Ends** and **Religious Humanist Worldly Ends**.

Chapter 4, Reconciliation

The two paragraphs in this section were moved forward to become the first two paragraphs in **Reconciling Materialism and Dualism**. The section title was deleted.

Chapter 4, Reconciling Teleonomic Theories

Inserted the following two paragraphs to the end of the introduction:

“As previously stated, strategic economic theories ought to concern what beings capable of using the knowledge that they create would do if they were wise. Is Schweitzer’s ultimate end of reverence for life wise? A thorough examination of this issue exceeds the bounds of this essay. In its place, the author offers his views of how Schweitzer’s reverence for life fits into secular and religious humanism, humanity’s materialist and dualist teleonomic traditions.

“In addition to supporting the claim that reverence for life is wise, the following two sections introduce a number of useful concepts. These include the humanist definition of happiness, the need for ‘mystical oneness,’ and normative (versus temporal) ends.”

Chapter 4, Secular Humanist Ultimate Ends, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Modern biology tells us that life is a complex adaptive system in which everything is changing. However, we know that what we human beings think and do changes much more quickly than our genetics. We can safely assume that our nature is fixed. This is the foundation of humanistic ethics.”

was deleted.

Chapter 4, Secular Humanist Ultimate Ends, new first paragraph

“Humanist philosophers believe that the ultimate end of human life is happiness, which **is** a good life, **that is**, a life well lived. They claim that the statement, “the ultimate end of life is a good life,” has meaning, as opposed to simply being true by definition. To have meaning, a statement must tell us something more than is contained in the statement alone. This statement has meaning because it focuses our attention on what we need in order to live a good life.”

was changed to:

“Humanist philosophers believe that the ultimate end of human life is happiness, which **they define as** a good life, a life well lived. They claim that the statement, “the ultimate end of life is **living** a good life,” has meaning, as opposed to simply being true by definition. To have meaning, a statement must tell us something more than is contained in the statement alone. This statement has meaning because it focuses our attention on what we need in order to live a good life.”

Chapter 4, Eliminating Simplistic Theories, section heading

“Simplistic” was changed to “Teleonomic.”

Chapter 4, Eliminating Teleonomic Theories, first paragraph

Inserted the following paragraph:

“If we accept that reverence for life is wise, then we can develop two means of eliminating teleonomic theories. The first is simply to eliminate theories that are clearly incompatible with Schweitzer’s ultimate normative end of reverence for life. The most obvious examples are theories based on too narrow a conception of who ‘we’ are. The second is to eliminate misleadingly simple theories, theories that don’t yield the most useful problems to solve.”

Chapter 4, Eliminating Teleonomic Theories, first paragraph, first three sentences

“Beautiful theories are simple but not too simple. To help us identify simplistic theories, we can think of ourselves as complex adaptive systems consisting of individual elements, each having its own set of needs. This suggests that we should

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

eliminate theories that are based on a single element, type of element, or level of abstraction.”

was replaced by:

“We find useful theories that explain causation at various levels of abstraction. For example, Maslow’s ‘becoming’ needs naturally fall into two categories, physical needs and mental needs. We study these two types of needs at different levels of abstraction. Some materialists even claim that our minds ‘emerge’ from our bodies.

“The fact that we find useful theories about human needs at various levels of abstraction suggests that we should beware of theories based on any one level of abstraction.”

Chapter 4, Summary

“This chapter proposed a pragmatic means of eliminating teleonomic theories.⁺⁺ What remains is a set of theories that deserve our tolerance. This tolerance is based on our **ignorance** of our ultimate ends and of the best means to them, rather than on the presumed right to do as we please.”

was replaced by:

“This chapter proposed pragmatic means of eliminating **unethical and simplistic** teleonomic theories.⁺⁺ What remains is a set of theories that deserve our tolerance. This tolerance is based on our **incomplete knowledge** of our ultimate ends and of the best means to them, rather than on the presumed right to do as we please.”

Version 2002.06.08

Chapter 4

Removed quotation marks around all but first occurrences of ‘mystical oneness,’ ‘ethical mysticism,’ and ‘magical mysticism.’

Chapter 4, Introduction, last paragraph, last sentence

“It then uses this reconciliation to develop means of eliminating **unethical and simplistic** theories.”

was replaced by:

“It then uses this reconciliation to develop means of eliminating **teleonomic** theories.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 4, Reconciling Teleonomic Theories, second paragraph

“However, if we seek what is *useful*, we can reconcile these two logically incompatible belief systems. **In order to do so, we need to recognize two facts. First, belief in either the dualist or materialist system is based on faith in metaphysical assumptions. By definition, we currently have no generally accepted means of disproving these assumptions. Second, by expanding the scope of our ethical, economic, and political problem to its logical limit, we can find common ground. Both materialists and dualists can agree on Schweitzer’s ultimate end of reverence for life.**”

was replaced by:

“However, if we seek what is *useful*, we can reconcile these two logically incompatible belief systems. **Materialists and dualists can agree on Schweitzer’s ultimate end of reverence for life.**”

Chapter 4, Secular Humanist Ultimate Ends, first paragraph, last sentence

“**This** statement has meaning because it focuses our attention on what we need in order to live a good life.”

was replaced by:

“**In this case, the** statement has meaning because it focuses our attention on what we need in order to live a good life.”

Chapter 4, Secular Humanist Ultimate Ends, sixth paragraph, first sentence

“Each of us has a structure (system) of beliefs.”

was replaced by:

“Each of us has a structure (system) of beliefs **(ideas/knowledge).**”

Chapter 4, Secular Humanist Ultimate Ends, last paragraph

“In summary, the **materialist good life is a life spent** as high in our hierarchy of needs as possible. The higher we go in this hierarchy, the more important culture becomes relative to nature. At the top of this hierarchy is the need for mystical oneness, which we can satisfy best with a practical combination of magical and complete ethical mysticism.”

was replaced by:

“In summary, **secular humanist ultimate end is living a good life, which we achieve by living** as high in our hierarchy of needs as possible. The higher we go in this

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

hierarchy, the more important culture becomes relative to nature. At the top of this hierarchy is the need for mystical oneness, which we can satisfy best with a practical combination of magical and complete ethical mysticism.”

Chapter 4, Secular Humanist Ultimate Ends, thirteenth paragraph, first sentence

“Schweitzer’s magical mysticism lies beyond ethics.”

changed to:

“Magical mysticism lies beyond ethics.”

Chapter 4, Secular Humanist Ultimate Ends, thirteenth paragraph, first sentence

“Schweitzer’s ethical mysticism does not involve this problem.”

changed to:

“Ethical mysticism does not involve this problem.”

Chapter 4, Secular Humanist Ultimate Ends, fifteenth paragraph

“Schweitzer saw an uneasy mix of magical and ethical means of satisfying this need in the history of both Indian and Western thought. In the development of Indian thought, he saw a slow evolution from the predominance of magical mysticism in ancient Hindu teachings, which denied the reality of this world, to that of the ethical mysticism in Japanese Buddhist sects, which early Jesuit missionaries denounced as being Lutheran.¹¹ In the development of Western thought, he saw magical mysticism dominating in the late Hellenic and Medieval period and ethical mysticism making a revival in the Renaissance and becoming supreme during the Enlightenment.^{12”}

changed to:

“Schweitzer saw an uneasy mix of magical and ethical means of satisfying our need for mystical oneness. He believed that this uneasy mix explained the very different trajectories of Eastern and Western religious thought. In the development of Eastern thought, he saw a slow evolution from the predominance of magical mysticism in ancient Hindu teachings, which denied the reality of this world, to that of the ethical mysticism in Japanese Buddhist sects, which early Jesuit missionaries denounced as being Lutheran.¹¹ In the development of Western thought, he saw magical mysticism dominating in the late Hellenic and Medieval period and ethical mysticism making a revival in the Renaissance and becoming supreme during the Enlightenment.^{12”}

Chapter 4, Secular Humanist Ultimate Ends, seventeenth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Schweitzer recognized that the great disadvantage of magical mysticism is that it is impracticable.”

changed to:

“The great disadvantage of magical mysticism is that it is impracticable.”

Chapter 4, Secular Humanist Ultimate Ends, eighteenth paragraph, first sentence

“Schweitzer’s ethical mysticism also has advantages and disadvantages.”

changed to:

“Ethical mysticism also has advantages and disadvantages.”

Chapter 4, Secular Humanist Ultimate Ends, nineteenth paragraph

“Schweitzer states that all life is to be revered. Because most forms of life survive by killing other life forms or by feeding on their remains, it is clearly naïve to wish that no living thing suffer or die. What complete ethical mysticism aims at is avoiding unnecessary suffering and killing. However, it is not immediately clear that this ideal yields a practical means of judging the justice of the actions, customs, and laws of intelligent beings. Does it require that we treat rats the same as humans?”

changed to:

“Some claim that reverence for life, the basis for ethical mysticism, is too idealistic; that it provides too little practical guidance. They argue that we need to kill other life forms if we are to survive. It is clearly naïve to wish that no living thing suffer or die. In making this argument, they confuse temporal and normative ends. Complete ethical mysticism aims at avoiding *unnecessary* suffering and killing, not all suffering and killing. It tells us to do what we can to minimize suffering and killing.”

Chapter 4, Secular Humanist Ultimate Ends, twentieth paragraph, first sentence

“Moral philosopher John Rawls provides a means of translating Schweitzer’s ideal into a more practical means of judging our actions, customs, and laws.”

changed to:

“Others claim that the principle of reverence for life provides too little practical guidance. Moral philosopher John Rawls provides a means of judging our actions, customs, and laws, which we can apply to the principle of reverence for life.”

Chapter 4, Secular Humanist Ultimate Ends, twentieth paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Humans should neither treat **rats** as equals, nor treat them with no regard.”

changed to:

“Humans should neither treat **less intelligent forms of life** as equals, nor treat them with no regard.”

Chapter 4, Secular Humanist Ultimate Ends, twenty-first paragraph, first four sentences

“Schweitzer **advocated that we embrace complete ethical mysticism rather than either one of its incomplete forms or magical mysticism.** He believed that combining magical and ethical mysticism is a logical impossibility in that the former requires us to deny the world and life while the latter requires us to embrace them. **However, several traditions claim that this is possible.** We can combine magical and ethical mysticism by setting our objectives according to ethical mysticism, but acting according to magical mysticism.”

changed to:

“Schweitzer believed that combining magical and ethical mysticism is a logical impossibility in that the former requires us to deny the world and life while the latter requires us to embrace them. **He failed to recognize that we** can combine the best of magical and ethical mysticism by setting our objectives according to ethical mysticism, but acting according to magical mysticism.”

Chapter 4, Religious Humanist Worldly Ends, seventh through eleventh paragraphs and first sentence of twelfth paragraph

“The most straightforward means of dismissing ritual death is to refute those individual beliefs about the means to the ultimate ends of existence that support them. Given that we cannot agree that any of us have the ability to communicate with beings familiar with the afterlife, we cannot test these beliefs. This leaves us with the difficult task of proving that the belief systems supporting ritual death are somehow flawed. The most common flaw is incompleteness.

“The purest example of ritual death involving the belief that sacrifice leads to the ultimate end is the twenty-five hundred year old Jainist tradition of choosing to starve to death rather than continue killing other living beings in order to survive. Jainists believe that (1) ritual suicide by starvation is the culmination of countless cycles of death and reincarnation on the road to perfection; (2) all forms of life participate in the cycle of death and rebirth and so are equally precious; (3) once a person has reached perfection (sainthood) there is no need to continue to live; and (4) a saint’s death by starvation will help all life advance toward perfection, as it stops the saint from killing other living beings in order to survive.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The Jainist belief system is flawed in that it assumes that a saint’s suicide will help life more than living a life dedicated to promoting life. In economic terms, Jainists believe that they live in a zero or negative sum world. This is very rarely the case. If it is possible to help life by living a life devoted to it, suicide means choosing immediate bliss over postponing bliss to help others, which makes a Jainist saint’s suicide by starvation an act of self-centeredness rather than self-sacrifice.

“The Viking belief that death in battle leads to Valhalla is a relatively pure example of ritual death involving the belief that dying in a state of ecstasy leads to the ultimate end. This belief led Viking warriors to prefer death in battle to a good life ending in a peaceful death. In considering whether a warrior’s choice to continue to fight until the day he dies in battle is wise, it is not clear that death in battle is the best means to Valhalla. It may be possible to experience ecstasy in life, to pursue happiness, and to find ecstasy in death by remembering the experience of ecstasy in life. If so, the Viking can both reach Valhalla and live a good life.

“In both of these examples, the belief system is flawed because it does not capture important aspects of reality. Are all belief systems that support ritual death as incomplete as these two?”

“All forms of ritual death aim at self-sacrifice, bliss through ecstasy, or some combination of the two.”

were deleted. The balance of the twelfth paragraph was merged into the sixth paragraph.

Chapter 4, Religious Humanist Worldly Ends, new eighth paragraph, second sentence

“Christian philosopher **and mystic** Sören ...” was changed to: “Christian philosopher Sören ...”

Chapter 4, Religious Humanist Worldly Ends, end

Inserted the paragraph:

“In summary, religious humanist ultimate normative end of life is living a good life, which we achieve by living as high in our hierarchy of needs as possible. At the top of this hierarchy is Schweitzer’s need for mystical oneness, which we can satisfy best with a practical combination of magical and complete ethical mysticism. Achieving mystical oneness by relinking with the divine element within ourselves may cause us to assume the subordinate normative end of the divine, which is to bring ever more divine consciousness into the world.”

Chapter 4, Eliminating Teleonomic Theories, first paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The second is to eliminate misleadingly simple theories, theories that don’t yield the **most useful** problems **to solve**.”

changed to:

“The second is to eliminate misleadingly simple theories, theories that don’t yield the **best** problems **for achieving the ultimate end of reverence for life**.”

Chapter 4, Eliminating Teleonomic Theories, second paragraph

“We find useful theories that explain causation at various levels of abstraction. For example, Maslow’s ‘becoming’ needs naturally fall into two categories, physical needs and mental needs. We study these two types of needs at different levels of abstraction. Some materialists even claim that our minds “emerge” from our bodies.”

changed to:

“Maslow’s hierarchy of needs suggests a method of discovering misleading theories. Again, he discovered needs by investigating the causes of distress and illness. What he found naturally fell into three categories, physical needs, mental needs, and spiritual needs. These three types of needs emerge on at least two levels of abstraction. Our physical needs emerge at the molecular level. For example, our need for oxygen, water, and nutrition arise from our molecular processes’ need for oxygen, water, and nutrition. In contrast, our mental needs arise from our minds, not from the molecular processes of our brain cells. Molecular processes have no need for love or self-respect. Arguably, our spiritual needs emerge at an even higher level of abstraction than our mental needs.”

Chapter 4, Eliminating Teleonomic Theories, third paragraph, first sentence

“The fact that our needs emerge at more than one level of abstraction suggestions that we should beware of **any theory that attributes** human motivation to **any one** level of abstraction.”

changed to:

“The fact that our needs emerge at more than one level of abstraction suggestions that we should beware of **teleonomic theories that concern a single** level of abstraction.”

Chapter 4, Eliminating Teleonomic Theories, third paragraph, last sentence, last word

Changed “spirits” to “spirit(s).”

Chapter 4, Eliminating Teleonomic Theories, eighth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The problem with this world-view is that we live in a material world, **not a world constructed entirely of our beliefs.**”

changed to:

“The problem with this world-view is that we live in a material world.”

Chapter 4, Eliminating Teleonomic Theories, end

Added the paragraph:

“We are complex adaptive beings living in a complex adaptive world. We should beware of simple theories that claim to explain causation.”

Chapter 4, Summary, first paragraph, first two sentences

“This chapter proposed pragmatic means of eliminating **unethical and simplistic** teleonomic theories.⁺⁺ **What remains is** a set of theories that deserve our tolerance.”

changed to:

“This chapter proposed **accepting Schweitzer’s reverence for life as the ultimate normative end of life. It then used this guiding principle to develop** pragmatic means of eliminating teleonomic theories.⁺⁺ **Applying these means to the set of all teleonomic theories yields** a set of theories that deserve our tolerance.”

Chapter 6, Economic Turbulence, first paragraph, last sentence

“Unemployment and transient inflation are symptoms of economic turbulence.”

changed to:

“Transient inflation and unemployment are symptoms of economic turbulence.”

Version 2002.06.13

Preface, ninth paragraph, first three sentences

“Traditional theories of ethics, politics, and economics ultimately rest on **a set of unverifiable fundamental assumptions about human nature. Finding a set that we can all agree on is impossible. Rather than founding a theory on a set of such** assumptions, I propose suspending a set of theories from a vague description of an ideal ultimate end.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Traditional theories of ethics, politics, and economics ultimately rest on unverifiable fundamental assumptions about human nature. **Given that we will never be able to agree on these** assumptions, I propose suspending a set of theories from a vague description of an ideal ultimate end.”

Chapter 1, Modern Economics’ Blind Spot, second paragraph, third sentence

Deleted “clearly.”

Chapter 1, Efficiency and Effectiveness, third paragraph, fourth sentence

“Further, the inherent versatility of knowledge makes it impossible to predict with certainty how knowledge will be used: discoveries in one field often lead to discoveries in completely unrelated fields.”

was deleted.

Chapter 1, Efficiency and Effectiveness, sixth paragraph, first sentence

“The distinction between **the established and proposed concepts of wealth and excellence in means** may be made clearer by thinking about the difference between how marginalist economists use ‘rationality’ and how we commonly use ‘wisdom.’”

was changed to:

“The distinction between **marginalist ‘efficiency’ and managerial ‘efficiency and effectiveness’** may be made clearer by thinking about the difference between how marginalist economists use ‘rationality’ and how we commonly use ‘wisdom.’”

Chapter 2, Manufacturing Complexity, first paragraph, last sentence

“A simple production process has a single operation and so requires no links; a complicated one has more than one operation and no flexible links; and a complex one has at least one flexible link.”

was changed to:

“A simple production process has a single operation and so requires no links; a complicated one has more than one operation and no flexible links; and a complex one has **more than one operation and** at least one flexible link.”

Chapter 2, Good People, first paragraph, first sentence

“The kaizen / **Total Quality Control (TQC)** adage, ...”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“The kaizen adage, ...”

Chapter 2, *Good People*, bullet list, last point

“Those with **TQC** programs that focus on customers’ needs provide their employees with meaningful work”

was changed to:

“Those with programs that focus on customers’ needs (e.g., **Total Quality Control programs**) provide their employees with meaningful work”

Chapter 2, *A Dynamic Perspective*, first paragraph, third and fourth sentences

“**This book** tells the story of the life and travels of A. Square, a resident of the two-dimensional world of Flatland. Residents of Flatland have no concept of height, and so believe that ‘up’ **is** the same as ‘north’.”

was changed to:

“**Abbott** tells the story of the life and travels of A. Square, a resident of the two-dimensional world of Flatland. Residents of Flatland have no concept of height, and so believe that ‘up’ **means** the same as ‘north.’”

Chapter 3, Introduction, second paragraph, last sentence

“Although Einstein’s theory of relativity provides more accurate answers than Newtonian dynamics, the latter is the more useful for plotting **a spacecraft’s course because** the slightly higher value of the former’s predictions **is outweighed by** the higher cost of using it.”

was changed to:

“Although Einstein’s theory of relativity provides more accurate answers than Newtonian dynamics, the latter is the more useful for plotting **an artillery shell’s trajectory**. The slightly higher value of the former’s predictions doesn’t justify the higher cost of using it.”

Chapter 3, Introduction, fifth paragraph, second sentence

“It is possible to explain causation without being able to predict in the traditional (Newtonian) sense, as is the case in **what physicists call** *deterministic chaotic systems*.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“It is possible to explain causation without being able to predict in the traditional (Newtonian) sense, as is the case in *deterministic chaotic systems*.”

Chapter 3, Introduction, fifth paragraph, last sentence

“Because we can never know initial conditions precisely, the best we can hope to predict much into the future is the general ‘climate’ as opposed to the specific ‘weather.’”

was changed to:

“Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the ‘weather.’ In the long term, the best we can hope to do is to predict the bounds of the trajectory, the ‘climate.’”

Chapter 3, Introduction, seventh paragraph, last sentence

“From the static perspective of marginalist economics, predictions help us decide *how to get what we want* and explanations help us decide *what to want*.”

was deleted.

Chapter 3, The Strategy for Choosing Economic Explanations, last paragraph

Inserted the paragraph:

“Contrary to modern Austrian doctrine, we can think in terms of what we need to achieve our ultimate ends even when we only have a rough idea of what our ultimate ends are and what we need to achieve them.”

Chapter 4, Eliminating Teleonomic Theories, second paragraph, second sentence

“Maslow’s **hierarchy of needs** suggests a method of discovering misleading theories. **Again, he discovered needs by investigating the causes of distress and illness. What he found naturally fell into three categories, physical needs, mental needs, and spiritual needs.** These **three** types of needs emerge on at least two levels of abstraction. Our physical needs emerge at the molecular level. For example, our need for oxygen, water, and nutrition arise from our molecular processes’ need for oxygen, water, and nutrition. In contrast, our mental needs arise from our minds, not from the molecular processes of our brain cells. **Molecular processes have no need for love or self-respect. Arguably, our spiritual needs emerge at an even higher level of abstraction than our mental needs.**”

changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The fact that Maslow’s becoming needs fall into two categories, physical needs and mental needs, suggests a method of discovering misleading theories. These two types of needs emerge at different levels of abstraction. Our physical needs emerge at the molecular level. For example, our need for oxygen, water, and nutrition arise from our molecular processes’ need for oxygen, water, and nutrition. In contrast, our mental needs arise from our minds, not from the molecular processes of our brain cells. The molecular processes of our brain cells have no need for love or self-respect.”

Chapter 7, Introduction, first paragraph, first sentence

“From the recursionist perspective put forth in this work, the normative end of government is promoting progress by administering justice, which is a matter of continuously improving the quality of decision-making.”

was changed to:

“The normative end of government is administering justice. From the recursionist perspective put forth in this work, administering justice is a matter of continuously improving the quality of decision-making.”

Chapter 7, Consider Incentives and Enforcement Costs, second paragraph, last sentence

“Excellence in governing concerns the justice of government interventions into private affairs, not the justice of those affairs.”

was deleted.

Chapter 7, Consider Incentives and Enforcement Costs, third paragraph, first sentence

“Many factors make judging the interventions of governments difficult.”

was changed to:

“Many factors make judging the interventions of governments difficult:”

Chapter 7, Consider Incentives and Enforcement Costs, third paragraph, last sentence

“We know as little about how human cultures evolve and what effect government interventions have on this evolution as we do about how ecosystems evolve and what effect human interventions have on these systems.”

was deleted.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 7, *Consider Incentives and Enforcement Costs*, last paragraph, second and third sentences

“**Public choice economics** provides insights into the dynamics of how governments actually work and the field of ‘**law and economics**’ provides insights into the cost of enforcing laws. The emerging science of complex dynamic systems may eventually provide us with the (**positive**) transaction cost theory that Ronald Coase called for in his Nobel lecture.”

was changed to:

“*Public choice economics* provides insights into the dynamics of how governments actually work and the field of *law and economics* provides insights into the cost of enforcing laws. The emerging science of complex dynamic systems may eventually provide us with the transaction cost theory that Ronald Coase called for in his Nobel lecture.”

Chapter 7, *Lucid Culture*, second paragraph, second sentence

“We can see this trend clearly in England, the first country to industrialize, where **over the course of four hundred years**, the organizing principle of the predominant culture shifted from the medieval ideal of fulfilling one’s role in God’s plan to a crassly hedonistic version of Jeremy Bentham’s ideal of “the greatest good for the greatest number.”

was changed to:

“We can see this trend clearly in England, the first country to industrialize, where the organizing principle of the predominant culture **gradually** shifted from the medieval ideal of fulfilling one’s role in God’s plan to a crassly hedonistic version of Jeremy Bentham’s ideal of “the greatest good for the greatest number.”

Chapter 7, *Lucid Culture*, sixth paragraph, third sentence

Deleted “(Marxist).”

Chapter 7, *Conclusion*, second paragraph, last sentence

“However, the case for decentralization itself depends on the assumption that we seek to live wisely.”

was italicized.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, fourth paragraph, first sentence

“Focusing on the scarcity of knowledge creates a problem for economists.”

was changed to:

“Recognizing the scarcity of knowledge creates an immediate problem for modern economists.”

Preface, fourth paragraph, last six sentences

“Most economists have chosen to stay with closed-ended models. In effect, they have chosen to ignore the possibility of solving economic problems by creating knowledge. To think clearly about information age economies, economies in which the primary means of progress is the creation of knowledge, we need a theory that encompasses the creation of knowledge. *We need an economics of knowledge.* Because wisdom is a form of knowledge, an adequate economics of knowledge must be based not on *what people will do*, but on *what the wise would do*. This is not only a radical departure from modern economics but also a radical departure from what modern economists deem to be science.”

was changed to:

“Recognizing the scarcity of knowledge also creates a deeper problem for modern economists. Wisdom is a form of knowledge. Economic theories that consider wisdom must be based not on *what people will do*, but on *what the wise would do*. This is beyond the pale of what modern economists deem to be science. Most economists have chosen to stay with closed-ended models based on what people will do. In effect, they have chosen to ignore the possibility of solving economic problems by creating knowledge.”

Preface, fifth paragraph, first sentence

“The source of modern economics’ problem goes back to Adam Smith, the grandfather of modern economics.”

was changed to:

“The root of these problems goes back to Adam Smith, the grandfather of modern economics.”

Preface, sixth paragraph, last sentence

“Regrettably, economists are right when they say that a rigorous theory that reconciles these two, a precise theory that aims at progress rather than growth, is beyond our grasp.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“We need a theory of economics that encompasses the creation of knowledge, including the knowledge of how to act wisely. Regrettably, economists are right when they say that a rigorous theory that reconciles ethics and modern economics, a precise theory that aims at progress rather than growth, is beyond our grasp.”

Chapter 4, Introduction, first paragraph, first sentence, footnote

Added the following paragraph:

“Teleonomic theories are both positive and normative. As David Hume observed, one cannot produce a normative statement from a string of positive ones. The implicit normative statement in teleonomic theories is that we *owe* it to ourselves to follow our internal programming. In other words, we *ought* to live good lives. For more on this topic, read part two of Mortimer Adler’s book, *Ten Philosophical Mistakes*.”

Chapter 4, Secular Humanist Ultimate Ends, sixth paragraph, first sentence

“Each of us has a structure (system) of beliefs (ideas/knowledge). Some of our beliefs are critical to this structure.”

Added the following paragraph:

“Each of us has a belief system, a structure of articulate knowledge. Some of our beliefs are critical to this system.”

Chapter 4, Summary, first paragraph, second sentence, footnote

Deleted the footnote:

“Teleonomic theories are *descriptions*. Adding the *prescription* that we ought to fulfill our internal programs wisely, that is, pursue happiness, changes these positive theories into normative ones. Because our internal programming includes programming to fulfill our programming, the statement that we ought to fulfill our programming (pursue happiness) is positive as well as normative. For more on this apparent contradiction of David Hume’s dictum as well as on the nature of happiness, read part two of Mortimer Adler’s book, *Ten Philosophical Mistakes*.”

Version 2002.07.07

Chapter 1, Introduction, fourth paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“A generation later, Alfred Marshall used these marginalist concepts to develop a toolbox of models **to analyze markets after they have been shocked by change. Every student of microeconomics recognizes these partial equilibrium models as the familiar supply and demand curves of comparative static analysis.**”

was changed to:

“A generation later, Alfred Marshall used these marginalist concepts to develop a toolbox of **partial equilibrium** models **for predicting the effects of external shocks on markets.**”

Chapter 4, Secular Humanist Ends, fourth paragraph, last sentence

Changed “ill-defined needs” to “illusive needs.”

Chapter 4, Eliminating Simplistic Theories, last two paragraphs

“Trinitarianism provides an explanation of altruism in its least selfish form. However, it fails to consider a usefully complete range of human motivations and so too often fails to find the most effective problem to solve. This lesson applies to other theories as well. We should reject the theories of Sigmund Freud, which focuses on procreation, and of Alfred Adler, which focuses on power. This does not mean that we should reject more complex theories that incorporate elements of these two theories.

“We are complex adaptive beings living in a complex adaptive world. We should beware of simple theories that claim to explain causation.”

was changed to:

“This example of misguided charity illustrates why we need theories that help us identify *all* of our needs. Theories that seek to explain our needs based on a single level of abstraction, such as the selfish gene theory, positive rights postmodernism, and naïve Trinitarianism, only help us identify *some* of our needs. We owe it to ourselves to eliminate teleonomic theories that consider only a single level of abstraction.”

Chapter 4, Summary, last sentence

“This tolerance is based on our incomplete knowledge of our ultimate ends and of the best means to them, **rather than on the presumed right to do as we please.**”

was changed to:

“This tolerance is based, **not on the presumed right to do as we please, but** on our incomplete knowledge of our ultimate ends and of the best means to them.”

Version 2002.07.11

Chapter 1, Overview, fourth sentence

Deleted “(‘muddle-headed’)” and “(‘simple-minded’).”

Chapter 4, Eliminating Teleonomic Theories, heading

Changed “Teleonomic” to “Simplistic.”

Chapter 4, Eliminating Simplistic Theories, second paragraph, first two sentences

“The fact that Maslow’s becoming needs fall into two categories, physical needs and mental needs, suggests a method of discovering misleading theories. These two types of needs emerge at different levels of abstraction.”

was changed to:

“Our needs are complex in that they at more than one level of abstraction. Consider our physical needs and mental needs.”

Chapter 6, A Simple (Simplistic?) Model of Progress and Turbulence, heading

Deleted “(Simplistic?)”

Chapter 6, A Simple Model of Progress and Turbulence, first paragraph

“We can imagine a freely evolving economy consisting of people seeking happiness. Given that these people tend to implement better means whenever they are not busy responding to turbulence, the level of turbulence will tend toward a critical value. If a catastrophe increases the level of turbulence past the critical value, they will spend less time (and other resources) implementing better means and more responding to turbulence, which tends to return the level of turbulence to the critical value. On the other hand, if they make exceptionally good decisions, they will have more time (and other resources) to implement better means, which creates turbulence. Again, the level of turbulence tends to return to the critical value.”

was changed to:

“Imagine an economy filled with free and wise people pursuing happiness. Given that people pursuing happiness seek to find and implement better means whenever they have the resources to do so, the level of turbulence economy will tend toward a critical value. When turbulence exceeds the critical value, people will be forced to spend more resources, particularly time, responding to turbulence. This will leave them fewer

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

resources for finding and implementing better means. The resulting decrease in new means will eventually decrease turbulence. On the other hand, when turbulence falls below the critical value, people will have more resources for finding and implementing better means. The resulting increase in new means will eventually increase turbulence. In both cases, the level of turbulence tends to return to the critical value.”

Chapter 6, A Simple Model of Progress and Turbulence, second paragraph

“In reality, we are neither completely free to pursue happiness nor wise enough to do so. Relaxing the assumptions that people are both free and wise enough to pursue happiness lowers the quality of decision-making. This has opposing effects on the level of turbulence. On the one hand, it tends to slow the rate of progress, which lowers the level of turbulence. On the other, it tends to increase economic viscosity, which raises the level of turbulence for a given rate of progress. The overall effect of lowering the quality of decision-making on the level of turbulence is unclear. The only thing that is clear is that lowering the quality of decision-making slows progress and wastes resources.”

was deleted.

Chapter 6, A Simple Model of Progress and Turbulence, last paragraph, first sentence

Changed “simple” to “weakly chaotic.”

Chapter 6, A Simple Model of Progress and Turbulence, last paragraph, last two sentences

“It tells us to beware of policies that address the symptoms of economic turbulence (unemployment and transient inflation) rather than its cause (poor decision making). When such policies lower the quality of decision-making, they retard progress.”

changed to:

“It tells us to focus on the cause of economic turbulence, poor decision-making, rather than on its symptoms, transient inflation and unemployment. When policies meant to treat the symptoms lower the quality of decision-making, they retard progress.”

Chapter 6, A Simple Model of Progress and Turbulence, last paragraph, third sentence

Inserted the following footnote:

“This model predicts a chaotic phase space trajectory that creates what appears to be (but isn't) an exploitable trade-off between transient inflation and unemployment (a

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Phillips curve). It also predicts that economic avalanches will follow a power law. Note that these two predictions are based on assumption that people pursue happiness. Violating this assumption has two opposing effects on the level of turbulence. On the one hand, it tends to slow the rate of progress, which lowers the level of turbulence. On the other, it tends to increase economic viscosity, which raises the level of turbulence for a given rate of progress. The overall effect is to make the system less weakly chaotic, hence less predictable.”

Version 2002.07.18

Chapter 1, Introduction, second paragraph, fourth sentence

Changed “warrant” to “justify.”

Chapter 6, Economic Viscosity, last paragraph

“In a competitive market, individuals and managers experiment with new decision-making methods. In the long run, the best methods are emulated and the worst are discarded. **Because of this, competitive** economies tend to become **ever** more fluid.”

was changed to:

“In **freely evolving economies**, individuals and managers experiment with new decision-making methods. In the long run, the best methods are emulated and the worst are discarded. **Thus, freely evolving** economies tend to become more fluid **over time**.”

Chapter 7, Introduction, first paragraph

“The normative end of government is administering justice. From the recursionist perspective put forth in this work, administering justice is a matter of continuously improving the quality of decision-making. To do this well, governments **must** have a **learning** strategy to help decide who makes what decisions under what incentives. What constitutes a good **learning** strategy? This chapter considers several factors: **freedom**, moral vision, just taxation, and lucid culture.”

was changed to:

“The normative end of government is administering justice. From the recursionist perspective put forth in this work, **government policy makers administer justice by deciding who makes what decisions under what incentives. Excellence in** administering justice is a matter of continuously improving the quality of decision-making. What constitutes a good strategy **for deciding who makes what decisions under what incentives, one that continuously improves the quality of decision-making?**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

This chapter considers several factors: **decentralization**, moral vision, just taxation, and lucid culture.”

Chapter 7, Freedom, heading

The heading was changed from “Freedom” to “Decentralization”

Chapter 7, Decentralization, first paragraph

“**The JIT example highlighted the benefits of decentralized decision-making.** The following **describes three** prescriptions for decentralizing decision-making.”

was changed to:

“**Learning how to progress toward our ultimate ends ever more wisely, like learning how to manufacture batches of different goods ever more efficiently, is an infinitely large, amorphous problem. Such problems yield more readily to many average minds acting in unison than to a few exceptional minds directing many hands.** The following **provides two** prescriptions for decentralizing decision-making **wisely.**”

Chapter 7, Consider Incentives and Enforcement Costs, first paragraph, third sentence

“(authoritarian in **regard to** means, progressive in **regard to** ends)”

was changed to:

“(authoritarian in means, progressive in ends)”

Chapter 7, Consider Incentives and Enforcement Costs, third paragraph, last sentence

Inserted the following footnote (which was the last paragraph of this section):

“Regrettably, we currently have no theory that captures enough of reality to provide us with cookbook judgments about government intervention. *Public choice economics* provides insights into the dynamics of how governments actually work and the field of *law and economics* provides insights into the cost of enforcing laws. The emerging science of complex dynamic systems may eventually provide us with the transaction cost theory that Ronald Coase called for in his Nobel lecture. Until computer simulation provides us with such a tool, judging government interventions will remain more art than engineering.”

Chapter 7, Consider Incentives and Enforcement Costs, second to last paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“As public choice economist Mancur Olson observed, those that benefit from such interventions will **vigorously oppose changing or eliminating it.**”

was changed to:

“As public choice economist Mancur Olson observed, **this makes them nearly impossible to rescind.**”

Chapter 7, Consider Incentives and Enforcement Costs, second to last paragraph, end of third sentence

Inserted the footnote:

“Popular solutions to this problem of democratic governance include limiting terms in office, campaign contributions, and campaign expenditures. None of these solutions addresses the fundamental problem, which is public ignorance and apathy. The surest solution involves creating a culture that considers creating or maintaining programs and policies that benefit special interests at the expense of the general public and future generations to be as evil as dumping toxic industrial waste down storm sewers. Given such a culture, the problem becomes one of exposing those who create or maintain these barriers to progress.”

Chapter 7, Consider Incentives and Enforcement Costs, second to last paragraph, last sentence

“Given that **any intervention by government tends to become permanent**, prudence demands that **the burden of proof as to whether an intervention is just or unjust should fall on the government.**”

was changed to:

“Given that **unjust government interventions are nearly impossible to rescind**, prudence demands that **policy makers err on the side of not intervening.**”

Chapter 7, Consider Incentives and Enforcement Costs, last paragraph

This paragraph was converted to footnote, which was placed at the end of the third paragraph. (See above.)

Chapter 7, Eliminate Barriers to Progress

This section was deleted. Parts were used to create the new footnote at the end of the previous section. (See above.)

Chapter 7, Moral Vision, second paragraph, fourth and fifth sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The higher we are in this hierarchy, the more we need a vision to help us **understand** what **we currently need**. Second, as we accumulate **wealth**, the pace of change tends to increase, which makes following the virtuous path of accumulating wealth and accelerating change more difficult.”

was changed to:

“The higher we are in this hierarchy, the more we need a vision to help us **know** what **to do**. Second, as we accumulate **useful knowledge**, the pace of change tends to increase, which makes following the virtuous path of accumulating wealth and accelerating change more difficult.”

Chapter 7, Moral Vision, third paragraph

“Note that a moral vision is not the same as moral values. Where the former recognizes our ignorance, the latter does not. The failure to distinguish between these two has led some famous liberals and progressives to recommend conservative actions. Both liberal Thomas Jefferson and progressive Theodore Roosevelt feared that the accumulation of material wealth would destroy American virtue. Their prescription was a set of behaviors meant to impart the “right” moral values. For Jefferson this was the life of a gentleman farmer and for Roosevelt it was a periodic return to the vigorous outdoor life of America’s frontier past. Both were blind to the possibility of discovering values and behaviors that help us satisfy our needs better than existing ones do. In information age economies, what matters most is not values and behaviors, but vision and concepts.”

was converted to a footnote.

Chapter 7, Just Taxation, first paragraph

“All forms of taxation disrupt **markets**. Just forms disrupt **markets** in ways that promote progress.”

was changed to:

“All forms of taxation disrupt **the coordination of decision-making**. Just forms disrupt **it** in ways that promote progress.”

Chapter 7, Just Taxation, second paragraph, last sentence

“Over time, **lowering the demand for oil and providing an example of inducing new knowledge** will reduce the risk of war over oil.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Over time, **inducing such knowledge** will reduce the risk of war over oil **and other scarce resources.**”

Chapter 7, Lucid Culture, first paragraph, first and second sentences

“All cultures are mixtures of lucidity, passion, and dark inertia, **where lucidity concerns the pursuit of happiness, passion concerns the pursuit of pleasure, and dark inertia concerns the pursuit of nothing.** Given the **reasonableness** of pursuing happiness, we might expect there to be a trend toward lucidity.”

were replaced by the following footnote in the next sentence:

“All cultures are mixtures of lucidity, passion, and dark inertia. **When lucidity prevails, we pursue happiness; when passion prevails, we pursue pleasure; and when dark inertia prevails, we pursue nothing.** Given the **wisdom** of pursuing happiness, we might expect there to be a trend toward lucidity.”

Chapter 7, Lucid Culture, eighth paragraph, second and third sentences

“Given that economies are complex recursive systems, this question is simply a variation of our original question of what is the best learning decision strategy. Nevertheless, it is a useful one to ask in that it focuses our attention on relationships.”

were replaced by the following footnote in the next sentence:

“Delving deeper returns us to our original question, what is the best learning strategy?”

Chapter 7, Lucid Culture, ninth paragraph, first sentence

“Near the top of the list of barriers to free association...”

was changed to:

“A good example of such a barrier in the United States...”

Afterword, fourth to the last paragraph

“As a practical matter, liberals and conservatives can talk to, rather than past, each other by adhering to two principles. The first is to recognize the normative end of reverence for life. The second is to use the broadest definition of the problem for which there is empirical evidence. In the commuter airlines example, this would likely be whether the proposal to regulate commuter airlines like major airlines would actually save lives.”

was deleted.

Version 2002.07.25

Chapter 1, Introduction, heading

“Introduction”

was changed to:

“Concepts of Wealth”

Chapter 1, Concepts of Wealth, first paragraph, third sentence

“They belong to the class of resources that are **forms**, patterns of matter, energy, space, and time. We can think of this class **of resources** as **useful knowledge**.”

was changed to:

“They belong to the class of resources that are patterns of matter, energy, space, and time. We can think of this class as *knowledge resources*.”

Chapter 1, Concepts of Wealth, first paragraph, last two sentences

“**Useful knowledge** resources differ from **non-knowledge scarce** resources in a fundamental way: *although they can be costly to create and to put into production, once in production, they are free.* * **Once we put knowledge to use, we do not have to pay to do so again.**”

was moved to the beginning of a new paragraph and changed to:

“**Knowledge resources** differ from **other** resources in a fundamental way: *although they can be costly to create, to reproduce, and to place into production, once in production, they are free.* * **Using a pattern does not exhaust it.**”

Chapter 1, Concepts of Wealth, first footnote

“For both simplicity and to avoid debate over whether knowledge not yet in use is ‘scarce,’ all future references to ‘scarce resources’ will refer to non-knowledge scarce resources.”

was changed to:

“This work classifies resources into three categories: (1) scarce resources, (2) free resources, and (3) knowledge resources. Scarce resources are those that are costly to use. Free resources are those that are costless to use and costless to put into

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

production. Knowledge resources are those that are costless to use but costly to put into production.”

Chapter 1, Concepts of Wealth, new third paragraph, second through sixth sentences

“This great benefit comes at a cost. Because we do not have to pay to put to use knowledge already in use, knowledge in use has an advantage over otherwise superior knowledge not yet in use. For example, once a railroad company has laid its track, changing the distance between rails is very expensive. Rarely does the benefit of changing this distance justify doing so. Economists usually think of this effect, which economist Brian Arthur calls “lock-in,”¹ in terms of technology. However, it applies to all forms of useful knowledge, including concepts.”

was changed to:

“The inexhaustibility of knowledge gives knowledge in use an advantage over knowledge not yet in use. This advantage is equal to the cost of placing into service the pattern not yet in service. Consider the advantage that existing railroad track has over the same rails set on the same track bed at a slightly different distance between rails. This advantage is equal to the cost of resetting the pattern, in this case, the cost of resetting the rails. This *lock-in effect*⁺ applies to all forms of useful knowledge, including concepts.”

Chapter 1, Overview, third and fourth sentences

“The third proposes the strategy. The fourth takes an inclusive look at our ultimate ends and the fifth takes a discriminating look at the means to them.”

was changed to:

“The next three present the strategy. The third proposes the strategy, the fourth refines the set of ultimate ends that deserve our tolerance, and the fifth refines our understanding of excellence in means.”

Chapter 4, title

“Ultimate Ends” was changed to “Refining Ultimate Ends.”

Chapter 4, Reconciling Teleonomic Theories, second paragraph, first two sentences

“However, if we seek what is *useful*, we can reconcile these two logically incompatible belief systems. **Materialists and dualists can agree on Schweitzer’s ultimate end of reverence for life.**”

was appended to the first paragraph and changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“However, if we seek what is *useful*, we can reconcile these two logically incompatible belief systems **by finding a common ultimate end.**”

Chapter 4, Reconciling Teleonomic Theories, new second paragraph

“As previously stated, strategic economic theories ought to concern what beings capable of using the knowledge that they create would do if they were wise. Is Schweitzer’s ultimate end of reverence for life wise? A thorough examination of this issue exceeds the bounds of this essay. In its place, the author offers his views of how Schweitzer’s reverence for life fits into secular and religious humanism, humanity’s materialist and dualist teleonomic traditions.”

was changed to:

“Humanity’s materialist and dualist teleonomic traditions are secular and religious humanism. The following two sections argue that secular and religious humanists can agree on Albert Schweitzer’s ultimate end of reverence for life.”

Chapter 4, Reconciling Teleonomic Theories, last paragraph

“In addition to supporting the claim that reverence for life is wise, the following two sections introduce a number of useful concepts. These include the humanist definition of happiness, the need for “mystical oneness,” and normative (versus temporal) ends.”

was deleted.

Chapter 4, Eliminating Simplistic Theories, heading

“Simplistic” was changed to “Teleonomic.”

Chapter 4, Eliminating Simplistic Theories, first paragraph

“If we accept that reverence for life is wise, then we can develop two means of eliminating teleonomic theories. The first is simply to eliminate theories that are clearly incompatible with reverence for life. The most obvious examples are theories based on too narrow a conception of who ‘we’ are. The second is to eliminate misleadingly simple theories, theories that don’t yield the best problems for achieving the ultimate end of reverence for life.”

was changed to:

“If we can agree on the ultimate normative end of reverence for life, then we can develop rules for eliminating theories that don’t yield the best problems for achieving this end. An obvious rule is to eliminate theories that are based on too narrow a conception of who ‘we’ are. A less obvious rule is to eliminate theories that are based on a single level of abstraction.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 4, Summary, last paragraph

“This chapter proposed accepting Schweitzer’s reverence for life as the ultimate normative end of life. It then used this guiding principle to develop pragmatic means of eliminating teleonomic theories. Applying these means to the set of all teleonomic theories yields a set of theories that deserve our tolerance. This tolerance is based, not on the presumed right to do as we please, but on our incomplete knowledge of our ultimate ends and of the best means to them.”

was changed to:

“This chapter proposed using humanism’s conceptual framework and highest ideal to refine the set of ultimate ends that deserve our tolerance. This process provides us with both a moral vision and a conceptual framework for thinking about our ultimate ends and the best means to them.”

Version 2002.07.28

Preface, eighth paragraph

Changed “human nature” to “our nature” in the first and third sentences.

Chapter 3, Introduction, second paragraph

Added new section titled “The Nature of Theories.”

Chapter 3, The Nature of Theories

Moved paragraph starting with the sentence “*Theories are subjective.*” to the beginning of the section.

Moved last section, “Science as a Process,” forward, demoted it to subsection status, and changed the opening sentences from:

“The proposed strategy refines everyday thinking. This is consistent with Einstein’s conception of science:”

to:

“Einstein tells us that if we are to understand science, we need to analyze the nature of everyday thinking:”

Chapter 3, The Nature of Theories, last paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“To do so, we need (1) agreement about the general nature of our ultimate ends and (2) the means to measure how well explanations help us find problems to solve.”

was changed to:

“To do so, we need agreement about the general nature of our ultimate ends and the means to measure how well explanations help us find problems to solve.”

Chapter 3, The Nature of Theories, second paragraph, first sentence

“Einstein tells us to analyze the process of everyday thinking.”

was deleted.

Chapter 3, The Strategy for Choosing Economic Explanations

Changed the title to: “The Strategy for Progress.”

Inserted the following paragraphs at the beginning of the section:

“The last two decades of the twentieth century, Adam Smith’s vision of a beneficent self-organized system driven by individuals’ free pursuit of enlightened self-interest gained ground around the world. While proponents of this vision celebrated free markets, opponents patiently waited for the next crisis. That crisis arrived in the form of a series of scandals involving malfeasance in corporate governance, accounting, and investment banking in the United States.”

“Free market proponents and opponents interpret this malfeasance, this unenlightened decision-making, very differently. Proponents perceive it as a regrettable by-product of the process of improving the quality of decision-making. Opponents perceive it as a systemic problem that governments ought to eradicate.”

“The problem of unenlightened decision-making is made worse by economists’ failure to define enlightened self-interest adequately. To be enlightened is to be wise. We owe it to ourselves to act wisely. What do the wise want of life? What do the wise want of government?”

“The primary reason economists have failed to define enlightened self-interest adequately is that most limit economics to theories that predict. The notable exception is one small but increasingly influential group, the modern Austrian school of evolutionary economics.”

Polished balance of this section by eliminating sentences, rearranging paragraph breaks, and making a few small changes in wording.

Chapter 4, Introduction, third paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This chapter proposes a **pragmatic** means of reconciling materialist and dualist teleonomic theories. It then uses this reconciliation to develop means of **eliminating** teleonomic theories.”

was changed to:

“This chapter proposes a **practical** means of reconciling materialist and dualist teleonomic theories. It then uses this reconciliation to develop means of **refining the set of** teleonomic theories. **What remains are teleonomic theories that deserve our tolerance.**”

Chapter 5, title

Changed “Excellence in Means” to “Increasing Excellence.”

Chapter 5, Introduction, first sentence

“This chapter **outlines the** core theory of means.”

was changed to:

“This chapter **addresses deficiencies in modern Austrian economists’** core theory of means.”

Version 2002.08.15

Preface, fourth paragraph

“Recognizing the scarcity of knowledge creates an immediate problem for modern economists. Knowledge resources differ from non-knowledge resources in that using them does not deplete them. The act of creating knowledge adds an infinite element into economic calculations that changes mathematically tractable closed-ended economic models into seemingly intractable open-ended ones. Recognizing the scarcity of knowledge also creates a deeper problem for modern economists. Wisdom is a form of knowledge. Economic theories that consider wisdom must be based not on *what people will do*, but on *what the wise would do*. This is beyond the pale of what modern economists deem to be science. Most economists have chosen to stay with closed-ended models based on what people will do. In effect, they have chosen to ignore the possibility of solving economic problems by creating knowledge.”

was deleted.

Preface, new fourth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The root of these problems goes back to Adam Smith, the grandfather of modern economics.”

was changed to:

“The person most responsible for this ‘Second Wave’ (industrial age) bias is Adam Smith, the grandfather of modern economics.”

Preface, new tenth paragraph

“Further, I italicize the first use of unfamiliar terms.”

was changed to:

“I have also laid bare the essential arguments by eliminating much of the fluff that cushions conversational writing styles. I would rather have a few people understand the work than many misunderstand it.”

Preface, last paragraph, last four sentences

“Theories that predict help us solve given problems. In contrast, I advocate a simple-minded theory that explains causation. Theories that explain causation, such as Darwin’s theory of evolution and Wegener’s theory of plate tectonics, help us find better problems to solve. My *strategic* theory that explains what happens in economies compliments *tactical* theories that predict what will happen in markets.”

was changed to:

“In contrast, I advocate simple-minded theories that explain causation. Theories that predict help us solve given problems. Theories that explain causation, such as Darwin’s theory of evolution and Wegener’s theory of plate tectonics, help us find better problems to solve. *Wise decision-making requires performing both tasks well.*”

Chapter 1, Concepts of Wealth

Changed heading to “Modern Economics’ Key Concepts”

The fourth through seventh paragraphs were replaced by:

“All economic conceptual frameworks are founded on concepts that define the *end (goal) of economics* and *excellence in means*. In modern economics, these key concepts are the one hundred and thirty year old marginalist concepts of wealth and efficiency. The marginalist concept of wealth means consumer goods and the resources for producing them, where consumer goods are those goods and services that we buy to satisfy our wants and desires. The marginalist concept of efficiency means excellence in the the allocation of scarce resources at achieving a given end: the

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

most efficient means to a given end is the one that uses the least valuable scarce resources.”

The old third footnote at the end of the section was added to the end of the fifth paragraph of the section now titled “Managerial Excellence in Means.”

Chapter 1, Modern Economics' Blind Spot

Changed heading to “Marginalist Economics’ Blind Spot.”

Chapter 1, Marginalist Economics' Blind Spot, second and third sentences

“... focuses our attention on **the allocation of** scarce resources. In doing so, it tends to blind us to the possibility of creating useful knowledge.”

was changed to:

“... focuses our attention on **how we allocate** scarce resources **to achieve given ends**. In doing so, it tends to blind us to the possibility of creating useful knowledge **and finding better ends**.”

Chapter 1, Efficiency and Effectiveness

Changed heading to “Managerial Excellence in Means.”

Chapter 1, Managerial Excellence in Means, second paragraph

“This managerial concept of excellence in means **recognizes that we can learn. Instead of thinking about excellence in means as efficiency, we can think about it as the managerial combination of efficiency and effectiveness. Consider a 1993 decision about whether to develop digital or analog “next generation” television. Digital television is more versatile, but more expensive. However, digital television technology is progressing down a much steeper learning curve. We can reasonably expect that** within a few years advances in digital technology **will** eliminate most of analog television’s cost advantage. The efficient choice is analog, but the efficient and effective choice **is** digital. Choosing the right problem to solve is as important as choosing the right solution to a given problem.”

was changed to:

“This managerial concept of excellence in means **permits learning. It also permits finding better problems to solve. Consider the late twentieth century problem of setting standards for the next generation of analog television. After considering the problem for decades, the Japanese settled on a high definition standard that used the same height to width aspect ratio as widescreen movies. A few years later, the Americans settled on a more versatile digital standard. At the time, digital television**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was far more expensive than analog. However, **the Americans recognized that** digital television technology **was** progressing down a much steeper learning curve. Within a few years advances in digital technology **would** eliminate most of analog television's cost advantage. The 'efficient' choice **was** analog, but the 'efficient and effective' choice **was** digital. *By considering what they would do if they had more knowledge, the Americans found a better problem to solve.* Choosing the right problem to solve is as important as choosing the right solution to a given problem."

Chapter 1, Managerial Excellence in Means, third paragraph, first sentence

"Changing our concept of excellence in means from "efficiency" to "efficiency and effectiveness" ..."

was changed to:

"Changing our concept of excellence in means from the marginalist concept of efficiency to the managerial concept of efficiency and effectiveness ..."

Chapter 1, The Recursionist Approach, first paragraph, first sentence

"Changing our concept of excellence in means to "efficiency and effectiveness" ..."

was changed to:

"Changing our concept of excellence in means to **the managerial concept of** efficiency and effectiveness ..."

Chapter 1, The Recursionist Approach, second paragraph, second sentence

"Decision scientists tell us that formal decision-making **processes** consist of **four basic operations**: (1) finding a problem to solve, (2) identifying alternative solutions **to the chosen problem**, (3) selecting an alternative, and (4) implementing the selected alternative."

was changed to:

"Decision scientists tell us that formal decision-making consists of (1) finding a problem to solve, (2) identifying alternative solutions, (3) selecting an alternative, and (4) implementing the selected alternative."

Chapter 1, The Recursionist Approach, second paragraph, last two sentences

"Because we do not decide perfectly, this process wastes time and other resources. It is, as the English put it, a matter of "muddling through.""

was replaced by the former fourth paragraph:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Decision scientists tell us that formal decision-making processes consist of four basic operations: (1) finding a problem to solve, (2) identifying alternative solutions to the chosen problem, (3) selecting an alternative, and (4) implementing the selected alternative. Of course, not all decisions deserve the scarce resources necessary for formal decision-making. Less important decisions ought to be made by habit, standard procedure, or decision rules. The decision to employ these cheaper means for certain types of decisions is itself a decision, which often warrants formal deliberation.”

plus the following new paragraph

“We do not decide perfectly. Our mistakes waste time and other resources. However, *given a learning attitude*, we learn from our mistakes. *Given a learning attitude*, waste from imperfect decision-making is a regrettable by-product of learning through experience.”

Chapter 1, Managerial Excellence in Means, first paragraph, footnote, second sentence

“The focus here is on the problems of individual economic agents.”

was changed to:

“The focus here is on the problems of individual economic agents, which includes the problem of what individuals owe to themselves to want of government.”

Chapter 1, Overview, fourth through sixth sentences

“**The next three** present the strategy. **The third proposes strategy, the fourth refines the set of ultimate ends that deserve our tolerance, and the fifth refines our understanding of excellence in means.** The final two chapters discuss **macroeconomic issues.**”

was changed to:

“**Chapters three, four, and five** present the strategy. The final two chapters discuss **what modern economists call macroeconomic issues.**”

Chapter 3, The Strategy for Progress, first through fourth paragraphs

“The last two decades of the twentieth century, Adam Smith’s vision of a beneficent self-organized system driven by individuals’ free pursuit of enlightened self-interest gained ground around the world. While proponents of this vision celebrated free markets, opponents patiently waited for the next crisis. Inevitably, opponents will find a suitable crisis. They need only wait for poor private sector decision-making to hurt a substantial number of people.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Free market proponents and opponents interpret this malfeasance, this unenlightened decision-making, very differently. Proponents perceive it as a regrettable by-product of the process of improving the quality of decision-making. Opponents perceive it as a systemic problem that governments ought to eradicate.”

“The problem of unenlightened decision-making is made worse by economists’ failure to define enlightened self-interest adequately. To be enlightened is to be wise. We owe it to ourselves to act wisely. What do the wise want of life? What do the wise want of government?”

“The primary reason economists have failed to define enlightened self-interest adequately is that most limit economics to theories that predict. The notable exception is one small but increasingly influential group, the modern Austrian school of evolutionary economics.”

was changed to:

“The recursionist approach to economics aims at improving the quality of decision-making. Formal decision-making consists of (1) finding a problem to solve, (2) identifying alternative solutions, (3) selecting an alternative, and (4) implementing the selected alternative. To perform the first two tasks well, decision-makers need theories that explain causation based on what the wise would do. The economics profession fails to provide such theories.”

“Why has the economics profession failed to provide decision-makers with theories that explain causation based on what the wise would do? The major reason is that most schools of economics believe that the primary purpose of economic theories is to predict, not explain, the world. The notable exception is one small but increasingly influential school, the modern Austrian school of evolutionary economics.”

Chapter 3, The Strategy for Progress, new seventh and eighth paragraphs

The seventh paragraph was converted into a footnote, which was placed at the end of the eighth paragraph. The reference to Ludwig von Mises and associated endnote was moved to the eighth paragraph. The opening sentence of the footnote was changed slightly. The last sentence of the footnote was deleted.

Chapter 5, Increasing Excellence

Changed title back to “Excellence in Means.”

Chapter 5, second footnote

Eliminated all quotation marks.

Chapter 6, Introduction, third paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This little thought experiment exposes the foolishness at the heart of **modern** macroeconomics.”

was changed to:

“This little thought experiment exposes the foolishness at the heart of macroeconomics.”

Chapter 7, Just Taxation, second paragraph, last sentence

Added the footnote:

“There are two major issues to consider. The first is whether we can trust policy makers to act justly. The second is whether policy makers have enough knowledge to act justly. Given the practical impossibility of ridding ourselves of unjust government policies, it is better to err on the side of caution.”

Version 2002.08.15

Preface, last three paragraphs

“**Alfred North Whitehead** once remarked that his friend and collaborator, **Bertrand Russell**, always focused on what was of primary importance, while he tried to make sense of complexity: “You know, there are two sorts of people in the world, the muddle-headed and the simple-minded. You, Bertie, are simple-minded; I am muddle-headed.”

“**I am muddle-headed in my pursuit of the truth (per se), but simple-minded in my pursuit of the useful.** Economies are more complex than we can possibly imagine. Over time, small events, including small changes in beliefs, can have huge consequences. Capturing this complexity in its entirety is far beyond our mental abilities. The best we can do is to capture what is most useful for the task at hand.”

“This instrumental approach to economics is not new – Milton Friedman took it in his 1953 essay, “The Methodology of Positive Economics.” In this most cited economics paper, Friedman advocates **what Whitehead would call “simple-minded”** theories that predict. In contrast, I advocate **simple-minded** theories that explain causation. Theories that predict help us solve given problems. Theories that explain causation, such as Darwin’s theory of evolution and Wegener’s theory of plate tectonics, help us find better problems to solve. Wise decision-making requires performing both tasks well.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Economies are more complex than we can possibly imagine. Over time, small events, including small changes in beliefs, can have huge consequences. Capturing this complexity in its entirety is far beyond our mental abilities. The best we can do is to capture what is most useful for the task at hand.”

“This instrumental approach to economics is not new – Milton Friedman took it in his 1953 essay, “The Methodology of Positive Economics.” In this most cited economics paper, Friedman advocates theories that predict. In contrast, I advocate theories that explain causation. Theories that predict help us solve given problems. Theories that explain causation, such as Darwin’s theory of evolution and Wegener’s theory of plate tectonics, help us find better problems to solve. Wise decision-making requires performing both tasks well.”

Chapter 1, Modern Economics’ Key Concepts

Changed heading to “Conceptual Resources.”

Moved fourth paragraph to next section.

Chapter 1, Marginalist Economics’ Blind Spot

Changed heading to “Modern Economics’ Blind Spot.”

Chapter 1, Modern Economics’ Blind Spot, new second paragraph, third sentence

“In doing so, it tends to blind us to the possibility of **creating useful knowledge and finding better ends.**”

was changed to:

“In doing so, it tends to blind us to the possibility of finding better ends, **particularly those that involve creating useful knowledge.**”

Chapter 4, Introduction, footnote, first paragraph

Inserted the paragraph:

“The rationale for using teleonomic theories is that we, like all other biological organisms, are motivated by internal programming. This is not to say that our programming works the same as that of other organisms. To say that it does is to deny the emergence of higher level phenomena such as human consciousness.”

Chapter 5, Title and Section Headings

“Excellence in Means” was changed back to “Increasing Excellence.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Excellence in Consumption” was changed to “Consumption.”

“Excellence in Trade” was changed to “Trade.”

“Excellence in Production” was changed to “Production Technology.”

Chapter 5, Introduction, first paragraph

“This chapter addresses deficiencies in modern Austrian economics’ core theory of means. It begins with an outline of excellence in consumption, which describes the pursuit of happiness. Next is an outline of excellence of trade, which emphasizes current misconceptions about trade. Following that is a brief discussion of excellence in production, which emphasizes the complex relationships between excellence in production, trade, and consumption. The chapter ends with a reminder that the focus of recursionist economics is on processes rather than states of the world and on individuals rather than organizations.”

was changed to:

“Increasing excellence in means is a matter of substituting knowledge for non-knowledge resources in progressing toward our ultimate ends. This can be a matter of choosing better means to a given subordinate end. It can also be a matter of choosing better subordinate ends.

“Some concepts derived from marginalist economics tend to blind us to better means and subordinate ends. This chapter proposes alternatives to four of these concepts: consumption, trade, production technology, and profit. To paraphrase Mark Twain, ‘It ain’t what you don’t know that gets you into trouble. It’s what you know for sure that just ain’t *useful*.’”

Chapter 5, Consumption, first paragraph, first sentence

“**Recursionist economics’** humanistic ethics differs markedly from utilitarianism, **the ethical base of the marginalist economics.**”

was changed to:

“**The marginalist concept of consumption is loosely based on Jeremy Bentham’s utilitarian ethics. In contrast, the recursionist concept is based on a loose amalgam of humanistic ethical theories. Humanistic ethics differs markedly from utilitarianism.** Humanistic ethics differs markedly from utilitarianism.”

Chapter 5, *The Effect of the Information Revolution*, entire section including references

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Market forces create incentives to lower trading relationship costs. In rapidly changing economies, these forces tend to lower fixed trading costs as well as marginal ones. In 1932, economist Ronald Coase observed that firms would expand until the costs of doing business within the firm equaled those of doing business outside the firm.¹⁹ Coase’s insight allows us to imagine what the world would be like if the fixed costs of establishing, maintaining, and ending low variable cost trading relationships fell to zero. In such a world, there would be no distinction between activity inside and outside firms. Everyone in the private sector would be a subcontractor to a single, continuously reorganizing, internally competitive, horrendously complex virtual firm. It is toward this end that the knowledge intensive segments of economies are being driven. Examples of such fluid organization include Hollywood, Wall Street, and the Silicon Valley.”⁺”

“¹⁹ Coase, Ronald, “The Institutional Structure of Production”, 1991 Alfred Nobel Memorial Prize Lecture in Economic Sciences, reprinted in *Essays on Economics and Economists* (Chicago: University of Chicago Press, 1994).”

“⁺ From the marginalist perspective, understanding the complex adaptive process that leads toward this end is problematic. As logical time horizons shrink, the long-term strategic issue of what assets to own encroaches on the short-term tactical issue of how to best manage currently owned assets. When the extraordinary activity of redeploying assets becomes ordinary, firms are no longer firm, which makes studying the ordinary behavior of firms very difficult. From the recursionist view, the focus is on decision-making rather than on how firms allocate scarce resources. The fact that firms are no longer firm is not a problem.”

were deleted.

Chapter 5, Production Technology, first paragraph, first two sentences

“Production technology is not simply something that comes out of a research and development lab or manufacturing engineering department. As the rapid tool-setting example showed, a well designed and implemented production process can produce both product and the knowledge of how to improve the production process.”

was changed to:

“Production technology is the knowledge of how to produce a product. As the rapid tool-setting example showed, a well designed and implemented production process can produce both product and production technology.”

Chapter 6, Introduction, second paragraph, fourth sentence

“Economists would record an immediate fall in aggregate production and rise in unemployment and inflation.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Economists would record an immediate fall in aggregate production and rise in unemployment. **Consumer prices would also rise as resources formerly used to produce consumer goods are diverted to the reallocation process.**”

Version 2002.08.22

Preface, second paragraph

Inserted the paragraph

“Modern economic science focuses on the allocation of scarce resources. In doing so, it ignores the process of creating useful knowledge. Equally important, its theory of consumption ignores knowledge of how to live wisely. Arguably, these are the two most important aspects of information age economies.”

Preface, new third paragraph

“In a **widely discussed** article published in the February 1997 issue of *The Atlantic Monthly*, **billionaire speculator George** Soros wrote that the main threat to an open society no longer comes from communism but from capitalism. **Soros** fears that we place too much faith in laissez-faire economic theories. **He** calls for a conceptual framework that recognizes our fallibility. **In economic terms, he calls for explicitly recognizing the scarcity of knowledge as well as non-knowledge resources.**”

was changed to:

“**Billionaire speculator George Soros believes that the threat posed by modern economic science is dire.** In an article published in the February 1997 issue of *The Atlantic Monthly* **titled *The Capitalist Threat***, Soros wrote that the main threat to an open society no longer comes from communism but from capitalism. **He** fears that we place too much faith in laissez-faire economic theories. **To counteract this, he** calls for a conceptual framework that recognizes our fallibility.”

Preface, new fourth paragraph, first sentence

“**Futurists Alvin and Heidi Toffler see the failure of modern economic theories** to consider knowledge adequately more of a missed opportunity than a threat.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Futurists Alvin and Heidi Toffler **are less alarmed**. **They** see modern economic **science’s** failure to consider knowledge adequately more of a missed opportunity than a threat.”

Preface, new fifth paragraph, first sentence

Changed “... modern economics” to “... modern economic **science**.”

Preface, new sixth paragraph, fifth sentence

Changed “knowledge of how to **act** wisely” to “knowledge of how to **live** wisely.”

Preface, new eighth paragraph

“Traditional theories of ethics, politics, and economics ultimately rest on unverifiable fundamental assumptions about our nature. Given that we will never be able to agree on these assumptions, I propose suspending a set of theories from a vague description of an ideal ultimate end. As we discover more about our nature, we can eliminate members of this set. This approach works regardless of our current beliefs. Think of how hikers climb a hill. Regardless of where they begin, they can find their way to the top by heading toward it.”

was deleted.

Preface, new eighth paragraph, first sentence

“An immediate benefit of this **convergence** strategy is that it provides us with a strategic world-view and related conceptual framework that can help us find the better tactical problems to solve.”

was changed to:

“An immediate benefit of this strategy is that it provides us with a strategic world-view and related conceptual framework that can help us find the better tactical problems to solve”

Chapter 1, The Recursionist Approach, title

“The Recursionist Approach” was changed to “The Recursionist Strategy.”

Chapter 1, Recursionist Economics, fifth paragraph, first sentence

“The recursionist **approach** aims at improving decision-making by improving the factors of good decision-making.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The recursionist **strategy** aims at improving decision-making by improving the factors of good decision-making.”

Chapter 3, The Strategy for Progress, title

“The Strategy for Progress” was changed to “A New Foundation for Explanation.”

Chapter 3, A New Foundation for Explanation, first paragraph, first sentence

“The recursionist approach to economics... ” was changed to “The recursionist strategy....”

Chapter 3, A New Foundation for Explanation, last three paragraphs

“The subject of how we turn knowledge and scarce resources into progress toward our ultimate ends is the metaphysical equivalent of quicksand. Fortunately, Einstein has given us a rope in the form of his philosophy of knowledge, which recognizes that we form concepts by means of the “free inventions of the human intellect” (intuition) rather than reason.⁷ If we can agree on an ultimate end, we can use Einstein’s rope to pull ourselves across this quagmire.

“At first glance, it may seem that this suggestion is of little use in that there appears to be no ultimate end strong enough to support us. Agreeing on an ultimate end is at least as difficult as agreeing on a foundation of metaphysical assumptions about our nature. However, we can choose to define a *set of ultimate ends*, which provides more support than any one such end. We can then formulate a theory of means that is common to all members of this set. This strategy has two advantages. First, it allows us to avoid most of the metaphysical problems associated with defining a single ultimate end. Second, it makes the problem of defining ultimate ends part of the economic problem that we must solve. As we learn more, we can eliminate members of this set without having to change our core theory of means.

“Contrary to modern Austrian doctrine, we can think in terms of what we need to achieve our ultimate ends even when we only have a rough idea of what our ultimate ends are and what we need to achieve them.”

were changed to:

“We can correct this deficiency by replacing modern Austrian economics’ marginalist foundation with an evolutionary one. To do so, the explanations that we use to help us satisfy our needs and the explanations that we use to define our needs must both fit together and work together. We can insure that these two types of explanations fit together by defining our needs and ultimate ends tautologically: *our needs are those things we need to progress toward our ultimate ends and our ultimate ends are what we progress toward when we satisfy our needs*. We can insure they work together by assuming that we are motivated to satisfy our needs. *Teleonomic theories*, theories that

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

look to an internal program or programs to explain what motivates us, satisfy both of these conditions.**7

“Modern biology provides the rationale for using teleonomic theories as the foundation for evolutionary explanations. It tells us that everything is evolving. It also tells us that our beliefs and behaviors are evolving many orders of magnitude faster than our internal programming. Therefore, we can safely assume that our internal programming is fixed.

“Although we can safely assume that we have fixed internal programming, we do not know, and may never know completely, what this internal programming is. The best we can hope to know is what it is not. Thus, the process of solving the global economic problem must include the process of eliminating inadequate teleonomic theories from the set of all teleonomic theories.

“Rather than basing evolutionary explanations on what we currently want, which ignores the possibility of solving problems by learning to live more wisely, we can base them on the set of all teleonomic theories. Over time we can tighten these loose explanations by eliminating members of this set.”

Chapter 3, A New Foundation for Explanation, fourth footnote

Added the fourth footnote:

“+ Teleonomic theories are positive in that they describe the world as it is: We are motivated to follow our internal programming. Teleonomic theories are also normative in that they prescribe what we ought to do: We *owe it to ourselves* to live good lives, which is the end we achieve by successfully following our programming. Thus, we *ought* to follow our internal programming. For more on the philosophical argument supporting this apparent contradiction of David Hume, see Mortimer Adler’s book, *Ten Philosophical Mistakes*.”

Chapter 3, A New Foundation for Explanation, fifth footnote

Added the fifth footnote:

“** This may not always be the case. The next economic era is most likely to be defined by our ability to change our internal programming. A major challenge of the information age must be to accumulate the wisdom we will need to meet the challenges of the coming era.”

Chapter 3, A New Foundation for Explanation, seventh endnote

⁷ Einstein, Albert, “On the Method of Theoretical Physics”, The Herbert Spencer Lecture delivered at Oxford, June 10, 1933, reprinted in *Ideas and Opinions* (New York: The Modern Library, 1994).”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Adler, Mortimer, *Ten Philosophical Mistakes* (New York: Macmillan, 1985), Part 2.”

Chapter 3, Summary

“This chapter proposed a strategy for progress, which involves **defining and** gradually tightening **a loose theory** of means to our ultimate ends. **This loose theory of means consists of a core theory of means suspended from a set of ultimate ends.** This **loose theory** stands ready to be proved less useful than competing explanations in helping us find better problems to solve.”

was changed to:

“This chapter proposed a strategy for progress, which involves gradually tightening **loose evolutionary explanations** of means to our ultimate ends. **These explanations** stand ready to be proved less useful than competing explanations in helping us find better problems to solve.”

Chapter 4, title

“Refining Ultimate Ends” was changed to “Eliminating Teleonomic Theories.”

Chapter 4, Introduction, first paragraph

“The previous chapter proposed a loose theory of means consisting of a core theory of means suspended from a set of ultimate ends. We can tighten this loose theory by eliminating members from the set of ultimate ends. We do so by eliminating members of the set of all *teleonomic theories*, theories that look to an internal program or programs to explain our ultimate ends.”

was changed to:

“This chapter proposes two means of eliminating teleonomic theories from the set of teleonomic theories that we use to help us find what we need. The first uses our highest ideal to eliminate theories that aim too low. The second uses the concept of emergence to eliminate misleadingly simple theories.”

Chapter 4, Introduction, second and third paragraphs

The second paragraph was moved to the beginning of the next section. The third paragraph was deleted.

Chapter 4, Reconciling Teleonomic Theories

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

The heading was changed to: “Eliminating Unethical Theories.”

Chapter 4, Reconciling Teleonomic Theories, first paragraph, first sentence

“The major difficulty in developing means of eliminating teleonomic theories is agreeing on metaphysical assumptions about our nature.”

was changed to:

“The major difficulty in developing means of eliminating teleonomic theories **that aim too low** is agreeing on metaphysical assumptions about our nature.”

Chapter 4, Eliminating Unethical Theories, third paragraph, last sentence

“The **following two** sections argue that secular and religious humanists can agree on Albert Schweitzer’s ultimate end of reverence for life.”

was changed to:

“The **balance of this** section argues that secular and religious humanists can agree on Albert Schweitzer’s ultimate end of reverence for life. **If we can agree on this, we can develop rules for eliminating theories that aim too low. For example, we can eliminate theories that are based on too narrow a conception of who ‘we’ are.**”

Chapter 4, Eliminating Teleonomic Theories

The heading was changed to: “Eliminating Simplistic Theories.”

Chapter 4, Eliminating Simplistic Theories, first paragraph

“If we can agree on the ultimate normative end of reverence for life, then we can develop rules for eliminating theories that don’t yield the best problems for achieving this end. An obvious rule is to eliminate theories that are based on too narrow a conception of who “we” are. A less obvious rule is to eliminate theories that are based on a single level of abstraction.”

was deleted.

Chapter 4, Eliminating Simplistic Theories, new second paragraph, first sentence

Changed “beware of” to “eliminate.”

Chapter 4, Summary

“This chapter proposed using humanism’s conceptual framework and highest ideal to refine the set of ultimate ends that deserve our tolerance. This process provides us with

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

both a moral vision and a conceptual framework for thinking about our ultimate ends and the best means to them.”

was changed to:

“This chapter proposed two means of refining the set of teleonomic theories that we use to help us find what we need. What remains are theories that deserve our tolerance. This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them rather than on the presumed right to do as we please.”

Chapter 5, title

Changed “Increasing Excellence” to “Increasing Excellence in Means.”

Chapter 7, Introduction, fourth sentence

Started a new paragraph.

Chapter 8, first paragraph, second and third sentences

“To progress readily, we need a loose **theory** of means **suspended from a set of ultimate ends**. Over time, we can tighten **this loose theory** by discovering more about our **ultimate ends** and the best means to them.”

was changed to:

“To progress readily, we need **recursionist explanations, loose evolutionary explanations** of means **founded on teleonomic theories**. Over time, we can tighten **these loose explanations** by discovering more about our **needs** and the best means to **satisfy** them.”

Chapter 8, first paragraph, second paragraph

“**This loose theory** differs markedly from current economic theories. Where current microeconomic theories help us use scarce resources to achieve our subordinate ends, **this theory** helps us choose these ends. **It does** this by providing us a world-view and related conceptual framework for thinking about our ultimate ends and the best means to them. **It** also helps prevent us from being blinded by the models that we use to get what we want. And where current macroeconomic theories attempt to help government officials achieve their ends, **this theory** helps officials design a decision strategy to help all of us achieve our ultimate ends with a minimum amount of wasteful turbulence in the flow of resources. **It** tells us that we should judge the interventions of governments rather than the actions of individuals and that we should err on the side of not intervening justly rather than intervening unjustly. Like physicians, governments should first do no harm. Equally important, **it** reminds us that wise decision-making requires moral vision.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“**Recursionist explanations** differ markedly from current economic theories. Where current microeconomic theories help us use scarce resources to achieve our subordinate ends, **recursionist explanations** help us choose these ends. And where current macroeconomic theories attempt to help government officials achieve their ends, **recursionist explanations** help officials design decision strategies to help all of us achieve our ultimate ends with a minimum amount of wasteful turbulence in the flow of resources. **They** tell us that we should judge the interventions of governments rather than the actions of individuals and that we should err on the side of not intervening justly rather than intervening unjustly. Equally important, **they** remind us that wise decision-making requires moral vision.”

Chapter 8, third paragraph, first sentence

“The moral vision inherent in **this theory** shows us that by becoming a part of something bigger than ourselves, we can become more than we currently are, but if we try to help others foolishly, we can do far more harm than good.”

was changed to:

“The moral vision inherent in **recursionist explanations** shows us that by becoming a part of something bigger than ourselves, we can become more than we currently are, but if we try to help others foolishly, we can do far more harm than good.”

Version 2002.08.28

Entire book

Changed “modern Austrian” to “Austrian.”

Preface, new first paragraph

“Modern economic science focuses on the allocation of scarce resources. In doing so, it ignores the process of creating useful knowledge. Equally important, its theory of consumption ignores knowledge of how to live wisely. Arguably, these are the two most important aspects of information age economies.”

was changed to:

“The economics profession is in the midst of a crisis. Its core theory of means focuses on what is of primary importance in industrial age economies, the allocation of scarce resources. In doing so, it ignores what is of primary importance in information age economies, the creation of useful knowledge.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, new second paragraph, first sentence

“Billionaire speculator George Soros believes that the threat posed by **modern economic science** is dire.”

was changed to:

“Billionaire speculator George Soros believes that the threat posed by **this crisis** is dire.”

Preface, new second paragraph, last sentence

Reinserted the sentence:

“In effect, Soros calls for recognizing the scarcity of knowledge as well as non-knowledge resources.”

Preface, new third paragraph

“The person most responsible for this “Second Wave” (industrial age) bias is **Adam Smith, the grandfather of modern economic science. Smith was faced with the problem of modeling two sorts of complex adaptive systems, human beings and the system of relationships that join them. He naturally chose a simpler model of human nature for his “political economy,” which focuses on human relationships, than the one he chose for his moral philosophy, which focuses on human nature. In making this simplification, Smith separated political economy from moral philosophy.**”

was changed to:

“The person most responsible for this “Second Wave” (industrial age) bias is **the Scottish Enlightenment moral philosopher, Adam Smith. Smith wrote two great works of moral philosophy. In his first, *The Theory of Moral Sentiments* (1759), Smith focused on the nature of altruism. In his second, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776), he focused on the complex adaptive system of human relationships. Given the overwhelming complexity of simultaneously modeling two complex adaptive systems, human organisms and human organizations, Smith chose a much simpler model of human nature for *Wealth* than he did for *Moral Sentiments*. In making this simplification, Smith created a new branch of moral philosophy, *political economy*.**”

Preface, new seventh paragraph

“An immediate benefit of this strategy is that it provides us with a strategic world-view and related conceptual framework that can help us find the better tactical problems to solve. Providing such a framework is the first step in any plan for working and living together.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

was deleted.

Chapter 2, *Knowledge Induction*, fifth paragraph, fourth sentence

Started a new paragraph and changed:

“Which of these solutions the team chooses is often a matter of how it defines the problem.”

to:

“Stressing the production system produces small manufacturing problems. The nature of these problems is not always obvious.”

Chapter 2, *Visibility*, last paragraph, last sentence

“Increasing visibility by these and other means makes it easier to find problems, **which is the first step toward improving the process.**”

was changed to:

“Increasing visibility by these and other means makes it easier to find problems.”

Chapter 3, *Theories produce predictions and explanations of causation.*, second paragraph, second sentence

“It is possible to explain causation without being able to predict in the traditional (Newtonian) sense, as is the case in what physicists call *deterministic chaotic systems*.”

was changed to:

“In *deterministic chaotic systems*, physicists can explain causation without being able to predict in the traditional (Newtonian) sense.”

Chapter 3, *A New Foundation for Explanation*, second paragraph, first two sentences

“Why has the economics profession failed to provide decision-makers with theories that explain causation based on what the wise would do? The major reason is that most schools of economics believe that the primary purpose of economic theories is to predict, not explain, the world.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The major reason the economics profession has failed to provide such theories is that most schools of economics believe that the primary purpose of economic theories is to claim, not explain, the world.”

Chapter 3, A New Foundation for Explanation, fourth paragraph, third sentence

“The founder of **modern** Austrian economics, **Ludwig von Mises**, chose to avoid this and other metaphysical problems in the traditional manner, which is to define ‘wealth’ as consumer goods and the resources to produce consumer goods.”

was changed to:

“The founder of Austrian economics, **Carl Menger**, chose to avoid this and other metaphysical problems in **what was to become** the traditional **marginalist** manner, which is to define ‘wealth’ as consumer goods and the resources to produce consumer goods.”

Chapter 3, A New Foundation for Explanation, fourth paragraph, last sentence

Moved Ludwig von Mises endnote to first sentence of the third paragraph. Dropped the Chapter 1 reference.

Chapter 3, A New Foundation for Explanation, fifth paragraph, last sentence, footnote

Added the following paragraph at the beginning of the footnote:

“C. S. Pittendrigh coined ‘teleonomic’ to differentiate end directed biological theories from Aristotle’s end directed (teleological) theories. The use of ‘teleonomic’ here does not imply that all biological programming is molecular level programming. It allows the emergence of higher level programming, e.g., the emergence of mental and spiritual needs.”

Version 2002.08.31

Preface, first paragraph

“Economists once aspired to be worldly philosophers, literally lovers of useful knowledge. Had the economics profession remained faithful to this calling, modern economics would be the science of useful knowledge. The phrase ‘economics of knowledge’ would be redundant, not radical. Unhappily, it is not.”

was deleted.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, new second first paragraph, second and third sentences

“In an article published in the February 1997 issue of *The Atlantic Monthly* titled *The Capitalist Threat*, Soros wrote that **the main threat to an open society no longer comes from communism but from capitalism. He fears that** we place too much faith in laissez-faire economic theories.”

was changed to:

“In an article published in the February 1997 issue of *The Atlantic Monthly* titled *The Capitalist Threat*, Soros wrote that we place too much faith in laissez-faire economic theories.”

Preface, new eleventh paragraph, end

Added the following sentences:

“It asks them to be worldly philosophers, literally lovers of useful knowledge. (Had the economics profession remained faithful to this calling, modern economics would be the science of useful knowledge. The phrase ‘economics of knowledge’ would be redundant, not radical. Unhappily, it is not.)”

Chapter 3, A New Foundation for Explanation, third paragraph, sixth sentence

“To obtain a more useful truth, we need an explicitly moral theory of economics —”

was changed to:

“To obtain a more useful truth, we need an explicitly moral theory of **evolutionary** economics —”

Chapter 3, Summary, second sentence

“These explanations stand ready to be proved less useful than competing explanations in helping us find better problems to solve.”

was changed to:

“These explanations **should** stand ready to be proved less useful than competing explanations in helping us find better problems to solve.”

Chapter 4, *Religious Humanist Worldly Ends*, first paragraph, third sentence

“For the statement “the ultimate end of life is a good life” to be self-evident, we cannot imagine a situation where the statement “the ultimate end of life is not to live a good life” is true.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“ For the statement “the ultimate end of life is a good life” to be self-evident, we cannot imagine a situation where the **contrary** statement “the ultimate end of life is not to live a good life” is true.”

Chapter 4, *Religious Humanist Worldly Ends*, second paragraph, second and third sentences

“ To begin to answer this question we must recognize that ends can concern either **states** or processes. Because ends that concern **states** are bounded in time, they are known as *temporal* ends.”

was changed to:

“To begin to answer this question we must recognize that ends can concern either **specific events** or processes. Because ends that concern **specific events** are bounded in time, they are known as *temporal* ends.”

Chapter 4, *Religious Humanist Worldly Ends*, third paragraph

“Happiness, which is a whole life spent living well, is the ultimate normative end of life. We cannot imagine a higher normative end of life than happiness. All other worthy normative ends of life, such as serving others, perfecting our spirit, or obeying the teachings of God’s prophets are means to happiness.”

was deleted.

Chapter 4, *Religious Humanist Worldly Ends*, fifth paragraph

Inserted the paragraph:

“For the religious humanist the highest normative end is living the saintly life. This life includes attaining the temporal end of experiencing mystical union with the infinite Being. As a result of this union/reunion, the person assumes a divine subordinate end consistent with Schweitzer’s reverence for life. This universal normative end serves as the basis for reconciling disparate religions.+”

The second footnote (fifth paragraph, second sentence, +):

“+ A common belief in many religions is that an awakening to one’s divine self is necessary to achieve the ultimate end of existence. Because a spiritual awakening yields a clearer understanding of one’s needs and how best to satisfy them, it is potentially an aid to happiness. The process leading up to the awakening, which may keep us from satisfying our needs, can be seen as an investment in happiness as well as the achievement of the ultimate temporal end of life.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was replaced by the a footnote created from the seventh through ninth paragraphs.

Chapter 4, *Religious Humanist Worldly Ends*, sixth and seventh paragraphs

“The most extreme conflicts between these two competing ends involve ritual death. Examples include Mayan ball games that culminated in the ritual beheading of the captain of the losing team, Jainist suicide by starvation, and Japanese kamikaze. At the heart of ritual death lies the belief that sacrificing one’s life for the sake of others or dying in a state of ecstasy leads to the ultimate end of existence. This mixture of altruism and mystical oneness suggests a Trinitarian argument against ritual death: We have an internal program that motivates us toward bliss, which is either mystical union with the Absolute (magical mysticism) or mystical union with His creative spirit, which manifests Herself as the Universe (complete ethical mysticism). Achieving mystical union with either is union with both and with the divine element in us. Once we have completed this union, we assume the three-element Godhead’s purpose, which includes bringing ever more divine consciousness into the world. We achieve this divine subordinate end by pursuing happiness.”

“In summary, religious humanist ultimate normative end of life is living a good life, which we achieve by living as high in our hierarchy of needs as possible. At the top of this hierarchy is Schweitzer’s need for mystical oneness, which we can satisfy best with a practical combination of magical and complete ethical mysticism. Achieving mystical oneness by relinking with the divine element within ourselves may cause us to assume the subordinate normative end of the divine, which is to bring ever more divine consciousness into the world.”

were replaced by:

“The most extreme conflicts between these two competing ends involve ritual death. At the heart of ritual death lies the belief that sacrificing one’s life for the sake of others or dying in a state of ecstasy leads to the ultimate end of existence.

“Examples of ritual death include Mayan human sacrifice, Jainist suicide by starvation, and Japanese kamikaze attacks. All of these arise from false beliefs. Mayan human sacrifices were based on the belief that such sacrifices insured good crops. Jainist suicide by starvation was based on the belief that the death of the saint would benefit the rest of life more than helpful devotion to it. Kamikaze attacks were based on the belief that such sacrifice was the best means of insuring the future of the Japanese people. These religious practices fell into disrepute when the beliefs supporting them were proved to be false.”

Chapter 4, *Eliminating Simplistic Theories*, ninth paragraph, first sentence

Inserted the former third footnote on Trinitarianism. Moved the endnote into a reference.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 4, Eliminating Simplistic Theories, ninth paragraph, third sentence

“From this perspective, all other living things are extensions of our true selves.”

was deleted.

Chapter 5, Introduction, first paragraph

“Increasing excellence in **means** is a matter of substituting knowledge for non-knowledge resources **in progressing toward our ultimate ends. This can be a matter of choosing better means to a given subordinate end. It can also be a matter of choosing better subordinate ends.**”

was changed to:

“**The recursionist core theory of means is both simple and straightforward: We are motivated to satisfy our needs.** Increasing excellence in **satisfying our needs** is a matter of substituting knowledge for non-knowledge resources. **We do this by choosing either better subordinate ends or better means to a given subordinate end.**”

Chapter 5, Introduction, second paragraph, third sentence

“To paraphrase Mark Twain, ‘It ain’t what you don’t know that gets you into trouble. It’s what you know for sure that just ain’t *useful*.’”

was deleted.

Chapter 7, Just Taxation, last paragraph, last sentence

“High on this list are **income** taxes, which discourage acquiring knowledge and taking risks.”

was changed to:

“High on this list are taxes **on profits**, which discourage acquiring knowledge and taking risks.”

Version 2002.09.05

Preface, eighth paragraph, third and fourth sentences

“To make it easier for readers to understand my meaning, I’ve used the following conventions. When I use a term as a term, I enclose it in single quotation marks (‘’),

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

and when I use a term to denote one of several meanings, I enclose it in double quotation marks (“”).”

was changed to:

“To make it easier for readers to understand my meaning, I have used single quotation marks (‘’) to denote terms and double quotation marks (“”) to denote one of several meanings of of terms.”

Preface, ninth paragraph

The second sentence:

“It potentially puts them in a different role, solving a different sort of problem, using a different concept of science, in order to meet better the needs of their information age customers.”

was deleted. The parenthesis around the last three sentences in the paragraph were removed.

Acknowledgments, fourth paragraph, eighth sentence

Changed “ my studies at the Stanford Graduate School of Business” to “business school.”

Acknowledgments, fifth paragraph

Inserted the paragraph:

“The fifth is the speaker at the Stanford Graduate School of Business orientation meeting who told our incoming class (1979) that if we learned nothing else in the next two years, we should learn the difference between efficiency and effectiveness. I may not have remembered his name, but I remembered his advice.”

Chapter 3, title

Changed “The Strategy for Progress” to “A New Foundation.”

Chapter 3, second footnote

Changed “common sense” to “practical” in the second sentence.

Added the following sentences to the end of the footnote:

“The inspiration for this practical approach is the discrete decision tree analysis technique that parses complex decisions into decision objects and uncertain event

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

objects. Explanations help us formulate decision objects and predictions help us formulate uncertain event objects.”

Chapter 3, *Theories as Refinements of Everyday Thinking*, fourth paragraph

Changed “pragmatic” to “practical” throughout.

Chapter 4, *Eliminating Unethical Theories*, third paragraph, last sentence

“For example, we can eliminate teleonomic theories based on too narrow a conception of who ‘we’ are.”

Chapter 4, *Religious Humanist Worldly Ends*

This subsection was rewritten. The structure returned to what it was before the most recent rewrite.

Chapter 5, *Introduction*, first paragraph, last sentence

“We do this by choosing **either** better subordinate ends **or** better means to **a** given subordinate end.”

was changed to:

“We do **so** by choosing better subordinate ends **and** better means to given subordinate ends.”

Chapter 5, *Introduction*, first paragraph, last sentence

“Some concepts derived from marginalist economics tend to blind us to better ends **and means**.”

was changed to:

“Some concepts derived from marginalist economics tend to blind us to better **subordinate** ends.”

Version 2002.09.12

Preface, title

“Again, I was inspired by Ohno’s **work**.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Again, I was inspired by Ohno’s **strategy**.”

Chapter 1, title

Changed “Strategic Assets” to “A Strategy for Progress.”

Chapter 1, Conceptual Framework, second paragraph, last sentence

“**As philosopher of science Thomas Kuhn observed**, once we have learned to conceptualize the world in one way, it is difficult for us to do so in another.”

was changed to:

“**Once** we have learned to conceptualize the world in one way, it is difficult for us to do so in another.”

Chapter 1, Modern Economics' Blind Spot, third paragraph, third sentence

“The EOQ model yields the quantity at which the marginal cost and benefit of **setting up more often** just equal one another.”

was changed to:

“The EOQ model yields the quantity at which the marginal cost and benefit of **holding inventory with respect to setting up** just equal one another.”

Chapter 1, The Recursionist Strategy, fourth paragraph, fourth sentence

Changed “sumo wrestling” to “dog fighting.”

Chapter 1, Overview, third sentence

“Chapters three, four, and five present the strategy.”

was changed to:

“Chapters three, four, and five expand on the recursionist strategy. The third discusses the philosophical foundation. The fourth provides means for tightening the loose theory on which the foundation is based. The fifth offers recursionist alternatives for several marginalist concepts.”

Chapter 3, title

Changed “The Strategy for Progress” to “A New Foundation.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 3, *Theories are refinements of everyday thinking*, last paragraph, second sentence

Changed “measure” to “test.”

Version 2002.09.20

Chapter 1, *Managerial Excellence in Means*, last paragraph

Changed “wants and desires” to “wants” throughout.

Chapter 3, first footnote:

“A corollary of the proposition that all theories are subjective is that the tenability of theories depends on our belief in the meanings of their concepts. Consider the argument ‘because the ground is wet, it must have rained.’ If we define ‘rain’ as anything that makes the ground wet, the argument is not only tenable but also tautological, true by definition. However, if we use the common definition of ‘rain,’ which excludes such causes of wet ground as morning dew, melted snow, and lawn sprinklers, the argument is untenable. Whether this argument is tenable depends on what we believe ‘rain’ means.

“The EOQ model illustrates this corollary. If we believe that what is best is what is ‘efficient,’ then the EOQ model is tenable. On the other hand, if we believe that what is best is what is ‘efficient and effective,’ then the EOQ model is tenable only if there is no possibility of learning. Whether the EOQ model is tenable depends on what we believe ‘best’ means.

“Similarly, marginalist economics as a whole depends on the marginalist definition of excellence in means. For marginalist models to yield their conclusions, economic agents must not learn through experience. From a common sense perspective, this requirement makes marginalist models untenable. Failing to learn through experience when it is possible to do so at negligible cost is foolish. In the language of marginalist economics, assuming that consumers and producers do not learn from experience means assuming that consumers do not try to maximize utility and producers do not try to maximize profits. This conflicts with the textbook assumptions that they do.”

was deleted.

Chapter 3, *Theories produce predictions and explanations of causation.*, first paragraph, second sentence

“Predictions tell us what is likely to happen given a particular set of circumstances: explanations tell us what causes a particular phenomenon.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“A prediction is knowledge of what is likely to happen under a particular set of conditions. An explanation of causation is knowledge that helps us predict what is likely to happen under a variety of conditions.”

Chapter 3, *Theories produce predictions and explanations of causation.*, second and third paragraphs

“Some theories explain relatively better than they predict. In *deterministic chaotic systems*, physicists can explain causation without being able to predict **in the traditional (Newtonian) sense**. In these systems, small differences in initial conditions become ever greater over time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate.”

“Other theories predict relatively better than they explain. For example, quantum mechanics provides very accurate statistical predictions of subatomic events without explaining **fully the causes of these events**. Physicists currently seek better means of explaining, theories of what lies “beneath” or “behind” quantum mechanics, e.g., superstring theory, rather than better means of predicting what quantum mechanics predicts.”

were changed to:

“**Explanations of causation are more than simply predictions ‘written backwards.’** In *deterministic chaotic systems*, physicists can explain causation without being able to predict **equally well**. In these systems, small differences in initial conditions become ever greater over time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the ‘weather.’ In the long term, the best we can hope to do is to predict the bounds of the trajectory, the ‘climate.’ **Further**, quantum mechanics provides very accurate statistical predictions of subatomic events without explaining **their causes equally well**. Physicists currently seek better means of explaining, theories of what lies ‘beneath’ or ‘behind’ quantum mechanics, e.g., superstring theory, rather than better means of predicting what quantum mechanics predicts.”

and placed in a footnote at the end of the first paragraph.

Chapter 3, second footnote

“The meaning of ‘explanation of causation’ is problematic. The practical approach taken here is to define it functionally. An explanation of causation is knowledge that

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

helps us find problems to solve. Thus, the statement “Theories that explain causation help us find problems to solve.” is true by definition. The inspiration for this practical approach is the discrete decision tree analysis technique that parses complex decisions into decision objects and uncertain event objects. Explanations help us formulate decision objects and predictions help us formulate uncertain event objects.”

was replaced by:

“Decision analysis consists of three basic steps: (1) defining alternatives, (2) defining the details necessary to evaluate alternatives, and (3) evaluating alternatives. Theories that explain causation help us define alternatives. Theories that predict help us define the details necessary to evaluate alternatives. Specifically, they help us define the probabilities of uncertain events.”

Chapter 5, Introduction, first paragraph, last sentences

“We are motivated to satisfy our needs. Increasing excellence in satisfying our needs is a matter of substituting knowledge for non-knowledge resources. We do so by choosing better subordinate ends and better means to given subordinate ends.”

was replaced by:

“Excellence is the wise use of resources in satisfying our needs. We increase excellence by choosing better subordinate ends and better means to given subordinate ends.”

Version 2002.10.02

Preface, second paragraph, last sentence

“In **effect**, Soros calls for recognizing the scarcity of knowledge as well as non-knowledge resources.”

was changed to:

“In **economic terms**, **he** calls for recognizing the scarcity of knowledge as well as non-knowledge resources.”

Preface, third paragraph, quote

Removed added emphasis.

Preface, fourth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Reversed positions of “Second Wave” and “industrial age.”

Preface, fourth paragraph

“The **person most responsible** for this industrial age (“Second Wave”) bias **is** the Scottish Enlightenment moral philosopher, Adam Smith. Smith wrote two great works of moral philosophy. In the first, *The Theory of Moral Sentiments* (1759), Smith focused on **the nature of** altruism. In the second, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776), he focused on **the complex adaptive system of** human relationships. Given the overwhelming complexity of simultaneously modeling **two complex adaptive systems**, human organisms and human organizations, Smith chose a **much** simpler model of human nature for *Wealth* than he did for *Moral Sentiments*. In making this simplification, Smith created a new branch of moral philosophy, *political economy*.”

was changed to:

“The **source of** this industrial age (“Second Wave”) bias is the Scottish Enlightenment moral philosopher, Adam Smith. Smith wrote two great works of moral philosophy. In the first, *The Theory of Moral Sentiments* (1759), Smith focused on altruism. In the second, *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776), he focused on human relationships. Given the overwhelming complexity of simultaneously modeling human organisms and organizations, Smith chose a simpler model of human nature for *Wealth* than he did for *Moral Sentiments*. In making this simplification, Smith created a new branch of moral philosophy, **political economy**.”

Preface, fifth paragraph, last sentence

“Regrettably, economists are right when they say that a rigorous theory that **reconciles ethics and modern economics, a precise theory that** aims at progress rather than growth, is beyond our grasp”

was deleted.

“Regrettably, economists are right when they say that a rigorous theory that aims at progress rather than growth is beyond our grasp.”

Chapter 1, Conceptual Resources, third paragraph, third through last sentences

“This advantage is equal to the cost of placing into service the pattern not yet in service. Consider the advantage that existing railroad track has over the same rails set on the same track bed at a slightly different distance between rails. This advantage is equal to the cost of resetting the pattern, in this case, the cost of resetting the rails. This *lock-in effect*¹ applies to all forms of useful knowledge, including concepts. Once we have learned to conceptualize the world in one way, it is difficult for us to do so in another.²”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to

“When combined with economies of scale, this localized “lock-in” effect can become significant.¹ This is as true of conceptual frameworks as it is for railroad networks. Once we have learned to conceptualize the world in one way, it is difficult for us to do so in another.² Yet this is what we must do if we are to overcome our industrial age bias.”

Chapter 1, Conceptual Resources, third paragraph, footnote

“Economists associate lock-in with increasing returns. This large scale phenomenon emerges from the fundamental advantage knowledge in use has over knowledge not yet in use.”

was deleted.

Chapter 1, Managerial Excellence in Means, first paragraph, last sentence

“Efficiency concerns choosing solutions to given problems and effectiveness concerns choosing problems to solve.”

was deleted.

Chapter 1, Managerial Excellence in Means, last paragraph

“The distinction between ...” was inserted in front of the second paragraph.

Chapter 1, Managerial Excellence in Means, new third paragraph, second sentence

“It also permits finding better problems to solve.”

was deleted.

Chapter 1, Managerial Excellence in Means, new third paragraph, last sentence

“Choosing the right problem to solve is as important as choosing the right solution to a given problem.”

was moved to the end of the second paragraph.

Chapter 1, Managerial Excellence in Means, third through fifth paragraphs

Converted the three points made in these three paragraphs to bullet paragraphs. The new paragraph and three bullet paragraphs were moved to the beginning of the next section.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 1, Strategic Assets, new second paragraph, first sentence

“Changing our concept of excellence in means to **the managerial concept of** efficiency and effectiveness changes the global (universal) economic problem into one of how we, members of the community of beings capable of using the knowledge that we create, choose to progress toward our ultimate ends.”

was changed to:

“**In short,** changing our concept of excellence in means to ‘**efficiency and effectiveness**’ changes the global (universal) economic problem into one of how we, members of the community of beings capable of using the knowledge that we create, choose to progress toward our ultimate ends.”

Inserted a paragraph break at the end of the sentence.

Chapter 3, first two sections

The sections titled “Introduction” and “The Nature of Theories” were combined under the latter's title.

Chapter 3, *Theories are subjective.*, first paragraph, last sentence

“We would be foolish to discard theories based on how subjective they seem to us.”

was deleted.

Chapter 3, *Theories produce predictions and explanations of causation.*, second sentence

“An explanation of causation is **knowledge** that helps us predict what is likely to happen under a variety of conditions.”

was changed to:

“An explanation of causation is a **deeper understanding** that helps us predict what is likely to happen under a variety of conditions.”

Chapter 3, Summary, first sentence

“This chapter proposed a strategy for progress, which involves gradually tightening loose evolutionary explanations of means to our ultimate ends.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This chapter proposed a decision-oriented, evolutionary foundation for decision-oriented, evolutionary economic explanations of causation.”

Inserted a paragraph break at the end of the sentence.

Chapter 5, Production Technology

Changed title from “Production Technology” back to “Production.”

Changed:

“Production technology is not simply something that comes out of a research and development lab or manufacturing engineering department. As the rapid tool-setting example showed, a well designed and implemented production process can produce both product and the knowledge of how to improve the production process. Such joint production requires people that have the practical wisdom to think of better ways to produce. It also requires trading relationships that support the exchange of sensitive information. Managers must trust their employees with valuable information about products, processes, customers, and suppliers, and employees must trust managers with information that potentially replaces their current services.

“The relationships between excellence in consumption, trade, and production potentially create a complex virtuous cycle. Efficient production potentially leads to more of the things that satisfy our needs, which potentially leads to better lives and greater practical wisdom. Greater practical wisdom potentially leads to more efficient production and trade, which potentially leads to greater practical wisdom and better lives. Only by pursuing this complex cycle can we realize the full potential of the information age.”

to:

“As the rapid tool-setting example showed, a well designed and implemented production process can produce both product and production technology. Such joint production requires people that have the practical wisdom to think of better ways to produce. It also requires trading relationships that support the exchange of dangerous information. Excellence in consumption, trade, and production potentially create a complex virtuous cycle. Only by pursuing this complex cycle can we realize the full potential of the information age.”

Chapter 7, Just Taxation, first paragraph, first sentence

“All forms of taxation disrupt the coordination of decision-making.”

was changed to:

“All forms of taxation disrupt the process of decision-making.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 7, third footnote, third sentence

Changed “conservative actions” to “conservative behaviors.”

Chapter 7, third footnote, last two sentences

“Both were blind to the possibility of discovering **values and** behaviors that help us satisfy our needs better than existing ones do. In information age economies, what matters most is not values and behaviors, but vision and concepts.”

was changed to:

“Both were blind to the possibility of discovering behaviors that help us satisfy our needs better than existing ones do. In information age economies, what matters most is not values (and **related** behaviors), but vision (and **related** concepts).”

Chapter 7, Conclusion, last paragraph, last sentence

“The strategy put forth in this work **increases** this propensity.”

was changed to:

“The strategy put forth in this work **aims to increase** this propensity.”

Version 2002.10.14

Entire work

Endnotes were converted to footnotes. All footnotes were renumbered by chapter.

Chapter 1, Conceptual Resources

Renamed this first section, “Introduction.” Moved existing paragraphs down the the beginning of the next section, “Modern Economics’ Blind Spot.”

Chapter 1, first footnote

“This work classifies resources into three categories: (1) scarce resources, (2) free resources, and (3) knowledge resources. Scarce resources are those that are costly to use. Free resources are those that are costless to use and costless to put into production. Knowledge resources are those that are costless to use but costly to put into production.”

was deleted.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 1, Modern Economics' Blind Spot, last paragraph, last sentence

Added the sentence:

“(Readers who are unfamiliar with the Toyota manufacturing system as a tool for inducing production technology ought to read the Appendix before proceeding.)”

Chapter 1, Overview, first three sentences

“The remainder of this work presents a strategy for creating knowledge that is useful in progressing toward our ultimate ends. The second chapter prepares the reader to view the world from the new perspective. Chapters three, four, and five expand on the recursionist strategy. The third discusses the philosophical foundation. The fourth provides means for tightening the loose theory on which the foundation is based. The fifth offers recursionist alternatives for several marginalist concepts. The final two chapters discuss what modern economists call macroeconomic issues. The sixth argues that the fundamental such issue ought to be how we can progress toward our ultimate ends with the least amount of economic turbulence and the seventh discusses how government policy makers can address this problem.”

was changed to:

“This chapter introduced a strategy that provides all of us with a conceptual framework for thinking about how best to progress toward our ultimate ends. The next three chapters expand on this strategy. *A New Foundation* discusses the philosophical foundation. *Eliminating Teleonomic Theories* provides means for tightening the loose theory on which the foundation is based. *Increasing Excellence in Means* offers recursionist alternatives for several potentially misleading marginalist concepts. The final two chapters discuss what modern economists call macroeconomic issues. *Progress and Turbulence* argues that the fundamental such issue ought to be how we can progress toward our ultimate ends with the least amount of economic turbulence and *Government Policy* discusses how government policy makers can address this problem.”

Chapter 2

Chapter 2 was put into an appendix.

Chapter 2, Theories are refinements of everyday thinking., fourth paragraph, last sentence

“Classic examples are Darwin’s theory of evolution, which provides the foundation for the life sciences, and plate tectonics, which does the same for the earth sciences.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Classic examples are Darwin’s theory of evolution, which provides the foundation for **biology**, and plate tectonics, which does the same for **geology**.”

Chapter 2, A New Foundation for Explanation, fourth paragraph, fourth sentence

“Supporters of this concept of wealth believe it to be value-neutral.”

was changed to:

“Supporters of this **subjectivist** concept of wealth believe it to be value-neutral.”

Chapter 2, A New Foundation for Explanation, fifth paragraph, first sentence

“We can correct this deficiency by replacing Austrian economics’ **marginalist** foundation with an evolutionary one.”

was changed to:

“We can correct this deficiency by replacing Austrian economics’ **subjectivist** foundation with an evolutionary one.”

Chapter 4, Profit, second through fourth sentences

“**From the marginalist perspective, entrepreneurs profit by managing their businesses efficiently. From the recursionist, all of us profit by deciding wisely. Because the money we save from not buying what we don’t need is just as useful to us as the money we receive from trading and producing wisely, the profits that we create by consuming wisely are just as real as those that we create by trading or producing wisely.**”

was changed to:

“**We profit by deciding wisely. The profits that we create by consuming wisely are just as real as those that we create by trading or producing wisely.**”

Afterword, first paragraph, second sentence

Changed “nearly three years” to “nearly four years.”

Afterword, last paragraph and closing

“In the months since the presidential election, I’ve speculated whether a revolution in the way thoughtful Americans view ethics, economics, and politics would be sufficient to cause the rise of a “progress and freedom” party at the center of American politics. The terrorist attack on September 11 made such speculation less theoretical. The terrorists claim to attack the Great Satan, the hedonistic destroyer of Islamic traditions.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Americans must reveal the terrorists to be a hindrance to progress toward a good life for all. The surest way to do so is for Americans to rededicate themselves to progress and freedom, the intertwined ideals that made the United States of America great.”

was changed to:

“Implicit in this call for progress and freedom, the intertwined ideals that made the United States of America great, is a warning not to confuse modernism with lucidity. The cultural journey from dark inertia to lucidity need not pass through hedonism.”

Changed date from September 26, 2001 to October 15, 2002.

Appendix, Introduction, first paragraph, second sentence

“Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to **illustrate** the **potential virtuous circle involving** the division of labor **and the expansion of market size.**”

was changed to:

“Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to **introduce** the virtuous **dynamic that drove early industrial age economies: the self-reinforcing combination of** the division of labor and the expansion of market size.”

Appendix, Introduction, second paragraph

“What makes JIT manufacturing exemplary is its information age organization and management, which are based on the self-fulfilling belief that manufacturing processes produce **not only saleable products but also knowledge of how to produce more efficiently. As shown in the rapid tool-setting example, when the potential for learning is great, manufacturing excellence requires creating knowledge at the cost of lowering current ‘production.’ Under these circumstances, less ‘production’ is more productive.**”

was changed to:

“What makes JIT manufacturing exemplary is its information age organization and management, which are based on the self-fulfilling belief that manufacturing processes produce **production technology as well as saleable product. From this perspective, more “production” (of saleable product) is not necessarily more productive.**”

Appendix, Introduction, fourth paragraph, last sentence

“Instead, they developed a means of inventing **manufacturing** technology, which proved more useful in the long run.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Instead, they developed a means of inventing **production** technology, which proved more useful in the long run.”

Appendix, Introduction, fifth paragraph, last sentence

“Line workers, supervisors, and production staff, working as a team, solve these problems, thereby **completing the solution to** the complex problem.”

was changed to:

“Line workers, supervisors, and production staff, working as a team, solve these problems, thereby **solving** the complex problem.”

Appendix, The Efficiency Frontier, title

The title was change to “Shaping Constraints.”

Appendix, Shaping Constraints, first paragraph

“Like other forms of economic activity, manufacturing involves economic constraints, **which, collectively, form what economists refer to as a *production possibility frontier***. JIT manufacturing offers a new mix of constraints, **hence a new frontier**. **The Toyota version of JIT manufacturing** also provides a method for pushing back its frontier. Understanding two of the factors that determine these constraints—the complexity of the process and the size of the production batch—makes understanding **Toyota’s version of JIT manufacturing easier**. (Unless otherwise noted, all **future** references to JIT manufacturing will refer to the Toyota version.)”

was changed to:

“Like other forms of economic activity, manufacturing involves economic constraints. JIT manufacturing offers a new mix of constraints. **It** also provides a method for pushing back constraints **by creating production technology**. Understanding two of the factors that determine these constraints—the complexity of the process and the size of the production batch—makes understanding **this knowledge creation process easier**.”

Appendix, *Batch Size*, third paragraph, sixth sentence

“Compared to traditional job shops, they sacrifice flexibility and capital to lower **direct labor, waste, inventory, and indirect unit** costs.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Compared to traditional job shops, they sacrifice flexibility and capital to lower **other** costs.”

Appendix, Organization, Procedures, and Tools, third paragraph, last sentence

“The solution is assigning **people** to more than one machine.”

was changed to:

“The solution is assigning **individual workers** to more than one machine.”

Appendix, Organization, Procedures, and Tools, fourth paragraph, last sentence

“**Here, multimachine manning** saves four full day’s work each shift.”

was changed to:

“**This** saves four full day’s work each shift.”

Appendix, Organization, Procedures, and Tools, fifth paragraph, first sentence

“Multimachine manning makes it possible to accumulate fractions of a full day’s work, **which** makes it possible to automate efficiently in small increments without **creating uneven flows or wasting labor.**”

was changed to:

“Multimachine manning makes it possible to accumulate fractions of a full day’s work. **This** makes it possible to automate efficiently in small increments without **wasting labor or creating uneven flows.**”

Appendix, Organization, Procedures, and Tools, last paragraph

“JIT manufacturing’s organization, procedures, and machine tools lend themselves to incremental improvements by production line workers. The Japanese refer to the process of continuous improvement as ‘kaizen.’”

was deleted.

Appendix, Requirements for Kaizen, first paragraph, last sentence

Changed “a dynamic world-view” to “a learning attitude.”

Appendix, A Dynamic Perspective, title

Changed “A *Dynamic Perspective*” to “A *Learning Attitude.*”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Appendix, A *Learning Attitude*, first paragraph

“A dynamic world-view is one that allows people to think clearly about changing phenomena. Those with a static world-view often find such phenomena paradoxical. Edwin Abbott’s Victorian novel, *Flatland*, provides insight into this problem. Abbott tells the story of the life and travels of A. Square, a resident of the two-dimensional world of Flatland. Residents of Flatland have no concept of height, and so believe that ‘up’ means the same as ‘north.’ Like Swift’s Gulliver, A. Square encounters many strange phenomena, characters, and cultures in his travels. In one adventure, a sphere from the three dimensional world of Spaceland whisks A. Square off the surface of Flatland. This gives him the opportunity to look down onto the plane that forms his world. Later, when attempting to communicate his insights to his fellow Flatlanders, he is at a loss for words to explain the concept of height. The best the he can manage is “up, but not north.” People trying to communicate a dynamic perspective to those with a static view face a similar problem in that those with a static perspective unconsciously think in terms of moving along an efficiency frontier rather than of pushing it back. The following kaizen adages illustrate this. Each is obvious from a dynamic perspective, yet paradoxical from a static one:”

was changed to:

“A learning attitude is the propensity to solve problems by creating knowledge. To people with a learning attitude, excellence in means is a matter of progressing toward their ultimate ends well, rather than simply allocating scarce resources well.”

“Those with a learning attitude have difficulty communicating with those without one. The following kaizen adages illustrate this problem. Each is obvious from a learning perspective, yet paradoxical from a non-learning one:”

Appendix, A *Learning Attitude*, last paragraph

“In *Flatland*, the sphere performed apparent miracles by traveling in three dimensions. Similarly, Japanese manufacturers practicing kaizen adapted to the oil shocks of the seventies and the yen shock of the eighties by rapidly pushing back their efficiency frontiers. They thrived by learning wisely.”

was changed to:

“In Edwin Abbott’s Victorian novel, *Flatland*, characters performed apparent miracles by breaking through apparent dimensional boundaries. Similarly, Japanese manufacturers practicing kaizen performed apparent miracles by rapidly pushing back their production possibility frontiers⁶. In lay terms, they thrived by learning wisely.”

plus the footnote:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“⁶ A production possibility frontier is an output hyperspace map of the most efficient use of a given set of production inputs. This conceptual model is founded on the assumption that people do not learn through experience.”

Version 2002.10.21

Chapter 1, Managerial Excellence in Means, second paragraph, fourth sentence

Changed “wisdom” to “wise”.

Chapter 2, A New Foundation for Explanation, first sentence

“The major reason the economics profession has failed to provide such theories is that most schools of economics claim that the primary purpose of economic theories is to predict, not explain, **the world.**”

was changed to:

“The major reason the economics profession has failed to provide such theories is that most schools of economics claim that the primary purpose of economic theories is to predict, not explain **causation.**”

Chapter 2, A New Foundation for Explanation, seventh paragraph, second sentence

Changed “best we can hope to know” to “most we can know.”

Chapter 2, six footnote, first paragraph, last sentence

“The use of ‘teleonomic’ here does not imply that all biological programming is molecular level programming. It allows the emergence of higher level programming, e.g., the emergence of mental and spiritual needs.”

was deleted. The second paragraph was merged with the first.

Chapter 2, A New Foundation for Explanation, end

Added the paragraph:

“The problem, once found, is obvious.”

Chapter 2, Summary, first sentence

“This chapter proposed **a decision-oriented**, evolutionary foundation for **decision-oriented**, evolutionary economic explanations of causation.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“This chapter proposed an evolutionary foundation for evolutionary economic explanations of causation.”

Chapter 4, *The Common Misconceptions*, first paragraph

Changed “static world-view” to “marginalist world-view” and “dynamic world-view” to “managerial world-view.”

Changed second to last sentence,

“JIT manufacturing is much more than simply minimizing WIP inventories.”

to:

“‘True’ JIT manufacturing (as envisioned by Taiichi Ohno) is much more than simply minimizing WIP inventories.”

Chapter 5, Introduction, first paragraph, first sentence

Changed “pharmaceutical biologist working” to “biologist searching for new medicines.”

Chapter 5, Avalanche Catastrophes, first paragraph, second sentence

“Examples include the collapse of the Soviet Union and the dot.com speculative bubble.”

was changed to:

“Examples include the collapse of the Soviet Union and the bursting of the dot.com speculative bubble.”

Chapter 5, Avalanche Catastrophes, first paragraph, last two sentences

“When adjustment is complete and immediate, no avalanches will occur. Ball bearings falling on a plane make complete and immediate adjustments and so will never create an avalanche.”

were deleted.

Chapter 5, Avalanche Catastrophes, last paragraph

Added the sentence:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Ball bearings falling on a plane never produce avalanches.”

Chapter 6, Conclusion, first paragraph, second sentence

Changed “(e.g., JIT manufacturing)” to “(e.g., the Toyota JIT system).”

Afterword, second to last paragraph, last sentence

Changed “please themselves without considering others (libertarians)” to “consider liberty an end in itself rather than a means to justice (libertarians).”

Appendix, title

Changed “Just-In-Time Manufacturing” to “The Toyota System.”

Appendix, Introduction, second paragraph

Added the footnote:

“Much of the confusion about JIT manufacturing is due to the common misconception that it is a collection of techniques that minimize work-in-process inventory rather than the production system that creates these techniques. At Toyota, JIT manufacturing includes the learning-by-doing process that creates these techniques.”

Appendix, Introduction, third paragraph, fifth sentence

Changed “Ohno’s” to “Toyota’s.”

Appendix, Introduction, third paragraph, second sentence

Changed “Toyota executive” to “person” and changed “JIT manufacturing” to “the Toyota system.”

Appendix, Introduction, fourth paragraph

“JIT manufacturing decomposes overwhelmingly complex manufacturing problems into smaller problems capable of being solved by production teams. The heart of JIT manufacturing is a simple, inexpensive, and robust means of controlling the flow of WIP inventory. This capability allows engineers and schedulers to provide partial solutions to complex problems. Partial solutions require excessive WIP inventory. Slowly reducing this inventory creates small problems. Line workers, supervisors, and production staff, working as a team, solve these problems, thereby solving the complex problem.”

was deleted.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Appendix, Shaping Constraints, first paragraph, second sentence

Changed “JIT manufacturing” to “The Toyota system.”

Appendix, Shaping Constraints, first paragraph, last sentence

Changed “knowledge creation” to “learning-by-doing.”

Appendix, The Elastic Production System, first paragraph, second sentence

Changed “such systems” to “batch production systems.”

Appendix, The Elastic Production System, second paragraph

“The popular image of JIT manufacturing is that of a giant machine that **stretches across** dozens of factories owned by many different firms. Work-in-process flows so smoothly that it appears to be continuous production. This is the image that **Japanese manufacturers** like to show foreigners. What foreigners are not likely to see is **a JIT process before things are running so smoothly**. In many respects, this learning-by-doing process is even more impressive.”

was changed to:

“The popular image of **the Toyota JIT manufacturing system** is that of a giant machine that **encompasses** dozens of factories owned by many different firms. Work-in-process flows so smoothly that it appears to be continuous production. This is the image that **Toyota and its affiliates** like to show foreigners. What foreigners are not likely to see is **the learning-by-doing process that preceded smooth production**. In many respects, this learning-by-doing process is even more impressive.”

Appendix, The Elastic Production System, third paragraph

“The JIT manufacturing control system is simple, flexible, and robust. By loosening production links, it can stretch to cover complex problems, e.g., those arising from simultaneously assembling different product lines on a single production line. Stretching the system in this manner increases the complexity of the production process. Tightening the loosened links one by one gradually turns the complex process back into a complicated one. In this way, JIT processes swallow and digest complex problems. This digestion process produces manufacturing technology in the form of improvements in product design, organization, procedures, and machine tools.”

was changed to:

“The Toyota system combines a simple, elastic, and robust means of linking production operations (*dual kanban*) with the guiding principle of continual improvement (*kaizen*). Metaphorically, it involves swallowing and digesting

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

production problems that are too complex for production engineers to solve by themselves. By loosening production links, a Toyota system can stretch to accommodate these large problems. Gradually tightening the loosened links creates small production problems that members of the production team are able to solve. Solving these problems creates useful knowledge in the form of improved procedures, organization, machine tools, and product design. The learning-by-doing process ends when the complex (stretched) production system returns to being merely complicated.”

Appendix, The Elastic Production System, last paragraph

Added the following paragraph and footnote:

“The balance of this section discusses the learning-by-doing process and a number of JIT manufacturing techniques from the early nineteen eighties.”

“² Most of this material came from a seminar (Chicago, 1983) and a two week tour of JIT manufacturing plants (Japan, 1984) sponsored by The Cambridge Corporation, a Tokyo based management consulting firm founded by Masaaki Imai. Taiichi Ohno lectured at both Cambridge Corporation events.”

Appendix, Organization, Procedures, and Tools, first paragraph, first sentence

Changed “JIT manufacturing” to “Toyota.”

Appendix, Organization, Procedures, and Tools, first paragraph

Changed “JIT manufacturing” to “Toyota” in all.

Appendix, Organization, Procedures, and Tools, second paragraph, last sentence

Changed ““multimachine manning.”” to “*multimachine manning.*”

Appendix, Production Links, last paragraph, first sentence

Changed “JIT manufacturing system” to “Toyota JIT manufacturing system.”

Appendix, Production Links, last paragraph, second sentence

Changed “JIT teams” to “Production teams.”

Appendix, Production Links, last paragraph, second sentence

Changed “JIT teams” to “Production teams.”

Appendix, A Learning Attitude, last paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“**In lay terms**, they thrived by learning wisely.”

was changed to:

“**T**hey thrived by learning wisely.”

Appendix, Summary, last sentence

Changed “JIT manufacturers” to “Toyota system team members.”

Version 2002.10.28

Chapter 1, Marginalist Economics’ Blind Spot, sixth paragraph, fourth sentence

Changed: “marginal cost and benefit” to “marginal cost and marginal benefit.”

Chapter 1, Marginalist Economics’ Blind Spot, ninth paragraph, third sentence

Inserted the sentence:

“The inexhaustibility of knowledge, the fact that using a pattern does not wear it out, makes determining the value of this knowledge problematic.”

Chapter 1, Marginalist Economics’ Blind Spot, ninth paragraph, last sentence

“The possibility of learning makes what otherwise would be a simple closed-ended problem into a complex open-ended one.”

was changed to:

“In general, determining the value of useful knowledge is an open ended problem. Thus, the possibility of learning makes what otherwise would be a simple closed-ended problem into a complex open-ended one.”

Chapter 1, The Strategy, seventh paragraph, third sentence

Changed: “deserve” to “warrant.”

Chapter 1, fourth footnote

“Although not generally recognized, the theoretical crisis created by this shortcoming has already arrived. Many economists have already accepted dynamic computer models that involve the fitness of economic agents. Such models concern what

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

economic agents *need* (to become fit) rather than what they *want*. This contradicts the generally accepted belief that economics concerns *wants* rather than *needs*. Accepting these models requires redefining the field of economics.”

was deleted.

Chapter 2, The Nature of Theories, first paragraph, first two sentences

“Toyota’s strategy for learning how to manufacture ever more wisely involves slowly tightening a loose production system. This chapter proposes a strategy for learning how to live ever more wisely, **which** involves slowly tightening a loose theory.”

was changed to:

“Toyota’s strategy for learning how to manufacture ever more wisely involves slowly tightening a loose production system **by removing ignorance in the form of work-in-process inventory**. This chapter proposes a **similar** strategy for learning how to live ever more wisely. **It** involves slowly tightening a loose theory **of means by removing ignorance in the form of theories of ultimate ends**.”

Chapter 2, *Theories produce predictions and explanations of causation.*, first paragraph, last sentence, footnote 1

“Explanations of causation are not simply predictions “written backwards.” In *deterministic chaotic systems*, physicists can explain causation without being able to predict equally well. In these systems, small differences in initial conditions become ever greater over time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate.” Further, quantum mechanics provides very accurate statistical predictions of subatomic events without explaining their causes equally well. Physicists currently seek better means of explaining, theories of what lies “beneath” or “behind” quantum mechanics, e.g., superstring theory, rather than better means of predicting what quantum mechanics predicts.”

was inserted as the second paragraph.

Chapter 2, *Theories produce predictions and explanations of causation.*, new third paragraph, last two sentences

“**From the decision-oriented perspective of recursionist economics**, predictions help us evaluate **alternatives and** explanations help us find **them**. Better predictions help us become more *efficient* and better explanations help us become more *effective*.¹”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“¹ Decision analysis consists of three basic steps: (1) defining alternatives, (2) defining the details necessary to evaluate alternatives, and (3) evaluating alternatives. Theories that explain causation help us define alternatives. Theories that predict help us define the details necessary to evaluate alternatives. Specifically, they help us define the probabilities of uncertain events.”

was changed to:

“Predictions help us evaluate uncertain events, which helps us choose which of a set of given alternatives is the best solution to a given problem. In contrast, explanations help us find better problems to solve and better alternative solutions to given problems. Better predictions help us become more *efficient* and better explanations help us become more *effective*.”

Chapter 2, *Theories are refinements of everyday thinking.*, second paragraph, first sentence

“We can start by classifying the process of knowing into sets.”

was changed to:

“We can start by classifying our ways of knowing into sets.”

Chapter 2, A New Foundation for Explanation, second paragraph, first sentence

“The major reason the economics profession has failed to provide such theories is that most schools of economics claim that the primary purpose of economic theories is to predict, not explain explanation.”

was changed to:

“The primary reason the economics profession has failed to provide such theories is that most schools of economics claim that the purpose of economic theories is to predict, not explain explanation.”

Chapter 2, A New Foundation for Explanation, third paragraph, fourth sentence

“To many who don’t believe this, it is merely an apology for current culture or despoiling the planet for the sake of producing ever more consumer goods.”

was changed to:

“To many who don’t believe this, it is merely an apology for current beliefs and behaviors.”

Chapter 2, A New Foundation for Explanation, sixth paragraph, third sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “evolving” to “evolving at a pace.”

Chapter 2, A New Foundation for Explanation, seventh paragraph, first sentence

“Although we can safely assume that we have fixed internal programming, we do not know, and may never know completely, what this internal programming is.”

was changed to:

“We do not know, and may never know completely, what this internal programming is.”

Chapter 2, A New Foundation for Explanation, new fourth footnote

“⁴C. S. Pittendrigh coined ‘teleonomic’ to differentiate end directed biological theories from Aristotle’s end directed (teleological) theories. Teleonomic theories are positive in that they describe the world as it is: We are motivated to follow our internal programming. Teleonomic theories are also normative in that they prescribe what we ought to do: We owe it to ourselves to live good lives, which is the end we achieve by successfully following our programming. Thus, we ought to follow our internal programming. For more on the philosophical argument supporting this apparent contradiction of David Hume, see Adler, Mortimer, *Ten Philosophical Mistakes* (New York: Macmillan, 1985), Part 2.”

was deleted.

Chapter 2, A New Foundation for Explanation, last paragraph

“The problem, once found, is obvious.”

was changed to:

“Explanations of causation based on the set of all acceptable teleonomic theories are unique in that they both describe what is and prescribe what ought to be. Specifically, they both describe the program that motivates us and prescribe that we owe it to ourselves (ought) to follow our programming. Doing so leads to happiness, a life well-lived.”

“⁵ Adler, Mortimer, *Ten Philosophical Mistakes* (New York: Macmillan, 1985), Part 2.”

Version 2002.10.31

Acknowledgments, second paragraph, first three sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The second is Howard Sherman, former counterintelligence agent, philosophy professor, corporate executive, entrepreneur, and **official unofficial philosopher of the Santa Fe Institute, now a consultant specializing in business strategy**. Howard introduced me to Einstein’s epistemology. In it I found a form of pragmatism (searching for useful truth) **more palatable to modern intellectuals and intelligent laymen** than the popular interpretation of William James’s pragmatism (recognizing truth by its usefulness).”

was changed to:

“The second is the late Howard Sherman, former counterintelligence agent, philosophy professor, corporate executive, entrepreneur, and **business consultant**. Howard introduced me to Einstein’s epistemology. In it I found a **more palatable** form of pragmatism (searching for useful truth) than the popular interpretation of William James’s pragmatism (recognizing truth by its usefulness).”

Chapter 1, Modern Economics' Blind Spot, first paragraph, second sentence

“They belong to the class of resources that are patterns of matter, energy, space, and time.”

was changed to:

“They belong to the class of resources that are **useful** patterns of matter, energy, space, and time.”

Chapter 1, Modern Economics' Blind Spot, sixth paragraph, fourth sentence

“Between these two extremes lies the **most** “economic” order quantity.”

was changed to:

“Between these two extremes lies the “economic” order quantity.”

Chapter 1, Modern Economics' Blind Spot, tenth paragraph, eighth and ninth sentences

“Long setup times also increase waste: when production workers setup incorrectly, thirty or more days worth of parts need to be discarded. Further, they slow quality improvement by retarding feedback: it is much easier to remember the cause of a mistake made three hours ago than that of a mistake made three days ago.”

was changed to:

“Long setup times also increase waste: when production workers setup incorrectly, thirty or more days worth of parts **may** need to be **reworked or** discarded. Further, they

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

slow **the pace of** quality improvement by retarding feedback: it is much easier to remember the cause of a mistake made three hours ago than that of a mistake made three days ago.”

Chapter 1, The Recursionist Strategy, fourth paragraph, first sentence

“The end of economics must change.”

was changed to:

“The **ultimate** end of economics must change.”

Chapter 1, The Recursionist Strategy, fifth paragraph

“In short, changing our concept of excellence in means to “efficiency and effectiveness” changes the global (universal) economic problem into one of how we, members of the community of beings capable of using the knowledge that we create, choose to progress toward our ultimate ends.”

was changed to:

“In short, changing our concept of excellence in means to “efficiency and effectiveness” changes the global (universal) economic problem into one of how we, **the** members of the community of beings capable of using the knowledge that we create, choose to progress toward our ultimate ends.”

Chapter 1, The Recursionist Strategy, seventh paragraph, first paragraph

“The obvious choice for a process to apply recursively is decision-making, understood as the process that begins with finding a problem to solve and ends with **implementing** the chosen solution.”

was changed to:

“The obvious choice for a process to apply recursively is decision-making, understood as the process that begins with finding a problem to solve and ends with **evaluating the decision process.**”

Chapter 1, The Recursionist Strategy, seventh paragraph, second sentence; Chapter 2, A New Foundation for Explanation, first paragraph, second sentence

“... formal decision-making consists of (1) finding a problem to solve, (2) identifying alternative solutions, (3) selecting an alternative, **and** (4) implementing the selected alternative.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“... formal decision-making consists of (1) finding a problem to solve, (2) identifying alternative solutions, (3) selecting an alternative, (4) implementing the selected alternative, and (5) evaluating the first four steps.”

Chapter 2, *Theories are refinements of everyday thinking.*, second through seventh paragraphs

“We can start by classifying our ways of knowing into sets. The first set is the set of knowing that involves intuition. Because all knowing begins with intuition, this is the universal set of knowing. A good example of knowing that falls into this set and into no other set is that of an eyewitness who cannot describe a suspect’s face but can nevertheless identify it.

“The second set involves the process of expressing our intuitive knowledge as narratives that we use to predict or explain our sense experiences. An example of a predictive narrative is a technical analysis model of stock market behavior. An example of an explanatory narrative is the fable of the tortoise and the hare.

“The third set involves rejecting narratives that explain causation using rules and standards of construction. We call narratives that conform to the rules “logical” and those that conform to the standards “elegant” or “beautiful.” A major characteristic of beautiful theories is their ability to explain much while using few primary concepts and relations. Excessively complex theories, such as the fourteenth century scholastic theories attacked by William of Ockham, are “ugly.” After we reject illogical and ugly narratives that explain, we are left with philosophical theories.

“The fourth set involves rejecting philosophical theories based on how well they explain our sense experiences. The practical means of testing tools is to test their performance at the task we want them to perform. As logical and elegant narratives that explain causation, philosophical theories are tools for helping us find problems to solve. Thus, the practical means of testing philosophical theories is to test how well they help us find problems to solve. After we reject philosophical theories that do not meet our empirical criteria, we are left with scientific theories that explain causation. Classic examples are Darwin’s theory of evolution, which provides the foundation for biology, and plate tectonics, which does the same for geology.

“The fifth and final set involves rejecting narratives that predict based on how well they predict our sense experiences. After we reject those that do not meet our empirical criteria, we are left with scientific theories that predict. Good researchers distinguish between these theories and those that explain causation. When talking about theories that predict, they are careful to say that a set of factors *correlates with* rather than *causes* the result.

“This concept of science allows us to explain what happens in economies scientifically. To do so, we need agreement about the general nature of our ultimate

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

ends and the means to test how well explanations help us find problems to solve. We currently lack both.”

were changed to:

“We can analyze everyday thinking by classifying worldly knowledge into sets based on the processes that we use to refine worldly knowledge. The most basic process, the process that separates knowing from not knowing something about the world, is the process of making an intuitive connection between our experiences and what we believe we know about the world. This intuitive process defines the universal set of knowledge about the world. A good example of worldly knowledge that falls into this set and into no other set is that of an eyewitness who cannot describe, but can nevertheless identify, a suspect’s face.

“We refine the universal set of worldly knowledge, (1), by rejecting all worldly knowledge that we cannot express as either words or symbols. What remains is the set of worldly narratives, (2). This set includes both narratives that help us predict the world and narratives that help us explain the world.

“We refine the set of all narratives that help us explain the world by rejecting those that fail to meet certain rules and standards of construction. We call narratives that conform to these rules “logical” and those that conform to these standards “elegant” or “beautiful.” What remains is the set of philosophical theories, (3).

“We refine the set of philosophical theories by rejecting those that fail to meet empirical standards for explaining our experiences. The practical means of testing tools is to test their performance at the task they were designed to perform. Thus, the practical means of testing philosophical theories is to test how well they help us find problems to solve. After rejecting philosophical theories that fail to meet our empirical criteria, we are left with the set of scientific theories that explain causation, (4). This set includes Darwin’s theory of evolution and Wegener’s theory of plate tectonics.

“We refine the set of narratives that predict by rejecting those that fail to meet empirical standards for predicting. What remains is the set of scientific theories that predict, (5). Good researchers distinguish between these scientific theories and those that explain causation. When talking about scientific theories that predict, they are careful to say that a set of factors *correlates with* rather than *causes* the result.”

Chapter 2, A New Foundation for Explanation, fourth paragraph, third sentence

“The founder of Austrian economics, Carl Menger, chose to avoid this and other metaphysical problems in what was to become the traditional marginalist manner, which is to define ‘wealth’ as consumer goods and the resources to produce consumer goods.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The founder of Austrian economics, Carl Menger, chose to avoid this and other metaphysical problems by defining ‘wealth’ as consumer goods and the resources to produce consumer goods.”

Chapter 2, A New Foundation for Explanation, sixth paragraph, last two sentences

“It also tells us that our beliefs and behaviors are evolving at a pace many orders of magnitude faster than our internal programming. Therefore, we can safely assume that our **internal** programming is fixed.”

was changed to:

“It also tells us that our beliefs and behaviors are evolving at a pace many orders of magnitude faster than **the genetic level programming that underlies** our **higher level** internal programming. Therefore, we can safely assume that our **basic genetic** programming is fixed.”

Chapter 5, Avalanche Catastrophes, second paragraph, second and third sentences

“Physicists call this phenomenon *self-organized criticality*. Experiments show that **small** sand piles are self-organized critical systems.”

was changed to:

“Physicists call this **weakly chaotic** phenomenon *self-organized criticality*. Experiments show that **some types of** sand piles are self-organized critical systems.”

Chapter 5, Avalanche Catastrophes, fourth paragraph

“**Self-organized criticality is a weak form of chaos.** Weakly chaotic behavior is more predictable than is fully chaotic behavior. Uncertainty grows according to a power law for a weakly chaotic system, but exponentially for a fully chaotic one. If, for instance, it takes one hundred observations to predict two time units ahead, one thousand observations would allow us to predict twenty time units ahead for a weakly chaotic system, but only four time units ahead for a fully chaotic one.”

The first sentence was deleted and the rest was moved to beginning of the second footnote.

Chapter 5, A Simple Model ..., first paragraph, last sentence

Appended the sentence:

“The system will create what appears to be (but isn't) an exploitable trade-off between transient inflation and unemployment, a Phillips curve.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 5, A Simple Model ..., new fourth footnote

“This model predicts a chaotic phase space trajectory that creates what appears to be (but isn't) an exploitable trade-off between transient inflation and unemployment (a Phillips curve). It also predicts that economic avalanches will follow a power law. Note that these two predictions are based on assumption that people pursue happiness. Violating this assumption has two opposing effects on the level of turbulence. On the one hand, it tends to slow the rate of progress, which lowers the level of turbulence. On the other, it tends to increase economic viscosity, which raises the level of turbulence for a given rate of progress. The overall effect is to make the system less weakly chaotic, hence less predictable.”

was deleted.

Chapter 6, Moral Vision, last paragraph, last sentence

“A clear moral vision helps us **to pursue the virtuous circle of accumulating wealth and accelerating change more quickly and surely.**”

was changed to:

“A clear moral vision helps us **cope with** accelerating change.”

Chapter 6, Just Taxation, first paragraph, second sentence

“Just forms disrupt it in ways that promote progress.”

was changed to:

“Just forms disrupt it in ways that promote progress **by creating incentives to act wisely.**”

Chapter 6, Just Taxation, footnote

“There are two major issues to consider. The first is whether we can trust policy makers to act justly. The second is whether policy makers have enough knowledge to act justly. Given the practical impossibility of ridding ourselves of unjust government programs, it is better to err on the side of less discretion.”

was deleted.

Chapter 6, Lucid Culture, title

Changed “Lucid Culture” to “Fluid Relationships.”

Chapter 6, Fluid Relationships, first paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “lucid culture” to “fluid relationships.”

Chapter 6, Fluid Relationships, first paragraph, second sentence

“When lucidity prevails, we pursue happiness; when passion prevails, we pursue pleasure; and when dark inertia prevails, we pursue nothing.”

was changed to:

“When lucidity prevails, we pursue happiness; when passion prevails, we pursue pleasure; and when dark inertia prevails, we **accept our current circumstances and** pursue nothing.”

Chapter 6, Fluid Relationships, third through ninth paragraphs

“We can tell many stories about why cultures become more hedonistic as they become more urban, industrial, and market-oriented. **Probably the best known stems from the Marxist belief that the predominant mode of production determines all. Industrialization lessened the demand for strong backs and increased the demand for skilled hands, creating the need for a new sort of “man,” the industrial worker. As industrialization progressed, economies of scale created the incentive for producers to use advertising to create mass markets for their products, which gave rise to a hedonistic “mass consumption” culture.**

“**Another explanation is that as people moved away from their traditional homes and work they had the opportunity to choose an entirely new way of life. In the city, they were exposed to many new ways of living. Freed from tradition, they chose the ones that offered the most pleasure. Still another tells us that as people left agriculture for industry, their standard of living rose, which gave them more and greater opportunities to do as they pleased.**

“**Most likely there is an element of truth in each of these stories and in many others as well. The one thing that is certain is that no single explanation captures the whole truth about something this complex.**

“**There are those who believe that the information revolution is causing a cultural shift toward lucidity. Again, there are many stories that support this belief. The “predominant mode of production” story says that the demand for clever minds is increasing, creating the need for a wiser sort of “man,” the knowledge worker. Some producers have discovered that they can make and sell small quantities of their products efficiently, eliminating the need to create mass markets, hence, a “mass consumption” culture. A few firms have discovered that they can be even more successful if they can determine how best to help individual customers solve their problems, that is, to help them satisfy their needs.**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Another story tells us that as the pace of change increases, people are forced to become ever wiser. Still others focus on how increased wealth, knowledge, and life spans lead to greater wisdom. Again, there is likely to be an element of truth in all of these stories, but none tell the whole truth.

“The question for just policy makers is not whether there is a trend toward lucidity, but how to promote such a trend. **The immediate answer is that policy makers should eliminate barriers to free (fluid) association**, those things that make forming, changing, or dissolving relationships difficult or expensive.

“A good example of such a barrier in the United States is the tax-free status of employee insurance benefits. This supposed break for employees effectively takes away their right to buy insurance from whomever they please. It also involves employers, and through authoritarian progressive legislation, the government, in the personal lives of employees.”

“**Delving deeper returns us to our original question, what is the best learning strategy?**”

was changed to:

“Just as we can tell many stories about why cultures become more hedonistic as they become more urban, industrial, and market-oriented, **we can tell many stories about to why cultures are likely to become more lucid as they become knowledge intensive**. However, the practical question for just policy makers in information age economies is not whether there is a trend toward lucidity, but how to promote such a trend **without dictating culture**.

“**Part of the solution to this difficult problem must be to eliminate barriers to fluid relationships**, those things that make forming, changing, or dissolving relationships difficult or expensive. A good example of such a barrier in the United States is the tax-free status of employee insurance benefits. This supposed break for employees effectively takes away their right to buy insurance from whomever they please. It also involves employers, and through authoritarian progressive legislation, the government, in the personal lives of employees.”

Chapter 6, Fluid Relationships, last paragraph

“In the long run, **free association** promotes lucidity by **helping to spread** practical wisdom.”

was changed to:

“In the long run, **fluid relationships** promote lucidity by **allowing** practical wisdom **to flourish**.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Afterword, title

“America is great because America is good. When America ceases to be good, America will cease to be great.”

was changed to:

“Born often under another sky, placed in the middle of an always moving scene, himself driven by the irresistible torrent which draws all about him, the American has no time to tie himself to anything, he grows accustomed only to change, and ends by regarding it as the natural state of man. He feels the need of it, more he loves it; for the instability, instead of meaning disaster to him, seems to give birth only to miracles all about him.”

Afterword, third to last paragraph

“Alexis de Tocqueville wrote “America is great because America is good. When America ceases to be good, America will cease to be great.” In a progressing world, goodness and greatness are moving targets. What made the United States great was a combination of classical liberal means and progressive ends. Maintaining this classical liberal, progressive tradition will ensure its greatness.”

was deleted.

Afterword, second to last paragraph, second and third sentences

“**As such, it is the radical center of American politics.** Its supporters are those who seek to maintain the process that made America great (*process conservatives*).”

was changed to:

“Its supporters are those who seek to maintain the **dynamic** process that made the United States great (*process conservatives*).”

Afterword 6, last paragraph

“Implicit in this call for progress and freedom is a warning not to confuse modernism with lucidity. The cultural journey from dark inertia to lucidity need not pass through hedonism.”

was deleted.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Version 2002.11.06

Chapter 6, Conclusion, second paragraph, last sentence

“However, the case for decentralization itself depends on the assumption that we seek to live wisely.”

was changed to:

“However, the case for decentralization itself depends on the assumption that we seek to live wisely: Decentralization is a means to the ultimate end of a good life for all, not an end in itself.”

Chapter 6, Conclusion, third paragraph, last sentence

“The strategy put forth in this work aims to increase this propensity.”

was changed to:

“The strategy put forth in this work aims to increase this propensity **by providing a conceptual framework for thinking more clearly about our ultimate ends and the best means to them.**”

Appendix, Introduction, third paragraph, last sentence

“Batches would flow like continuous production.”

was changed to:

“Batches of dissimilar parts would flow like continuous production of identical parts.”

Appendix, Introduction, fourth paragraph, last sentence

“Instead, they developed a means of inventing manufacturing technology, which proved more useful in the long run.”

was changed to:

“Instead, they developed a means of inventing manufacturing technology, which, **due to the inexhaustibility of knowledge,** proved more **beneficial** in the long run.”

Appendix, Organization, Procedures, and Tools, third paragraph

“The practice of restricting a person to one machine creates the dilemma of having to choose between complete automation and partial automation that speeds up the production rates. Because certain production operations are hard to automate,

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

complete automation is often very expensive. On the other hand, partial automation that speeds up production rates creates uneven flow of work in process, which increases manufacturing complexity. The solution is assigning individual workers to more than one machine.”

was deleted.

Appendix, *Organization, Procedures, and Tools*, new fourth paragraph

“Multimachine manning makes it possible to accumulate fractions of a full day’s work. This makes it possible to automate efficiently in small increments without wasting labor or creating uneven flows. It also makes adding and removing people from a process easier, which lowers both the cost of adjusting to fluctuations in production levels and the cost of inducing knowledge by removing people.”

was changed to:

“Multimachine manning makes it possible to accumulate fractions of a full day’s work. This makes it possible to automate in small increments without wasting labor or creating uneven flows. Automating in small increments makes it easier for production teams to target routine, difficult, and dangerous operations. Routine operations are the least costly to automate, difficult ones exhaust a full day’s work in less than a full day, and dangerous ones threaten precious human capital.”

“Multimachine manning also makes adding and removing people from a process easier, which lowers both the cost of adjusting to fluctuations in production levels and the cost of inducing knowledge by removing people.”

Appendix, *Organization, Procedures, and Tools*, new sixth paragraph

“The incremental nature of this human centered approach to automation makes it easier for firms to target routine, difficult, and dangerous operations. Routine operations are the least costly to automate, difficult ones exhaust a full day’s work in less than a full day, and dangerous ones threaten precious human capital. Targeting these is both cost-effective and humane.”

was deleted.

Version 2002.11.20

Preface, sixth paragraph, third sentence

“My inspiration was Taiichi Ohno’s production strategy, which is popularly known as **Just-In-Time Manufacturing**.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“My inspiration was Taiichi Ohno’s production strategy, which is popularly known as *Just-In-Time Manufacturing, Lean Manufacturing, or, most accurately, The Toyota Production System.*”

Chapter 1, seventh paragraph, last sentence

“Until **Just-In-Time manufacturing** became popular, it was common for standard procedures for setting up machine tools to remain unchanged for years, even decades.”

was changed to:

“Until **the Toyota manufacturing practice of rapid tool-setting** became popular, it was common for standard procedures for setting up machine tools to remain unchanged for years, even decades.”

Chapter 5, Three Misconceptions, first paragraph, last sentences

“This cultural blindness was evident in many early American attempts to adopt **Just-In-Time (JIT) manufacturing**. Many American manufacturers perceived **JIT manufacturing** as a collection of techniques for minimizing WIP inventory. By adopting these techniques they thought they could catch up to their Japanese competitors. They soon discovered that by the time they adopted current Japanese techniques, the Japanese had developed new ones. “**True**” **JIT manufacturing (as envisioned by Taiichi Ohno)** is much more than simply minimizing WIP inventories. Early American failures to adopt JIT manufacturing warn us that this impressive means of inducing knowledge requires recognizing the possibility of improving the means of trade.”

was changed to:

“This cultural blindness was evident in many early American attempts to adopt **the Toyota Production System**. Most American manufacturers perceived **this system** as a collection of techniques for minimizing WIP inventory. By adopting these techniques they thought they could catch up to their Japanese competitors. They soon discovered that by the time they adopted current Japanese techniques, the Japanese had developed new ones. **The Toyota system** is much more than simply minimizing WIP inventories. Early American failures to adopt it warn us that this impressive means of inducing knowledge requires recognizing the possibility of improving the means of trade.”

Chapter 6, Conclusion, first paragraph, second sentence

Changed “(e.g., the Toyota JIT system)” to “(e.g., the Toyota JIT system).”

Appendix, first two paragraphs

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Just-In-Time (JIT) manufacturing has become something of a joke among economists. Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to introduce the virtuous dynamic that drove early industrial age economies: the self-reinforcing combination of the division of labor and the expansion of market size. Like Smith’s pin factory, **JIT manufacturing** straddles two economic epochs. Where Smith’s pin factory combined pre-industrial age technology with industrial age batch manufacturing organization and management, **JIT manufacturing** combines industrial age batch manufacturing technology with something post-industrial. The joke is that economists cannot agree on what that something is.”

“What makes the **JIT manufacturing** system exemplary is its information age organization and management, which are based on the self-fulfilling belief that manufacturing processes produce production technology as well as saleable product. From this perspective, more “production” (of saleable product) is not necessarily more productive.”

“**Much of the confusion about the JIT manufacturing system is due to the common misconception that it is a collection of techniques that minimize work-in-process inventory rather than the production system that creates these techniques. At Toyota, JIT manufacturing includes the learning-by-doing process that creates these techniques.**”

was changed to:

“Just-In-Time Manufacturing/ **Lean Manufacturing / Toyota Production System** has become something of a joke among economists. Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to introduce the virtuous dynamic that drove early industrial age economies: the self-reinforcing combination of the division of labor and the expansion of market size. Like Smith’s pin factory, **the Toyota system** straddles two economic epochs. Where Smith’s pin factory combined pre-industrial age technology with industrial age batch manufacturing organization and management, it combines industrial age batch manufacturing technology with something post-industrial. The joke is that economists cannot agree on its name, much less what makes it exemplary.”

“What makes the **Toyota Production System** exemplary is its information age organization and management, which are based on the self-fulfilling belief that manufacturing processes produce production technology as well as saleable product. From this perspective, more ‘production’ (of saleable product) is not necessarily more productive.”

**Appendix, Introduction, third paragraph
through The Elastic Production System, fourth paragraph**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“In the early postwar years, Japan’s small market for trucks and Toyota’s lack of capital forced Toyota to produce trucks in small batches. Taiichi Ohno, the person most credited for inventing the Toyota system, recognized that Toyota could never catch up to the giant American firms by using traditional batch or mass production technology. Instead he envisioned a means of capturing the scale economies of mass production in Toyota’s small factories. Capturing scale economies without large scale appears paradoxical. As is often the case, this paradox disappears with a change in perspective. Toyota’s scale economies would come from producing large numbers of batches of differing goods rather than large numbers of identical goods. Batches of dissimilar parts would flow like continuous production of identical parts.

“Ohno’s imaginary factories required the knowledge of how to (1) reduce setup costs to insignificance, (2) achieve continuous production quality in batch production, (3) coordinate individual batch production processes precisely, and (4) maintain high rates of machine tool availability. Fortunately for Toyota, it was impossible for Ohno and his team to invent this knowledge directly. Instead, they developed a means of inventing manufacturing technology, which, due to the inexhaustibility of knowledge, proved more beneficial in the long run.

“Toyota first used this system to realize Ohno’s vision of equaling American production costs and quality while continuing to produce vehicles in relatively small quantities. Toyota and other Japanese firms have since used it to learn to build higher quality products at lower costs, build a large variety of products without raising costs, design easier to build products, and introduce new products quickly.

“**Shaping Constraints**

“Like other forms of economic activity, manufacturing involves economic constraints. The Toyota system offers a new mix of constraints. It also provides a method for pushing back constraints by creating production technology. Understanding two of the factors that determine these constraints—the size of the production batch and the complexity of the manufacturing system—makes understanding this learning-by-doing process easier.

“**Manufacturing Complexity**

“Production processes consist of separate operations such as cutting, grinding, printing, stamping, painting, bending, and welding. The movement and storage activities that connect two production operations form a *production link*. These links vary in both the amount and the variation of the amount of work in process that flows across them. A link is loose when the amount of work in process is great; tight when the amount is small; flexible when the variation in the amount of work in process is great; and rigid when it is small.

“Manufacturing systems can be simple, complicated, or complex. Simple systems are those that consists of a single production operation. Complicated systems are those that have more than one production operation but no flexible links. Complex systems are those that have at least one flexible link.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Complex systems are complex in that they involve many choices. The more choices they involve, the more complex they are. One measure of complexity is the number of the number of ways (modes) that we can operate the system. The problem with this measure is that the difference between these modes can be trivial. For example, the difference between operating a printing press at fifteen hundred impressions per minute and fifteen hundred and one impressions per minute is trivial. A more sophisticated measure of complexity is the number of ways that we can vary the system. In other words, we can measure the systems degrees of freedom, the number of coordinates it takes to describe the state of the system. Simple systems and complicated systems have only one degree of freedom. We can vary their speed but nothing else. In contrast, complex systems have this degree of freedom plus an additional degree of freedom for each of its flexible production links. We can vary not only their speed but also the amount of work-in-process inventory at each flexible production link.

“**Batch Size**

“Production processes also vary by the number of identical items produced at one time. Some types of manufacturing facilities are good at producing small lots, others at producing large ones. At the low end of the spectrum is job shop (custom) manufacturing; at the high end is continuous process production.

“Traditional job shops have two major advantages, flexibility and low capital costs. Most use general-purpose machine tools grouped into departments by type or function. Work flows from department to department according to the demands of the job. Production links are flexible and loose. Capital costs tend to be low because general purpose machine tools permit operators to use the same tool to make a variety of parts and there is little machinery dedicated to transferring work in process from one operation to another. Offsetting these two advantages are high direct labor, waste, inventory, and indirect unit costs. Direct labor costs per unit are high because there is little automation and because workers require special skills, spend much time setting up machines, and waste time waiting for parts and work. Waste costs per unit are high because every machine setup is an opportunity to make mistakes. Inventory holding costs per unit are high because production links are loose. Indirect costs per unit are high because loose links require more scheduling, material handling, accounting, expediting, and supervising.

“Continuous production processes, such as paper mills and oil refineries, are essentially complicated machines dedicated to turning out large amounts of a narrow range of products with very few workers. Compared to traditional job shops, they sacrifice flexibility and capital to lower other costs.

“Between the two extremes of job shop and continuous process manufacturing is *batch production*. Some batch production operations are more like job shops; others are more like continuous processes.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The Elastic Production System

“The Toyota JIT manufacturing system is a batch production system. Like other batch production systems, it combines characteristics of job shop and continuous process production. It uses tools intensively like a job shop, but its plant layout is similar to that of continuous processes. Like other batch production systems, production teams can vary its character by varying batch size. Unlike other batch systems, teams can easily vary the tightness of its production links.

“The popular image of the Toyota system is that of a giant machine that encompasses dozens of factories owned by many different firms. Work-in-process flows so smoothly that it appears to be continuous production. This is the image that Toyota and its affiliates like to show foreigners. What foreigners are not likely to see is the learning-by-doing process that preceded smooth production. For those who understand the Toyota system to be a means of producing production technology rather than simply a collection of techniques for minimizing WIP inventory, the learning-by-doing process is far more impressive.

“The Toyota system combines a simple, elastic, and robust means of linking production operations (*dual kanban*) with the guiding principle of continual improvement (*kaizen*). Metaphorically, it involves swallowing and digesting production problems that are too complex for production engineers to solve by themselves. By loosening production links, a Toyota system can stretch to accommodate these large problems. Gradually tightening the loosened links creates small production problems that members of the production team are able to solve. Solving these problems creates useful knowledge in the form of improved procedures, organization, machine tools, and product design. The learning-by-doing process ends when the complex (stretched) production system returns to being merely complicated.

“The balance of this section discusses the learning-by-doing process and a number of JIT manufacturing techniques from the early nineteen eighties.”

was changed to:

“Ever Leaner Manufacturing

“In the early postwar years, Japan’s small market for trucks and Toyota’s lack of capital forced Toyota to produce trucks in small batches. Taiichi Ohno, the person most credited for inventing the Toyota system, recognized that Toyota could never catch up to the giant American firms by using traditional batch or mass production technology. Instead he envisioned a means of capturing the scale economies of mass production in Toyota’s small factories. Capturing scale economies without large scale appears paradoxical. As is often the case, this paradox disappears with a change in perspective. Toyota’s scale economies would come from producing batches of similar goods rather than large numbers of identical goods. Batches of similar parts would flow like continuous production of identical parts.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Ohno’s imaginary factories required the knowledge of how to (1) reduce setup costs to insignificance, (2) achieve continuous production quality in batch production, (3) coordinate production precisely, which is to say, reduce work-in-process inventory to the absolute minimum, and (4) maintain high rates of machine tool availability. Fortunately for Toyota, it was impossible for Ohno and his team to invent this knowledge directly. Instead, they developed a means of inventing manufacturing technology, which, due to the inexhaustibility of knowledge, proved more beneficial in the long run.

“Toyota first used this system to realize Ohno’s vision of equaling American production costs and quality while continuing to produce vehicles in relatively small quantities. Toyota and other Japanese firms have since used it to learn to build higher quality products at lower costs, build a large variety of products without raising costs, design easier to build products, and introduce new products quickly.

“Those seeking to explain Toyota’s success have provided a wide variety of explanations. This appendix provides yet another. The essence of the Toyota Production System is the ongoing process of folding a continuous process manufacturing system in on itself and then smoothing out the resulting wrinkles. The result of this ongoing process is an ever leaner manufacturing system. Understanding this explanation requires understanding why changing batch sizes affects the shape of traditional manufacturing systems.

“**Traditional Manufacturing Systems**

“Traditional manufacturing systems consist of a series of separate production operations. These operations include such things as cutting, grinding, printing, stamping, painting, bending, assembling, sewing, gluing, riveting, soldering, and welding. The movement and storage activities that connect production operations form *production links*. Some of these links are *rigid* in that they provide those operating the production system no choice. Others are *flexible* in that they allow production operators (production schedulers, supervisors, and line workers) the choice of where the output of the operation flows.

“The simplest production systems are simple in form and in operation. They are simple in form in that they consist of a single operation. They are simple in operation in that operators only face one choice, the rate at which the production system produces.

“Other production systems are complex in form but simple in operation. They are complex in form in that they consist of more than one production operation. They are simple in operation in that operators only face one choice, the rate at which the production system produces. They consist of production operations rigidly linked together into what is essentially a single complicated machine. These systems contain no flexible production links.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Still other production operations are complex in both form and operation. These systems contain at least one flexible production link.

“The traditional means of classifying production systems is by batch size, the number of identical items produced at one time. Batch sizes range from one to infinity. At the low end of this scale is *custom manufacturing*. At the high end of the scale is *continuous process manufacturing*. Between the two extremes is *batch production*. Batch production systems near the low end of the scale are more like custom manufacturing; those near the high end of the scale are more like continuous process manufacturing.

“Traditional custom manufacturing, which is commonly known as job shop manufacturing, has two major advantages, flexibility and low capital costs. Most job shops use general-purpose machine tools grouped into departments by type or function. Work flows from department to department according to the demands of the job. Capital costs tend to be low because general purpose machine tools permit operators to use the same tool to make a variety of parts and there is little machinery dedicated to transferring work in process from one operation to another. Offsetting these two advantages are high direct labor, waste, inventory, and indirect unit costs. Direct labor costs per unit are high because there is little automation and because workers require special skills, spend much time setting up machines, and waste time waiting for parts and work. Waste costs per unit are high because every machine setup is an opportunity to make mistakes. Inventory holding costs per unit are high because production links are loose. Indirect costs per unit are high because the ad hoc links connecting production operations require more scheduling, material handling, accounting, and supervising. Traditional custom manufacturing is complex both in form and in operation.

“In contrast, continuous manufacturing processes, such as paper mills and oil refineries, are essentially complicated machines dedicated to turning out large amounts of a narrow range of products with very few workers. They are complex in form but not in operation. Compared to traditional custom manufacturing, they sacrifice flexibility and capital in order to lower other costs.

“***Folding in Production Operations***”

“Imagine a world in which operational simplicity always trumps capital equipment and labor costs. In this imaginary world, all manufacturing would be river-like continuous processes producing a single type of product. There would be no intermingling of parts or subassembly production. If each of the four wheels requires five wheel bolts, there are twenty identical wheel bolt subassembly production lines. Further, there would be no intermingling of finished goods production. If the market demands a single pink limousine per year, a firm would produce it on a freestanding pink limousine production line.

“In the real world total production system designers must balance the costs of operational simplicity, capital equipment, and labor. Wise designers lower capital and

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

labor costs without increasing operational complexity by grouping the production of identical parts together while maintaining a rigid link to the rest of the production process. Metaphorically, they fold in identical parts of the river-like continuous manufacturing process on top of each other.

“Production system designers can also fold in similar parts of manufacturing process on top of each other. This requires batching the production of identical parts using machine tools capable of producing a variety of similar parts. Producing in batches makes the most of capital equipment. However, it requires additional labor and increased operational complexity. Someone needs to decide the size of the batch. In job shops, someone also needs to decide where each batch goes next.

“For the folding in of similar parts of the manufacturing process on top of each other to be wise, the benefits of lowering capital equipment costs must overwhelm the costs associated with increasing labor and operational complexity. The lower the production rate, the greater the relative benefits of lowering capital equipment costs become. Taking this argument to its logical limit, a traditional job shop is simply countless continuous process manufacturing lines folded in to a small space.

“*Smoothing Flows*

“The popular image of the Toyota system is that of a giant machine that encompasses dozens of factories owned by many different firms. WIP flows so smoothly that it appears to be continuous production. This is the image that Toyota and its affiliates like to show foreigners. What foreigners are not likely to see is the learning-by-doing process that preceded smooth production. For those who understand the Toyota system to be a means of producing production technology rather than simply a collection of techniques for minimizing WIP inventory, this smoothing process is far more impressive.

“The Toyota system is a batch production system. Like other batch production systems, it combines characteristics of custom and continuous process manufacturing. It uses tools intensively like a job shop, but its plant layout is similar to that of continuous processes. Like other batch production systems, production teams can vary its character by varying batch size. Unlike other batch systems, teams can easily vary the tightness of its production links.

“The Toyota system combines a simple, elastic, and robust means of linking production operations (*dual kanban*) with the guiding principle of continual improvement (*kaizen*). The elasticity of the dual kanban production links allows the production system to stretch to fit problems that are too complex for production engineers to solve by themselves, the kind of problems created by folding in large parts of a production system. The production engineers’ ignorance of how to make the system work smoothly manifests itself as excessive WIP inventory stored in stretched production links. The production team renders this ignorance by gradually tightening the stretched links. Tightening these links creates small production problems that team members are able to solve. Solving these problems creates useful knowledge in the

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

form of improved procedures, organization, machine tools, operator training, manufacturing quality, and product design. Applying this new knowledge eliminates the need for excessive WIP inventory, thereby restoring the stretched production link

“The benefits of smooth flow do not stop at the end of the production line. The Toyota system maintains a smooth flow of finished goods to the customer by setting the production rate to the rate that customers demand products. Metaphorically, customer purchases pull work-in-process (WIP) through the production system. In theory, there is only a single operating mode: on. In practice, varying the production rate may require building discretionary reserve capacity into the system, which increases operational complexity. The benefits of smooth flow do not stop at the end of the production line. The Toyota system maintains a smooth flow of finished goods to the customer by setting the production rate to the rate that customers demand products. Metaphorically, customer purchases pull work-in-process (WIP) through the production system. In theory, there is only a single operating mode: on. In practice, varying the production rate may require building discretionary reserve capacity into the system, which increases operational complexity.

“Manufacturing Techniques

“Toyota manufacturing techniques evolve over time. However, the underlying principles remain relatively constant. The following describes some of the techniques Toyota, its suppliers, and its Japanese imitators were using in the early nineteen eighties.”

Appendix, Production Links, first paragraph, first sentence

“Understanding **Toyota’s version of JIT manufacturing fully** requires understanding the two ways the system links production operations.”

was changed to:

“Understanding **the Toyota Production System** requires understanding the two ways the system links production operations.”

Appendix, Summary, last sentence

“To Toyota **system** team members, it is common sense.”

was changed to:

“To Toyota **production** team members, it is common sense.”

Version 2002.11.29

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Title, quote

Added the Max Planck quote:

“Science... means unrelenting endeavor and continually progressing development toward an end which the poetic intuition may apprehend, but which the intellect can never fully grasp.”

Appendix, Introduction, first paragraph, second sentence

“Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to introduce the virtuous **dynamic that drove early industrial age economies: the self-reinforcing combination** of the division of labor and the expansion of market size.”

was changed to:

“Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to introduce the virtuous **circle** of the division of labor and the expansion of market size.”

Appendix, Introduction, second paragraph

“What makes the Toyota Production System exemplary is its information age organization and management, which **are based on the self-fulfilling belief that manufacturing processes produce production technology as well as saleable product.** From this perspective, more ‘production’ (of saleable product) is not necessarily more productive.”

was changed to:

“What makes the Toyota Production System exemplary is its information age organization and management, which **focuses on continual improvement (*kaizen*) in production, trade, and consumption. It is the epitome of learning-by-doing.** From this **information age** perspective, more production of saleable product is not necessarily more productive. **Less ‘production’ can be more productive.**”

Appendix, Ever Leaner Production, fourth paragraph

“**Those seeking to explain Toyota’s success have provided a wide variety of explanations. This appendix provides yet another.** The essence of the Toyota Production System is the ongoing process of folding a continuous process manufacturing system **in** on itself and then smoothing out the resulting wrinkles. The result of this ongoing process is an ever leaner manufacturing system. Understanding this explanation requires understanding **why changing batch sizes affects the shape of traditional manufacturing systems.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“The essence of the Toyota Production System is the ongoing process of folding **in** a continuous process manufacturing system on itself and then smoothing out the resulting wrinkles. The result of this ongoing process is an ever leaner manufacturing system. Understanding this explanation requires understanding **a bit about the trade-offs involved in designing production systems.**”

Appendix, Traditional Manufacturing Systems, first paragraph, last sentence

“Others are *flexible* in that they allow production **operators (production schedulers, supervisors, and line workers)** the choice of where the output of the operation flows.”

was changed to:

“Others are *flexible* in that they allow production **team members** the choice of **when and** where the output of the operation flows.”

Appendix, Traditional Manufacturing Systems, second paragraph, last sentence

“They are also simple in operation in that operators only face one choice, the rate at which the **operation** produces.”

was changed to:

“They are also simple in operation in that operators only face one choice, the rate at which the **production system** produces.”

Appendix, Production Links, last two paragraphs

“A team also can lower WIP inventory by reducing batch sizes. For a given production level, reducing batch sizes requires setting up machines more frequently and moving more containers. The main benefit is flexibility.

“In summary, the Toyota system connects operations tightly into tasks within work centers and connects work centers with elastic kanban links. Reducing WIP inventory by removing kanbans increases labor efficiency and product quality, which are advantages of continuous process manufacturing. In contrast, reducing WIP inventory by decreasing batch size increases flexibility, which is an advantage of job shop production.”

were deleted.

Appendix, fourth footnote, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“While learning to produce using fewer kanban makes a **batch production process** more like a continuous **one**, learning to produce using smaller batch sizes makes a **batch production process** more like a job shop.”

was changed to:

“While learning to produce using fewer kanban makes a **Toyota system** more like continuous **process manufacturing**, learning to produce using smaller batch sizes makes **it** more like **custom manufacturing**.”

Version 2002.12.05

Preface, fifth paragraph, second sentence

“In economies with the potential for rapid change, **the potential interactions between ethics and modern economics, between the studies of how we progress toward our ultimate ends and how we use scarce resources to satisfy our wants**, are too important to ignore.”

was changed to:

“In economies with the potential for rapid change, **the potential interactions between the studies of how we progress toward our ultimate ends and how we use scarce resources to satisfy our wants, between ethics and modern economics**, are too important to ignore.”

Preface, sixth paragraph, second sentence

“My inspiration was Taiichi Ohno’s production strategy, **which is popularly known as *Just-In-Time Manufacturing, Lean Manufacturing*, or, most accurately, *The Toyota Production System***.”

was changed to:

“My inspiration was Taiichi Ohno’s production strategy.”

Preface, sixth paragraph, fifth sentence

“I see intelligent beings’ **ethical/economic/political** problem as one of progressing toward our ultimate ends *and of learning how to progress toward our ultimate ends ever more efficiently*.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“I see intelligent beings’ **global** problem as one of progressing toward our ultimate ends *and of learning how to progress toward our ultimate ends ever more efficiently.*”

Chapter 1, Modern Economics Blind Spot, fifth paragraph, first sentence

“Concepts focus our attention on certain characteristics of objects, **causing** us to ignore other characteristics.”

was changed to:

“Concepts focus our attention on certain characteristics of objects, **which causes** us to ignore other characteristics.”

Chapter 2, title

Added Planck quote.

Version 2002.12.12

Preface, end

Inserted the paragraph:

“The idea of replacing a theory with a strategy for creating knowledge will remind many economists of George Stigler’s maxim on methodology: “Theories are not rejected by circumstantial evidence: it takes a theory to beat a theory.” I argue that Stigler defined the market for academic thinking too narrowly. He got the second half of his maxim wrong: it takes an intellectual tool for creating knowledge to beat an intellectual tool for creating knowledge. The relevant market is not for theories but rather for intellectual tools for creating useful knowledge.”

Acknowledgments, second paragraph, second sentence

“In it I found a more palatable form of pragmatism (searching for useful truth) than the popular interpretation of William James’s pragmatism (recognizing truth by its usefulness).”

was deleted.

Chapter 1, The Recursionist Strategy, fourth paragraph, first two sentences

Changed “**evaluating** the decision process” to “**reviewing** the decision process.”

Changed “**evaluating** the first four steps” to “**reviewing** the first four steps.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 1, Overview, fourth sentence

Changed “on which the **foundation is based**” to “on which the **strategy rests**.”

Chapter 2, title

Deleted Planck quote.

Chapter 2, A New Foundation for Explanation, first paragraph, second

Changed “**evaluating** the first four steps” to “**reviewing** the first four steps.”

Version 2002.12.30

Preface, last paragraph, third sentence

“**I argue that** Stigler defined the market for academic thinking too narrowly.”

was changed to:

“Stigler’s **conventional epistemology led him to** define the market for academic thinking too narrowly.”

Preface, end

Inserted the paragraphs:

“The reason that economists must broaden their market from theories to strategies is that those looking for ethical/economic/political theories have failed to provide us with the universal ethical theory that the life sciences tells us must exist: We all share a common design for life. Should we not, in theory, share the same basic plan for how best to develop this design?

“Our ethical/economic/political problem is far too complex for any one academic discipline, much less any one academic. Thomas Sowell has likened economists’ efforts to solve it to a drunk looking for his car keys under a lamppost. When asked why he confines his search to under the lamppost, the drunk replies that that is where the light is. The implication is that economists search where their theoretical tools allow them to search, not where it is most productive to search.

“Discovering what is in the light (Kuhn’s ordinary science) is part of the solution to our ethical/economic/political problem. Developing sources of light (Kuhn’s extraordinary science) is another part. So is developing strategies for how all of us, working as a team, can best search the darkness (knowledge management).”

Version 2002.12.31

Preface, last four paragraphs

“The idea of replacing a theory with a strategy for creating knowledge will remind many economists of George Stigler’s maxim on methodology: “Theories are not rejected by circumstantial evidence: it takes a theory to beat a theory.” Stigler’s conventional epistemology led him to define the market for academic thinking too narrowly. He got the second half of his maxim wrong: it takes an intellectual tool for creating knowledge to beat an intellectual tool for creating knowledge. The relevant market is not for theories but rather for intellectual tools for creating useful knowledge.

“The reason that economists must broaden their market from theories to strategies is that those looking for ethical/economic/political theories have failed to provide us with the universal ethical theory that the life sciences tells us must exist: We all share a common design for life. Should we not, in theory, share the same basic plan for how best to develop this design?

“Our ethical/economic/political problem is far too complex for any one academic discipline, much less any one academic. Thomas Sowell has likened economists’ efforts to solve it to a drunk looking for his car keys under a lamppost. When asked why he confines his search to under the lamppost, the drunk replies that that is where the light is. The implication is that economists search where their theoretical tools allow them to search, not where it is most productive to search.

“Discovering what is in the light (Kuhn’s ordinary science) is part of the solution to our ethical/economic/political problem. Developing sources of light (Kuhn’s extraordinary science) is another part. So is developing strategies for how all of us, working as a team, can best search the darkness (knowledge management).”

were changed to:

“To those who define the markets for intellectual tools to exclude everything but theories, it takes a theory to beat a theory. To those who define these markets to include strategies for creating useful knowledge, it takes an intellectual tool to beat an intellectual tool. Who defines these markets? In the market for intellectual production tools, the customers decided that Toyota’s early information age production strategy was better than late industrial age production theories. The strategy beat the theories.”

Chapter 2, *Theories produce predictions and explanations of causation*, third paragraph, second and third sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Predictions help us evaluate uncertain events, which helps us **choose which of a set of given alternatives is the best solution to a given problem**. In contrast, explanations help us find better problems to solve **and better alternative solutions to given problems.**”

was changed to:

“Predictions help us evaluate uncertain events, which helps us **evaluate** alternatives. In contrast, explanations help us find better problems to solve.”

Chapter 4, title, quotation

“Men who are lucid go upward;
men of passion stay in between;
men of dark inertia,
caught in vile ways, sink low.”
— *The Bhagavad-Gita*

was changed to:

“It is better to know nothing than to know what ain’t so.” — *Josh Billings*

Changes in Version 2003.01.20

Preface, eleventh paragraph, first two sentences

“**Toyota engineers are part of the system that they are designing. Similarly,** economists are part of the system that they are studying.”

was changed to:

“**The first lesson economists can learn from Toyota is that** economists are part of the system that they are studying.”

Preface, thirteenth paragraph, third sentence

“In contrast, I advocate theories that explain causation.”

was changed to:

“In contrast, I advocate **both theories that predict and those that explain causation. Academics are used to looking at the market for intellectual tools from the supply side. As someone who has spent most of his working life outside of the academy, I look at**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

it both from the supply and the demand side. From the demand side, all economic agents need both theories that predict and theories that explain causation.”

Preface, thirteenth paragraph

Inserted the following paragraphs:

“A major unintended consequence of Friedman’s famous essay on methodology is that it has retarded the acceptance of strategic theories that explain causation such as those of Ludwig von Mises, F. A. Hayek, and other modern Austrian economists. Without such theories, neoclassical economics goes unchecked. Thoughtless neoclassical practitioners ignore Alfred Marshall’s warnings about the proper use of the tools in his partial equilibrium analysis toolbox. Worse, most economic agents use neoclassical concepts without recognizing either their source or their limitations.

“The problem is that theories that help us predict and those that help us explain causation ought to have different foundations. To be effective, theories that help us predict must be based *on what people will do*. In contrast, theories that help us explain causation must be based *on what the wise would do*. Only a fool would use a theory that tells him what problem the average person would choose to solve.

“Modern Austrian economics also falls short as a tool for helping us find better problems to solve. Modern Austrian economists ignore important interactions between ethics (how we live good lives) and modern economics (how we satisfy our wants). Whether it is the ability to read, write, calculate, operate a motor vehicle, use a computer, learn quickly, communicate clearly, think logically, or behave continently, useful knowledge does not recognize the boundaries that separate “consumption” from “production” and “trade.” The inappropriate assumption of a barrier separating these supposedly separate spheres of human action disconnects modern Austrian economics from the (non-human) life sciences.

“The second lesson economists can learn is that quality is as much a matter of satisfying customer needs as it is conforming to philosophical and scientific standards. How can economists satisfy customer needs when economic agents themselves don’t know exactly what their needs are? Economists can provide strategies for helping economic agents identify their needs.”

Preface, last paragraph, last sentence

Added the paragraph:

“Human cultures evolve most readily when individual humans decide wisely. Wise decision-making is as much a matter of choosing the best problem to solve (effectiveness) as it is of choosing the best alternative to a given problem (efficiency). We need theories that explain what happens in economies as well as those that predict what will happen in markets.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 4, title, quotation

“It is better to know nothing than to know what ain’t so.” — *Josh Billings*

was changed back to:

“Men who are lucid go upward;
men of passion stay in between;
men of dark inertia,
caught in vile ways, sink low.”
— *The Bhagavad-Gita*

Changes in Version 2003.01.24

Preface, eleventh paragraph, first sentence

“The first **lesson economists can learn from Toyota** is that economists are part of the system that they are studying.”

was changed to:

“**Economists can learn two lessons from Toyota manufacturing engineers.** The first is that economists are part of the system that they are studying.”

Preface, fourteenth to sixteenth paragraphs

“A major unintended consequence of Friedman’s famous essay on methodology is that it has retarded the acceptance of **strategic** theories that explain causation **such as those of Ludwig von Mises, F. A. Hayek, and other modern Austrian economists.** Without such theories, neoclassical economics **goes unchecked.** Thoughtless neoclassical practitioners ignore Alfred Marshall’s warnings about the proper use of the tools in his partial equilibrium analysis toolbox. Worse, **most** economic agents use neoclassical concepts without recognizing either their source or their limitations.

The problem is that theories that help us predict and those that help us explain causation ought to have different foundations. To be effective, theories that help us predict must be based *on what people will do*. In contrast, theories that help us explain causation must be based *on what the wise would do*. Only a fool would **use a theory that tells him what problem the average person would choose to solve.**

Modern Austrian economics **also falls short as a tool for helping us find better problems to solve.** Modern Austrian economists ignore important interactions between **ethics (how we live good lives) and modern economics (how we satisfy our wants).** Whether it is the ability to read, write, calculate, operate a motor vehicle, use a

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

computer, learn quickly, communicate clearly, think logically, or behave continently, useful knowledge does not recognize the boundaries that separate “consumption” from “production” and “trade.” **The inappropriate assumption of a barrier separating these supposedly separate spheres of human action disconnects modern Austrian economics from the (non-human) life sciences. It is not the best tool for helping us find better problems to solve.”**

were changed to:

“A major unintended consequence of Friedman’s famous essay on methodology is that it has retarded the acceptance of theories that explain causation. Without such theories, neoclassical economics **expands into the strategic sphere of helping us find better problems to solve.** Thoughtless neoclassical practitioners ignore Alfred Marshall’s warnings about the proper use of the tools in his partial equilibrium analysis toolbox. Worse, economic agents use neoclassical concepts **without realizing their limitations as tools for finding problems to solve.**

Theories that help us predict and those that help us explain causation ought to have different foundations. To be effective, theories that help us predict must be based *on what people will do*. In contrast, theories that help us explain causation must be based *on what the wise would do*. Only a fool would **choose a theory for finding problems to solve based on what the average person has chosen in the past.**

Modern Austrian economic **theories explain causation. Unfortunately, they share the same subjectivist foundation as marginalist economic theories. Like marginalist theories, they fail to include** important interactions between “consumption” and “productive activities.” Whether it is the ability to read, write, calculate, operate a motor vehicle, use a computer, learn quickly, communicate clearly, think logically, or behave continently, useful knowledge does not recognize the boundaries that separate “consumption” from “production” and “trade.” **Worse, they fail to include the potential virtuous circle involving excellence in “consumption” and “productive activities.” Arguably, this potential virtuous circle is as important to information age economies as the potential virtuous circle involving the division of labor and the expansion of market size was to the industrial age economies.”**

Changes in Version 2003.02.07

Preface, fourteenth paragraph

“A major unintended consequence of Friedman’s famous essay on methodology is that it has retarded the acceptance of theories that explain causation. **Without such theories, neoclassical economics expands into the strategic sphere of helping us find better problems to solve.** Thoughtless neoclassical practitioners ignore Alfred Marshall’s warnings about the proper use of the tools in his partial equilibrium analysis toolbox.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Worse, economic agents use neoclassical concepts without realizing their limitations as tools for finding problems to solve.”

was changed to:

“A major problem with Friedman’s *Essays in Positive Economics* is that it has retarded the acceptance of theories that explain causation. The most prominent of these are evolutionary theories. In his intellectual autobiography, evolutionary economist F. A. Hayek wrote:

“[O]ne of the things I most regret is not having returned to a criticism of Keynes’s treatise, but it is as much true of not having criticized Milton Friedman’s [*Essays in*] *Positive Economics*, which in a way is quite as dangerous a book.”

Friedman and his followers have created a theoretical vacuum. Foolish practitioners of neoclassical economics have rushed in to fill this vacuum. Worse, economic agents use neoclassical concepts without understanding their limitations as tools for finding problems to solve.”

Preface, sixteenth paragraph, first sentence

“Modern Austrian economic theories explain causation.”

was changed to:

“Modern Austrian economics’ **evolutionary theories are the leading candidates for explaining causation.**”

Preface, sixteenth paragraph, last sentence

“Arguably, this potential virtuous circle is as important to information age economies as the potential virtuous circle involving the division of labor and the expansion of market size was to the industrial age economies.”

was changed to:

“Just as recognizing Adam Smith’s potential virtuous circle involving the division of labor and expansion of market size is key to understanding the dynamics of industrial age economies, recognizing the potential virtuous circle involving excellence in “consumption” and “productive activities” is key to understanding the dynamics of information age economies.”

Acknowledgments, last paragraph, last two sentences

“Although I finished my first draft before reading any of his works, I owe more to **this self-proclaimed member of “the party of life”** than to any other economist. **Some day I**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

hope to honor him more fully with an essay titled *Why I Am Not a Libertarian* to compliment his essay, *Why I Am Not a Conservative*.”

was changed to:

“Although I finished my first draft before reading any of his works, I owe more to Hayek than to any other economist. In the Afterword of *The Constitution of Liberty*, this self-proclaimed member of the party of life explained why he was neither a conservative nor a libertarian. Understanding this essay helped me understand the dynamic balance of progress and freedom that made America great. In the Afterword of this book, I explain why I am a classical liberal progressive, by which I mean someone who advocates classical liberal means and ever more inclusive ends.”

Changes in Version 2003.02.14

Preface, last paragraph, last sentence

Added the following:

“Further, human cultures evolve most readily, and peaceably, when there is a free exchange of ideas about our ultimate ends and the best means to them. We need a common conceptual framework for thinking about our ultimate ends and the best means to them. A good economic strategy provides both theories that explain what happens in economies and a common conceptual framework for thinking about our ultimate ends and the best means to them.”

Acknowledgements, second paragraph, last two sentences

“Howard introduced me to Einstein’s epistemology. Howard freed me from the dogmatism of “Great Books’ humanism.””

was changed to:

“Howard introduced me to Einstein’s epistemology, thereby freeing me from the dogmatism of Great Books’ humanism.”

Changes in Version 2003.05.01

Preface, thirteenth paragraph, second through ninth sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“In this most cited economics paper, Friedman **advocates theories that** predict. In contrast, I **advocate both theories that** predict and **those that** explain causation. **Academics are used to looking at the market for intellectual tools from the supply side. As someone who has spent most of his working life outside of the academy, I look at it both from the supply and the demand side. From the demand side, all economic agents need both theories that predict and theories that explain causation. Theories that** predict help us solve given problems. **Theories** that explain causation, such as Darwin’s theory of evolution and Wegener’s theory of plate tectonics, help us find better problems to solve.”

was changed to:

“In this most cited economics paper, Friedman **states that economists ought to produce theories that help us** predict and **tautological classification schemes**. In contrast, I **claim that economists ought to produce intellectual tools that help us** predict and **intellectual tools that help us** explain causation. **Intellectual tools that help us** predict are useful in that **they** help us solve given problems. **Intellectual tools that help us** explain causation, such as Darwin’s theory of evolution and Wegener’s theory of plate tectonics, **are useful in that they** help us find better problems to solve.”

Preface, sixteenth paragraph

“**Theories** that help us predict and those that help us explain causation ought to have different foundations. To be effective, **theories** that help us predict must be based *on what people will do*. In contrast, **theories** that help us explain causation must be based *on what the wise would do*. Only a fool would choose a **theory** for finding problems to solve based on what the average person has chosen in the past.”

was changed to:

“**Intellectual tools** that help us predict and those that help us explain causation ought to have different foundations. To be effective, **tools** that help us predict must be based *on what people will do*. In contrast, **tools** that help us explain causation must be based *on what the wise would do*. Only a fool would choose a **tool** for finding problems to solve based on what the average person has chosen in the past.”

Preface, last paragraph, fifth sentence

“We need a common conceptual framework for thinking about our ultimate ends and the best means to them.”

was changed to:

“We need a common **classification system, a common** conceptual framework, for thinking about our ultimate ends and the best means to them.”

Changes in Version 2003.05.08

Preface, thirteenth through fifteenth paragraphs

“This instrumental approach to economics is not new – Milton Friedman took it in his 1953 essay, “The Methodology of Positive Economics.” In this most cited economics paper, Friedman states that economists ought to produce theories that help us predict **and tautological classification schemes**. In contrast, I claim that economists ought to produce intellectual tools that help us predict and intellectual tools that help us explain causation. Intellectual tools that help us predict are useful in that they help us solve given problems. Intellectual tools that help us explain causation, such as Darwin’s theory of evolution and Wegener’s theory of plate tectonics, are useful in that they help us find better problems to solve. Wise decision-making requires performing both tasks well.

“A major problem with Friedman’s *Essays in Positive Economics* is that it has retarded the acceptance of theories that explain causation. The most prominent of these are evolutionary theories. In his intellectual autobiography, evolutionary economist F. A. Hayek wrote:

“[O]ne of the things I most regret is not having returned to a criticism of Keynes’s treatise, but it is as much true of not having criticized Milton Friedman’s [*Essays in*] *Positive Economics*, which in a way is quite as dangerous a book.”

“Friedman and his followers have created an intellectual vacuum. Foolish practitioners of neoclassical economics have rushed in to fill this vacuum. Worse, economic agents use neoclassical concepts without understanding their limitations as tools for finding problems to solve.”

was changed to:

“This instrumental approach to economics is not new – Milton Friedman took it in his 1953 essay, “The Methodology of Positive Economics.” In this most cited economics paper, Friedman states that economists ought to produce theories that help us predict. In contrast, I claim that economists ought to produce intellectual tools that help us predict and intellectual tools that help us explain causation.

“My perspective is thoroughly recursionist, by which I mean that it focuses on the process that we apply recursively in order to solve the infinitely large problem of how intelligent beings live good lives. This process is decision-making, defined as the process that begins with finding a problem to solve and ends in reviewing the implemented solution. From this decision-oriented perspective, the distinction between predictions and explanations of causation is crystal clear: predictions help us evaluate alternatives and explanations of causation help us formulate them. Intellectual

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

tools that help us predict are useful in that they help us solve given problems. Intellectual tools that help us explain causation, such as Darwin's theory of evolution and Wegener's theory of plate tectonics, are useful in that they help us find better problems to solve. Wise decision-making requires performing both tasks well."

Preface, new sixteenth paragraph, last sentence

"Just as recognizing Adam Smith's potential virtuous circle involving the division of labor and expansion of market size is key to understanding the dynamics of industrial age economies, recognizing the potential virtuous circle involving excellence in "consumption" and "productive activities" is key to understanding the dynamics of information age economies."

was changed to:

"Just as recognizing Adam Smith's potential virtuous circle involving the division of labor and expansion of market size is key to understanding the dynamics of industrial age economies, recognizing the potential virtuous circle involving excellence in "consumption" and "productive activities" is key to understanding the dynamics of information age economies: **Good people produce good products. Good products, particularly good intellectual tools, "produce" good people.**"

Preface, new seventeenth paragraph, second sentence

"How can economists satisfy **customer** needs when economic agents themselves don't know exactly what **these** needs are?"

was changed to:

"**In a freely evolving economy, economists' customers are economic agents.** How can economists **help economic agents** satisfy **their** needs when economic agents themselves don't know exactly what **their** needs are?"

Preface, last paragraph

"**Human** cultures **evolve** most readily when individual **humans** decide wisely. Wise decision-making is as much a matter of choosing the best problem to solve (effectiveness) as it is of choosing the best alternative to a given problem (efficiency). We need theories that explain what happens in economies as well as those that predict what will happen in markets. Further, **human** cultures **evolve** most readily, and peaceably, when there is a free exchange of ideas about our ultimate ends and the best means to them. We need a common **classification system, a conceptual framework**, for thinking about our ultimate ends and the best means to them. A good economic strategy provides both theories that explain what happens in economies and a common conceptual framework for thinking about our ultimate ends and the best means to them."

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Cultures **progress** most readily when individuals decide wisely. Wise decision-making is as much a matter of choosing the best problem to solve (effectiveness) as it is of choosing the best alternative to a given problem (efficiency). We need theories that explain what happens in economies as well as those that predict what will happen in markets. Further, cultures **progress** most readily, and peaceably, when there is a free exchange of ideas about our ultimate ends and the best means to them. We need a common conceptual framework for thinking about our ultimate ends and the best means to them. A good economic strategy provides both theories that explain what happens in economies and a common conceptual framework for thinking about our ultimate ends and the best means to them. **In effect, it is a research program not only for economists but also for economic agents.**”

Changes in Version 2003.05.10

Preface and Chapter 2

Eliminated all references to causation, e.g., changed “explanations of causation” to “explanations.” “Explanations of causation” has proved to be a trigger word for arguments that have nothing to do with the clear utilitarian distinction between predictions and explanations.

Chapter 2, *Theories produce predictions and explanations.*, second paragraph

“Explanations are not simply predictions “written backwards.” In *deterministic chaotic systems*, **physicists** can explain without being able to predict equally well. In these systems, small differences in initial conditions become ever greater over time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate.” Further, quantum mechanics provides very accurate statistical predictions of subatomic events without explaining their causes equally well. **Physicists currently seek better means of explaining, theories of what lies “beneath” or “behind” quantum mechanics, e.g., superstring theory, rather than better means of predicting what quantum mechanics predicts.**”

was replaced by the following footnote:

“Explanations are not simply predictions “written backwards.” **Some theories explain relatively better than they predict and others predict relatively better than they explain.** In *deterministic chaotic systems*, **we** can explain without being able to predict equally well. In these systems, small differences in initial conditions become ever greater over

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate.” Other theories predict relatively better than they explain: Quantum mechanics provides very accurate statistical predictions of subatomic events without explaining their causes equally well. **Rather than better means of predicting what quantum mechanics predicts, physicists currently seek to explain what links subatomic phenomena and cosmological phenomena. The best remind themselves “not to confuse the map with the territory.”**”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph

Added the paragraph:

“Note that this Venn diagram is nothing more than a simple static representation of the complex dynamic process of refining useful knowledge. Copernicus’s explanation of the solar system began as a philosophical theory (3). It became a scientific explanation (4) by helping Kepler find an explanation that was able to predict the trajectories of planets better than other theories of its day. It became a former scientific explanation when Kepler’s theory displaced it as the best scientific explanation for all intents and purposes.”

Changes in Version 2003.05.24

Preface, fifteenth paragraph

“Intellectual tools that **help us** predict and those that **help us** explain ought to have different foundations. To be effective, tools **that** help us predict must be based *on what people will do*. In contrast, tools **that** help us explain must be based *on what the wise would do*. Only a fool would choose a tool for finding problems to solve based on what the average person has chosen in the past.”

Added the sentence:

“Intellectual tools that predict and those that explain ought to have different foundations. To be effective, tools **for helping** us predict must be based *on what people will do*. In contrast, tools **for helping** us find problems to solve must be based *on what the wise would do*. Only a fool would choose a tool for finding problems to solve based on what the average person has chosen in the past. **Intellectual tools that explain ought to be based on *enlightened* self-interest, not *revealed* self-interest.**”

Chapter 1, *The Recursionist Approach*, last paragraph, third sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Added the footnote:

“We can see the importance of world-view / strategic vision in the Cold War rivalry beneath the seas. At the beginning of the nuclear submarine era, the Soviets assumed that NATO submarines had as difficult time detecting their submarines as they did detecting NATO ones. Given this belief, the Soviets viewed submarines as being like contemporary aircraft. Rather than focusing on stealth, they focused on speed and diving capability. In the mid-seventies the Soviets discovered how easily the US Navy tracked their submarines. This discovery led them to build a new fleet of much stealthier submarines, which greatly lowered the probability of a quick NATO victory at sea. The vision of stealthy submarines produced better problems to solve than the vision of fast, deep diving ones.”

Chapter 3, Secular Humanist Ends, sixteenth paragraph, first three sentences

“Magical mysticism has advantages and disadvantages. Its **otherworldly** focus can help us cope with worldly stress and disappointments. In addition, it can help us improve the performance of a difficult activity by allowing us to detach ourselves from the activity and the results of that activity. **In addition**, it can help us improve the performance of a difficult activity by allowing us to detach ourselves from the activity and the results of that activity.”

was changed to:

“Schweitzer explains that humans have a need for mystical oneness — a religious impulse — that we can satisfy by relinking to the infinite Being by either renouncing or embracing the world and life. This explanation is logical in that it follows the rules for philosophical theories. However, it is aesthetically flawed in that it presumes the existence of the infinite Being when this metaphysical assumption is not necessary to explain what it explains. This violates the philosophical standard of beauty known as Occam’s Razor. We can easily correct this flaw by eliminating this assumption. The corrected explanation is that humans have a need for mystical oneness that we satisfy either by embracing the world and life or by embracing the complete absence of the world and life (oblivion).

“The corrected explanation is good philosophy. For it to be good science, it must stand ready to be proven less useful than competing explanations in helping us find better problems to solve.

“Exploring the relative merits of magical and ethical mysticism yields several useful **problems**. Magical mysticism has advantages and disadvantages. Its **unworldly** focus can help us cope with worldly stress and disappointments. **Further**, it can help us improve the performance of a difficult activity by allowing us to detach ourselves from the activity and the results of that activity.”

Chapter 3, Secular Humanist Ends, new nineteenth paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Because it **concerns only our relationship with the infinite Being and not** our relationship with **life**, it offers no foundation for an ethical system.”

was changed to:

“Because it **ignores** our relationship with **the world**, it offers no foundation for an ethical system.”

Chapter 3, Secular Humanist Ends, second to last paragraph, second sentence

“He failed to recognize that we can combine the best of magical and ethical mysticism by setting our objectives according to ethical mysticism, **but** acting according to magical mysticism.”

was changed to:

“He failed to recognize that we can combine the best of magical and ethical mysticism by setting our objectives according to ethical mysticism **and then** acting according to magical mysticism.”

Changes in Version 2003.05.27

Preface, sixteenth paragraph

Inserted the paragraph:

“At issue is not whether the development of consumer preferences can be predicted but rather whether it can be explained. I argue that consumer preferences emerge from the complex interaction of two types of pleasure. The first is the reward for satisfying our teleonomic programming (pleasure-in-being) and the second is the reward for acting (pleasure-in-acting). In Western ethics, we see these two types of pleasure in Spinoza’s definition of pleasure as the result of moving toward completion (pleasure-in-being) and Aristotle’s definition of pleasure as the result of becoming lost in activity (pleasure-in-acting). In Eastern ethics, we see the complex interaction of these two types of pleasure in the Hindu doctrine of the three gunas and in the Taoist doctrine of yin and yang. In these and many other ethical traditions, enlightened self-interest is a matter of finding pleasure-in-acting in those activities that yield pleasure-in-being.”

Changes in Version 2003.06.10

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, fifteenth paragraph, last two sentences

“Only a fool would choose a tool for finding problems to solve based on what the average person has chosen in the past. Intellectual tools that explain ought to be based on *enlightened* self-interest, not *revealed* self-interest.”

was changed to:

“The wise choose based on what they need to learn in order to achieve their ultimate ends ever more efficiently. They look beyond what they currently know. Thus, intellectual tools that explain ought to be based on *enlightened* self-interest, not *revealed* self-interest.”

Chapter 2, The Nature of Theories, first paragraph, second sentence

Changed “chapter” to “book.”

Changes in Version 2003.06.30

Acknowledgments, first paragraph, last sentence

“Fred was extremely generous with his time **when I needed it most.**”

was changed to:

“Fred was extremely generous with his time.”

Acknowledgments, third paragraph, last sentence

“In 1996, he suggested that I stop trying to convert economists and write a book for the **general public “from the heart.”**”

was changed to:

“In 1996, he suggested that I stop trying to convert economists and write a book for the **Harvard Business Review / Economist audience.**”

Acknowledgments, third to the last paragraph

“The fifth is the speaker at the Stanford Graduate School of Business orientation meeting who told our incoming class (1979) that if we learned nothing else in the next two years, we should learn the difference between efficiency and effectiveness. I may not have remembered his name, but I remembered his advice.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“The fifth is James Likens, the current head of the Pomona College economics department. In the early seventies, the department was dominated by Keynesians of the Hick’s ISLM persuasion. After experiencing stagflation and hearing few objections to Nixon’s wage and price controls, which came very close to bankrupting my father’s manufacturing company, I vowed to stay as far away from Keynesian macroeconomics as possible. This meant taking every economics course taught by Jim, who I found to be the most inquisitive professor in the department. He frequently told us that social scientists can tell many stories about this or that complex phenomenon and that economists don’t do dynamics well. A poster in my high school physics classroom proclaimed: “*The problem, once solved, is simple.*” To this I add: “*The problem, once found, is obvious.*””

Acknowledgments, last paragraph

“Students of F. A. Hayek will recognize the homage I paid him in the dedication. Although I finished my first draft before reading any of his works, I owe more to Hayek than to any other economist. **In the Afterword of *The Constitution of Liberty*, this self-proclaimed member of the party of life explained why he was neither a conservative nor a libertarian. Understanding this essay helped me understand the dynamic balance of progress and freedom that made America great. In the Afterword of this book, I explain why I am a classical liberal progressive, by which I mean someone who advocates classical liberal means and ever more inclusive ends.**”

was changed to:

“Students of F. A. Hayek will recognize the homage I paid him in the dedication. Although I finished my first draft before reading any of his works, I owe more to him than to any other economist. **Understanding his popular works helped me better understand the dynamic balance of freedom and ever expanding concept of justice that made the United States both great and the Great Satan: liberal progressive societies tend to destroy inefficient and ineffective traditions.**

“Hayek exposed the practical problems of central planning. His goal was to demonstrate why socialism is fatally flawed. In contrast, I expose practical problems of capitalism, the free enterprise system as it is currently understood. My goal is to improve the free enterprise system by improving our understanding of our ultimate ends and the best means to them.”

Changes in Version 2003.07.25

Preface

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Replaced the old preface with a new one that targets business school students.

Acknowledgments, second to last paragraph, last sentence

Changed “liberal progressive **societies** tend to **destroy inefficient and ineffective traditions**” to “**classical** liberal progressive **cultures** tend to **abandon their less wise traditions.**”

Acknowledgments, last paragraph, last sentence

Changed “our ultimate ends and the best means to them” to “enlightened self-interest.”

Chapter 1, Overview, first paragraph, second sentence

“*A New Foundation* discusses the philosophical foundation.”

was changed to:

“*New Foundations* proposes new foundations for science and evolutionary explanations.”

Chapter 1, Overview, first paragraph, sixth sentence

“The final two chapters discuss **what modern economists call** macroeconomic issues.”

was changed to:

“The final two chapters discuss macroeconomic issues.”

Chapter 2, title

The title was changed from: “A New Foundation” to “New Foundations.”

Chapter 2, The Nature of Theories, title

The title was changed to “Refining Everyday Thinking.”

Chapter 2, The Nature of Theories, last three sentences

“This book proposes a similar strategy for learning how to live ever more wisely. **It** involves slowly tightening a loose theory of means by removing ignorance in the form of theories of ultimate ends. Understanding this strategy requires understanding something about theories.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This book proposes a similar strategy for learning how to live ever more wisely, **which** involves slowly tightening a loose theory of means by removing ignorance in the form of theories of ultimate ends. Understanding this strategy requires understanding something about **the nature of** theories.”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph

“Note that this Venn diagram is nothing more than a simple static representation of the complex dynamic process of refining useful knowledge. Copernicus’s explanation of the solar system began as a philosophical theory (3). It became a scientific explanation (4) by helping Kepler find an explanation that was able to predict the trajectories of planets better than other theories of its day. It became a former scientific explanation when Kepler’s theory displaced it as the best scientific explanation for all intents and purposes.”

was changed to:

“Thus, we should judge neoclassical economics, which aims at helping us predict what happens in markets, by how well it helps us to predict what happens in markets. Neoclassical economics should stand ready to be proved less useful in helping us predict what happens in markets than competing theories. In contrast, we should judge evolutionary economic theories, which aim at helping us explain what happens in economies, by how well they help us formulate alternatives. These explanations should stand ready to be proved less useful in helping us formulate alternatives than competing explanations.”

Chapter 2, A New Foundation for Explanation, title

The title was changed to “Refining Evolutionary Explanations”

Chapter 2, Refining Evolutionary Explanations, first paragraph, last sentence

“The economics profession fails to provide such theories.”

was changed to:

“The only school of economics that comes close to producing such theories is the Austrian school.”

Chapter 2, Refining Evolutionary Explanations, second paragraph

“The major reason the economics profession has failed to provide such theories is that most schools of economics claim that the primary purpose of economic theories is to predict, not explain. The notable exception is one small but increasingly influential school, the Austrian school of evolutionary economics.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was deleted.

Chapter 2, Refining Evolutionary Explanations, last paragraph, last sentence

“**Doing so** leads to happiness, a life well-lived.”

was changed to:

“**Following our internal programming** leads to happiness, a life well-lived.”

Chapter 2, Summary, entire section

“This chapter proposed an evolutionary foundation for evolutionary economic explanations. These explanations should stand ready to be proved less useful than competing explanations in helping us find better problems to solve.”

was deleted.

Chapter 4, *Pleasure and Pain*, second paragraph, last sentence

“We can think of the first, pleasure-in-acting, as **“pleasure”** and the second, pleasure-in-being, as **“joy.”**”

was changed to:

“We can think of the first **as** pleasure-in-acting and the second **as** pleasure-in-being.”

Chapter 4, *Pleasure and Pain*, third paragraph

“In Western ethics, Aristotle best defines ‘pleasure’ and Spinoza best defines **‘joy.’** Aristotle defined ‘pleasure’ as the thing that perfects or completes activity. Pleasure comes from being absorbed in activity. To give us pleasure, an activity must not be so easy as to be boring, nor so difficult as to be overwhelming. Work that does not challenge us is boring and work that challenges us too much is overwhelming. Between these two extremes there is a level of challenge that enables us to become absorbed in work. Complete pleasure, total involvement in activity, is ecstasy. Pain (in acting) is anything that interferes with losing ourselves in activity.”

was changed to:

“In Western ethics, Aristotle best defines pleasure-**in-acting** and Spinoza best defines **pleasure-in-being**. Aristotle defined **pleasure-in-acting** as the thing that perfects or completes activity. Pleasure-**in-acting** comes from being absorbed in activity. To give us pleasure, an activity must not be so easy as to be boring, nor so difficult as to be overwhelming. Work that does not challenge us is boring and work that challenges us too much is overwhelming. Between these two extremes there is a level of challenge

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

that enables us to become absorbed in work. Complete pleasure-in-acting, total involvement in activity, is ecstasy. Pain-in-acting is anything that interferes with losing ourselves in activity.”

Chapter 4, *Pleasure and Pain*, all but last paragraph

Replaced “pleasure” with “pleasure-in-acting” and “joy” with “pleasure-in-being.”

Chapter 4, *Pleasure and Pain*, last paragraph

“Because pleasure and joy can each increase the other, there exists a potential virtuous circle of pleasure and joy. Learning to find pleasure in what is good for us encourages us to do what is good, which in turn gives us the potential to do more. Pursuing this virtuous circle increases not only our pleasure and joy but also our abilities, knowledge, material goods, and habit of pursuing the good. Misfortune, ignorance, material scarcity, and incontinence tend to break this circle. We need practical wisdom, knowledge of how to act wisely, to pursue this virtuous circle.”

was changed to:

“Thus, there exists a potential virtuous circle of pleasure-in-acting (“pleasure”) and pleasure-in-being (“joy”): learning to find pleasure in activities that are good for us encourages us to do these activities, which in turn gives us the potential to do more. Pursuing this virtuous circle increases not only both “pleasure” and “joy” but also our abilities, knowledge, material goods, and habit of pursuing the good. Misfortune, ignorance, material scarcity, and incontinence tend to break this circle.”

Chapter 4, *Alternatives to Pursuing Happiness*, last paragraph

“We can also see this distinction in Taoism. Here, yin corresponds to dark inertia (pleasure-in-being); yang corresponds to passion (pleasure-in-acting); and the balance of yin and yang corresponds to lucidity (pursuing the virtuous circle of pleasure and joy).”

was changed to:

“We can also see this distinction in Taoism. Here, yin corresponds to dark inertia (pleasure-in-being / joy); yang corresponds to passion (pleasure-in-acting / pleasure); and the balance of yin and yang corresponds to lucidity (pursuing the virtuous circle of pleasure and joy).”

Chapter 5, Introduction, third paragraph, second sentence

“From the recursionist perspective, the problem is obvious: economists address strategic issues using the tactical conceptual framework of marginalist economics.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“From the recursionist perspective, the problem is obvious: addressing strategic issues using the **inherently** tactical conceptual framework of marginalist economics **is foolish.**”

Appendix, Folding in Production Operations, last paragraph, last sentence

“**Taking this argument to its logical limit**, a traditional job shop is simply countless continuous process manufacturing lines folded in **to a small space.**”

was changed to:

“**From this perspective**, a traditional job shop is simply countless continuous process manufacturing lines folded **together poorly.**”

Changes in Version 2003.08.02

Preface, eighth paragraph, last two sentences

“For Friedman, this alternative means is Adam Smith’s vision of economies as complex adaptive systems that arise out of the decision-making of individual economic agents. Friedman’s popular works, e.g., *Free to Choose*, focus on decision-making, not on allocating scarce resources.”

was changed to:

“From his popular works and public lectures, we know that Friedman thinks about economies as complex adaptive systems that emerge from the decision-making of individual economic agents. He focuses on decision-making, not on allocating scarce resources.”

Preface, twelfth paragraph, second and third sentences

“To be most effective in helping us formulate alternatives, theories that explain causation must be based on what we would do if we had complete knowledge. **This requires that we know what we do not know.**”

was was changed to:

“To be most effective in helping us formulate alternatives, theories that explain causation must be based on what we would do if we had complete knowledge **of what we ought to seek.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, last paragraph, first two sentences

“Why ought we to step backwards from Neoclassical self-interest to Classical *enlightened* self-interest at the dawn of the information age? Just as industrial economies are driven by a virtuous circle that involves the division of labor and the expansion of market size, information age economies are driven by a virtuous circle that involves excellence in trade and production and excellence in consumption.”

was changed to:

“At the dawn of the industrial age, Adam Smith’s example of a pin factory demonstrated the wisdom of pursuing the virtuous circle of the division of labor and the expansion of market size. Today, the example of the Toyota production system demonstrates the wisdom of pursuing the virtuous circle of increasing excellence in production and trade and increasing excellence in consumption.”

Preface, last paragraph, last two sentences

“We **ought** to know more about what makes people good. We **ought to know** more about what enlightened self-interest truly is.”

was changed to:

“**Given this new reality, we owe it to ourselves** to know more about what makes people good. We **owe it to ourselves to learn** more about what enlightened self-interest truly is.”

Chapter 3, footnote 11

“This argument does not try to refute metaphysical assumptions, **especially assumptions about** the ultimate end of existence.”

was changed to:

“This argument does not try to refute metaphysical assumptions, **particularly those concerning** the ultimate end of existence.”

Chapter 4, Introduction

“**The recursionist core theory of means is both simple and straightforward:** Excellence is the wise use of resources in satisfying our needs. We increase excellence by choosing better subordinate ends and better means to **given** subordinate ends.

“Some concepts derived from marginalist economics tend to blind us to better subordinate ends. This chapter proposes recursionist alternatives to four of these concepts: consumption, trade, production, and profit.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Excellence **in means** is the wise use of resources in satisfying our needs. We increase excellence by choosing better subordinate ends and better means to **chosen** subordinate ends. Some concepts derived from marginalist economics tend to blind us to better subordinate ends. This chapter proposes **recursionist** alternatives to four of these concepts: consumption, trade, production, and profit.”

Chapter 6, footnote 4, last sentence, last phrase

Changed “but vision (and related concepts)” to “but rather vision (and related concepts).”

Chapter 6, Fluid Relationships, last sentence

“In the long run, fluid relationships promote lucidity by **allowing** practical wisdom to **flourish**.”

was changed to:

“In the long run, fluid relationships promote lucidity by **encouraging the spread of** practical wisdom.”

Appendix, fifth footnote, last sentence

“This conceptual model is founded on the assumption that people do not learn through experience.”

was deleted.

Changes in Version 2003.08.07

Preface, first paragraph, first sentence

Changed “ethics” to “normative economics.”

Preface, third paragraph, last sentence

“Thus, there can be no complete theory to guide our actions.”

was changed to:

“We can never be certain about what it is that we ought to seek.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, eleventh paragraph, last sentence

“The Austrians failed to rise to Friedman’s challenge.”

was changed to:

“Friedman’s solution divided economics into theories that help us predict and normative theories, theories that help us formulate alternatives. The Austrians failed to rise to Friedman’s challenge by abandoning the former in order to focus exclusively on the latter. They failed to rededicate themselves to explaining causation.”

Preface, fourteenth and fifteenth paragraphs

“Fortunately, the solution is also both simple and straightforward: How can we know what we do not know? We can learn by doing. Rather than trying to find the best theory of what we ought to seek, we can create strategies for **eliminating inferior theories of** what we ought to seek. **The goal is to create an explicitly moral free enterprise system, one that not only encourages the creation of knowledge of how to produce and trade ever more wisely but also encourages the creation of knowledge of how to turn consumer goods into good lives ever more wisely.**

“This radical solution will be resisted by those intellectuals who define the markets for intellectual tools to exclude everything but theories. To such people, it takes a theory to beat a theory. They ought to think carefully about who ultimately defines the market for intellectual tools. In the market for intellectual production tools, *the consumers of intellectual tools* decided that Toyota’s early information age production strategy was better than late industrial age production theories. The strategy beat the theories.”

was changed to:

“Fortunately, the solution is also both simple and straightforward: How can we know what we do not know? We can learn by doing.

“A strategy is a general plan for solving a problem that is too large or too complex for a specific solution. Rather than trying to find the best theory of what we ought to seek, we can create a strategy for **learning** what we ought to seek.

“This radical solution will be resisted by those intellectual tool makers who define the markets for intellectual tools to exclude everything but theories. To such people, it takes a theory to beat a theory. **They ought to consider the following argument:**

“A complete conceptual system for helping us formulate alternatives must include all uncertainty. No theory can encompass the uncertainty of all of its own fundamental propositions. Addressing all uncertainties associated with any given theory requires introducing a more complete theory. Thus, a complete conceptual system for helping us

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

formulate alternatives must be based not on a theory but rather on a strategy for solving an open-ended problem that includes all uncertainty.

“These intellectual tool makers also ought to think carefully about who ultimately defines the market for intellectual tools. In the market for intellectual production tools, *the consumers of intellectual tools* decided that Toyota’s early information age production strategy was better than late industrial age production theories. The strategy beat the theories.”

Preface, last paragraph, second sentence

“Today, the example of the Toyota...”

was changed to:

“Today, the Toyota...”

Acknowledgments, second to last paragraph, last sentence

“Understanding his popular works helped me better understand the dynamic balance of freedom and an ever expanding concept of justice that made the United States both great and the Great Satan: classical liberal progressive cultures tend to abandon their less wise traditions.”

was changed to:

“Understanding his popular works helped me better understand the dynamic balance of an ever expanding concept of justice and freedom. This dynamic balance is what made the United States both great and the Great Satan: classical liberal progressive cultures tend to abandon their less wise traditions.”

Chapter 2, Refining Evolutionary Explanations, fifth paragraph, last sentence

“Therefore, we can safely assume that our basic genetic programming is fixed.⁵”

was changed to:

“Although we can improve the process by which our genetic programming develops into our higher level programming, we cannot improve our higher level internal programming beyond the bounds set by our genetic programming.⁵ Therefore, we can safely assume that our fully realized internal programming is fixed.”

Chapter 2, fifth footnote, second sentence

Changed “internal programming” to “genetic programming.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Refining Evolutionary Explanations, sixth paragraph, first sentence

“Although we can safely assume that **we have fixed internal programming**, we do not know, and may never know completely, what this internal programming is.”

was changed to:

“Although we can safely assume that **our fully realized internal programming is fixed**, we do not know, and may never know completely, what this internal programming is.”

Chapter 2, Refining Evolutionary Explanations, last paragraph

“Explanations based on **the set of all acceptable** teleonomic theories are unique in that they both describe *what is* and prescribe *what ought to be*. **Specifically, they both describe the program that motivates us and prescribe that we owe it to ourselves (ought) to follow our programming. Following our internal programming leads to happiness, a life well-lived.**”

was changed to:

“Explanations based on teleonomic theories are unique in that they both describe *what is* and prescribe *what ought to be*. **These explanations describe our internal programming. Following our internal programming leads to happiness, a life well-lived. Because we owe it to ourselves (ought) to follow our internal programming, these explanations also prescribe what we ought to do.**”

Chapter 3, Eliminating Simplistic Theories, first paragraph, first sentence

“Our needs are complex in that they at more than one level of abstraction.”

was changed to:

“Our needs are complex in that they **emerge** at more than one level of abstraction.”

Chapter 3, Eliminating Simplistic Theories, fifth paragraph, last sentence

Changed “many people” to “most people.”

Chapter 3, Eliminating Simplistic Theories, tenth paragraph, first sentence

Changed “theory” to “doctrine.”

Chapter 4, Consumption, first paragraph, first three sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The marginalist concept of consumption is loosely based on **Jeremy Bentham’s** utilitarian ethics. In contrast, the recursionist concept is based on **a loose amalgam of** humanistic ethical theories. Humanistic ethics differs markedly from **utilitarianism.**”

was changed to:

“The marginalist concept of consumption is loosely based on utilitarian ethics. In contrast, the recursionist concept is based on humanistic ethical theories. Humanistic ethics differs markedly from **utilitarian ethics.**”

Chapter 4, Consumption, first paragraph, first three sentences

“Deriving pleasure from an activity requires the physical and mental ability to perform that activity, the knowledge of how to perform it, sufficient time to perform it, and any necessary material goods.”

was changed to:

“Deriving pleasure from an activity requires the physical capacity, mental capacity, spiritual capacity, time, material goods, and knowledge necessary to perform it.”

Chapter 4, Pleasure and Pain, fifth paragraph

“Deriving pleasure from an activity requires the **physical and mental ability to perform that activity, the knowledge of how to perform it, sufficient time to perform it, and any necessary material goods.** Common pleasures come from activities that require common **capacities, knowledge, and material goods.** Watching a beautiful sunset is a common pleasure. Deriving pleasure from other activities can require making an investment in training, **learning, or material goods.** Finding pleasure in playing chess requires knowing how to play the game.”

was changed to:

“Deriving pleasure from an activity requires **the physical capability, mental capability, spiritual capability, time, material goods, and knowledge of how to perform it.** Common pleasures come from activities that require common **capabilities, material goods, and knowledge.** Watching a beautiful sunset is a common pleasure. Deriving pleasure from other activities can require making an investment in training, **material goods, or learning.** Finding pleasure in playing chess requires investing in how to play the game.”

Chapter 4, Pleasure and Pain, fifth paragraph, last two sentences

“Pursuing this virtuous circle increases not only **both “pleasure” and “joy”** but also our abilities, knowledge, non-knowledge goods, **and habit of pursuing the good.** Misfortune, ignorance, material scarcity, **and incontinence** tend to break this circle.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Pursuing this virtuous circle increases not only pleasure and joy but also our abilities, knowledge, **and** non-knowledge goods. Misfortune, ignorance, **and** material scarcity tend to break this circle.”

Chapter 4, Practical Wisdom, second paragraph, last two sentences

“**Unlike** most other forms, using it enhances it. **By acting wisely we** develop and reinforce the habit of acting wisely.”

was changed to

“**Like** most other forms **of human knowledge**, using it enhances it. **We** develop and reinforce the habit of acting wisely **by acting wisely**.”

Chapter 4, Human Capital, Work, and Leisure, last paragraph, last sentence

“Too often ignored, such actions by employees, managers, and chief executives are good business practice.”

was deleted.

Chapter 4, Three Common Misconceptions, title

Changed “misconceptions” to “misbeliefs.”

Chapter 4, Three Common Misbeliefs, first paragraph, first three sentences

“Several **misconceptions** hinder **our ability to increase** excellence in trade. The most important of these is **not recognizing the possibility of improving the means of trade, which is common among those with a marginalist world-view. Even those who recognize the possibility often dismiss it as impractical or inappropriate to their situation.**”

was changed to:

“Several **common beliefs** hinder **increasing** excellence in trade. The most important of these is **the belief that the means of trade cannot be improved.**”

Chapter 4, Three Common Misbeliefs, first paragraph, last sentence

“Early American failures to adopt it warn us that this impressive means of inducing knowledge requires recognizing the possibility of improving the means of trade.”

was deleted.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 4, Three Common Misbeliefs, second paragraph, first sentence

“A second common belief that **keeps us from improving the** excellence in trade...”

was changed to:

“A second common belief that **hinders increasing** excellence in trade..”

Chapter 4, Three Common Misbeliefs, sixth paragraph, first sentence

“A third common belief that **prevents us from improving** trade is the belief that the only information that we need to make **rational** purchasing decisions is the knowledge of the good’s quality and price.”

was changed to:

“A third common belief that **hinders increasing excellence in** trade is the belief that the only information that we need to make **wise** purchasing decisions is the knowledge of the good’s quality and price.”

Chapter 4, Three Common Misbeliefs, sixth paragraph, last three sentences

“Knowing that what we consume was produced ethically helps us to satisfy this need. However, providing information about the means of production is not always wise. It is only wise when the benefits of providing this information exceed the costs of providing it. Until people feel the need for it, providing it is wasteful.”

were deleted.

Chapter 4, Production, first sentence

Changed “can produce” to “produces.”

Chapter 7, second paragraph, second sentence

“Where current microeconomic theories help us **use scarce resources to achieve our subordinate ends**, recursionist explanations help us **choose these ends**.”

was changed to:

“Where current microeconomic theories help **evaluate alternatives**, recursionist explanations help us **formulate them**.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, footnote 1

“¹ Explanations are not simply predictions ‘written backwards.’ Some theories explain relatively better than they predict and others predict relatively better than they explain. In *deterministic chaotic systems*, we can explain without being able to predict equally well. In these systems, small differences in initial conditions become ever greater over time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the ‘weather.’ In the long term, the best we can hope to do is to predict the bounds of the trajectory, the ‘climate.’ Other theories predict relatively better than they explain: Quantum mechanics provides very accurate statistical predictions of subatomic events without explaining their causes equally well. Rather than better means of predicting what quantum mechanics predicts, physicists currently seek to explain what links subatomic phenomena and cosmological phenomena. The best remind themselves ‘not to confuse the map with the territory.’”

was changed to:

“¹ Explanations are not simply predictions ‘written backwards.’ Some theories explain relatively better than they predict and others predict relatively better than they explain. In *deterministic chaotic systems*, we can explain without being able to predict equally well. In these systems, small differences in initial conditions become ever greater over time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the ‘weather.’ In the long term, the best we can hope to do is to predict the bounds of the trajectory, the ‘climate,’ **which ‘emerges’ from the complex interactions of matter and energy.**”

“Other theories predict relatively better than they explain: Quantum mechanics provides very accurate statistical predictions of subatomic events without explaining their causes equally well. Rather than better means of predicting what quantum mechanics predicts, physicists currently seek to explain what links subatomic phenomena and cosmological phenomena. The best remind themselves ‘not to confuse the map with the territory.’”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph, end

Added the footnote:

“³ This instrumentalist concept of science addresses a common argument against Milton Friedman’s more limited instrumentalist concept, which is that Friedman’s concept would have rejected Copernicus’s theory of the solar system on the grounds that it did not predict as well as some contemporary Ptolemaic theories. Under this concept of science, Copernicus’s theory would have been rejected as a theory that predicts but not as theory that explains. Copernicus’s theory proved its worth as a

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

theory that explains when it helped Kepler find a theory that predicted better than any Ptolemaic theory.”

Chapter 3, ninth footnote

“⁹ Anything less than complete ignorance will introduce bias. For example, if we simply imagine that we were born into our current society, we will tend to ignore the potential affect of our behavior on members of other human societies, future generations of humans, and non-human life. Using Rawls’s means, we can argue that incomplete forms of ethical mysticism permit unjust predation and exploitation. We also can argue that they permit unjust limitations on cooperation. The most obvious examples are restrictions on “foreign” trade. These limit cooperation with living members of other societies. Less obvious are actions that effectively limit cooperation with future generations. Justice requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Each generation must seek to maximize the amount of progress for the turbulence it can bear. **Each generation must ask itself, ‘If not now, when? If not us, who?’** Shielding a favored group from change violates this agreement. “Social justice” is not the highest form of justice. Whenever we are tempted to use ‘social justice’ we **should consider substituting either ‘tribal justice’ or ‘justice’ depending on what we mean to say.**”

was changed to:

“⁹ Anything less than complete ignorance will introduce bias. For example, if we simply imagine that we were born into our current society, we will tend to ignore the potential affect of our behavior on members of other human societies, future generations of humans, and non-human life. Using Rawls’s means, we can argue that incomplete forms of ethical mysticism permit unjust predation and exploitation. We also can argue that they permit unjust limitations on cooperation. The most obvious examples are restrictions on “foreign” trade. These limit cooperation with living members of other societies. Less obvious are actions that effectively limit cooperation with future generations **of intelligent life.**

Justice requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Each generation must seek to maximize the amount of progress for the turbulence it can bear. Shielding a favored group from change violates this agreement. **The basis of this complete concept of justice is not a social contract but rather a contract between all intelligent life for the benefit of all life. For those who believe that all life contains an element of the infinite Being, it is a contract with the infinite Being.**

“Whenever we are tempted to use ‘social justice’ we **ought to substitute ‘tribal justice’ in order to remind ourselves and others that we are talking about an inherently incomplete concept of justice.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 6, *Consider Incentives and Enforcement Costs*, second and third paragraphs, including footnote

“From a **dynamic** perspective, the cost of enforcing laws is much more problematic. Assume behavior “A” is helpful in pursuing happiness and that if we perform “A,” we will eventually learn that “A” is helpful. A government can prescribe “A” or let us learn that “A” is helpful. In theory, if the total cost of prescribing “A” is greater than the total cost of not prescribing “A,” then prescribing “A” is unjust. Further assume that behavior B is harmful and that if we perform “B,” we will eventually learn that “B” is harmful. A government can proscribe “B” or let us learn that “B” is harmful. In theory, if the total cost of proscribing “B” is greater than the total cost of not proscribing “B,” then proscribing “B” is unjust. What matters is the justice of interventions, not behaviors.

“**Many factors make judging the interventions of governments difficult: We do not always learn from our experiences. We learn from others’ experiences as well as from our own. Behaviors often help or harm others more directly than us. We have different belief systems, often based on different concepts. Public officials have private and bureaucratic agendas. We do not understand fully how all of these complicating factors interact.**”

“**Regrettably, we currently have no theory that captures enough of reality to provide us with cookbook judgments about government intervention. *Public choice economics* provides insights into the dynamics of how governments actually work and the field of *law and economics* provides insights into the cost of enforcing laws. The emerging science of complex dynamic systems may eventually provide us with the transaction cost theory that Ronald Coase called for in his Nobel lecture. Until computer simulation provides us with such a tool, judging government interventions will remain more art than engineering.**”

was changed to:

“From the **recursionist** perspective **outlined in this work, justice requires that we continuously learn how better to pursue happiness. From this perspective**, the cost of enforcing laws is much more problematic. Assume behavior “A” is helpful in pursuing happiness and that if we perform “A,” we will eventually learn that “A” is helpful. A government can prescribe “A” or let us learn that “A” is helpful. In theory, if the total cost of prescribing “A” is greater than the total cost of not prescribing “A,” then prescribing “A” is unjust. Further assume that behavior B is harmful and that if we perform “B,” we will eventually learn that “B” is harmful. A government can proscribe “B” or let us learn that “B” is harmful. In theory, if the total cost of proscribing “B” is greater than the total cost of not proscribing “B,” then proscribing “B” is unjust. What matters is the justice of interventions, not behaviors.”

Appendix, second to the last paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Recognizing this dynamic exposes problems on both sides.”

was changed to:

“Recognizing this dynamic exposes problems on both sides **of the current political divide.**”

Changes in Version 2003.08.27

Preface, second paragraph, second sentence

Deleted “(1949-59).”

Preface, fifth and sixth paragraphs

“**In information age economies, this theoretical problem is very real. Arguably, the defining characteristic of information age economies is learning by doing.** Our industrial age concept of excellence in means, efficiency, defines excellence to be a matter of using the least valuable scarce resources to achieve a given end. **This concept of excellence is incompatible with learning by doing.**”

“**The problem is that we** can never be sure that the most efficient means to a given end that involves learning knowledge “X” is better than a less efficient means to the same end that involves learning knowledge “Y.” To be sure, we need to assign a value to knowledge “X” and “Y.” The inexhaustibility of knowledge — the fact that using knowledge does not deplete it — makes this impossible to do except in the very special case where we know exactly when and under what circumstances knowledge “X” and “Y” will be used in the future. **Toyota used this insight about learning by doing to surpass the big three American motor vehicle manufacturing companies, who until recently focused on efficiency rather than on learning by doing.**”

was changed to:

“**The possibility of learning by doing makes this theoretical problem a very practical one.** Our industrial age concept of excellence in means, efficiency, defines excellence to be a matter of using the least valuable scarce resources to achieve a given end. **We** can never be sure that the most efficient means to a given end that involves learning knowledge “X” is better than a less efficient means to the same end that involves learning knowledge “Y.” To be sure, we need to assign a value to knowledge “X” and “Y.” The inexhaustibility of knowledge — the fact that using knowledge does not deplete it — makes this impossible to do except in the very special case where we know exactly when and under what circumstances knowledge “X” and “Y” will be used in the future. **We cannot know this without knowing exactly what it is that we ought to seek.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, new ninth paragraph, third sentence

“ By focusing the efforts of **the** most **talented** economists on the former, **Friedman and his followers have** retarded the development of the latter, particularly the development of Austrian economics, **the leading school of evolutionary economics.**”

was changed to:

“ By focusing the efforts of most economists on the former, **his solution has** retarded the development of the latter, particularly the development of Austrian economics.”

Preface, third to last paragraph, argument, second and third sentences

“A complete conceptual system for helping us formulate alternatives must **include** all uncertainty. **No** theory can **encompass** the uncertainty of all of its own fundamental propositions. **Addressing** all uncertainties associated with any given theory requires introducing a more complete theory. Thus, a complete conceptual system for helping us formulate alternatives must be based not on a theory but rather on a strategy for solving an open-ended problem that includes all uncertainty.”

was changed to:

“A complete conceptual system for helping us formulate alternatives must **address** all uncertainty. **Because** no theory can **address** the uncertainty of all of its own fundamental propositions, **addressing** all uncertainties associated with any given theory requires introducing a more complete theory. Thus, a complete conceptual system for helping us formulate alternatives must be based not on a theory but rather on a strategy for solving an open-ended problem that **addresses** all uncertainty.”

Preface, second to last paragraph

“These intellectual tool makers also ought to think carefully about who ultimately defines the market for intellectual tools. In the market for intellectual production tools, *the consumers of intellectual tools* decided that Toyota’s **early information age** production strategy was better than late industrial age production theories. The strategy beat the theories.”

was changed to:

“These intellectual tool makers also ought to think carefully about who **it is that** ultimately defines the market for intellectual tools. In the market for intellectual production tools, *the consumers of intellectual tools* decided that Toyota’s **learning by doing** production strategy was better than production theories **that focused on allocating scarce resources efficiently**. The strategy beat the theories.”

Acknowledgments, second to last paragraph, third sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Understanding his popular works helped me better understand the dynamic balance of **an ever expanding concept of justice and freedom.**”

was changed to:

“Understanding his popular works helped me better understand the dynamic balance of **freedom and progress.**”

Changes in Version 2003.08.29

Chapter 1, Modern Economics' Blind Spot, last paragraph, last sentence

Changed “Toyota manufacturing system” to “Toyota production system.”

Chapter 1, Overview, fifth sentence

“*Increasing Excellence in Means* offers recursionist alternatives for several potentially misleading marginalist concepts.”

was changed to:

“*Increasing Excellence in Means* offers recursionist alternatives for several potentially misleading marginalist concepts **and apparent precepts.**”

Chapter 2, Predictions and Explanations, second paragraph

“Predictions help us **evaluate** uncertain events, which helps us evaluate alternatives. In contrast, explanations help us find better problems to solve.”

was changed to:

“Predictions help us **assign probabilities to** uncertain events, which helps us evaluate alternatives. In contrast, explanations help us find better problems to solve.”

Chapter 2, Refining Evolutionary Explanations, last paragraph

“Explanations based on teleonomic theories are unique in that they both **describe** *what is* and **prescribe** *what ought to be*. These explanations describe our internal programming. Following our internal programming leads to happiness, a life well-lived. Because we owe it to ourselves (ought) to **follow our internal programming**, these explanations also prescribe what we ought to **do.**”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Explanations based on teleonomic theories are unique in that they both *describe what is* and *prescribe what we ought to seek*. These explanations describe our (fully realized) internal programming *as it is*. Following our (fully realized) internal programming leads to happiness, a life well-lived. Because we owe it to ourselves (ought) to *live good lives*, these explanations also prescribe what we ought to *seek*.”

Changes in Version 2003.08.31

Preface, throughout

Changed “explain causation” to “explain.”

Preface, tenth paragraph, last three sentences

“Friedman’s solution divided economics into theories that help us predict and normative theories, theories that help us formulate alternatives. The Austrians failed to rise to Friedman’s challenge by abandoning the former in order to focus exclusively on the latter. They failed to rededicate themselves to explaining human action.”

was changed to:

“The Austrians failed to rise to Friedman’s challenge by rededicating themselves to developing intellectual tools for helping us formulate alternatives.”

Preface, fourteenth and fifteenth paragraphs

Changed “intellectual tool makers” to “intellectuals.”

Preface, end

Added the following paragraph:

“Readers who are unfamiliar with the Toyota production system as a strategy for learning by doing ought to read the Appendix before reading the rest of this brief work.”

Chapter 1, Modern Economics' Blind Spot, last paragraph, last sentence

“(Readers who are unfamiliar with the Toyota production system as a tool for inducing production technology ought to read the Appendix before proceeding.)”

was deleted.

Chapter 1, The Recursionist Strategy, last paragraph, sixth sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“(Consider the importance of the rule of law in decision-making.)”

was replaced by the following footnote:

“Consider the importance of the rule of law in decision-making: the rule of law increases the quality of decision-making by lowering the uncertainty associated with how authorities will respond to a given circumstance.”

Chapter 3, *Conclusion*, last sentence

Dropped double quotation marks around “we.”

Chapter 3, *Eliminating Simplistic Theories*, last paragraph, last sentence

Changed “owe it to ourselves” to “ought.”

Chapter 6, *Consider Incentives and Enforcement Costs*, title

The title was changed to “*Consider the Justice of Interventions*.”

Chapter 6, *Fluid Relationships*, title

The title was changed to “Free Association.”

Chapter 6, *Fluid Relationships*, last paragraph

“In the long run, **fluid relationships** promote lucidity by encouraging the spread of practical wisdom.”

was changed to:

“In the long run, **free association** promotes lucidity by encouraging the spread of practical wisdom.”

Changes in Version 2003.09.04

Preface, eleventh paragraph, first two sentences

“The major problem **with economic theories that explain** is both simple and straightforward: To be most effective in helping us formulate alternatives, **theories that explain** must be based on what we would do if we had complete knowledge of what we ought to seek.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“The major problem **in developing intellectual tools for helping us formulate alternatives** is both simple and straightforward: To be most effective, **intellectual tools for helping us formulate alternatives** must be based on what we would do if we had complete knowledge of what we ought to seek.”

Chapter 1, Modern Economics’ Blind Spot, fourth paragraph, first sentence

“Concepts focus our attention on certain characteristics of objects, which **causes us** to ignore other characteristics.”

was changed to:

“Concepts focus our attention on certain characteristics of objects, which **tends to blind** us to other characteristics.”

Chapter 1, Overview, third and fourth sentences

“*New Foundations* proposes new foundations for science and evolutionary explanations. *Eliminating Teleonomic Theories* provides means for tightening the loose theory on which the strategy rests.”

was changed to:

“*New Foundations* proposes new foundations for science and evolutionary **economic** explanations. *Eliminating Teleonomic Theories* provides **two** means for tightening the loose theory on which the strategy rests.”

Chapter 2, Theories are refinements of everyday thinking., last paragraph

“Thus, we should judge **neoclassical** economics, which **aims** at helping us predict what happens in markets, by how well **it** helps us to predict what happens in markets. **Neoclassical** economics should stand ready to be proved less useful in helping us predict what happens in markets than competing theories. In contrast, we should judge evolutionary economic theories, which aim at helping us explain what happens in economies, by how well they help us formulate alternatives. These explanations should stand ready to be proved less useful in helping us formulate alternatives than competing explanations.”

was changed to:

“Thus, we should judge **marginalist** economic **theories**, which aim at helping us predict what happens in markets, by how well **they** help us to predict what happens in markets. **Marginalist** economic **theories** should stand ready to be proved less useful in helping us predict what happens in markets than competing theories. In contrast, we should judge

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

recursionist economic theories, which aim at helping us explain what happens in economies, by how well they help us formulate alternatives. These explanations should stand ready to be proved less useful in helping us formulate alternatives than competing explanations.”

Chapter 2, Refining Evolutionary Explanations, title

The title was changed to “Refining Recursionist Explanations.”

Chapter 2, Refining Recursionist Explanations, first paragraph, last sentence

“The only school of economics that comes close to producing such theories is the Austrian school.”

was changed to:

“The only school of economics that comes close to producing such theories is the Austrian school **of evolutionary economics**.”

Appendix, *Traditional Manufacturing Systems*, last paragraph, last sentence

Changed “to lower other costs” to “in order to lower other costs.”

Changes in Version 2003.09.08

Acknowledgments, first paragraph, second sentence

Changed “GSB” to “Graduate School of Business.”

Acknowledgments, fifth paragraph, third sentence

“After experiencing stagflation and hearing few objections to Nixon’s wage and price controls, which **came very close to bankrupting** my father’s manufacturing **company**, I vowed to stay as far away from Keynesian macroeconomics as possible. This meant taking every economics course taught by Jim, who I found to be the most inquisitive professor in the department.”

was changed to:

“After experiencing stagflation and hearing few objections to Nixon’s wage and price controls, which **caused the mill that supplied well over half of the paper to** my father’s printing company **to convert all production capacity to an uncontrolled paper product**, I vowed to stay as far away from Keynesian macroeconomics as possible. This meant

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

taking every **micro**economics course taught by Jim, who I found to be the most inquisitive professor in the department.”

Acknowledgments, seventh paragraph, last two sentences, eighth paragraph

“Understanding his popular works helped me better understand the dynamic balance of freedom and progress. **This dynamic balance is what** made the United States **both great and the Great Satan: classical liberal progressive cultures tend to abandon their less wise traditions.**”

“**Hayek exposed the practical problems of central planning. His goal was to demonstrate why socialism is fatally flawed. In contrast, I expose practical problems of capitalism, the free enterprise system as it is currently understood. My goal is to improve the free enterprise system by improving our understanding of enlightened self-interest.**”

was changed to:

“Understanding his popular works helped me better understand the dynamic balance of freedom and progress **that** made the United States **what it is today.**”

Chapter 2, *Theories produce predictions and explanations.*, last paragraph, fifth and sixth sentences

“In economics, we predict our behavior based on the knowledge that we currently possess. We could choose to explain our behavior on this same basis.”

was changed to:

“In economics, we predict our **collective** behavior based on the knowledge that we currently possess. We could choose to explain our **individual** behavior on this same basis.”

Chapter 2, *Theories produce predictions and explanations.*, last paragraph, eighth sentence

Changed “creating knowledge” to “learning.”

Chapter 2, *Theories produce predictions and explanations.*, last paragraph, end

Added the sentence:

“Failing to do so embeds ignorance into the economic system, which sets the stage for catastrophe.”

Chapter 6, Introduction, last paragraph, last sentence

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Changed “fluid relationships” to “free association.”

Chapter 6, *Control the Money Supply Passively*, last paragraph, last sentence

Added the sentence:

“In the long run, do we want economic agents to learn to adapt to unadulterated economic changes or to economic changes adulterated by activist monetary authorities?”

Chapter 6, Free Association, third paragraph, last sentence

“**However**, the practical question for just policy makers **in information age economies** is not whether there is a trend toward lucidity, but how to promote such a trend **without dictating culture**.”

was changed to:

“**T**he practical question for just policy makers is not whether there is a trend toward lucidity but **rather** how to promote such a trend.”

Chapter 6, Free Association, fourth paragraph, last sentence

“It also involves employers, and through authoritarian **progressive** legislation, the government, in the personal lives of employees.”

was changed to:

“It also involves employers, and through authoritarian legislation, the government, in the personal lives of employees.”

Chapter 6, Free Association, last paragraph

“**In the long run**, free association **promotes** lucidity **by encouraging the spread of practical wisdom**.”

was changed to:

“**Fluid relationships allow** lucidity **to flourish**.”

Changes in Version 2003.09.15

Preface, fourth paragraph, end

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Added the following:

“Frank Knight recognized this problem in his 1939 *Economica* article, *Ethics and Economic Reform*, which is reprinted in his book, *Freedom and Reform*.”

Preface, fifth paragraph, first sentence

“The possibility of learning by doing makes this theoretical problem a very practical one.”

was changed to:

“The possibility of learning by doing makes Knight’s theoretical problem of moral philosophy a very practical one.”

Chapter 2, *Theories produce predictions and explanations.*, first paragraph

“A prediction is knowledge of what is likely to happen under a particular **set of conditions**. An explanation is a deeper understanding that helps us predict what is likely to happen under a variety of **conditions**.”

was changed to:

“A prediction is knowledge of what is likely to happen under particular **circumstances**. An explanation is a deeper understanding that helps us predict what is likely to happen under a variety of **circumstances, which includes predicting when making predictions becomes practically impossible for our given level of knowledge**.”

Chapter 2, first footnote, first paragraph

“Explanations are not simply predictions “written backwards.” Some theories explain relatively better than they predict and others predict relatively better than they explain. In *deterministic chaotic systems*, we can explain without being able to predict equally well. **In these systems, small differences in initial conditions become ever greater over time. The further into the future we wish to predict, the more accurate our knowledge of initial conditions must be.** Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate,” which “emerges” from the complex interactions of **matter and energy**.”

was replaced by the following paragraph:

“The entire value of predictions and primary value of explanations stems from their usefulness in decision-making. In decision analysis terms, a prediction is knowledge that helps us assign probabilities to a given uncertain event and an explanation is knowledge that helps us formulate the model. The same knowledge that helps us

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

formulate the model may also help us assign probabilities to uncertain events. However, this does not mean that the two types of knowledge are identical. Explanations are not simply predictions “written backwards.””

“Some theories explain relatively better than they predict and others predict relatively better than they explain. In *deterministic chaotic systems*, we can explain without being able to predict equally well. **Mathematical models of deterministic chaotic systems explain why they are predictable at low levels of energy and why they become practically unpredictable at higher levels of energy.** The reason that they become practically unpredictable is that any deviation between actual initial conditions of these systems and our estimates of these conditions grows over time. In order to be able to predict these systems in their chaotic mode, we would have to know initial conditions with infinite precision. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate,” which “emerges” from the complex interactions of **the elements of the system.**”

Chapter 2, *Theories are refinements of everyday thinking.*, second paragraph, last two sentences

“When talking about scientific theories that predict, they are careful to say that a set of factors *correlates with* rather than *causes* the result.”

was changed to:

“When talking about scientific theories that predict **but do not explain**, they are careful to say that a set of factors *correlates with* rather than *causes* the result.”

Changes in Version 2003.09.20

Acknowledgments, last paragraph

“Students of F. A. Hayek will recognize the homage I paid him in the dedication. Although I finished my first draft before reading any of his works, I owe more to **him** than to any other economist. Understanding **his popular works** helped me better understand the dynamic balance of **freedom and progress that made the United States what it is today.**”

was changed to:

“Students of F. A. Hayek will recognize the homage I paid him in the dedication. Although I finished my first draft before reading any of his works, I owe more to **this self-proclaimed member of the party of life** than to any other economist. Understanding **the inconsistency between his conceptual framework and his ultimate end of the free**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

evolution of life helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment. Reconciling this inconsistency requires considering our spiritual needs without relying on the crutch of revealed truth.”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph

Deleted “what happens in markets” and “what happens in economies” in all.

Chapter 2, third footnote

“This instrumentalist concept of science addresses a common argument against Milton Friedman’s more limited instrumentalist concept, which is that Friedman’s concept would have rejected Copernicus’s theory of the solar system on the grounds that it did not predict as well as some contemporary Ptolemaic theories. Under this concept of science, Copernicus’s theory would have been rejected as a theory that predicts but not as theory that explains. Copernicus’s theory proved its worth as a theory that explains when it helped Kepler find a theory that predicted better than any Ptolemaic theory.”

was deleted.

Changes in Version 2003.09.24

Acknowledgments, third to last paragraph, third sentence

“After experiencing stagflation and hearing few objections to Nixon’s wage and price controls, which caused the mill that supplied well over half of the paper to my father’s printing company to convert all production capacity to an uncontrolled paper product, I vowed to stay as far away from Keynesian macroeconomics as possible.”

was changed to:

“After experiencing stagflation and hearing few objections to Nixon’s wage and price controls, which effectively cut off the supply of paper to my father’s printing company, I vowed to stay as far away from Keynesian macroeconomics as possible.”

Chapter 3

Extensive changes were made to this chapter, which were later deemed to be inadequate, if not dangerously misleading.

Chapter 6, Control the Money Supply Passively, second paragraph, last two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“It buries the problem. In the long run, do we want economic agents to learn to adapt to **unadulterated** economic **changes** or to economic **changes** adulterated by activist monetary authorities?”

was changed to:

“It buries the **best** problem **to solve**. In the long run, do we want economic agents to learn to adapt to economic **turbulence** or to economic **turbulence modified** by activist monetary authorities?”

Chapter 6, Conclusion, first paragraph, third sentence

Changed “a single simple trade-off” to “a simple trade-off.”

Changes in Version 2003.10.06

Preface, fourth paragraph, last sentence

“Frank Knight recognized this problem in his 1939 *Economica* article, *Ethics and Economic Reform*, **which is reprinted in his book, *Freedom and Reform*.**”

was changed to:

“**(University of Chicago economist** Frank Knight recognized this problem in his 1939 *Economica* article, *Ethics and Economic Reform*.)”

Preface, fifth paragraph, first sentence

“The possibility of learning by doing makes **Knight’s** theoretical problem of moral philosophy a very practical one.”

was changed to:

“The possibility of learning by doing makes **this** theoretical problem of moral philosophy a very practical one.”

Preface, ninth paragraph, last two sentences

“**The** blame for this theoretical vacuum lies **as much** with members of the Austrian school **as it does with Friedman and his followers. The Austrians failed to rise to Friedman’s challenge by rededicating** themselves to developing intellectual tools for helping us formulate alternatives.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“**Ultimately**, the blame for this theoretical vacuum lies with members of the Austrian school **for failing to rededicate** themselves to developing intellectual tools for helping us formulate alternatives.”

Preface, fourth from last paragraph, first two sentences

“This radical solution will be resisted by **those** intellectuals who define the markets for intellectual tools to exclude everything but theories. To **such people**, it takes a theory to beat a theory. They ought to consider the following argument:”

was changed to:

“This radical solution will be resisted by intellectuals who define the markets for intellectual tools to exclude everything but theories. To **these intellectuals**, it takes a theory to beat a theory. They ought to consider the following argument:”

Acknowledgments, last paragraph, third sentence

“Understanding the inconsistency between his conceptual framework and his ultimate end of **the free evolution of life** helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment.”

was changed to:

“Understanding the inconsistency between his conceptual framework and his ultimate end of free **growth and spontaneous** evolution helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment.”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph

“Thus, we should judge marginalist economic theories, which aim at helping us predict, by how well they help us predict. Marginalist economic theories should stand ready to be proved less useful in helping us predict than competing theories. In contrast, we should judge recursionist economic theories, which aim at helping us explain, by how well they help us formulate alternatives. These explanations should stand ready to be proved less useful in helping us formulate alternatives than competing explanations.”

was changed to:

“This pragmatic concept of science would have rejected Copernicus’s theory of the solar system as a theory that predicts because Copernicus’s theory did not predict as well as some contemporary Ptolemaic theories. However, it would not have rejected Copernicus’s theory as theory that explains. Copernicus’s theory later proved its worth as a theory that explains by helping Kepler find a theory that predicted better than any Ptolemaic theory.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3

Extensive changes were made to this chapter. The focus shifted to the problems raised by revealed truth.

Afterword, last paragraph

Inserted the following paragraph:

“Conservative elites once claimed that the United States owed its success to their Protestant heritage. Their children claimed it was their Christian heritage. Their grandchildren claim it was their Judeo-Christian heritage. Their great-grandchildren will likely claim it was their Abrahamic heritage. *Because the ground is wet it must have rained.* The United States owes its success to its tradition of continuously improving natural law/ethics, which welcomes useful truth regardless of source.”

Changes in Version 2003.10.11

Preface, first paragraph, first two sentences

“*Wealth in the Information Age, The Reintegration of Ethics and Economics* is the book that I wish I had read in George Leland Bach’s second year **MBA** normative economics course, *Business and the Changing Environment*. Dean Bach intended his course to be the capstone of our **Stanford Graduate School of Business** experience, the course that would connect everything we had learned into a coherent **structure**.”

was changed to:

“*Wealth in the Information Age, The Reintegration of Ethics and Economics* is the book that I wish I had read in George Leland Bach’s second year **Stanford Graduate School of Business** normative economics course, *Business and the Changing Environment*. Dean Bach intended his course to be the capstone of our **MBA** experience, the course that would connect everything we had learned into a coherent **whole**.”

Preface, eighth paragraph, last sentence

“Freed from the constraint of realistic assumptions, economists can find new uses for their theories **throughout the life sciences**.”

was changed to:

“Freed from the constraint of realistic assumptions, economists can find new uses for their theories.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph

“This pragmatic concept of science would have rejected Copernicus’s theory of the solar system as a theory that predicts because Copernicus’s theory did not predict as well as some contemporary Ptolemaic theories. However, it would not have rejected Copernicus’s theory as theory that explains. Copernicus’s theory later proved its worth as a theory that explains by helping Kepler find a theory that predicted better than any Ptolemaic theory.”

was changed to:

“Consider how we would have used this pragmatic approach to science to refine early modern theories about our solar system. Although Copernicus’s theory of planets traveling around the sun in circular orbits was simpler and more elegant, it could not predict quite as well as the best Ptolemaic theory, which had the sun and other planets traveling around the earth in epicyclical (“Spirographic”) orbits. We would have rejected Copernicus’s theory as a theory that predicts. However, we would not have rejected the idea of the planets traveling around the sun as a means of explaining the solar system. Like the digital approach to television in the early nineteen nineties, the heliocentric approach had advantages (simplicity and elegance) over Ptolemaic theories. Also like the digital approach to television in the early nineties, it was less thoroughly explored and so offered a greater possibility for improvement.

“Copernicus’s heliocentric approach proved its worth by helping Kepler formulate his theory of planets traveling around the sun in elliptical orbits. Kepler’s theory was superior to its contemporaries in simplicity, elegance, and ability to predict. We would not have rejected it as either a theory that predicts or one that explains. Instead, we would have used it to cull lesser theories in both categories.

“Kepler’s theory helped Newton formulate his theory of gravity. Given the greater depth and breadth of Newton’s theories of gravity and mechanics, we would not have rejected them as either theories that predict or ones that explain. However, Newton’s discovery that calculating the trajectories of the earth, moon, and sun was practically impossible would have prevented us from enshrining Newton’s theories as Alexander Pope did when he wrote:

Nature and Nature’s laws lay hid in night:
God said, “Let Newton be!” and all was light.

“Today, scientists recognize Newton’s “three body problem” to be a deterministic chaotic system. Our solar system is not as predictable as those who worshipped at Newton’s altar believed it to be.”

Chapter 6, *Free Association*, last two paragraphs

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We are used to thinking about the moral hazards of insurance, people choosing to act foolishly because they are protected by insurance. We also **should** consider the potential moral encouragements of buying insurance. If people were free to buy insurance from any organization, many would choose to buy it from **those** that would help them live more wisely, e.g., religious and fraternal organizations. Organizations that successfully help people live more wisely would pass the savings on to their customers in the form of lower premiums, thereby attracting more people to their program. Those **insuring** organizations with a mandate to do good works would **use some of their savings to do so, thereby passing spiritual benefits on to their members.**

“Fluid relationships allow lucidity to flourish.”

was changed to:

“We are used to thinking about the moral hazards of **having** insurance, people choosing to act foolishly because they are protected by insurance. We also **ought to** consider the potential moral encouragements of buying insurance. If people were free to buy insurance from any organization, many would choose to buy it from **organizations** that would help them live more wisely, e.g., religious and fraternal organizations. Organizations that successfully help people live more wisely would pass the savings on to their customers in the form of lower premiums, thereby attracting more people to their program. Those organizations with a mandate to do good works would **pass spiritual benefits on to their insurance clients.**

“**Nothing is more useful to a human than another human ruled by lucidity.** Fluid relationships allow lucidity to flourish.”

Afterword, first paragraph and closing

Changed “nearly four years ago” to “nearly five years ago.” Also dropped October 2002 date at end of the section.

Changed “OODA” to “Colonel John Boyd’s OODA (observation-orientation-decision-action).”

Afterword, second to last paragraph, last two sentences

“*Because the ground is wet it must have rained.* **The United States owes its success to its tradition of continuously improving natural law/ethics, which welcomes useful truth regardless of source.**”

was changed to:

“**A more useful explanation is that** the United States actually owes its success to its tradition of **freedom and progress toward an end defined by human nature**, which welcomes useful truth regardless of **its** source.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Afterword, last paragraph, first sentence

“Classical liberal progressivism is the essence of American idealism.”

was changed to:

”This tradition of freedom and progress is the essence of American idealism.”

Afterword, last paragraph

Eliminated italics for “process conservatives” and “state-of-the-world conservatives.”

Changes in Version 2003.10.23

Preface, second paragraph, second sentence

Added the phrase: “under its first six Secretaries.”

Preface, third paragraph, second sentence

Changed “outside of all the boxes” to “outside all of the boxes.”

Preface, fourth paragraph, last sentence

“(University of Chicago economist Frank Knight recognized this problem in his 1939 *Economica* article, *Ethics and Economic Reform*.)”

was moved the the end of the fifth paragraph.

Preface, sixth paragraph, second to the last sentence

“Whether economic agents seek what is most efficient or something else doesn’t matter. What matters is whether models based on a given theory predict better than models based on competing theories.”

was changed to:

“Whether economists assume that economic agents seek what is most wise, most efficient, or most traditional doesn’t matter. What matters is how well their models predict relative to other models.”

Preface, third to the last paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“These intellectuals also ought to **think carefully about who it is that ultimately defines the market for intellectual tools. In the market for intellectual production tools, consumers of intellectual tools** decided that Toyota’s learning by doing production strategy was better than production theories that focused on allocating scarce resources efficiently.”

was changed to:

“These intellectuals also ought to **consider what happened in** the market for intellectual production tools. **Consumers** decided that Toyota’s learning by doing production strategy was better than production theories that focused on allocating scarce resources efficiently.”

Acknowledgments, last paragraph, last sentence

“Reconciling this inconsistency requires considering our spiritual needs **without relying on the crutch of revealed truth.**”

was changed to:

“Reconciling this inconsistency requires considering our spiritual needs.”

Chapter 2, Theories are refinements of everyday thinking., last paragraph, last sentence

Changed “altar” to “shrine.”

Chapter 3, Eliminating Teleonomic Theories, second to last paragraph, end

Added the following paragraphs:

“We also need to distinguish between ethics and religion. Ethics concerns how we live good lives. Religion concerns how we mystically unite with something greater than ourselves. The words that several major religions use to define this concern reflect this aim: ‘religion’ comes from the Latin word that means to relink; ‘yoga’ comes from the Sanskrit word that means to yoke; and ‘Islam’ comes from the Arabic word that means to submit (to the will of God). From this perspective, the statement that atheist Soviet Communism was a secular religion is more than a metaphor. It is a statement of fact.”

Chapter 3, Ultimate Normative Ends of Life, first two paragraphs

“Humanists look to human nature (teleonomic theories) to explain our ultimate ends and the best means to them. **To think clearly about our ultimate ends and the best means to them, we need to distinguish between ethics and religion. Ethics concerns how we live good lives. Ethics is secular (worldly) in that it concerns matters of this world. Religion concerns how we mystically unite with something greater than**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

ourselves. The words that several major religions use to define this concern reflect this aim: ‘religion’ comes from the Latin word that means to relink; ‘yoga’ comes from the Sanskrit word that means to yoke; and ‘Islam’ comes from the Arabic word that means to submit (to the will of God). From this perspective, the statement that atheist Soviet Communism was a secular religion is more than a metaphor. It is a statement of fact. Soviet Communism competed against other religions in helping us mystically unite with something greater than ourselves.

“Humanist philosophers believe that the ultimate end of human life is happiness, which they define as a good life, a life well lived. They claim that the statement, “the ultimate end of life is a good life,” has meaning, as opposed to simply being true by definition. To have meaning, a statement must tell us something more than is contained in the statement alone. In this case, the statement has meaning because it focuses our attention on what we need in order to live a good life.”

were merged into:

“Humanists look to human nature (teleonomic theories) to explain our ultimate ends and the best means to them. They believe that the ultimate end of human life is happiness, which they define as a good life, a life well lived. They claim that the statement, “the ultimate end of life is a good life,” has meaning, as opposed to simply being true by definition. To have meaning, a statement must tell us something more than is contained in the statement alone. In this case, the statement has meaning because it focuses our attention on what we need in order to live a good life.”

Chapter 3, Ultimate Normative Ends of Life, fifth to the last paragraph

“Schweitzer explains that humans have a need for mystical oneness — a religious impulse — that we can satisfy by relinking to the infinite Being by either renouncing or embracing the world and life. This explanation is logical in that it follows the rules for philosophical theories. However, it is flawed in that it presumes the existence of the infinite Being when this metaphysical assumption is not necessary to explain what it explains. This violates the philosophical standard of beauty known as Occam’s razor. We can easily correct this flaw by eliminating this assumption. The corrected explanation is that humans have a need for mystical oneness that we satisfy either by embracing the world and life or by embracing the complete absence of the world and life (oblivion).”

was shifted to the end of the section, where it replaced:

“Moral philosopher John Rawls provides a means of judging the justice of Schweitzer’s normative ultimate end of reverence for life. Rawls asks us to imagine what rules we would choose to govern us if we were ignorant of the circumstances of our birth.⁵ For this imagined original position of ignorance to produce a *complete* theory of justice, we must consider what rules we would want to guide intelligent life if we were *completely* ignorant of the circumstances of our birth, which includes

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

ignorance of what species we will be and into what era we will be born.⁶ Under these conditions we would want intelligent beings to satisfy their needs efficiently as this minimizes killing and suffering. We would also want intelligent beings to devote themselves to helping other life survive and thrive (with preference given to other intelligent life). In short, we would want intelligent life to live by Schweitzer's normative end of reverence for life."

Chapter 3, Practical Benefits of Magical Mysticism, last three paragraphs

"The experience of the transcendent state of mystical oneness by means of magical mysticism may result in a more integrated, coherent, and useful belief system. This more useful belief system may in turn result in a permanently higher state of being.

"Religious orders and cults have long used this knowledge to educate their initiates. The procedure involves immersing initiates in teachings and then inducing altered state of consciousness capable of reordering belief systems. Inducing an altered state of consciousness strong enough to change belief systems requires breaking the stream of words that define normal consciousness. Techniques include the use of drugs, extreme fear, extreme fatigue, extreme pain, extreme (ecstatic) activity, deprivation, and meditation. Secular education and reeducation programs such as military boot camps, graduate and professional schools, and political indoctrination programs also use this procedure.

"The dangers of inducing altered states of consciousness and the diversion of time and energy from satisfying our needs tends to divide those religious leaders and organizations that promote ethical behavior from those who promote transcendent experience. While actively seeking transcendent experience can be dangerous and wasteful, denying it can be as dangerous and wasteful. Religious movements that deny transcendent experience risk becoming dogmatic, bureaucratic, legalistic, and empty. Healthy religious movements seek transcendent experience prudently."

were changed to:

"The experience of the transcendent state of mystical oneness by means of magical mysticism may result in a more integrated, coherent, and useful belief system. This more useful belief system may in turn result in a permanently higher state of being.

"We commonly associate this sort of change in belief system with spontaneous religious conversions in which the transcendent experience precedes the change in beliefs. These experiences raise thorny metaphysical issues concerning revealed truth, which make them relatively inaccessible to inquiry.

"More accessible to inquiry are major epiphanies in which the changes in beliefs precede or accompany transcendent experience. The classic example is the exhilaration Archimedes felt upon understanding the relationship between the volume of his body, the volume of water displaced by his body, and the density of his body relative to that

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

of water. These major epiphanies raise the question of whether a small change in beliefs elevates consciousness, which in turn triggers further changes in beliefs.

“We experience this elevation in consciousness when we laugh at a joke that plays on inconsistencies in our belief systems, especially when they play on underlying concepts. We laugh when a child asks why freedom fighters fight freedom. We also laugh when the three stooges throw away artwork described as being priceless because they confuse being priceless with being worthless. This laughter briefly lifts us out of our normal state of consciousness. Chan (Zen) Buddhist masters have long used this insight to elevate the consciousness of their students in the hope of triggering enlightenment.

“If changes in belief systems, especially in the meaning of concepts, elevate consciousness and the increased clarity and energy of elevated consciousness encourages further changes in beliefs, then it may be useful to think of major epiphanies as avalanches that release stress within belief systems. Changing a single anomaly in a belief system rife with anomalies may trigger massive and virtually immediate changes throughout the system.

“Not all transformations in belief systems involving altered states of consciousness are spontaneous. Religious orders, cults, fraternal organizations, militaries, professional schools, graduate schools, and political re-education centers have used altered states of consciousness to indoctrinate people. The indoctrination procedure consists of memorizing prescribed material, inducing an altered state of consciousness, and testing the resulting belief system. Inducing an altered state of consciousness strong enough to change belief systems requires breaking the stream of words that define normal consciousness. Techniques include the use of drugs, extreme fear, extreme fatigue, extreme pain, extreme (ecstatic) activity, deprivation, and meditation.

“Understanding such transformations helps us reconcile the reasonable (Apollonian) and emotional (Dionysian) approaches to life. Redeeming Apollonian art encourages life-affirming (uplifting) values. Redeeming Dionysian art shocks us into confronting life-denying values. Both aim at improving our belief systems.

“Although actively seeking transformation by means of transcendent experience can be dangerous and wasteful, failing to seek it can be equally dangerous and wasteful. Cultures that actively deny transformation through transcendence inevitably become dogmatic and empty, which makes them ripe for Dionysian revolution. Healthy cultures balance the Apollonian and Dionysian by seeking life-affirming transformations prudently.”

Chapter 3, *Ritual Death*

This section was replaced by the *Revealed Truth* section:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The preceding arguments focused on individuals. Focusing on the universe as a whole leads to different problems, arguments, and conclusions. For example, the most simple and straightforward theories for explaining the creation of the universe assume the existence of a Creator. Occam’s razor cuts both ways.

“The existence of a Creator who reveals truths to us about the universe and our place in it does not eliminate our uncertainty about how we ought to live. How do we know pronouncements of divine law are the word of the Creator? How do we know that we have interpreted them correctly? Jesus tells us to judge them: “By their fruits you shall know them.” (Mathew 7:16).

“Moral philosopher John Rawls provides a means of judging theories about how we ought to live. Rawls asks us to imagine what theories we would choose if we were ignorant of the circumstances of our birth.¹⁰ For this imagined original position of ignorance to produce a complete theory of justice, we must consider what rules we would want to guide intelligent life if we were completely ignorant of the circumstances of our birth, which includes ignorance of what species we will be and into what era we will be born.¹¹ Under these conditions we would want intelligent beings to satisfy their needs efficiently as this minimizes killing and suffering. We would also want intelligent beings to devote themselves to helping other life survive and thrive (with preference given to other intelligent life). In short, we would want intelligent life to pursue Schweitzer’s normative end of reverence for life.”

“¹⁰ Rawls, John, *A Theory of Justice*, (Cambridge, MA: The Belknap Press of Harvard University, 1971).”

“¹¹ Anything less than complete ignorance will introduce bias. For example, if we simply imagine that we were born into our current society, we will tend to ignore the potential affect of our behavior on members of other human societies, future generations of humans, and non-human life. Using Rawls’s means, we can argue that incomplete forms of ethical mysticism permit unjust predation and exploitation. We also can argue that they permit unjust limitations on cooperation. The most obvious examples are restrictions on “foreign” trade. These limit cooperation with living members of other societies. Less obvious are actions that effectively limit cooperation with future generations of intelligent life.

“Justice requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Each generation must seek to maximize the amount of progress for the turbulence it can bear. Shielding a favored group from change violates this agreement. The basis of this complete concept of justice is not a social contract but rather a contract between all intelligent life for the benefit of all life. For those who believe that all life contains an element of the infinite Being, it is a contract with the infinite Being.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to an inherently incomplete concept of justice.”

Chapter 3, *Conclusion*

“Materialist and dualists can find common ground in the ultimate normative end of a **good life for all**. If we accept this **ultimate normative** end, we can develop rules for eliminating teleonomic theories that aim too low. For example, we can eliminate teleonomic theories based on too narrow a **conception** of who we are.”

was changed to:

“Materialist and dualists can find common ground in the ultimate normative end of **reverence for life**. If we accept this end, we can develop rules for eliminating teleonomic theories that aim too low. For example, we can eliminate teleonomic theories based on too narrow a **definition** of who we are.”

Chapter 3, **Eliminating Simplistic Theories, second to last paragraph, fourth sentence**

“This creates the incentive to deny **the reality of** its ineffectiveness.”

was changed to:

“This creates the incentive to deny its ineffectiveness.”

Chapter 3, **Summary, second to last paragraph, fourth sentence**

“This creates the incentive to deny **the reality of** its ineffectiveness.”

was changed to:

“This creates the incentive to deny its ineffectiveness.”

We can also agree on a foundation for arguments about human rights: Our human rights arise from our obligation to pursue the normative end of a good life for all.

Chapter 5, **Introduction, first paragraph, first sentence**

Changed “experience of profound bliss” to “transcendent experience.”

Chapter 5, **Introduction, fifth paragraph**

“The information revolution’s ever increasing potential for rapid learning exacerbates **both of** these measurement problems. **All** consumer goods and services **are** means to a

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

good life rather than ends in themselves. Thus, the problem of measuring inputs rather than outputs is universal. Worse, **assessing the value of human action according to how well it satisfies our needs is more difficult than assessing the value of a good or service according to more concrete criteria.**”

was changed to:

“The information revolution’s ever increasing potential for rapid learning exacerbates these measurement problems. **Because people living good lives learn more rapidly than people living poor lives, efficiency in consumption is more important in economies with the potential for rapid learning than in economies without this potential. Focusing on efficiency in consumption requires viewing consumer goods and services as means to a good life rather than ends in themselves. Therefore,** the problem of measuring inputs rather than outputs is universal. Worse, **measuring the satisfaction of consumer needs is far more difficult than measuring the satisfaction of consumer wants, which economists are able to do by assuming that consumer preferences remain constant over the period under consideration.**”

Chapter 6, Just Taxation, last paragraph, last sentence

“High on this list are taxes on profits, which discourage acquiring knowledge and taking risks.”

was changed to:

“High on this list are taxes on profits **(including personal income)**, which discourage acquiring knowledge and taking risks. **Rather than taxing profits progressively, governments ought to tax detrimental environmental impact progressively.**”

Afterword, second and third to the last paragraph

“Recognizing this dynamic exposes problems on both sides of the current political divide. **For conservatives, the major problem is that the dynamic continues only if each generation chooses increasingly “feminine” ends. At the logical limit is a Albert Schweitzer’s normative end of reverence for life.** For liberals, the major problem is that this dynamic requires “masculine” means. An ultimate end based on reverence for life requires unending progress, hence unending turbulence. Thriving under these conditions requires “masculine” qualities. A nanny state that protects its charges by eliminating change shuts down the dynamic. **Regardless of the cause, retarding this progressive dynamic** is unjust to our future selves, other societies, future generations, and other species.

“Conservative elites once claimed that the United States owed its success to their Protestant heritage. Their children claimed it was their Christian heritage. Their grandchildren claim it was their Judeo-Christian heritage. Their great-grandchildren will likely claim it was their Abrahamic heritage. A more useful explanation is that the

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

United States owes its success to its tradition of freedom and progress toward **an end defined by human nature, which welcomes useful truth regardless of its source.**"

was changed to:

"Recognizing this dynamic exposes problems on both sides of the current political divide. For liberals, the major problem is that this dynamic requires "masculine" means. An ultimate end based on reverence for life requires unending progress, hence unending turbulence. Thriving under these conditions requires "masculine" qualities. A nanny state that protects its charges by eliminating change shuts down the dynamic. **This** is unjust to our future selves, other societies, future generations, and other species.

"For conservatives, the major problem is that the dynamic continues only if each generation chooses increasingly inclusive ends. Conservative elites once claimed that the United States owed its success to their Protestant heritage. Their children claimed it was their Christian heritage. Their grandchildren claim it was their Judeo-Christian heritage. Their great-grandchildren will likely claim it was their Abrahamic heritage. A more useful explanation is that the United States owes its success to its tradition of freedom and progress toward **the normative end of reverence for life.**"

Changes in Version 2003.10.26

Preface, seventh and eighth paragraphs

"Limiting economic science to theories that predict has two effects. The primary effect is to limit the usefulness of economic science. Theories that predict help us assign probabilities to uncertain events, thereby helping us evaluate alternatives. In contrast, theories that explain help us think clearly about what happens in economies, thereby helping us formulate alternatives. Limiting economic science to theories that predict forces us to find another means of thinking about what happens in economies. From his popular works and public lectures, we know that Friedman thinks about economies as complex adaptive systems that emerge from the decision-making of individual economic agents. He focuses on decision-making, not on allocating scarce resources.

"The secondary effect of limiting economic science to theories that predict is to expand the scope of economic science. Freed from the constraint of realistic assumptions, economists can find new uses for their theories."

were deleted.

Preface, new seventh paragraph, third sentence

Inserted the following sentence:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“(In decision analysis, theories that predict help us assign probabilities to uncertain events and theories that explain help us draw the decision trees.)”

Acknowledgments, last paragraph, last two sentences

“Understanding the inconsistency between his conceptual framework and his ultimate end of free growth and spontaneous evolution helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment. **Reconciling this inconsistency requires considering our spiritual needs.**”

were changed to:

“ Understanding the inconsistency between his conceptual framework and his ultimate end of free growth and spontaneous evolution **of culture and organization** helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment.”

Chapter 3, *Revealed Truth*, title

Changed title to “*Divine Law*.”

Chapter 3, *Divine Law*, second paragraph, last sentence

“Jesus tells us to judge them: “By their fruits you shall know them.” (Mathew 7:16).”

was changed to:

“Jesus tells us to judge them **by their usefulness**: “By their fruits you shall know them.” (Mathew 7:16).”

Changes in Version 2003.10.30

Preface, sixth paragraph, first sentence

Changed “In his most cited work,” to “In his most cited **academic** work,”

Preface, seventh paragraph, third sentence

“(In decision analysis, theories that predict help us assign probabilities to uncertain events and theories that explain help us draw the decision trees.)”

was deleted.

Preface, seventh paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Ultimately, the blame for this theoretical vacuum lies with members of the Austrian school for failing to rededicate themselves to developing intellectual tools for helping us formulate alternatives.”

was deleted.

Preface, second to last paragraph, second sentence

“Today, the Toyota production system demonstrates the wisdom of pursuing the virtuous circle of increasing excellence in **production and trade** and increasing excellence in **consumption**.”

was changed to:

“ Today, the Toyota production system demonstrates the wisdom of pursuing the virtuous circle of increasing excellence in **consumption** and increasing excellence in **production and trade**.”

Preface, last paragraph

“Readers who are unfamiliar with the Toyota production system as a strategy for learning by doing ought to read the appendix before reading the rest of this brief work.”

was deleted.

Chapter 2, *Theories produce predictions and explanations.*, second paragraph, third sentence

Inserted the following sentence:

“In decision analysis terms, we use predictions to assign probabilities to uncertain events and explanations to help us draw decision trees.”

Chapter 3, *Ultimate Normative Ends of Life*, first paragraph

“Humanists look to human nature (teleonomic theories) to explain **our** ultimate ends **and the best means to them**. They believe that the ultimate end of **human** life is happiness, **which they define as a good life, a life well lived**. They claim that the statement, “the ultimate end of life is a good life,” has meaning, as opposed to simply being true by definition. To have meaning, a statement must tell us something more than is contained in the statement alone. In this case, the statement has meaning because it focuses our attention on what we need in order to live a good life.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Humanists look to human nature (teleonomic theories) to explain **human** ends. They believe that the ultimate normative end of human life is **living a good life (happiness)**. **Some humanists believe that this is self-evident. This ignores the possibility that the ultimate normative end of life and the ultimate normative end of existence may not be the same thing. For the statement “the ultimate normative end of human life is living a good life” to be true, it must be true by definition. For this statement to be true by definition, living a good life must include all temporal worldly ends necessary to achieve the ultimate end of human existence. Further, living a good life must be logically consistent with these temporal ends.**

“**Humanist philosophers** claim that the statement, “the ultimate end of **human** life is a good life,” has meaning, as opposed to simply being true by definition. To have meaning, a statement must tell us something more than is contained in the statement alone. In this case, the statement has meaning because it focuses our attention on what we need in order to live a good life.”

Chapter 3, Practical Benefits of Magical Mysticism, third paragraph, third sentence

“We see this clearly in the “effortless effort” doctrine of Zen Buddhism.”

was deleted.

Chapter 3, Practical Benefits of Magical Mysticism, third paragraph, last sentence

“This detachment of consciousness from action and results is also found”

was changed to:

“We also find this practical benefit of magical mysticism”

Moved quotations into footnotes.

Chapter 6, Just Taxation

“All forms of taxation disrupt the process of decision-making. Just forms disrupt it in ways that promote progress by creating incentives to act wisely.

“The most obvious forms of just taxation are those that discourage undesirable activities. These include taxes on consuming tobacco and **polluting** the environment. Less obvious are those that induce the creation of useful knowledge. For example, **the United States** can induce **new** useful knowledge that replaces oil **with tolerable turbulence by slowly escalating taxes on oil. In addition to lowering the demand for oil, this will provide an example of inducing new knowledge by means of just taxation. Over time, inducing such knowledge will reduce the risk of war over oil and other scarce resources.**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The least beneficial taxes are those that discourage desirable activities. High on this list are taxes on **profits (including personal income)**, which discourage acquiring knowledge and taking risks. Rather than taxing **profits** progressively, governments ought to tax detrimental **environmental impact** progressively.”

were changed to:

“All forms of taxation disrupt the process of decision-making. Just forms disrupt it in ways that promote progress by creating incentives to act wisely. **We owe it to ourselves to demand that governments tax us as justly as current information technology permits.**

“The most obvious forms of just taxation are those that discourage undesirable activities. These include taxes on consuming tobacco and **damaging** the environment. Less obvious are those that induce the creation of useful knowledge. For example, **governments** can induce the creation of useful knowledge that replaces oil **by taxing the consumption of oil. Trustworthy governments can minimize turbulence by escalating taxes over a long enough period to allow consumers to adjust gradually to the new environment.**

“The least beneficial taxes are those that discourage desirable activities. High on this list are taxes on **incomes (profits)**, which discourage acquiring knowledge and taking risks. Rather than taxing **incomes** progressively, **we ought to demand that** governments tax detrimental **forms of consumption** progressively.”

Changes in Version 2003.11.03

Preface, first paragraph

“*Wealth in the Information Age, The Reintegration of Ethics and Economics* is the book that I wish I had read in George Leland Bach’s **second year Stanford Graduate School of Business** normative economics course, *Business and the Changing Environment*. Dean Bach intended his course to be the capstone of our MBA experience, the course that would connect everything we had learned into a coherent whole. **His means to this end involved relentlessly questioning our solutions to a series of business school cases** without ever revealing what he believed to be the best decision alternative. It was only **on the final day of the course** that he described the three rules he used to test the morality of decision alternatives.”

was changed to:

“*Wealth in the Information Age, The Reintegration of Ethics and Economics* is the book that I wish I had read in George Leland Bach’s normative economics course, *Business and the Changing Environment*. Dean Bach intended his course to be the capstone of our **Stanford** MBA experience, the course that would connect everything

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

we had learned into a coherent whole. **From the first day until the last, Bach relentlessly questioned our solutions to case studies** without revealing his beliefs. It was only **after we finished the last case** that he **cautiously recommended** three rules that he used to test the morality of decision alternatives.”

Acknowledgments, last paragraph, last sentence

“Understanding the inconsistency between his conceptual framework and his ultimate end of free growth and spontaneous evolution **of culture and organization** helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment.”

was changed to:

“Understanding the inconsistency between his conceptual framework and his ultimate end of free growth and spontaneous evolution helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment. **It has led me back not to the skepticism of David Hume but rather to the common sense of Thomas Reid.**”

Chapter 3, Ultimate Normative Ends of Life, fifth paragraph, fourth sentence

“He found that these people seek to make the most of their talents in pursuit of goals that concern **such universals as truth, justice, and beauty.**”

was changed to:

“ He found that these people seek to make the most of their talents in pursuit of goals that concern **the transcendent values** of truth, **beauty**, and **the good (justice).**”

Chapter 3, Conclusion

Inserted the section titled **Sacrifice versus Prudence.**

Changes in Version 2003.11.08

Preface, seventh paragraph, third sentence

Changed “most traditional” to “something else.”

Acknowledgments, third paragraph, first sentence

Changed “truth” to “useful truth.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph

“Today, scientists recognize Newton’s “three body problem” to be a deterministic chaotic system. **Our solar system** is not as predictable as those who worshipped at Newton’s shrine believed it to be.”

was changed to:

“Today, scientists recognize Newton’s “three body problem” to be a deterministic chaotic system. **They also recognize that the complex interactions of the universe occasionally result in large asteroids colliding with earth. The universe** is not as predictable as those who worshipped at Newton’s shrine believed it to be.”

Chapter 3, *Practical Benefits of Magical Mysticism*, last two paragraphs

“Understanding such transformations helps us reconcile the reasonable (Apollonian) and emotional (Dionysian) approaches to life. Redeeming Apollonian art encourages life-affirming (uplifting) values. Redeeming Dionysian art shocks us into confronting life-denying values. Both aim at improving our belief systems.

“Although actively seeking transformation by means of transcendent experience can be dangerous and wasteful, failing to seek it can be equally dangerous and wasteful. Cultures that actively deny transformation through transcendence inevitably become dogmatic and empty, which makes them ripe for Dionysian revolution. Healthy cultures balance the Apollonian and Dionysian by seeking life-affirming transformations prudently.”

were deleted.

Footnote #9 becomes footnote #11 below.

Chapter 3, *Sacrifice versus Prudence*, second paragraph

“Some means of achieving mystical oneness sacrifice safety or health in order to economize on other scarce resources. Most successful religions include beliefs that serve to check these extreme **Dionysian** means. Examples include the belief that (1) we have as many lifetimes as it takes to achieve mystical union, (2) we can achieve the ultimate end of existence in an existence after death (e.g., purgatory), and (3) we can achieve the ultimate end of existence through revering life as well as through the temporal end of mystical union. The one area in which extreme **Dionysian** means to mystical oneness remains unchecked is when it coincides with the normative end of reverence for life. Even here, **successful religions** teach us to **balance the extreme Dionysian with the Apollonian**. Too small a willingness to risk ourselves for the sake of others is deemed to be cowardly. Too great a willingness to risk ourselves for others is deemed to be foolhardy or self-destructive. Only the proper balance is deemed to be heroic.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Some means of achieving mystical oneness sacrifice safety or health in order to economize on other scarce resources. Most successful religions include beliefs that serve to check these extreme means. Examples include the belief that (1) we have as many lifetimes as it takes to achieve mystical union, (2) we can achieve the ultimate end of existence in an existence after death (e.g., purgatory), and (3) we can achieve the ultimate end of existence through revering life as well as through the temporal end of mystical union. **As Maslow observed, healthy religions balance the Dionysian (emotional) and Apollonian (reasonable) means to mystical experience.¹¹ They seek life-affirming transformations prudently.** The one area in which extreme means to mystical oneness remains unchecked is when it coincides with the normative end of reverence for life. Even here, **the wise** teach us **to seek balance**. Too small a willingness to risk ourselves for the sake of others is deemed to be cowardly. Too great a willingness to risk ourselves for others is deemed to be foolhardy or self-destructive. Only the proper balance is deemed to be heroic.”

Chapter 3, Sacrifice versus Prudence, second to last paragraph, last sentence

“**In illiberal societies, heroism is more useful than** wisdom.”

was changed to:

“**Illiberal leaders promote sacrifice over prudence, romance over enlightenment, and heroism over** wisdom.”

Chapter 3, Sacrifice versus Prudence, last paragraph, last sentence

“**In liberal societies, wisdom is more useful than heroism.**”

was changed to:

“**The wise temper sacrifice with prudence, romance with enlightenment, and heroism with** wisdom.”

Changes in Version 2003.11.12

Preface, second paragraph, second sentence

Deleted “Pomona College.”

Preface, third to last paragraph, last two sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“**Because** no theory can address the uncertainty of all of its own fundamental propositions, **addressing** all uncertainties associated with any given theory requires introducing a more complete theory. Thus, a complete conceptual system for helping us formulate alternatives must be based **not on a theory but rather** on a strategy for solving an open-ended problem that addresses all uncertainty.”

was changed to:

“**No** theory can address the uncertainty of all of its own fundamental propositions. **Addressing** all uncertainties associated with any given theory requires introducing a more complete theory. Thus, a complete conceptual system for helping us formulate alternatives must be based on a strategy for solving an open-ended problem.”

Acknowledgments, fifth paragraph, third sentence

“ I vowed to **stay as far away from Keynesian** macroeconomics **as possible.**”

was changed to:

“ I vowed to **take no elective** macroeconomics **courses.**”

Acknowledgments, last paragraph, last sentence

“It has led me back not to the skepticism of David Hume but rather to the common sense of Thomas Reid.”

was deleted.

Chapter 1, The Recursionist Strategy, last paragraph, third sentence

Changed “practical wisdom, ” to “practical wisdom — ”.

Chapter 2, Theories produce predictions and explanations., first paragraph, last sentence

“An explanation is a deeper understanding that helps us predict what is likely to happen under a variety of circumstances, *which includes predicting when making predictions becomes practically impossible for our given level of knowledge.*”

was changed to:

“An explanation is knowledge of why things happen as they do.”

Replaced the footnote with the second two paragraphs in the footnote (changes in red):

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Some theories explain relatively better than they predict and others predict relatively better than they explain. In *deterministic chaotic systems*, we can explain without being able to predict equally well. Mathematical models of deterministic chaotic systems explain why they are predictable at low levels of energy and why they become *practically* unpredictable at higher levels of energy. The reason that they become practically unpredictable is that any deviation between actual initial conditions of these systems and our estimates of these conditions grows over time. In order to be able to predict these systems in their chaotic mode, we would have to know initial conditions with infinite precision. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate,” which “emerges” from the complex interactions of the elements of the system.

“Other theories predict relatively better than they explain: Quantum mechanics provides **incredibly** accurate statistical predictions of subatomic events without explaining their causes equally well. Rather than better means of predicting what quantum mechanics predicts, physicists currently seek to explain what links subatomic phenomena and cosmological phenomena, **e.g., string theory.**”

Chapter 2, Theories are refinements of everyday thinking., first paragraph, last sentence

Deleted “our experiences.”

Chapter 2, Theories are refinements of everyday thinking., fifth paragraph, first sentence

“We refine the set of philosophical theories by rejecting those that fail to meet empirical standards for explaining. **our experiences.**”

was changed to:

“We refine the set of philosophical theories by rejecting those that fail to meet empirical standards for explaining. **Unlike previous refinements, this one is an ongoing process that requires us not only to reject candidates but also to reject previously accepted theories in light of new information and newly accepted theories.**”

Chapter 2, Theories are refinements of everyday thinking., sixth paragraph, second sentence

Inserted the following sentence:

“Like the previous refinement process, this one is an ongoing process that requires us not only to reject candidates but also to reject previously accepted theories in light of new information and newly accepted theories.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 3, Eliminating Teleonomic Theories, last paragraph, fifth sentence

Changed “atheist Soviet Communism” to “Marxist-Leninism.”

Chapter 3, Ultimate Normative Ends of Life, twelfth paragraph, last sentence

Changed “universal truth, beauty, and justice” to “the transcendent values of the truth, beauty, and the good.”

Chapter 3, Practical Benefits of Magical Mysticism, first paragraph, second sentence

Changed “he saw ” to “Schweitzer saw.”

Chapter 3, Sacrifice versus Prudence, last paragraph, third and fourth sentences

“They also recognize that the need for **heroism** arises from **poverty**. **If everyone had everything they need, there would be no need to sacrifice for others.**”

was changed to:

“They also recognize that the need for **sacrifice** arises from **unsatisfied needs**.”

Chapter 4, Human Capital, Work, and Leisure, last paragraph, second sentence

“The wise manager knows that it is in everyone’s best interest to help subordinates find **what** work **best suits them** and to make all work as **satisfying** as possible.”

was changed to:

“The wise manager knows that it is in everyone’s best interest to help subordinates find work **that they enjoy** and to make all work as **enjoyable** as possible.”

Chapter 5, Economic Viscosity, first paragraph, second and third sentences

“Fluid economies are those that readily adapt to economic stress of progress. Economic fluidity concerns the quality of decision-making, **the process that begins with finding a problem to solve and ends with implementing the chosen solution.**”

was changed to:

“Fluid economies are those that readily adapt to **the** economic stress of progress. Economic fluidity concerns the quality of decision-making.”

Afterword, second to last paragraph, last sentence

Changed “tradition” to “natural law tradition.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Afterword, last paragraph, first sentence

Changed “tradition” to “natural law tradition.”

Appendix, first paragraph, first sentence

Changed “Just-In-Time” to “Just-In-Time (JIT).”

Appendix, first paragraph, fourth sentence

Changed “it combines” to “JIT combines.”

Appendix, Requirements for Kaizen, first paragraph, second sentence

Changed “cooperative” to “highly cooperative.”

Appendix, Cooperation, second paragraph, second sentence

“Whether the employees’ trust in top management survives this depends on their trust in **its** dedication to the firm’s welfare.”

was changed to:

“Whether the employees’ trust in top management survives this depends on their trust in **management’s** dedication to the firm’s welfare.”

Changes in Version 2003.11.22

Preface, first paragraph, first sentence

Changed “*Business and the Changing Environment*” to “*Business, Government, and the Changing Environment*.”

Preface, first paragraph, second sentence

Changed “connect everything we had learned” to “lock everything we had learned together.”

Preface, fifth paragraph, second to last sentence

Italicized “exactly.”

Preface, fifth paragraph, second to last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “recognized” to “touched on.”

Preface, eleventh paragraph, argument, all

Changed “complete conceptual system” to “perfect intellectual tool.”

Chapter 1, The Recursionist Strategy, first paragraph, last sentence

Changed “global (universal) ” to “universal (global)”.

Chapter 2, throughout

Changed “global” to “universal.”

Chapter 2, *Theories produce predictions and explanations.*, last paragraph, last sentence

“Failing to do so embeds ignorance into the economic system, which sets the stage for catastrophe.”

was deleted.

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph, second sentence

“They also recognize that the complex interactions of the universe occasionally result in large asteroids colliding with earth. The universe is not as predictable as those who worshipped at Newton’s shrine believed it to be.”

was changed to:

“The universe is not as predictable as those who worshipped at Newton’s shrine believed it to be. Among other things, large asteroids occasionally collide with the earth, devastating its higher forms of life.”

Chapter 5, Increasing Excellence, last paragraph, second to last sentence

“Everything else being equal, periods of great progress tend to coincide with rising prices, and periods of little or no progress tend to coincide with declining ones.”

was changed to:

“Everything else being equal, periods of heavy investment in new means tend to coincide with rising prices, and periods of little or no investment in new means tend to coincide with declining ones.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 6, Introduction, last paragraph, last sentence

Changed “just taxation, and free association” to “free association, and just taxation.”

Chapter 6, Just Taxation and Free Association

Switched *Just Taxation* and *Free Association*.

Chapter 6, Just Taxation, first paragraph, second sentence

“Just forms disrupt it in ways that promote progress by creating incentives to act wisely.”

was changed to:

“By creating incentives to act wisely, just forms of taxation disrupt decision-making in ways that promote progress.”

Chapter 6, Just Taxation, last paragraph

“The least beneficial taxes are those that discourage desirable activities. High on this list are taxes on incomes (**profits**), which discourage acquiring useful knowledge and taking risks. **Rather than taxing incomes progressively, we ought to demand that governments tax detrimental forms of consumption progressively.**”

was changed to:

“The least beneficial taxes are those that discourage desirable activities. High on this list are taxes on incomes, which discourage acquiring useful knowledge and taking risks.

“The case for eliminating corporate income taxes is straightforward. Depending on the nature of the demand for the products that the corporation sells, the burden of these taxes falls on either its customers or its owners. It would be better to tax customers and owners in ways that promote wise consumption.

“The case for eliminating personal income taxes is much more problematic. The wise satisfy their needs justly. If humans were perfectly wise, an increase in personal wealth would lead to an equivalent increase commonwealth (commonweal / general welfare). If humans were as lucid as angels, there would be no need for governments to redistribute income or wealth. Rather than demanding that governments redistribute income or wealth (per se), we ought to demand that governments encourage wise consumption.

“A just system for producing commonwealth produces not only commonwealth but also knowledge of how to produce commonwealth ever more wisely. A just system

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

must ensure minimum standards of welfare, which governments can best provide. It must also ensure ever more efficient and effective means of providing welfare, which markets can best provide. These two solutions are not incompatible. Government and market based welfare systems can coexist, each providing what it provides best.

“An example of just mixed system for producing commonwealth is the combination of a government run welfare system paid for by progressive income taxes and a market based universal welfare system exempt from these taxes. The model for a market based universal welfare system is the tax exempt individual retirement account. Unlike the individual retirement account, a universal system would not be limited to a particular type of welfare. It would include not only the provision of retirement income but also medical expenses, unemployment compensation, education expenses, and financial support for qualified welfare providers. In effect, it would combine a universal family welfare savings account with a private charitable foundation. Expenditures to help related parties would be subject to limitations and/or taxation. Gifts to qualified charitable organizations would not be subject to limitations or taxation. Upon the death of the last exempt beneficiary, all funds not willed to qualified charitable organizations would be taxed at rate at least as progressive as that of the income tax system. The goal here is to provide a politically determined safety net while promoting the general welfare as efficiently and effectively as possible. Ideally, the government program would shrink to insignificance. However, it would never be eliminated. Like a militia, it would be available for emergencies.”

Chapter 6, Conclusion, last paragraph, last sentence

“The strategy put forth in this work aims to increase this propensity by providing a conceptual framework for thinking more clearly about our ultimate ends and the best means to them.”

was changed to:

“The strategy put forth in this work aims to increase this propensity.”

Afterword, third paragraph, fourth sentence

Changed “global ethical problem” to “universal (global) ethical problem.”

Afterword, seventh paragraph, second sentence

Changed “global problem ” to “universal problem.”

Changes in Version 2003.11.26

Preface, first paragraph, second and third sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Dean Bach intended his course to be the capstone of our Stanford MBA experience, **the course that would bring everything we had learned together into a coherent whole.** From the first day until the last, **Bach** relentlessly questioned our solutions to case studies without revealing his beliefs.”

was changed to:

“Dean Bach intended his course to be the capstone of our Stanford MBA experience. From the first day until the last, **he** relentlessly questioned our solutions to case studies without revealing his beliefs.”

Preface, third paragraph, second sentence

Changed “realize” to “know.”

Preface, fourth paragraph, first sentence

“**To make matters worse**, uncertainty about what it is that we ought to seek translates into uncertainty about which means is best.”

was changed to:

“**Further**, uncertainty about what it is that we ought to seek translates into uncertainty about which means is best.”

Preface, fifth paragraph, first sentence

“The possibility of learning by doing makes **this theoretical problem of moral philosophy a very practical one.**”

was changed to:

“**To make matters worse**, the possibility of learning by doing makes **decision-making both more difficult and more crucial.**”

Preface, seventh paragraph, first sentence

“Friedman’s solution **to the problem of not knowing what it is that we ought to seek** has had a negative unintended consequence.”

was changed to:

“**Unfortunately**, Friedman’s solution has had a negative unintended consequence.”

Preface, eleventh paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This radical solution **will** be resisted by intellectuals who **define the markets for intellectual tools to exclude everything but theories. To these intellectuals,** it takes a theory to beat a theory. They ought to consider the following **argument:**

“**A perfect intellectual tool** for helping us formulate alternatives **must** address all uncertainty. No theory can address the uncertainty of all of its own fundamental propositions. **Addressing all uncertainties associated with any given theory requires introducing a more complete theory. Thus, a perfect intellectual tool for helping us formulate alternatives must be based on a strategy for solving an open-ended problem.**”

was changed to:

“This radical solution **is likely to** be resisted by intellectuals who **believe** it takes a theory to beat a theory. Intellectuals **who define the markets for intellectual tools to exclude everything but theories** ought to consider the following:

“**A theory** for helping us formulate alternatives **ought to** address all uncertainty. No theory can address the uncertainty of all of its own fundamental propositions. **Only a strategy for solving an open-ended problem can address all uncertainty.**”

Preface, twelfth paragraph, second sentence

Changed “Consumers” to “Users.”

Acknowledgments, first paragraph, first sentence

Changed “recognize” to “acknowledge.”

Acknowledgments, fourth paragraph

Switched this paragraph with the fifth.

Acknowledgments, new fourth paragraph, third sentence

Deleted “, which effectively cut off the supply of paper to my father’s printing company.”

Acknowledgments, new fifth paragraph, second sentence

Deleted “in college.”

Acknowledgments, last paragraph, last sentence

Changed “ultimate end” to “normative end.”

Chapter 1, first paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “localized” to “local.”

Chapter 2, *Theories are tools for producing useful knowledge.*, first paragraph, second sentence

Changed “an artillery shell’s” to “a spacecraft’s.”

Chapter 2, Refining Everyday Thinking, second sentence

“This book proposes a similar strategy for learning how to live ever more wisely, which involves slowly tightening a loose theory of means by removing ignorance in the form of theories of ultimate ends.”

was changed to:

“Similarly, the recursionist strategy for learning how to live ever more wisely involves slowly tightening a loose theory of means by removing ignorance in the form of theories of ultimate ends.”

Chapter 2, *Theories produce predictions and explanations.*, third paragraph, last sentence

“Rather than better means of predicting what quantum mechanics predicts, physicists currently seek to explain what links subatomic phenomena and cosmological phenomena, e.g., string theory.”

was changed to:

“Rather than better means of predicting what quantum mechanics predicts, physicists currently seek to explain what links the subatomic to the cosmological, e.g., string and complexity theories.”

Chapter 2, Refining Recursionist Explanations, third paragraph, last sentence

Changed “status quo” to “current state of the world.”

Chapter 2, Refining Recursionist Explanations, last paragraph

“Explanations based on teleonomic theories are unique in that they both *describe what is* and *prescribe what we ought to seek*. These explanations describe our (fully realized) internal programming as it is. Following our (fully realized) internal programming leads to happiness, a life well-lived. Because we owe it to ourselves (ought) to live good lives, these explanations also prescribe what we ought to seek.”

was shortened and integrated into the last footnote.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3, Ultimate Normative Ends of Life, seventh through tenth paragraphs

“Each of us has a belief system, a structure of articulate knowledge. Some of our beliefs are critical to this system. When these key beliefs are challenged, we feel threatened. When we stop believing in them, we undergo a crisis that causes us to reevaluate other beliefs.

“Our beliefs influence what we perceive. Primitive tribesmen shown an electrocardiogram printout are likely to see a meaningless line on a piece of paper; bankers are likely to see an artifact of modern medicine; and cardiologists are likely to see a healthy or an ill heart.

“Our beliefs also influence how we interpret what happens to us as we go through life. If we believe that bad things only happen to bad people, a personal crisis is likely to cause us to question our worth, but if we believe that every crisis is a combination of threat and opportunity, we are likely to look for the opportunity.

“Finally, our beliefs influence our conception of ultimate ends. If we believe that we are put on this earth to please ourselves, we are likely to seek a life of pleasure, but if we believe that we are here for a higher purpose we are likely to seek to discover and fulfill that purpose. Beliefs that influence our conception of our ultimate ends are key beliefs.”

was changed to:

“Our beliefs influence what we perceive. Primitive tribesmen shown an electrocardiogram printout are likely to see a meaningless line on a piece of paper; bankers are likely to see an artifact of modern medicine; and cardiologists are likely to see health or disease..

“Our beliefs also influence how we interpret what happens to us as we go through life. If we believe that bad things only happen to bad people, a personal crisis is likely to cause us to question our worth, but if we believe that every crisis is a combination of threat and opportunity, we are likely to look for opportunity.

“Some of our beliefs are critical to our structure of beliefs. When these key beliefs are challenged, we feel threatened. When we stop believing in them, we undergo a crisis that causes us to reevaluate other beliefs.

“Beliefs that concern our ultimate ends are key beliefs. If we believe that we are put on this earth to please ourselves, we are likely to seek a life of pleasure, but if we believe that we are here for a higher purpose we are likely to seek to discover and fulfill that purpose.”

Chapter 3, Practical Benefits of Magical Mysticism, ninth paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “massive **and virtually immediate** changes **throughout the system**” to “massive changes.”

Chapter 3, Sacrifice versus Prudence, sixth paragraph, last sentence

Changed “promote” to “push.”

Chapter 3, Eliminating Simplistic Theories, second paragraph, end of first sentence

“**The fact that our needs emerge at more than one level of abstraction** suggests that we should eliminate any theory that attributes human motivation to **any one** level of abstraction.”

was merged with preceding paragraph and changed to:

“**This** suggests that we should eliminate any theory that attributes human motivation to **a single** level of abstraction.”

Chapter 3, Eliminating Simplistic Theories, new second paragraph, first sentence

“As previously stated, scientists search for predictable or explainable phenomena on different levels of abstraction: subatomic physicists look for patterns in matter at a subatomic level; chemists look for it on an atomic level; and astronomers look for it on a cosmic level.”

was deleted.

Chapter 3, Eliminating Simplistic Theories, new third paragraph, first sentence

“**Biologists taking this view hope** to explain why organisms **sometimes** sacrifice themselves **in order to allow related organisms to survive and reproduce.**”

was merged with the preceding paragraph and changed to:

“**Some of these** biologists **claim** to explain why organisms sacrifice themselves.”

Chapter 3, Eliminating Simplistic Theories, new eighth paragraph, last sentence

“The wise seek **not to alleviate others’ pain, but** to help others **achieve their ultimate ends.**”

was changed to:

“The wise seek to help others **live good lives, not simply to lessen their pain.**”

Chapter 5, Economic Turbulence, second paragraph, fourth sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“But if they fail to adopt the process and other firms subsequently enter the industry to exploit the new process, the result is likely to be inflation followed by unemployment.”

was merged with the preceding paragraph and changed to:

“However, if they fail to adopt the new process, which encourages new firms to enter the industry, the result is likely to be inflation followed by unemployment.”

Chapter 6, Moral Vision, second paragraph

“Given the apparent success of libertarian economic policies in the past, libertarian economists may question why it is necessary for governments to push a moral vision. There are at least two reasons governments should do so. First, as we accumulate wealth, we tend to live higher in our hierarchy of needs, where identifying our current need is more difficult. The higher we are in this hierarchy, the more we need a vision to help us know what to do. Second, as we accumulate useful knowledge, the pace of change tends to increase, which makes following the virtuous path of accumulating wealth and accelerating change more difficult. A clear moral vision helps us cope with accelerating change.”

was changed to:

“Moral vision is especially useful in information age economies. As we accumulate wealth, we tend to live higher in our hierarchy of needs, where identifying our current need is more difficult. The higher we are in this hierarchy, the more we need a vision to help us know what to do. Further, as we accumulate useful knowledge, the pace of change tends to increase, which makes following the virtuous path of accumulating wealth and accelerating change more difficult. A clear moral vision helps us cope with accelerating change.”

Afterword, last paragraph, first sentence

Deleted “natural law.”

Appendix, Good People, first paragraph, first sentence

Changed “effective wage rates” to “wages.”

Changes in Version 2003.12.02

Preface, title

““[E]ven the free market economists...have failed, as yet, to come to terms with the new role and inexhaustibility of knowledge.” — *Alvin and Heidi Toffler*”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was deleted.

Preface, third paragraph

“In retrospect, I wanted a unified theory of ethics, economics, and politics that would allow me to think outside all of the boxes that less complete theories create. **I did not know that all theories meant to guide our actions are inherently incomplete. This is because all such theories define what it is that we owe to ourselves (ought) to seek. How do we know whether this definition is complete or incomplete? We can’t without introducing another, more complete theory. We can never be certain about what it is that we ought to seek.**”

was merged with second paragraph and changed to:

“In retrospect, I wanted a unified theory of ethics, economics, and politics that would allow me to think outside all of the boxes that less complete theories create.”

Preface, new third through sixth paragraphs

“Further, uncertainty about what it is that we ought to seek translates into uncertainty about which means is best. How can we know which road is best if we don’t know where it is that we ought to go?

“The possibility of learning by doing makes this theoretical problem of moral philosophy a very practical one. Our industrial age concept of excellence in means, efficiency, defines excellence to be a matter of using the least valuable scarce resources to achieve a given end. We can never be sure that the most efficient means to a given end that involves learning knowledge “X” is better than a less efficient means to the same end that involves learning knowledge “Y.” To be sure, we need to assign a value to knowledge “X” and “Y.” The inexhaustibility of knowledge — the fact that using knowledge does not deplete it — makes this impossible to do except in the very special case where we know exactly when and under what circumstances knowledge “X” and “Y” will be used in the future. We cannot know this without knowing *exactly* what it is that we ought to seek. (University of Chicago economist Frank Knight touched on this problem in his 1939 *Economica* article, *Ethics and Economic Reform*.)

“In his most cited academic work, *Essays in Positive Economics*, Milton Friedman proposed a brilliant solution to the problem of not knowing what it is that we ought to seek. His solution was to limit economic science to prediction. This limitation frees economists from having to worry about the realism of their assumptions. Whether economists assume that economic agents seek what is most wise, most efficient, or something else doesn’t matter. What matters is how well their models predict relative to other models.

“Unfortunately, Friedman’s solution has had a negative unintended consequence. Wise decision-making requires both theories that predict, which help us evaluate alternatives,

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

and theories that explain, which help us formulate alternatives. By focusing the efforts of most economists on the former, his solution has retarded the development of the latter, particularly the development of Austrian economics. In his intellectual autobiography, *Hayek on Hayek*, Austrian economist F. A. Hayek wrote:

“[O]ne of the things I most regret is not having returned to a criticism of Keynes’s treatise, but it is as much true of not having criticized Milton Friedman’s [*Essays in*] *Positive Economics*, which in a way is quite as dangerous a book.””

were deleted.

Preface, new third paragraph

“The major problem in developing intellectual tools for helping us formulate alternatives is both simple and straightforward: To be most effective, intellectual tools for helping us formulate alternatives must be based on what we would do if we had complete knowledge of what we ought to seek. How can we know what we don’t know?”

was changed to:

“To be most effective, intellectual tools for helping us formulate alternatives must be based on what we would do if we had complete knowledge of what we ought (owe to ourselves) to seek. How can we know what we don’t know?”

Preface, new fourth paragraph

“Fortunately, the solution is also both simple and straightforward: How can we know what we don’t know? We can learn by doing.”

was deleted.

Preface, new fourth paragraph, end

Added the following:

“How can we know what we don’t know? We can learn by doing.”

Preface, new fifth paragraph, second sentence

Changed “Individuals” to: “Those.”

Preface, new fifth paragraph, second sentence

Changed “These intellectuals” to: “They.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Acknowledgments, title

““If I have seen further it is by standing on the shoulders of Giants.” — *Isaac Newton*”
was deleted.

Chapter 1, title

“(designations, concepts)” was deleted.

Chapter 1, Modern Economics' Blind Spot, first paragraph, sentence, and word

Changed “Concepts” to “Words (designations, concepts).”

Chapter 1, Modern Economics' Blind Spot, fifth paragraph, first sentence

“Concepts focus our attention on certain **characteristics of** objects, which tends to blind us to other **characteristics.**”

was changed to

“Concepts focus our attention on certain objects, which tends to blind us to others.”

Chapter 2, *Theories produce predictions and explanations.*, last paragraph, fifth through eighth sentences

“We **predict behavior based on the world as it is. In economics, we** predict our **collective** behavior based on the knowledge that we currently possess. **We could choose to** explain our **individual** behavior **on this same basis. However, if we do,** we will tend to blind ourselves to the possibility of learning. **If we are to** avoid this, we need to explain our behavior based on *how we would act if we had **greater** knowledge.*”

was changed to:

“We predict our behavior based on the knowledge that we currently possess. **If we** explain our behavior **based on the knowledge we currently possess,** we will tend to blind ourselves to the possibility of learning. **To** avoid this, we need to explain our behavior based on *how we would act if we had complete knowledge **of what we ought to seek.***”

Chapter 3, Eliminating Simplistic Theories, new third paragraph

“The problem with this theory of altruism when applied to humans is that it ignores many examples in which thinking organisms that reproduce sexually have sacrificed themselves for less than the theory predicts. One only has to consider the many cases of saints and heroes who have sacrificed themselves for far less than it predicts to see

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

that it falls short of explaining human altruism. This inadequacy is not limited to humans: news stories of family dogs sacrificing themselves to save the life of a human family member are common. Further, most people find this version of altruism to be selfish, which itself is evidence that this theory is incomplete.”

was changed to:

“There are two problems with the selfish gene theory as a theory of human altruism. First, it predicts poorly. History is filled with saints and heroes who have sacrificed themselves for far less than it predicts. Second, most of us find its conclusions to be selfish, which makes it a very poor foundation for helping us find better problems to solve. When applied to humans, selfish gene theory is fatally incomplete.”

Afterword, first paragraph, second sentence

Changed “nearly five years ago” to “five years ago.”

Afterword, second to last paragraph, second to fifth sentences

“Conservative elites once claimed that the United States owed its success to their Protestant heritage. Their children claimed it was their **Christian** heritage. Their grandchildren claim it was their Judeo-Christian heritage. Their great-grandchildren will likely claim it was their Abrahamic heritage.”

was changed to

“Conservative elites once claimed that the United States owed its success to their **Anglo-Saxon** Protestant heritage. Their children claimed it was their **Protestant** heritage. **Their grandchildren claimed it was their Christian heritage.** Their great-grandchildren claim it was their Judeo-Christian heritage. Their **great-great-grandchildren** will likely claim it was their Abrahamic heritage.”

Changes in Version 2003.12.06

Preface, second paragraph, second sentence

Deleted “my great uncle.”

was deleted.

Preface, last paragraph, fourth sentence

Italicized “including good intellectual tools.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 6, Just Taxation, sixth paragraph

“A just system for producing commonwealth produces not only commonwealth but also knowledge of how to produce commonwealth ever more wisely. A just system must ensure minimum standards of welfare, which governments can best provide. It must also ensure ever more efficient and effective means of providing welfare, which markets can best provide. These two solutions are not incompatible. Government and market based welfare systems can coexist, each providing what it provides best.”

was changed to:

“A just system ensures both minimum standards of welfare and ever wiser means of producing commonwealth. Governments best ensure the former and markets the latter.”

Chapter 6, Just Taxation, seventh paragraph, first sentence

“An example of just mixed system for producing commonwealth is the combination of a government run welfare system paid for by progressive income taxes and a market based universal welfare system exempt from these taxes. The model for a market based universal welfare system is the tax exempt individual retirement account. Unlike the individual retirement account, a universal system would not be limited to a particular type of welfare. It would include not only the provision of retirement income but also medical expenses, unemployment compensation, education expenses, and financial support for qualified welfare providers. In effect, it would combine a universal family welfare savings account with a private charitable foundation. Expenditures to help related parties would be subject to limitations and/or taxation. Gifts to qualified charitable organizations would not be subject to limitations or taxation. Upon the death of the last exempt beneficiary, all funds not willed to qualified charitable organizations would be taxed at rate at least as progressive as that of the income tax system. The goal here is to provide a politically determined safety net while promoting the general welfare as efficiently and effectively as possible. Ideally, the government program would shrink to insignificance. However, it would never be eliminated. Like a militia, it would be available for emergencies.”

was merged with the preceding paragraph and changed to:

“For example, a just system might combine a government run safety net program paid for by progressive income taxes with a tax exempt universal welfare savings account program. The latter would allow tax free expenditures for qualified retirement, medical, unemployment, and educational expenses. It would also allow unlimited giving to qualified charitable organizations. Upon the death of the last exempt beneficiary, all funds not willed to qualified charitable organizations would be taxed at rate at least as progressive as that of the income tax system. Ideally, the government program would shrink to insignificance over time. However, it would never be eliminated. Like a militia, it would remain available for emergencies.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 6, Conclusion, second paragraph, last sentence

Changed “Decentralization” to “Freedom.”

Changes in Version 2003.12.10

Chapter 6, Control the Money Supply Passively, last paragraph, last sentence

“In the long run, do we want economic agents to learn to adapt to economic turbulence or to economic turbulence modified by activist monetary authorities?”

was replaced by the following paragraph:

“Recursionist monetary policy aims at eliminating the causes of turbulence, not turbulence per se. It seeks to dampen turbulence only when turbulence threatens the political stability of the system. Hence, the more robust the political system is, the faster progress is likely to be.”

Changes in Version 2003.12.12

Chapter 2, Refining Everyday Thinking

Added the following subsection:

“*Theories that explain are partial descriptions.* We understand a system completely if and only if we can predict it with absolute certainty under all circumstances. Ideally, theories that explain are simply theories that predict “written backwards.”

“Modern physics tells us that we can never predict physical systems with absolute certainty under all circumstances. The idealistic assertion that theories that explain are theories that predict “written backwards” is useless. Practically, theories that explain are partial descriptions of our world that we use to find problems to solve.”

Chapter 2, Refining Recursionist Explanations, fourth paragraph, last sentence

Added the following footnote:

“⁴ Teleonomic theories *describe* our internal programming as it is. Because we owe it to ourselves (ought) to live good lives, these explanations also *prescribe* what we ought to seek. For more on this apparent contradiction of David Hume, read part two of Mortimer Adler’s *Ten Philosophical Mistakes* (New York: Macmillan, 1985).”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Refining Recursionist Explanations, last two paragraphs

“Although we can safely assume that our **fully realized** internal programming is fixed, we **do not know, and may never know completely, what this internal programming** is. The most we can know is what it is not. **Thus**, the process of solving **the** universal economic problem **must** include **the process of** eliminating inadequate **teleonomic** theories **from the set of all teleonomic theories**.

“Rather than basing evolutionary explanations on what we currently want, which ignores the possibility of solving problems by learning to live more wisely, we can base them on the set of all teleonomic theories. Over time we can tighten these loose explanations by eliminating members of this set.”

were replaced by:

“Although we can safely assume that our internal programming is fixed, we **will never know with complete certainty what it** is. The most we can know is what it is not. The process of solving **our** universal economic problem **ought to** include eliminating inadequate theories of our internal programming.

“Rather than basing evolutionary explanations on what we currently want, which ignores the possibility of solving problems by learning to live more wisely, we can base them on the set of all teleonomic theories. Over time we can tighten these loose explanations by eliminating members of this set.”

Changes in Version 2003.12.20

Chapter 2, *Theories produce predictions and explanations.*, second paragraph, last sentence

“In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate,” **which “emerges” from the complex interactions of the elements of the system.**”

was changed to:

“In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate.””

Chapter 2, *Theories that explain are partial descriptions.*,

“Theories that explain are partial descriptions. We understand a system completely if and only if we can predict it with absolute certainty under all circumstances. Ideally, theories that explain are simply theories that predict “written backwards.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Modern physics tells us that we can never predict physical systems with absolute certainty under all circumstances. The idealistic assertion that theories that explain are theories that predict “written backwards” is **useless**. Practically, theories that explain are partial descriptions of our world that we use to find problems to solve.”

was changed to:

“Theories that explain are partial descriptions. Ideally, **a single theory explains and predicts everything about a system:** theories that explain are simply theories that predict “written backwards.” Modern physics tells us that we can never predict physical systems with absolute certainty under all circumstances. The idealistic assertion that theories that explain are theories that predict “written backwards” is **a poor foundation for studying most systems, particularly complex adaptive ones.** Practically, theories that explain are partial descriptions of our world that we use to find problems to solve.”

Chapter 6, Free Association, third paragraph

“Just as we can tell many stories about why cultures become more hedonistic as they become more urban, industrial, and market-oriented, we can tell many stories about why cultures are likely to become more lucid as they become knowledge intensive. The practical question for just policy makers is not whether there is a trend toward lucidity but rather how best to promote **such a** trend.”

was changed to:

“Just as we can tell many stories about why cultures become more hedonistic as they become more urban, industrial, and market-oriented, we can tell many stories about why cultures are likely to become more lucid as they become **more** knowledge intensive. The practical question for just policy makers is not whether there is a trend toward lucidity but rather how best to promote **this** trend.”

Chapter 6, Conclusion, second paragraph, last sentence

“Freedom is a means to the ultimate end of a good life for all, not an end in itself.”

was deleted.

Appendix, Introduction, second paragraph

“What makes the Toyota **Production System** exemplary is its information age organization and management, which focuses on continual improvement (*kaizen*) in production, trade, **and consumption**. It is the epitome of learning-by-doing. From this **information age** perspective, more production of saleable product is not necessarily more productive. Less “production” can be more productive.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“What makes the Toyota **s**ystem exemplary it its information age organization and management, which focuses on continual improvement (*kaizen*) in production, trade, **and consumption**. It is the epitome of **an information age**, learning-by-doing **strategy**. From this perspective, more production of saleable product is not necessarily more productive. Less “production” can be more productive.”

Changes in Version 2003.12.23

Chapter 3, Sacrifice versus Prudence, sixth paragraph, last sentence

“Illiberal leaders push sacrifice over prudence, romance over enlightenment, **and heroism over wisdom**.”

was changed to:

“Illiberal leaders push sacrifice over prudence and romance over enlightenment.”

Chapter 3, Sacrifice versus Prudence, last paragraph, last sentence

“The wise temper sacrifice with prudence, romance with enlightenment, **and heroism with wisdom**.”

was changed to:

“The wise temper sacrifice with prudence **and** romance with enlightenment.”

Chapter 6, Control the Money Supply Passively, last paragraph, last sentence

“Hence, the more robust the political system is, the faster progress is likely to be.”

was deleted.

Changes in Version 2003.12.29

Acknowledgments, third paragraph, first sentence

Added “Santa Fe Institute economist.”

Chapter 1, The Recursionist Strategy, fourth paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“*Given a learning attitude*, waste **from imperfect decision-making** is a regrettable by-product of learning through experience.”

was changed to:

“**From this perspective**, waste is a regrettable by-product of learning through experience.”

Chapter 1, The Recursionist Strategy, fifth paragraph, fourth sentence

Added “gladiatorial games.”

Chapter 2, *Theories that explain are partial descriptions.*, last three sentences

“Modern physics tells us that we can never predict physical systems with absolute certainty under all circumstances. The idealistic assertion that theories that explain are theories that predict “written backwards” is a poor foundation for studying most systems, particularly complex adaptive ones. Practically, theories that explain are partial descriptions of our world that we use to find problems to solve.”

were changed to:

“**We test theories that explain by how well they predict.** Practically, theories that explain are partial descriptions of our world that we use to find problems to solve. **We test theories by how well they perform their function. We test theories that explain by how well they help us find problems to solve.**”

Chapter 2, *Theories are refinements of everyday thinking.*, fifth paragraph, third and fourth sentences

“The practical means of testing tools is to test their performance at the task they were designed to perform. Thus, the practical means of testing philosophical theories is to test how well they help us find problems to solve.”

were changed to:

“**Practically, we test** philosophical theories **by** how well they help us find problems to solve.”

Chapter 2, *Theories are refinements of everyday thinking.*, seventh paragraph, first sentence

“Consider how we would have used this pragmatic approach to science to refine early modern theories about our solar system.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Consider how we would have used this **decision-oriented** pragmatic approach to science to refine early modern theories about our solar system.”

Chapter 2, *Theories are refinements of everyday thinking.*, ninth paragraph, second and third sentences

“Given the greater depth and breadth of Newton’s theories of gravity and mechanics, we would **not have rejected them as either theories that predict or ones that explain**. However, Newton’s discovery that calculating the trajectories of the earth, moon, and sun was practically impossible would have prevented us from enshrining Newton’s theories as Alexander Pope did when he wrote:”

were changed to:

“Given the greater depth and breadth of Newton’s theories of gravity and mechanics, we would **have accepted them as the leading theories that predict and explain**. However, Newton’s discovery that calculating the trajectories of the earth, moon, and sun was practically impossible would have prevented us from enshrining Newton’s theories **as the sacred truth** as Alexander Pope did when he wrote:”

Chapter 3, *Eliminating Unethical Theories*, third paragraph, third sentence

“In contrast, temporal ends are goals that concern events **that** are bounded in time.”

was changed to:

“**Processes are not bounded in time**. In contrast, temporal ends are goals that concern events. **Events** are bounded in time.”

Chapter 3, *Eliminating Unethical Theories*, third paragraph, fifth and sixth sentences

“Winning a particular basketball game **and sinking a particular free throw are** temporal ends. **In the current context**, satisfying those things that we need in order to live a good life is a normative end **and** satisfying a particular need is a temporal end.”

were changed to:

“Winning a particular basketball game **is a** temporal end. **Satisfying** those things that we need in order to live a good life is a normative end. **Satisfying** a particular need is a temporal end.”

Chapter 3, *Eliminating Unethical Theories*, fourth paragraph, last sentence

“It is a statement of fact.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

was changed to:

“It is a statement of fact: **True believers in Marxist-Leninism called on individuals to satisfy their human need for mystical unity by submitting to the will of the people as interpreted by Marxist-Leninist leaders.**”

Chapter 3, *Ultimate Normative Ends of Life*, first paragraph, last two sentences

“For **this statement** to be true by definition, living a good life must include all temporal worldly ends necessary to achieve the ultimate end of human existence. **Further, living a good life must be logically consistent with these temporal ends.**”

was changed to:

“For **it** to be true by definition, living a good life must include all temporal worldly ends necessary to achieve the ultimate end of human existence.”

Chapter 3, *Ultimate Normative Ends of Life*, second paragraph, first sentence

“Humanist philosophers claim that the statement, “the ultimate normative end of human life is living a good life,” has meaning, **as opposed to simply being true by definition.**”

was changed to:

“Humanist philosophers claim that the statement, “the ultimate normative end of human life is living a good life,” has meaning.”

Chapter 5, *A Simple Model of Progress and Turbulence*, last paragraph, first sentence

Changed “weakly chaotic **model**” to “**complex adaptive analogue to a weakly chaotic system.**”

Chapter 5, *A Simple Model of Progress and Turbulence*, last paragraph, last sentence

Changed “the symptoms” to “these symptoms.”

Afterword, eleventh paragraph, sixth sentence

Changed “political and economic turbulence” to “economic turbulence.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Title page

Changed “The Reintegration of Ethics and Economics” to “The Economics of Practical Wisdom.”

Preface, first paragraph, first sentence

Changed “The Reintegration of Ethics and Economics” to “The Economics of Practical Wisdom.”

Chapter 3, Eliminating Unethical Theories, fourth paragraph, first two sentences

“We also need to distinguish between ethics and religion. Ethics concerns how we live good lives.”

was changed to:

“We also need to define ‘religion.’”

Chapter 3, *Ultimate Normative Ends of Life*, first paragraph

“Humanists look to human nature (teleonomic theories) to explain human ends. They believe that the ultimate normative end of human life is living a good life. Some humanists believe that this is self-evident. This ignores the possibility that the ultimate normative end of life and the ultimate normative end of existence may not be the same thing. For the statement “the ultimate normative end of human life is living a good life” to be true, it must be true by definition. For it to be true by definition, living a good life must include all temporal worldly ends necessary to achieve the ultimate end of human existence.

“Humanist philosophers claim that the statement, “the ultimate normative end of human life is living a good life,” has meaning. To have meaning, a statement must tell us something more than is contained in the statement alone. In this case, the statement has meaning because it focuses our attention on what we need in order to live a good life.”

was changed to:

“Humanists look to human nature to explain human ends. They claim that the statement, “the ultimate normative end of human life is living a good life,”² has meaning. To have meaning, a statement must tell us something more than is contained in the statement alone. In this case, the statement has meaning because it focuses our attention on what we need in order to live a good life.”

² Some humanists believe that this statement is self-evident. This is to say that we cannot imagine a case in which the ultimate normative end of human life is living a

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

good life as defined by our internal programming is false. We don't need to imagine such a case. History is filled with examples of prophets claiming that achieving particular temporal ends is not only the best way but also the only way to live a good life. (Living a good life must include all temporal ends necessary to achieve the ultimate end of human existence.)”

Changes in Version 2004.01.08

Chapter 2, Venn Diagram

Changed shape of sets 4 and 5 to create a region that is part of the set of philosophical theories and the set scientific theories that predict but not part of the set of scientific theories that explain. This accommodates philosophers of science who would reject quantum mechanics as a theory that explains but accept it as a philosophical theory.

Chapter 5, Introduction, first paragraph, last sentence

“The biologist, having realized **consumer goods are not the only means of satisfying human needs**, decides to market the tea at an affordable price.”

was changed to:

“The biologist, having realized **that wealth is human goods and the capacity to produce human goods**, decides to market the tea at an affordable price.”

Chapter 6, *Control the Money Supply Passively*, last paragraph

“Recursionist monetary policy **aims at eliminating the causes of turbulence, not turbulence per se. It seeks to dampen** turbulence only when turbulence threatens the political stability of the system.”

was changed to:

“**Burying problems postpones, not eliminates, turbulence. Only improving the quality of decision-making eliminates turbulence.** Recursionist monetary policy **seeks to postpone** turbulence only when turbulence threatens the political stability of the system.”

Changes in Version 2004.01.12

Preface, fifth paragraph, second sentence:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Those who **define the markets for intellectual tools to exclude everything but theories** ought to consider the following:”

was changed to:

“**They** ought to consider the following:”

Chapter 3, Eliminating Unethical Theories, fourth paragraph, last sentence

Changed “the people” to “humanity.”

Changes in Versions 2004.01.28

Preface, fifth paragraph, third sentence:

“**A theory** for helping us formulate alternatives ought to address all uncertainty.”

was changed to:

“**An intellectual tool** for helping us formulate alternatives ought to address all uncertainty.”

Chapter 2, End

Added the section “*Practical Wisdom, Specialization, and Moral Science.*”

Chapter 3, Introduction, last paragraph

“We also need to define ‘religion.’ Religion concerns how we mystically unite with something greater than ourselves. The words that several major religions use to define this concern reflect this aim: ‘religion’ comes from the Latin word that means to relink; ‘yoga’ comes from the Sanskrit word that means to yoke; and ‘Islam’ comes from the Arabic word that means to submit (to the will of God). From this perspective, the statement that Marxist-Leninism is a secular religion is more than a metaphor. It is a statement of fact: True believers in Marxist-Leninism called on individuals to satisfy their human need for mystical unity by submitting to the will of humanity as interpreted by Marxist-Leninist leaders.”

was deleted.

Changes in Versions 2004.01.30

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, last paragraph, fifth sentence

Inserted the sentence: “(See Appendix: The Toyota System).”

Chapter 1, Modern Economics' Blind Spot, third paragraph, second sentence

“When combined **with economies of scale**, this local “lock-in” effect can become significant.”

was changed to:

“When **knowledge in use is** combined **in a network**, this local “lock-in” effect can become significant.”

Chapter 2, *Theories are refinements of everyday thinking.*, sixth paragraph, first sentence

Added the sentence:

“This is a matter of producing and testing hypotheses.”

Chapter 2, *Practical Wisdom, Specialization, and Moral Science*, title

The title was changed to: “*Practical Wisdom and Moral Science.*”

Chapter 2, *Practical Wisdom and Moral Science*, body

There were many small changes to this section. The most notable were eliminating the paragraphs on religion and the division of labor.

Chapter 3, *Sacrifice versus Prudence*, second paragraph, sixth sentence

Changed “unchecked” to “relatively unchecked.”

Chapter 4, Production

“**As the rapid tool-setting example showed**, a well designed and implemented production process produces both product and production technology. **Such joint production requires people that have the practical wisdom to think of better ways to produce. It also requires trading relationships that support the exchange of dangerous information. Excellence in consumption, trade, and production potentially create a complex virtuous cycle. Only by pursuing excellence everywhere can we realize the full potential of the information age.**”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“A well designed and implemented production process produces both product and production technology.”

Changes in Versions 2004.01.31

Chapter 3, eleventh footnote, second paragraph, last sentence

“For those who believe that all life contains an element of the infinite Being, it is a contract with the infinite Being.”

was deleted.

Chapter 3, *Sacrifice versus Prudence*, second paragraph, end

Added the sentence:

“The wise temper sacrifice with prudence.”

Chapter 3, *Sacrifice versus Prudence*, last two paragraphs

“In modern times, most ritual deaths have been in support of illiberal **societies, societies that** centralize most decision-making. Centralizing **most** decision-making **dramatically reduces their efficiency and their ability to learn by doing.** To compete with liberal societies, leaders **of illiberal ones must** encourage **their subjects to make extreme** sacrifices. They **commonly** do so by promoting an apocalyptic vision of the future buttressed by a romantic vision of the past. **This** apocalyptic vision promises heaven on earth for surviving true believers after they triumph over their enemies. **Illiberal leaders push sacrifice over prudence and romance over enlightenment.**

“**Instead of the promise of violent revolution followed by magical enlightenment, liberal societies offer tangible progress through self-moderating, mildly turbulent evolution. Thoughtful liberals refute the belief in the magical enlightenment of the leaders of the true believers after winning the final battle over their enemies. Power is far more likely to lead to corruption than to magical enlightenment. They also recognize that the need for sacrifice arises from unsatisfied needs. The wise temper sacrifice with prudence and romance with enlightenment.**”

were changed to:

“In modern times, most ritual deaths have been in support of illiberal **leaders, leaders who have** centralized decision-making **beyond what is prudent.** To compete **against** liberal societies, both in reality and in the hearts and minds of their subjects, **illiberal** leaders encourage sacrifice. The **worst** do so by promoting an apocalyptic vision of the future buttressed by a romantic vision of the past. **Apocalyptic visions** promise heaven

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

on earth for surviving true believers after they triumph over their enemies. *Visions of a past that never existed compete against liberal visions of a better future. Illiberal leaders push sacrifice over prudence and romance over enlightenment.*"

Chapter 3, thirteenth footnote

"This argument is based on a compressed amalgam of F. A. Hayek's *The Road to Serfdom* and Paul Berman's *Terror and Liberalism*. Hayek, a classical liberal economist, focuses on the practical problems of central planning that plague totalitarian regimes. Berman, a modern liberal intellectual, focuses on the cultural ideals of these regimes. Note that the classical liberal focuses on means and the modern liberal focuses on ends."

was changed to:

"Berman, Paul *Terror and Liberalism*, (New York: W.W. Norton & Company, 2003)."

Chapter 4, *Pleasure and Pain*, fifth paragraph, last sentence

"Finding pleasure in playing chess requires investing in how to play the game."

was changed to:

"Finding pleasure in playing chess requires investing in **knowledge of** how to play the game."

Changes in Versions 2004.02.04

Chapter 2, *Practical Wisdom and Moral Science*, third paragraph, end

Added the footnote:

"⁶ We can think about this complex interplay, which speculator and philanthropist George Soros calls "reflexivity," as the combination of two universal tendencies of normative intellectual models. The first is the tendency of normative models to become increasingly popular. This is due to their self-fulfilling nature. The second is their tendency to undermine the conditions that make them useful. This is due to their imperfections. When we apply these models repeatedly, they tend to lead us ever further away from ideal paths toward living good lives. (The "piling up" of intrinsic errors tends to pull us away from "attractors" that "emerge" from our teleonomic programming.) Model quality tends to vary directly with the first tendency and inversely with the second. This explains why speculative bubbles are the exception rather than the rule."

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Appendix, first paragraph, last two sentences

“Where Smith’s pin factory combined pre-industrial age technology with industrial age batch manufacturing organization and management, JIT combines industrial age batch manufacturing technology with something post-industrial. The joke is that economists cannot agree on **its** name, much less what makes it special.”

was changed to:

“Where Smith’s pin factory combined pre-industrial age technology with industrial age batch manufacturing organization and management, JIT/**Lean Manufacturing/Toyota Production System** combines industrial age batch manufacturing technology with something post-industrial. The joke is that economists cannot agree on **the system’s** name, much less what makes it special.”

Changes in Versions 2004.02.06

Chapter 4, Production

“**The marginalist concept of consumption is loosely based on utilitarian ethics. In contrast, the recursionist concept is based on humanistic ethical theories.** Humanistic ethics differs markedly from utilitarian ethics. From the **utilitarian** perspective, winning a fortune in the lottery will automatically lead to a good life, and so it is unequivocally good. From the **humanistic** view, it can be bad if the winner is foolish, as would be the case if the winner were an alcoholic who would use the money to pursue his or her self-destructive habit. Understanding **why this is** so requires a deeper understanding of pleasure and pain.”

was changed to:

“**The humanistic ethics of recursionist economics** differs markedly from **the utilitarian ethics of marginalist economics.** From the **marginalist** perspective, winning a fortune in the lottery will automatically lead to a good life, and so it is unequivocally good. From the **recursionist** view, it can be bad if the winner is foolish, as would be the case if the winner were an alcoholic who would use the money to pursue his or her self-destructive habit. Understanding **this difference** requires a deeper understanding of pleasure and pain.”

Chapter 4, Production

“**A well designed and implemented** production process produces **both** product and production technology.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Production processes produce useful knowledge as well as products. The wise plan to learn from experience.”

Chapter 4, Profit, first three sentences

“Profit is the result of processing inputs into outputs well. We profit by deciding wisely. The profits that we create by consuming wisely are just as real as those that we create by trading or producing wisely.”

were changed to:

“Profits are the result of acting wisely. The profits from consuming wisely are just as real as those from trading or producing wisely.”

Chapter 5, Introduction, second paragraph, fourth sentence

“Consumer prices would also rise as resources formerly used to produce consumer goods are diverted to the reallocation process.”

was deleted.

Chapter 5, Introduction, third paragraph

“This little thought experiment exposes the foolishness at the heart of macroeconomics. From the recursionist perspective, the problem is obvious: addressing strategic issues using the inherently tactical conceptual framework of marginalist economics is foolish. From the marginalist perspective, the problem is less obvious but no less real: measuring aggregate production is very difficult.”

was changed to:

“This little thought experiment exposes the foolishness of addressing strategic issues using the inherently tactical conceptual framework of marginalist economics. Mainstream economists do so because they believe that it is better to have a poor measure of aggregate production than none at all.”

Chapter 5, Introduction, fourth paragraph, first sentence

“There are two major technical problems in measuring aggregate production.”

was changed to:

“Economists face two major technical problems in measuring aggregate production.”

Chapter 5, Introduction, fourth paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “three thousand dollar” to “one thousand dollar.”

Chapter 5, Introduction, fifth paragraph

“The information revolution’s ever increasing potential for rapid learning exacerbates both of these measurement problems. Because people living good lives learn more rapidly than people living poor lives, efficiency in consumption is more important in economies with the potential for rapid learning than in economies without this potential. Focusing on efficiency in consumption requires viewing consumer goods and services as means to a good life rather than ends in themselves. Therefore, the problem of measuring inputs rather than outputs is universal. Worse, measuring the satisfaction of consumer needs is far more difficult than measuring the satisfaction of consumer wants, which economists are able to do by assuming that consumer preferences remain constant over the period under consideration.”

was changed to:

“Most mainstream economists recognize that the information age’s trend toward services exacerbates the first measurement problem and its trend toward ever higher quality exacerbates the second. Most do not recognize that its ever increasing potential for rapid learning worsens both. This is because people living good lives learn more rapidly than people living poor lives. Efficiency in consumption is more important in economies with the potential for rapid learning than in economies without this potential.

“Focusing on efficiency in consumption requires viewing consumer goods and services as means to a good life rather than ends in themselves. The problem of measuring inputs rather than outputs is universal. Worse, measuring the satisfaction of human needs is far more difficult than measuring the satisfaction of consumer wants.”

Changes in Version 2004.02.12

Acknowledgments, fifth paragraph, sixth sentence

“Gordon apparently recognized that my inability to produce the required term paper was more due to profound frustration and confusion than to sloth.”

was deleted.

Afterword, second paragraph, last two sentences

“My curt answer is that this question is not the most productive one to ask. These industrial age terms are not the best tools for thinking about information age politics.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“My curt answer is that these industrial age terms are not the best tools for thinking about information age politics.”

Afterword, third paragraph

“Most of us fail to recognize that economic and political problems are part of the infinitely large ethical problem of how we, intelligent beings living now and in the future, pursue happiness. Failing to consider this strategic problem tends to blind us to the possibility of finding better tactical problems to solve. This leads to foolish decision-making, which in turn increases economic and political turbulence. A strategic plan for solving this universal (global) ethical problem would help us progress with the least amount of turbulence. Such a plan has the potential to unite thoughtful Americans on both sides of the prevailing political divide.”

was deleted.

Afterword, new third paragraph, first two sentences

“To understand how this may happen, one first needs to understand the nature of the American political divide. Two academics, “liberal” linguist George Lakoff and “conservative” economist Thomas Sowell, provide **credible** explanations.”

was changed to:

“Two academics, “liberal” linguist George Lakoff and “conservative” economist Thomas Sowell, provide **partial** explanations **of the current political divide.**”

Afterword, new sixth paragraph, first two sentences

“Lakoff’s and Sowell’s **analyses** are not as disparate as they first appear. Liberals break down the universal problem into smaller pieces than conservatives do.”

was changed to:

“Lakoff’s and Sowell’s **explanations** are not as disparate as they first appear. Liberals break down the universal problem **of how we live good lives** into smaller pieces than conservatives do.”

Afterword, new seventh and eighth paragraphs

“The 2000 presidential election highlighted this conflict of visions. From the liberal perspective, it was enough that people tried to vote rather than that they succeeded in doing what was necessary for their vote to be counted by machine. Further, getting Gore elected justified changing the rules during the process and advocating “cherry-

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

picking” means for analyzing data that any reputable scientific journal would reject. In contrast, conservatives believed that voters who failed to follow instructions did not deserve to have their votes counted and that maintaining the integrity of the election process was more important than winning any election. Bush supporters were as upset at the prospect of measuring voter intent using post-election standards as Gore supporters were at losing the election due to legal technicalities.

“How is the information revolution affecting conservatives and liberals? As the pace of change increases, thoughtful conservatives are finding they have to think more, and more clearly, about ultimate ends. Thoughtful liberals are finding the world filled with ever more complex and amorphous problems. In both cases, the press of events is forcing people to consider the means and ends of problem-solving/decision-making more fully.”

were deleted.

Afterword, new seventh through ninth paragraphs

“The key to bridging the chasm between conservatives and liberals is to recognize the essential nature of the progressive dynamic responsible for the United States’ success. This complex dynamic involves decentralized decision-making (“masculine” means) and an ever more-inclusive concept of justice (increasingly “feminine” ends). In short, the United States owes its greatness to its citizens’ free pursuit of progress toward a good life for all.

“The free pursuit of progress creates knowledge useful in living good lives. Useful knowledge differs from other resources in that using it does not deplete it. Further, the cost of replicating most useful knowledge is far less than that of creating it. The useful knowledge we create benefits us, others around the world, and future generations. When used to displace scarce resources used by other species, it also benefits other species. Regrettably, putting new knowledge to use creates economic turbulence. The worse the quality of decision-making is, the worse this turbulence will be.”

“Recognizing this dynamic exposes problems on both sides of the current political divide. For liberals, the major problem is that this dynamic requires “masculine” means. An ultimate end based on reverence for life requires unending progress, hence unending turbulence. Thriving under these conditions requires “masculine” qualities. A nanny state that protects its charges by eliminating change shuts down the dynamic. This is unjust to our future selves, other societies, future generations, and other species.”

were changed to:

“We can bridge the chasm between conservatives and liberals by recognizing that the United States owes its greatness to its citizens’ free pursuit of progress toward a good life for all. The useful knowledge we create benefits us, others around the world, and

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

future generations. When used to displace scarce resources used by other species, it also benefits other species. Regrettably, putting new knowledge to use creates economic turbulence. The worse the quality of decision-making is, the worse this turbulence will be.

“Recognizing this dynamic **process** exposes problems on both sides of the current political divide. For liberals, the major problem is that **an** ultimate end based on reverence for life requires unending progress, hence unending turbulence. Thriving under **turbulent** conditions requires “masculine” qualities. A nanny state that protects its charges by eliminating change shuts down **progress**. This is unjust to our future selves, other societies, future generations, and other species.”

Afterword, new ninth paragraph, first sentence

“For conservatives, the major problem is that the dynamic continues only if each generation chooses increasingly inclusive ends.”

was changed to:

“For conservatives, the major problem is that the dynamic **process** continues only if each generation chooses increasingly inclusive (“**feminine**”) ends.”

Changes in Version 2004.02.14

Chapter 1, Modern Economics’ Blind Spot, seventh paragraph, first sentence

“**This** marginalist model of the setup procedure **implicitly** assumes that **we** do not learn through experience.”

was changed to:

“**Whether managers who use** this marginalist model of the setup procedure **recognize it or not, they** assume that **production team members** do not learn through experience.”

Chapter 3, *Divine Law*, first paragraph, last two sentences

“For example, the most simple and straightforward theories for explaining the creation of the universe **assume the existence of** a Creator. **Occam’s razor cuts both ways.**”

were changed to:

“For example, the most simple and straightforward theories for explaining the creation of the universe **include** a Creator.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 6, Conclusion, second paragraph, first sentence

Changed “assume” to “include the assumption.”

Chapter 7, first paragraph, last sentence

Changed “to satisfy” to “of satisfying.”

Afterword, third paragraph, third sentence

“Liberals want government to **treat citizens** like nurturing mothers **raise their children, while conservatives want governments to treat citizens** like strict **fathers raise theirs.**”

was changed to:

“Liberals want governments to **be more** like nurturing mothers **than** like strict fathers.”

Afterword, last paragraph

“**This tradition of freedom and progress is the essence of American idealism. Its supporters are those who seek to maintain the dynamic process that made the United States great (process conservatives). Its enemies are those who seek to gain government favors at the expense of progress (special interests), impose their vision on others (authoritarians), maintain the current state of the world for its own sake (state-of-the-world conservatives), and consider liberty an end in itself rather than a means to justice (libertarians).**”

was changed to:

“**Supporters of this tradition of freedom and progress (process conservatives) seek to maintain the dynamic process that made the United States great. Enemies of this tradition are those who seek to gain government favors at the expense of progress (special interests), impose their vision on others (authoritarians), maintain the current state of the world for its own sake (state-of-the-world conservatives), and consider liberty an end in itself rather than a means to justice (libertarians). *Wealth in the Information Age* is liberal progressive, classically liberal in means and progressive in ends.**”

Changes in Version 2004.02.16

Chapter 1, *Managerial Excellence in Means*, second paragraph, third through fifth sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Any behavior that does not fit their concept of efficiency is deemed to be “irrational” and any behavior that does fit this concept is deemed to be “rational.” Thus, “rational” people are those **that** are efficient at satisfying their wants. In contrast, we commonly use ‘wise’ to describe those people **that** are not only “rational,” but also want the “right” things.”

were changed to:

““Rational” people are those **who** are efficient at satisfying their wants. In contrast, we commonly use ‘wise’ to describe those people **who** are not only “rational,” but also want the “right” things.”

Chapter 6, Introduction, first paragraph, first two sentences

“The normative end of government is **administering** justice. From **the** recursionist perspective **put forth in this work**, government policy makers administer justice by deciding who makes what decisions under what incentives.”

were changed to:

“The normative end of government is justice. **A marginalist view of government tends to blind us to the possibility of increasing justice by increasing practical wisdom. Marginalist economics concerns self-interest, not ever more enlightened self-interest.**

“From **a decision-oriented** recursionist perspective, government policy makers administer justice by deciding who makes what decisions under what incentives.”

Afterword, first paragraph, fifth sentence

“When I discuss it with business and military leaders **that** topic is the importance of culture and strategic vision in “fast” organizations, especially the need to **improve Colonel John Boyd’s OODA (observation-orientation-decision-action) loop** performance with strategic asset building loops.”

was changed to:

“When I discuss it with business and military leaders, **the** topic **of interest** is the importance of culture and strategic vision in “fast” organizations, especially the need to **bolster** observation-orientation-decision-action (OODA) loop performance with strategic asset building loops.”

Afterword, fourth and fifth paragraphs

“In *A Conflict of Visions, Ideological Origins of Political Struggles*, Sowell describes the difference in terms of how each side views the size of problems relative to our human ability to solve them. **Liberals see the world filled with relatively simple**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

problems that are not being solved. Accordingly, they desire to give government officials who recognize the problems they see so clearly the power to solve them. In contrast, conservatives see the world filled with relatively complex and amorphous problems, which are best solved through decentralized decision-making. Consequently, they believe that markets and local governments provide better solutions than central governments.

“For example, several years ago there was a series of commuter airline crashes. Liberals asked why commuter airlines were not subject to the same regulations as major airlines. Conservatives asked a bigger question, would the additional regulatory burden proposed by the liberals save lives? The new regulations would make flying commuter airlines more expensive, which would cause some people to switch from flying to driving. Driving is much more dangerous than flying. Would more regulation result in more highway deaths than it saved by preventing airline crashes? Some conservatives ask an even larger question, is government regulation necessary?”

were changed to:

“In *A Conflict of Visions, Ideological Origins of Political Struggles*, Sowell describes the difference in terms of how each side views the size of problems relative to our human ability to solve them. Conservatives see the world filled with relatively complex and amorphous problems, which are best solved through decentralized decision-making. For example, several years ago there was a series of commuter airline crashes. Liberals asked why commuter airlines were not subject to the same regulations as major airlines. Conservatives asked a bigger question, would the additional regulatory burden proposed by the liberals save lives? The new regulations would make flying commuter airlines more expensive, which would cause some people to switch from flying to driving. Driving is much more dangerous than flying. Would more regulation result in more highway deaths than it saved by preventing airline crashes?”

Afterword, new sixth paragraph, second sentence

“The useful knowledge we create benefits us, others around the world, and future generations.”

was changed to:

“The useful knowledge that we create by pursuing this dynamic process benefits us, others around the world, and future generations.”

Changes in Version 2004.02.20

Preface, last paragraph, third to last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Today, the Toyota production system demonstrates the wisdom of pursuing the virtuous circle of increasing excellence in **consumption** and increasing excellence in **production and trade**.”

was changed to:

“Today, the Toyota production system demonstrates the wisdom of pursuing the virtuous circle of increasing excellence in **production and trade** and increasing excellence in **consumption**.”

Acknowledgments, sixth paragraph, first two sentences

“I would **also** like to thank Daniel Brophy, John Swanson, Patrika Vaughn, James Fox, and Jeanmarie Hendry for their unwavering enthusiasm and for criticizing countless drafts. **Finally**, I would like to thank the many others who have contributed to this work over the years.”

were changed to:

“I would like to thank Daniel Brophy, John Swanson, Patrika Vaughn, **Lucile Harris**, James **Rogers** Fox, and Jeanmarie Hendry for their unwavering enthusiasm and for criticizing countless drafts. I **also** would like to thank the many others who have contributed to this work over the years.”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph, third sentence

“However, **Newton’s discovery that calculating the trajectories of the earth, moon, and sun was practically impossible would have prevented us from** enshrining Newton’s theories as the sacred truth as Alexander Pope did when he wrote:

Nature and Nature’s laws lay hid in night:
God said, “Let Newton be!” and all was light.”

was changed to:

“However, **we would not have** enshrined Newton’s theories as the sacred truth as Alexander Pope did when he wrote:

Nature and Nature’s laws lay hid in night:
God said, “Let Newton be!” and all was light.”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph, third to last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Today, scientists recognize Newton’s “three body problem” to be a deterministic chaotic system. The universe is not as predictable as those who worshipped at Newton’s shrine believed it to be.”

was changed to:

“Today, scientists know that the universe is not as predictable as those who worshipped at Newton’s shrine believed it to be.”

Chapter 2, *Refining Recursionist Explanations*, title

Changed “*Explanations*” back to “*Theories*.”

Chapter 3, *Sacrifice versus Prudence*, second paragraph, fifth sentence

Changed “They” to “The wise.” Added paragraph break at the end of the sentence.

Chapter 4, *Trade*, last paragraph, last sentence

“Information age economies need people ruled by lucidity for their moral virtues as well as for their intellectual ones.”

was deleted.

Chapter 6, *Introduction*, second paragraph, first sentence

“From a decision-oriented recursionist perspective, government policy makers administer justice by deciding who makes what decisions under what incentives.”

was changed back to:

“From the recursionist perspective put forth in this work, government policy makers administer justice by deciding who makes what decisions under what incentives.”

Chapter 7, throughout

Changed “recursionist explanations” back to “recursionist theories.”

Chapter 7, first paragraph, second and third sentences

“To progress readily, we need recursionist theories, loose evolutionary explanations of means founded on teleonomic theories. Over time, we can tighten these loose explanations by discovering more about our needs and the best means of satisfying them.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“To progress readily, we need recursionist theories, **theories that produce** loose evolutionary explanations of means founded on teleonomic theories **of ends**. Over time, we can tighten **recursionist theories and the** explanations **they produce** by discovering more about our needs and the best means of satisfying them.”

Chapter 7, last paragraph, first sentence

Changed “recursionist theories” to “recursionist economics.”

Changes in Version 2004.02.25

Chapter 3, *Sacrifice versus Prudence*, first two paragraphs

“Mystics of many faiths believe that the temporal worldly end of mystical oneness with the infinite Being during life is necessary to achieve the ultimate end of mystical oneness with the infinite Being after life. Given this belief, a life well lived must include the temporal worldly end of mystical oneness. There is no logical conflict between achieving this temporal end and the normative end of revering life. Indeed, **they can** complement one another. However, there are practical conflicts between these potentially complimentary ends **in that they** compete for the same scarce resources.

“Some means of achieving mystical oneness sacrifice safety or health in order to economize on **other** scarce resources. Most successful religions include beliefs that serve to check these extreme means. Examples include the belief that (1) we have as many lifetimes as it takes to achieve mystical union, (2) we can achieve the ultimate end of existence in an existence after death (e.g., purgatory), and (3) we can achieve the ultimate end of existence through revering life as well as through the temporal end of mystical union. As Maslow observed, healthy religions balance the Dionysian (emotional) and Apollonian (reasonable) means to mystical experience.¹² **The wise seek life-affirming transformations prudently.**”

were changed to the following new paragraph:

“Mystics of many faiths believe that the temporal worldly end of mystical oneness with the infinite Being during life is necessary to achieve the ultimate end of mystical oneness with the infinite Being after life. Given this belief, a life well lived must include the temporal worldly end of mystical oneness.

“There is no logical conflict between achieving the temporal end **of mystical oneness** and the normative end of revering life. Indeed, these two ends **usually complement** one another. However, there are **very real** practical conflicts. **These two ends** compete for the same scarce resources.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Some means of achieving mystical oneness sacrifice safety or health in order to economize on scarce resources. Most successful religions include beliefs that serve to check these extreme means. Examples include the belief that (1) we have as many lifetimes as it takes to achieve mystical union, (2) we can achieve the ultimate end of existence in an existence after death (e.g., purgatory), and (3) we can achieve the ultimate end of existence through revering life as well as through the temporal end of mystical union. As Maslow observed, healthy religions balance the Dionysian (emotional) and Apollonian (reasonable) means to mystical experience.¹² *The wise seek life-affirming transformations prudently.*”

Chapter 3, *Sacrifice versus Prudence*, new sixth paragraph

“The decision to die heroically is far too important to be guided by ritual. Only fools and knaves **would** ritualize heroic death. We owe it to ourselves to understand the ignorance at the heart of all forms of ritual death.”

was changed to the following new paragraph:

“The decision to die heroically is far too important to be guided by ritual. Only fools and knaves ritualize heroic death. We owe it to ourselves to understand the ignorance at the heart of all forms of ritual death.”

Note: this paragraph had been deleted accidentally from the Adobe Acrobat versions of the work.

Changes in Version 2004.02.27

Acknowledgments, second paragraph, first sentence

“The second is the late Howard Sherman, former counterintelligence agent, philosophy professor, corporate executive, entrepreneur, and **business consultant.**”

was changed to the following new paragraph:

“The second is the late Howard Sherman, former **OSS** counterintelligence agent, philosophy professor, **Midas** executive, **Supercuts** entrepreneur, and **founder of the Santa Fe Center for Emergent Strategies.**”

Chapter 3, *Ultimate Normative Ends of Life*, first paragraph, second sentence, footnote

¹² Some humanists believe that this statement is self-evident. This is to say that we cannot imagine a case in which the ultimate normative end of human life is living a good life as defined by our internal programming is false. We don’t need to imagine

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

such a case. History is filled with examples of prophets claiming that achieving particular temporal ends is not only the best way but also the only way to live a good life. (Living a good life must include all temporal ends necessary to achieve the ultimate end of human existence.)”

was deleted.

Chapter 3, *Practical Benefits of Magical Mysticism*, seventh paragraph

The phrase, “to inquiry,” was deleted from the first sentence. This paragraph was appended to the sixth paragraph.

Chapter 3, *Practical Benefits of Magical Mysticism*, last paragraph

“Not all transformations in belief systems involving altered states of consciousness are spontaneous. Religious orders, cults, militaries, professional schools, graduate schools, and political re-education centers have long used altered states of consciousness to indoctrinate people. The indoctrination procedure consists of memorizing prescribed material, inducing an altered state of consciousness, and testing the resulting belief system. Inducing an altered state of consciousness strong enough to change belief systems requires breaking the stream of words that define normal consciousness. Techniques include the use of drugs, extreme fear, extreme fatigue, extreme pain, extreme (ecstatic) activity, deprivation, and meditation.”

was deleted.

Chapter 3, *Divine Law and Sacrifice versus Prudence*

Reversed order of these two subsections.

Changes in Version 2004.02.28

Chapters 1, 5, 7, and the Afterword

Changed “modern econ...” to “mainstream econ... .”

Chapters 1, *Managerial Excellence in Means*, second paragraph

Changed “marginalist economist” to “mainstream economist.”

Chapters 1, *Managerial Excellence in Means*, second paragraph, second to last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The “wise” choice is not to smoke, **which is an alternative that marginalist economics ignores.**”

was changed to:

“The “wise” choice is not to smoke.”

Chapter 2, *Theories produce predictions and explanations.*, fourth paragraph, last three sentences

“In contrast, explanations help us find better problems to solve. **In decision analysis terms, we use predictions to assign probabilities to uncertain events and explanations to help us draw decision trees.** Better predictions help us become more *efficient* and better explanations help us become more *effective*.”

was changed to:

“In contrast, explanations help us find better problems to solve, **which helps us formulate alternatives.** Better predictions help us become more *efficient* and better explanations help us become more *effective*.¹”

plus the footnote:

¹ **In decision analysis terms, better predictions improve the quality of a given decision tree structure and better explanations improve the structure of the decision tree.**”

Chapter 2, Refining Recursionist Theories, footnote 4

Changed “mainstream marginalist” to “mainstream.”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph, second sentence

Changed “mainstream (marginalist)” to “mainstream.”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph, third sentence

Changed “marginalist economics” to “mainstream economics.”

Chapter 3, Eliminating Unethical Theories, second paragraph

Inserted the paragraph:

“From the materialist perspective, our brains are like freestanding personal computers. Our minds stop functioning when our brains stop functioning. From the dualist perspective, our brains are like intelligent terminals connected to a computer network. Part of us continues after our brains stop functioning.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 3, *Ultimate Normative Ends of life*, third paragraph, third sentence

“Maslow referred to these either as “deficiency needs,” because a lack of the goods that satisfies these needs prevents us from being fully human, or as “becoming needs,” because they are the needs we feel as we are becoming fully human.”

was changed to:

“We feel these “becoming needs” when we are becoming fully human.”

Chapter 3, *Ultimate Normative Ends of Life*, fourth paragraph, second sentence

“He referred to this as “being needs,” because they are the needs that motivate “fully human” people.””

was changed to:

“We feel these “being needs” only after we have become fully human.”

Chapter 3, *Ultimate Normative Ends of Life*, fourth paragraph, third sentence

“He found that these people seek to make the most of their talents in pursuit of goals that concern the transcendent values of truth, beauty, and the good (justice).”

was changed to:

“He found that these people seek to make the most of their talents in pursuit of goals that concern such transcendent values as truth, beauty, and goodness.”

Chapter 3, *Ultimate Normative Ends of Life*, fifth paragraph

“By definition, human needs are universal, which is to say that they are independent of belief. Maslow recognized the role of belief in satisfying “being needs,” but ignored its role in satisfying “becoming needs.” Belief actually plays a role in satisfying even the most basic needs: the belief that one is in mortal danger can lead to panic, which increases the need for oxygen. Belief plays a relatively small part in satisfying physiological needs, a larger one in satisfying mental needs, and a major role in satisfying spiritual needs. In general, the higher (less immediate) the need, the more important the role of belief is in satisfying it.”

was changed to:

“By definition, human needs are universal, which is to say that their existence is independent of belief. This is not to say that they are independent of belief. Belief plays a role in satisfying our most basic physical needs: the belief that we are in mortal danger may lead to panic, which increases our need for oxygen. Belief plays a larger

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

role in satisfying our mental needs and a major role in satisfying our spiritual needs. In general, the higher (less immediate) the need, the more important the role of belief is in satisfying it.”

Chapter 3, *Ultimate Normative Ends of Life*, eleventh paragraph, last sentence

“It is this need that Maslow’s self-actualizers seek to satisfy when they seek the transcendent values of the truth, beauty, and the good.”

was changed to:

“It is this need that Maslow’s self-actualizers seek to satisfy when they seek truth, beauty, and goodness.”

Chapter 3, *Practical Benefits of Magical Mysticism*, third paragraph, last sentence

Changed “practical benefit of magical mysticism” to “practical benefit.”

Chapter 3, *Practical Benefits of Magical Mysticism*, seventh paragraph

“We experience this elevation in consciousness when we laugh at a joke that plays on inconsistencies in our belief systems, especially when they play on underlying concepts. We laugh when a child asks why freedom fighters fight freedom. We also laugh when the three stooges throw away artwork described as being priceless because they confuse being priceless with being worthless. This laughter briefly lifts us out of our normal state of consciousness. Chan (Zen) Buddhist masters have long used this insight to elevate the consciousness of their students in the hope of triggering enlightenment.”

was changed to:

“We experience this elevation in consciousness when we laugh at jokes that play on inconsistencies in our conceptual frameworks. We laugh when a child asks “Why do freedom fighters fight against freedom?” We also laugh when the three stooges throw away “a priceless vase” because they confused being priceless with being worthless. Chan (Zen) masters have long told such jokes to their students in the hope of stopping the stream of words that defines normal consciousness.”

Chapter 3, *Sacrifice versus Prudence*, second paragraph, last sentence

“These two ends compete for the same scarce resources.”

was changed to:

“The temporal end of mystical oneness and normative end of reverence for life compete for scarce resources, especially for time.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3, *Sacrifice versus Prudence*, third paragraph, last sentence

“*The wise seek life-affirming transformations prudently.*”

was deleted.

Chapter 3, *Sacrifice versus Prudence*, sixth and seventh paragraphs

These two paragraphs were merged.

Chapter 3, *Sacrifice versus Prudence*, footnote 10

Changed “1962” to “2003.”

Changes in Version 2004.03.01

Chapter 4, Trade, third paragraph

Inserted the subtitle “*Trust.*”

Chapter 4, *Three Common Misbeliefs*, first paragraph, second through fourth sentences

“The most important of these is the belief that the means of trade **cannot be improved**. This **cultural blindness was evident in many early American attempts to adopt the Toyota Production System**. Most American manufacturers perceived **this** system as a collection of techniques for minimizing WIP inventory.”

were changed to:

“The most important of these is the belief that **we cannot improve** the means of trade. This **belief tends to blind us to the potential of improving the means of trade. Failing to see this potential in turn tends to blind us to other means of increasing excellence in means. For example, most American manufacturers originally perceived the Toyota Production System not as a learning-by-doing strategy but rather** as a collection of techniques for minimizing WIP inventory.”

Chapter 4, *Three Common Misbeliefs*, first paragraph, last sentence

“The Toyota system is much more than **simply** minimizing WIP inventories.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The Toyota system is much more than a collection of techniques for minimizing WIP inventories.”

Chapter 4, *Three Common Misbeliefs*, second through fifth paragraphs

Switched the second and third common misbeliefs by moving these paragraphs to the end of the subsection and renumbering the misbeliefs in first sentence of the new second and new fourth paragraphs.

Chapter 4, *Three Common Misbeliefs*, new sixth paragraph, first two sentences

“In business as in sports, competition creates the need to increase useful knowledge. For example, consumers in the former Soviet Union wasted billions of hours annually in stores that made them stand in line three times to make a purchase: once to select an item, a second time to pay for it, and a third to collect it.”

were changed to:

“In business as in sports, competition often increases cooperation: Consumers in the former Soviet Union wasted billions of hours annually in stores that made them stand in line three times to make a purchase: once to select an item, a second time to pay for it, and a third to collect it.”

Chapter 4, *Three Common Misbeliefs*, new last paragraph

“The relationship between competition and cooperation suggests that a good way to achieve greater cooperation is to promote competition. We see this when people in firms under competitive pressure pull together. It also suggests that decreasing competition leads to a breakdown in cooperation, as happens when firms that come to dominate their industry become bureaucratic.”

was deleted.

Chapter 5, *A Simple Model of Progress and Turbulence*, last paragraph, end

Added the sentence:

“We ought to learn to thrive in winds and survive in gales of creative destruction.”

Changes in Version 2004.03.03

Acknowledgments, second paragraph, last sentence

Changed “Great Books’ humanism” to “self-evident truth.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 1, Modern Economics' Blind Spot, fourth paragraph, second sentence

Changed “In mainstream economics” to “In mainstream (Neoclassical) economics.”

Chapter 2, footnote 7, last two sentences

“(The “piling up” of intrinsic errors tends to pull us away from “attractors” that “emerge” from our teleonomic programming.) Model quality tends to vary directly with the first tendency and inversely with the second. This explains why speculative bubbles are the exception rather than the rule.”

were changed to:

“Lao Tzu wrote: “The Way that can be known is not the true Way. / The Way that can be walked is not the everlasting Way.” In chaos theory terms, the “piling up” of intrinsic errors tends to pull us away from “attractors” that “emerge” from our teleonomic programming. Model quality tends to vary directly with the first tendency and inversely with the second. This explains why **large** speculative bubbles are the exception rather than the rule.”

Chapter 3, *Ultimate Normative Ends of Life*, fifth paragraph, first two sentences

“By definition, human needs are universal, which is to say that *their existence is independent of belief*. This is not to say that *they are independent of belief*. Belief plays a role in satisfying our most basic physical needs: the belief that we are in mortal danger may lead to panic, which increases our need for oxygen.”

were changed to:

“Belief plays a role in satisfying **even** our most basic human needs: the belief that we are in mortal danger may lead to panic, which increases our need for oxygen.”

Chapter 3, *Practical Benefits of Magical Mysticism*, last four paragraphs

“The experience **of the transcendent state** of mystical oneness **by means of magical mysticism** may result in a more integrated, coherent, and useful belief system. **This more useful belief system may in turn result in a permanently higher state of being.**

“We commonly associate this **sort of change in belief system** with **spontaneous religious conversions in which the transcendent experience precedes the change in beliefs**. These experiences raise thorny metaphysical issues concerning revealed truth, which make them relatively inaccessible to inquiry. More accessible are **major epiphanies in which the changes in beliefs precede or accompany transcendent experience**. The classic example is the exhilaration Archimedes felt upon **understanding the relationship between the volume of his body, the volume of water displaced by his body, and the density of his body relative to that of water**. These

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

major epiphanies raise **the question of whether a small change in beliefs elevates consciousness, which in turn triggers further changes in beliefs.**

“We experience this elevation in consciousness when we laugh at jokes that play on inconsistencies in our conceptual frameworks. We laugh when a child asks “Why do freedom fighters fight against freedom?” We also laugh when the three stooges throw away “a priceless vase” because they confused being priceless with being worthless. **Chan (Zen) masters have long told such jokes to their students in the hope of stopping the stream of words that defines normal consciousness.**

“If changes in belief systems, especially in the meaning of concepts, elevate consciousness and the increased clarity and energy of elevated consciousness encourages further changes in beliefs, then it may be useful to think of major epiphanies as avalanches that release stress within belief systems. Changing a single anomaly in a belief system rife with anomalies may trigger massive changes.”

were changed to:

“Further, the experience of mystical oneness may result in a more integrated, coherent, and useful belief system. We commonly associate these experiences with religious conversions. More amenable to analysis are epiphanies triggered by worldly events, e.g., Archimedes’s interrupted bath. Such epiphanies raise many questions about the complex interplay of changes in belief systems, world-view, and consciousness.”

“Changes in belief systems, especially in the meaning of concepts, can elevate consciousness. We experience this elevation in consciousness when we laugh at jokes that play on inconsistencies in our conceptual frameworks. We laugh when a child asks “Why do freedom fighters fight against freedom?” We also laugh when the three stooges throw away a priceless vase because they confused being priceless with being worthless. The increased clarity and energy of elevated consciousness can trigger further changes in beliefs. Thus, a small event can trigger an avalanche of change that produces the illusion of being magically transported to a new world.”

Changes in Version 2004.03.05

Chapter 1, Mainstream Economics' Blind Spot, fifth paragraph, first sentence

Changed “**this marginalist model of the setup procedure**” to “**the EOQ model.**”

Chapter 2, Refining Recursionist Theories, end

Added the footnote:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“⁷ Pragmatists focus on means. Idealists define ultimate ends. Pragmatic idealists refine ultimate ends.”

Chapter 2, Practical Wisdom and Moral Science, third paragraph, third sentence

Changed “our intellectual models” to “these models.”

Chapter 3, Eliminating Unethical Theories, first paragraph, third sentence

Changed “all of our elements” to “all parts of us.”

Chapter 3, *Ultimate Normative Ends of Life*, fourth paragraph, first sentence

Changed “Belief plays” to “Our beliefs about reality play.”

Chapter 3, *Ultimate Normative Ends of Life*, fourth paragraph, second sentence

Changed “Belief plays” to “Our beliefs play.”

Chapter 3, *Ultimate Normative Ends of Life*, fourth paragraph, third sentence

Changed “the role of belief is ” to “our beliefs are.”

Chapter 3, *Practical Benefits of Magical Mysticism*, first paragraph, second sentence

Changed “Schweitzer” to “he.”

Chapter 3, *Practical Benefits of Magical Mysticism*, first paragraph, last sentence

“We also see this in Islam with the withering away of Sufism over the last several hundred years.”

was changed to

“In Islamic thought, we see this trend in the withering away of Sufism.”

Chapter 3, *Practical Benefits of Magical Mysticism*, second paragraph, first sentence

Changed “are likely to interpret” to “interpret.”

Chapter 3, *Practical Benefits of Magical Mysticism*, last paragraph, last sentence

“Thus, a small event can trigger an avalanche of change that produces the illusion of being magically transported to a new world.”

was changed to

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Thus, a small event can trigger an avalanche of change that produces the illusion of being magically transported to a new **mental** world. **This magical process involves suspending the stream of words that rivets our consciousness to our mental worlds.**”

Chapter 3, *Sacrifice versus Prudence*, first paragraph, last sentence

Changed “temporal **worldly** end” to “temporal end.”

Chapter 6, *Sacrifice versus Prudence*, first paragraph, last sentence

Changed “Recursionist **monetary policy seeks**” to “Recursionists **seek.**”

Changes in Version 2004.03.08

Chapter 4, *Pleasure and Pain*, first paragraph, fourth through seventh sentences

“**Some pleasurable activities are bad and some painful activities are good for us. Gluttony is pleasurable but unhealthy, and learning to perform a good activity is often painful. Further, activities that are good are not always pleasurable and activities that are bad are not always painful. Exercise is often boring and exposure to too much sunshine is not immediately painful.**”

was changed to

“**For example,** exposure to too much sunshine is not immediately painful.”

Chapter 4, *Pleasure and Pain*, second paragraph, second and third sentences

Changed “acting” to “an activity.”

Chapter 4, *Pleasure and Pain*, third paragraph, second to last sentence

“Complete pleasure-in-acting, **total involvement in activity, is** ecstasy.”

was changed to

“Complete pleasure-in-acting, ecstasy, **is a matter of completely losing ourselves in activity.**”

Chapter 4, *Pleasure and Pain*, fifth paragraph, fourth sentence

“Deriving pleasure from other activities can require making **an** investment in **training,** material goods, **or learning.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to

“Deriving pleasure from other activities can require making investments in **knowledge** or material goods.”

Chapter 4, *Practical Wisdom*, first paragraph, first sentence

Changed “well **spent**” to “well **lived**.”

Chapter 4, *Pleasure and Pain*, second paragraph

“Like other forms of useful knowledge, practical wisdom is an inexhaustible resource. Like most other forms of human knowledge, using it enhances it. We develop and reinforce the habit of acting wisely by acting wisely.”

was deleted.

Chapter 4, *Practical Wisdom*, third through tenth paragraphs

“To understand what practical wisdom is and how we can develop it, we must know something about how we process information. We receive, store, manipulate, and use information. We receive information through our perceptual and motor senses; store it as experiential memories, motor skills, and conceptual beliefs; manipulate it through pattern recognition and logic; and use it in acting and communicating.

“We process information using both intellect and sense. Intellect concerns manipulating concepts; sense concerns all other information processing. Intellect includes logic, conceptual intuition, conceptual memory, and language. Sense includes perception, perceptual (experiential) memory, perceptual intuition, motor sense, motor memory, motor intuition, and non-language forms of communication.

“Our five senses receive information about the world and interpret this information through perceptual pattern recognition. When we sense something lightly touching us, we recognize the pattern of sensation as a twig, clothing, or an insect. We learn to recognize such patterns of sensations through experience. Perceiving is partly conscious and partly unconscious. If we concentrate on perceiving, we can become more conscious of what we perceive, but we can never be conscious of how we perceive.

“We store memories and emotions in perceptual memory. Perceptual intuition recognizes patterns in perceptions and memory. It is also partly conscious and partly unconscious. We can be conscious of those similarities that create patterns, but we can never be fully conscious of how we recognize them. Our motor sense initiates action and our motor and perceptual senses provide necessary feedback to control our actions. We learn to initiate and control most actions. Acting is also partly conscious and partly unconscious. We can be conscious of willing to act and of acting, but we

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

can never be fully conscious of how we initiate or control our actions. Our knowledge of how to act is stored as motor skills in memory. Motor intuition recognizes patterns in sensations and memory to allow us to combine motor skills in new ways. Again, we can never be fully conscious of how our motor intuition combines existing skills into new ones.

“We store conceptual information as beliefs. We link individual beliefs together to form structures of related beliefs, and these structures form a complex system of beliefs. An individual belief may or may not be empirically true. A belief is empirically true if it accurately corresponds to our sense experiences.

“We manipulate concepts by applying logical rules. Reasoning includes theorization, deduction (logical deliberation), and logical judgment. To theorize is to build conceptual models; to deduce is to draw conclusions from such models; and to judge logically is to decide whether to accept a model or belief by using rules for judging these things. Unlike other human information processing, reasoning can be a completely conscious process. We are usually conscious of how we use rules to manipulate concepts and can demonstrate this process to others.

“We also manipulate concepts by recognizing patterns. Conceptual intuition includes induction, intuitive deliberation, and intuitive judgment. Induction is the creation of universals from particulars through pattern recognition. Intuitive deliberation is the process of selecting the best conceptual model for logical deliberation. Intuitive judgment is deciding whether to accept a model or belief based on whether it fits our belief system. If a model’s conclusion or a belief does not fit our belief system, we use conceptual intuition to discover why it does not fit.

“We also manipulate concepts by recognizing patterns. Conceptual intuition includes induction, intuitive deliberation, and intuitive judgment. Induction is the creation of universals from particulars through pattern recognition. Intuitive deliberation is the process of selecting the best conceptual model for logical deliberation. Intuitive judgment is deciding whether to accept a model or belief based on whether it fits our belief system. If a model’s conclusion or a belief does not fit our belief system, we use conceptual intuition to discover why it does not fit.”

were deleted.

Chapter 4, *Pleasure and Pain*, new third paragraph, second sentence

“There are three basic means of choosing ends and means wisely: deliberation, decision rules, and discipline.”

was changed to

“There are three basic means of choosing ends and means wisely: (1) deliberation, (2) decision rules, and (3) discipline.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 4, *Deprivation and Practical Wisdom*

Deleted title. Appended paragraph to preceding subsection.

Chapter 4, *Pursuing Happiness*, title

Changed “*Pursuing Happiness*” to “*Two Means of Pursuing Happiness.*”

Chapter 4, *Two Means of Pursuing Happiness*, first two paragraphs

“Pursuing happiness is a matter of satisfying our needs justly and efficiently over our lifetimes. Aristotle and Spinoza provide us with two different means of doing this. Where Aristotle asks us to look for practical wisdom in the example of others, Spinoza asks us to look into ourselves.

“Aristotle believed that moral virtue concerns the habit of wanting the right things. He determined moral virtue by examining the characteristics of the wise and defined these in terms of emotions or actions. Associated with all except curiosity are one virtue and two vices. The virtue is having the proper amount of the characteristic, while the vices are having either too little or too much. From the emotion of confidence stems the virtue of courage and the vices of cowardice and recklessness. Similarly, from the act of giving stems the virtue of generosity and the vices of stinginess and extravagance. We develop moral virtue by acting as if we want the right things, thereby developing the habit of wanting them.”

were changed to

“Aristotle and Spinoza provide us with different means of pursuing happiness. Aristotle asks us to look for moral virtue in others. Spinoza asks us to look into ourselves.

“Aristotle believed that moral virtue concerns the habit of wanting the right things, which we develop by acting as if we want the right things. He determined moral virtue by examining the characteristics of the wise. He defined these characteristics in terms of emotions or actions. With one exception, he associated each of these characteristics with one virtue and two vices. The virtue is having the proper amount of the characteristic. The vices are having either too little or too much. The emotion of confidence yields the virtue of courage and the vices of cowardice and recklessness. The action of sharing yields the virtue of generosity and the vices of stinginess and extravagance. The exception is to this “golden mean” rule is curiosity: Aristotle believed that we can never have too much knowledge.”

Chapter 4, *Two Means of Pursuing Happiness*, fourth paragraph, first sentence

Changed “approach to happiness” to “means of pursuing happiness.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 4, *Two Means of Pursuing Happiness*, fourth paragraph, last sentence

Changed “its Einsteins” to “the world’s Einsteins.”

Chapter 4, *Alternatives to Pursuing Happiness*, second paragraph, first three sentences

“Those who pursue nothing more or less satisfy their needs by following their traditions or leaders. Their behavior may be due to ignorance, sloth, cowardice, or illness. Because they do not often consider whether their actions are just or efficient, they tend to develop even less practical wisdom than do those who pursue pleasure.”

were changed to

“Those who pursue nothing blindly follow their traditions or leaders. Because they seldom consider whether their actions are just or efficient, they tend to develop even less practical wisdom than do those who pursue pleasure.”

Chapter 4, *Alternatives to Pursuing Happiness*, last paragraph

“We can also see this distinction in Taoism. Here, yin corresponds to dark inertia (pleasure-in-being / joy); yang corresponds to passion (pleasure-in-acting / pleasure); and the balance of yin and yang corresponds to lucidity (pursuing the virtuous circle of pleasure and joy).”

was changed to

“We can also see this distinction in Taoism: yin corresponds to pleasure-in-being (dark inertia); yang corresponds to pleasure-in-acting (passion); and the balance of yin and yang corresponds to pursuing happiness (lucidity).”

Chapter 4, *Trade*, second paragraph, last sentence

“In general, the shorter or more uncertain the expected life of the trading relationship, the more attractive fluid (low fixed cost) relationships will be.”

was changed to

“In general, the shorter or more uncertain the expected life of the trading relationship, the more attractive low fixed cost relationships will be.”

Chapter 4, *Production*, end

Added the sentence:

“(See Appendix: The Toyota System.)”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 5, Introduction, fifth paragraph, last two sentences

“This is because **people living good lives learn more rapidly than people living poor lives**. Efficiency in consumption is more important in economies with the potential for rapid learning than in economies without this potential.”

were changed to

“This is because **efficiency** in consumption is more important in economies with the potential for rapid learning than in economies without this potential. **The better people live, the faster they tend to learn.**”

Chapter 5, Introduction, seventh paragraph, last sentence

“**In recursionist terms**, they discourage progress from increasing excellence in means.”

was changed to

“**T**hey discourage progress from increasing excellence in means.”

Chapter 5, Increasing Excellence, second paragraph, last sentence

“However, we can predict that increasing the flow of information will tend to increase the amount of knowledge usefully applied.”

was deleted.

Chapter 5, Economic Viscosity, second paragraph, first sentence

Changed “concepts” to “**moral vision (and related concepts)**.”

Chapter 5, Economic Viscosity, fourth paragraph, last sentence

Changed “Keynes’s” to “**John Maynard** Keynes’s.”

Chapter 6, Decentralization, first paragraph, first sentence

Changed “efficiently” to “wisely.”

Chapter 6, *Control the Money Supply Passively*, last paragraph, last sentence

Changed “Recursionists” to “The just.”

Chapter 6, Free Association, second paragraph, second sentence

Changed “Bentham’s ideal” to “Bentham’s **utilitarian** ideal.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 6, Free Association, third paragraph, end

Added the following footnote:

“This question ought to be of particular interest to leaders of traditional cultures. Is it possible to skip the hedonistic stage of development? If so, is it wise to discourage lucid ideas from other cultures?”

Chapter 6, Conclusion, first paragraph, second sentence

“We can see this distinction in manufacturing, where those who see inventory control in terms of the EOQ model favor centralized production control (e.g., MRP systems) and those who see it in terms of the rapid tool-setting model favor decentralized control (e.g., the Toyota Production System).”

was changed to

“We can see this distinction in manufacturing, where those who see inventory control in terms of the EOQ model favor **highly** centralized production control (e.g., MRP systems) and those who see it in terms of the rapid tool-setting model favor **more** decentralized control (e.g., the Toyota Production System).”

Appendix, *Traditional Manufacturing Systems*, sixth paragraph, first sentence

Changed “two major advantages,” to “two major advantages:.”

Appendix, *Good People*, third point, first sentence

Changed “setup” to “establish.”

Appendix, footnote 7

“A production possibility frontier is **an** output hyperspace **map of** the most efficient use of a given set of production inputs.”

was changed to

“A production possibility frontier is **the production** output hyperspace **surface defined by** the most efficient use of a given set of production inputs.”

Changes in Version 2004.03.10

Chapter 3, *Ultimate Normative Ends of Life*, ninth paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “life of pleasure” to “life filled with pleasurable activity.”

Chapter 3, *Ultimate Normative Ends of Life*, fourth paragraph, fourth sentence on

“He found that these people seek to make the most of their talents in pursuit of goals that concern such transcendent values as truth, beauty, and goodness. Maslow described this as self-actualizing behavior. He recognized that because his subjects were all products of modern Western civilization, his conclusions were not universal. People living in other cultures could have very different means of satisfying these illusive needs.”

were changed to

“All of his subjects were the products of modern Western culture. Maslow found that these wise modern Westerners “self-actualize,” by which he meant that they seek to make the most of their talents in pursuit of goals that concern such transcendent values as truth, beauty, and goodness. Maslow recognized that his conclusions were not universal: the wise of other cultures could have very different means of satisfying these illusive spiritual needs.”

Chapter 3, *Eliminating Simplistic Theories*, ninth paragraph, second sentence

Changed “mask” to “mask (forget).”

Chapter 4, *Pleasure and Pain*, second paragraph, third sentence

Changed “pleasure in being” to “pleasure.”

Chapter 4, *Pleasure and Pain*, fourth paragraph, end

Inserted the ninth paragraph after deleting the first word of the first sentence (“Further,”):

“Finding pleasure in an activity can improve the performance of that activity. Becoming absorbed in swimming can help competitive swimmers swim faster. Performance usually suffers when something painful, such as a sore shoulder, interferes with becoming absorbed in swimming. Similarly, becoming absorbed in thinking makes it easier to solve problems. We are usually less able to solve a problem if something painful, such as a headache, impedes losing ourselves in thinking.”

Chapter 4, *Pleasure and Pain*, sixth paragraph, second sentence

“Common pleasures come from activities that require common capabilities, material goods, and knowledge.”

was changed to:

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

“Common **pleasurable activities** require common capabilities, material goods, and knowledge.”

Chapter 4, *Pleasure and Pain*, seventh paragraph, third sentence

“Pleasure-in-being ranges from relief to bliss.”

was changed to:

“Pleasure-in-being, **which we commonly call "joy,"** ranges from relief to bliss.”

Chapter 4, *Pleasure and Pain*, new seventh paragraph, end

Inserted the subsection title “*Vicious and Virtuous Circles*.”

Chapter 4, *Vicious and Virtuous Circles*, first paragraph, second sentence

Changed “forget (mask)” to “mask.”

Chapter 4, *Vicious and Virtuous Circles*, first paragraph, last sentence

Changed “instead of” to “rather than.”

Chapter 4, *Vicious and Virtuous Circles*, third paragraph, last sentence

Changed “performing activities” to “performing **pleasurable** activities.”

Chapter 4, *Vicious and Virtuous Circles*, last paragraph, first two sentences

“Thus, there exists a potential virtuous circle of pleasure-in-acting (“**pleasure**”) and pleasure-in-being (“**joy**”): learning to find pleasure in activities that are good for us encourages us to do these activities, which in turn gives us the potential to do more. Pursuing this virtuous circle increases not only pleasure and **joy** but also our abilities, knowledge, and non-knowledge goods.”

were changed to:

“Thus, there exists a potential virtuous circle of pleasure-in-acting and pleasure-in-being: learning to find pleasure in activities that are good for us encourages us to do these activities, which in turn gives us the potential to do more. Pursuing this virtuous circle increases not only pleasure-**in-acting** and **pleasure-in-being** but also our abilities, knowledge, and non-knowledge goods.”

Chapter 4, *Practical Wisdom*, second and third paragraphs

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Switched order of the second (three means of deciding) and third (deprivation) paragraphs.

Chapter 4, *Two Means of Pursuing Happiness*, fourth paragraph, second sentence

Changed “pleasure’s ability” to “pleasure-*in-acting*’s ability.”

Chapter 4, *Alternatives to Pursuing Happiness*, first paragraph

“The two major alternatives to pursuing happiness are pursuing pleasure and pursuing nothing. Like the wise, those who pursue pleasure (hedonists) understand that satisfying their needs increases their ability to pursue pleasure. Unlike the wise, they become attached to their pleasures and so break the virtuous circle of pleasure and joy. In economic parlance, they are happiness “satisficers” rather than “maximizers.” Because they often choose to mask the pain of being with pleasure, they are vulnerable to the vicious circle of compulsive behavior, which is habitually responding to a need with an activity that fails to satisfy it.”

was changed to:

“The two major alternatives to pursuing happiness are pursuing pleasurable activities and pursuing nothing. Like the wise, those who pursue pleasurable activities (hedonists) understand that satisfying their needs increases their ability to pursue pleasurable activities. Unlike the wise, they become attached to their pleasurable activities and so break the virtuous circle of pleasure-*in-acting* and *pleasure-in-being*. In economic parlance, they are happiness “satisficers” rather than “maximizers.” Because they often choose to mask pain-*in-being* with pleasure-*in-acting*, they are vulnerable to the vicious circle of compulsive behavior, which is habitually responding to a need with an activity that fails to satisfy it.”

Chapter 4, *Alternatives to Pursuing Happiness*, second paragraph, second sentence

Changed “do those who pursue pleasure” to “hedonists do.”

Chapter 4, *Alternatives to Pursuing Happiness*, last two paragraphs

“This distinction between pursuing happiness, pleasure, and nothing is more than a relic of Western civilization. In the Hindu tradition, the Sāṃkhya doctrine of the three gunas recognizes that all living things are mixtures of the qualities of lucidity (*sattva*), passion (*rajas*), and dark inertia (*tamas*). When lucidity prevails, we pursue happiness; when passion prevails, we pursue pleasure; and when dark inertia prevails, we pursue nothing.

“We can also see this distinction in Taoism: yin corresponds to pleasure-*in-being* (*dark inertia*); yang corresponds to pleasure-*in-acting* (*passion*); and the balance of yin and yang corresponds to pursuing happiness (*lucidity*).”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

were changed to:

“This distinction between pursuing happiness, **pursuing pleasurable activity**, and **following traditions or leaders** is more than a relic of Western civilization. In the Hindu tradition, the Sāmkhya doctrine of the three gunas recognizes that all living things are mixtures of the qualities of **sattva (lucidity)**, **rajas (passion)**, and **tamas (dark inertia)**. When lucidity prevails, we pursue happiness; when passion prevails, we pursue **pleasurable activity**; and when dark inertia prevails, we pursue nothing.

“We see **compatible** distinction in Taoism: yin corresponds to **pursuing** pleasure-in-being (**joy**); yang corresponds to **pursuing** pleasure-in-acting (**pleasurable activity**); and the balance of yin and yang corresponds to pursuing happiness (**a life well lived**).”

Chapter 4, *Human Capital, Work, and Leisure*, second paragraph, second sentence

Changed “pleasure and **joy**” to “pleasure-**in-acting** and **pleasure-in-being**.”

Chapter 6, *Free Association*, first paragraph, second sentence

“When lucidity prevails, we pursue happiness; when passion prevails, we pursue pleasure; and when dark inertia prevails, we **accept our current circumstances and pursue nothing**.”

was changed to

“When lucidity prevails, we pursue happiness; when passion prevails, we pursue **pleasurable activity**; and when dark inertia prevails, we **follow our traditions or leaders**.”

Chapter 6, *Free Association*, first paragraph, second sentence

Changed “**seeking** pleasure” to “**pursuing pleasurable activity**.”

Chapter 7, second paragraph, second sentence

Changed “help evaluate” to “help us evaluate.”

Changes in Version 2004.03.11

Chapter 1, *Managerial Excellence in Means*, last paragraph, second to last sentence

Changed “efficient” to “rational” and “efficient and effective” to “wise.”

Chapter 1, *The Recursionist Strategy*, fourth paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“From this perspective, waste is a regrettable by-product of learning through experience.”

was changed to

“Given a learning attitude, waste is a regrettable by-product of learning through experience.”

Chapter 2, Refining Recursionist Theories, last paragraph, first sentence

Inserted a the following sentences:

“Pragmatists focus on means. Idealists define ultimate ends. Pragmatic idealists refine ultimate ends:”

Chapter 2, Refining Recursionist Theories, last paragraph, end

Deleted the following footnote:

“Pragmatists focus on means. Idealists define ultimate ends. Pragmatic idealists refine ultimate ends.”

Chapter 3, *Divine Law*, third paragraph, fourth sentence

Changed “efficiently” to “ever more efficiently.”

Chapter 6, *Consider the Justice of Interventions*, first paragraph, last sentence

Changed “to prescribe just” to “to prescribe just behavior.”

Chapter 6, *Consider the Justice of Interventions*, last paragraph, first sentence

“Second, unjust or ineffective interventions tend to benefit a few greatly and harm the majority little.”

was changed to

“Second, unjust interventions tend to benefit a few people greatly and to harm many people only a little.”

Chapter 6, Just Taxation, fifth paragraph, last sentence

“Rather than demanding that governments redistribute income or wealth (per se), we ought to demand that governments encourage wise consumption.”

was changed to

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Unfortunately, humans are not as lucid as angels. This does not mean that we ought to demand that governments redistribute income or wealth, which would be an unwarranted centralization of decision-making authority. Rather we ought to demand that governments encourage us to become ever more lucid.”

Changes in Version 2004.03.15

Chapter 2, Refining Recursionist Theories, fifth paragraph, first sentence

Changed “provides the rationale for” to “supports.”

Chapter 2, Practical Wisdom and Moral Philosophy, second paragraph

“One of the most valuable results of this ongoing human research program was the invention of science. Science competes with mystical revelation in providing us with objective truth, which some describe as a God’s eye view of the universe. **Scientists’ goal of discovering the objective truth has supported testing all theories by how well they predict.** Over the centuries the means of testing **predictions** has evolved. The earliest scientists tested simple systems using nothing more than their unaided senses and common sense. Later scientists invented **both** tools to enhance their senses (microscopes, telescopes, particle accelerators, **etc.**) **and** tools to enhance their common sense (calculus, statistics, computer simulation, **etc.**).”

was changed to:

“One of the most valuable results of this ongoing human research program was the invention of science. **Science provides us with proven knowledge useful in living good lives. Many scientists believe that it also provides us with objective truth, which some describe as a God’s eye view of the universe. The search for objective truth helps us to satisfy our need to be part of something greater than ourselves.**

“**The essence of science is testing.** Over the centuries the means of testing has evolved. The earliest scientists tested simple systems using nothing more than their unaided senses and common sense. Later scientists invented tools to enhance their senses. **These tools include** microscopes, telescopes, **cloud chambers**, particle accelerators, **and gene mapping equipment. They also invented** tools to enhance their common sense. **These tools include** calculus, statistics, and computer simulation.”

Chapter 2, Practical Wisdom and Moral Philosophy, new fourth paragraph, first sentence

Changed “**For over two centuries** scientists have struggled” to “**Scientists have long** struggled.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Practical Wisdom and Moral Philosophy, fifth paragraph, last two sentences

“Although we can improve the process by which our genetic programming develops into our higher level programming, we cannot improve our higher level internal programming beyond the bounds set by our genetic programming.⁶ Therefore, we can safely assume that our fully realized internal programming is fixed.”

were moved into the beginning of the sixth footnote. See footnote reference position below.

Chapter 2, Practical Wisdom and Moral, sixth paragraph

“**Although we can safely** assume that our internal programming is fixed, we will never know with complete certainty what **it** is. The most we **can** know is what it is not. **The process of solving our universal economic problem ought to include eliminating inadequate theories of our internal programming.**”

appended to the fifth paragraph and changed to:

“**For all practical purposes,** we can assume that our **fully realized** internal programming is fixed.⁶ **However,** we will never know with complete certainty what this internal programming is. The most we **will ever** know is what it is not.”

Chapter 2, footnote 7, Lao Tzu quote

Changed “everlasting” to “eternal.”

Chapter 2, Practical Wisdom and Moral Science, last paragraph, first sentence

Changed “**comes from defining**” to “**is to define.**”

Chapter 3, *Practical Benefits of Magical Mysticism*, second paragraph, first sentence

Changed “replacement” to “triumph.”

Chapter 4, *Vicious and Virtuous Circles*, first paragraph, second sentence

Added the sentence:

“Habitually masking our needs with pleasurable activity may lead to the vicious circle of compulsive behavior.”

Chapter 4, *Practical Wisdom*, second paragraph, third through eighth sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Second, it can bias our perception and intuition, e.g., a person suffering from severe thirst will tend to perceive opportunities for relieving thirst and not to perceive other opportunities. Similarly, a person needing love or esteem will tend to perceive opportunities for satisfying these needs and not others. Third, it can retard learning, and the resulting ignorance can cause us to act foolishly. For example, students lacking adequate safety, nourishment, affection, or self-respect often find learning difficult. Finally, it can cause strong emotions or appetites, which can lead to incontinence. Because we need practical wisdom to avoid deprivation, and deprivation can interfere with practical wisdom in a variety of ways, we face a variety of potential vicious circles involving imprudence and deprivation.”

was changed to

“Second, it can bias our perception and intuition: a person suffering from severe thirst, love, or self-esteem will tend to perceive opportunities for relieving the immediate need and not to perceive other opportunities. Third, it can retard learning, and the resulting ignorance can cause us to act foolishly: students lacking adequate safety, nourishment, affection, or self-respect often find learning difficult. Finally, it can cause strong emotions or appetites, which can lead to incontinence: anger, greed, lust, and ambition can overcome practical wisdom. Because we need practical wisdom to avoid deprivation, and deprivation can interfere with practical wisdom in a variety of ways, we face a variety of potential vicious circles involving practical wisdom and deprivation.”

Chapter 4, *Three Common Misbeliefs*, third paragraph

“The need for information about the conditions of production and the merits and demerits of these conditions creates an opportunity for suppliers, auditing firms, and advocacy groups. Trust in the quality of this information is crucial to the long-term success of suppliers of this information.”

was reduced to a footnote.

Chapter 6, footnote 3, last sentence

Changed “not values (and related behaviors), but rather vision (and related concepts)” to “vision (and related concepts, not values (and related behaviors)).”

Changes in Version 2004.03.20

Chapter 2, *Practical Wisdom and Moral Philosophy*, second paragraph, second sentence

Changed “proven knowledge” to “tested knowledge that is.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 2, Practical Wisdom and Moral Philosophy, second paragraph, third sentence

Changed “**scientists** believe that **it** is” to “**people** believe that **science** is.”

Chapter 3, footnote 13

Changed “Teh” to “Te (**Teh**).”

Chapter 4, Production, second to last sentence

“The wise plan to learn from experience.”

was changed to:

“To produce wisely is to seek to produce ever more wisely.”

Chapter 4, Profit, last sentence

“We **are all** entrepreneurs in the business of life.”

was changed to:

“**To live wisely is to seek to live ever more wisely.** We **ought to be** entrepreneurs in the business of life.”

Changes in Version 2004.03.22

Chapter 1, Mainstream Economics' Blind Spot, fourth paragraph, second sentence

Changed “(Neoclassical)” to “(**Anglo-American** Neoclassical).”

Chapter 1, Overview, fourth from last paragraph, last sentence

Changed “**for** certain **types of decisions**” to “**under** certain **conditions**.”

Chapter 1, The Recursionist Strategy, last paragraph

“The recursionist strategy aims at improving decision-making by improving the factors of good decision-making. **Four** of these strategic assets are worth mentioning here. The first is a **world-view and related conceptual framework that helps us think clearly about our ultimate ends and the best means for achieving them.**⁴ The second is practical wisdom — our ability to think clearly, choose prudently, and behave

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

continently. The **third** is trust, which is essential for both efficient exchange and wise decision-making.⁵ And the **fourth** is the liberty to implement the alternative that makes the most productive use of our resources without unjustly interfering with others' liberty to do the same. **Vision (and related concepts), practical wisdom, trust, and liberty** are critical factors in information age economies.”

was changed to:

“The recursionist strategy aims at improving decision-making by improving the factors of good decision-making. **Three** of these strategic assets are worth mentioning here. The first is practical wisdom — our ability to think clearly, choose prudently, and behave continently. **Practical wisdom includes a strategic vision of our ultimate ends and the best means of achieving them.**⁴ The **second** is trust, which is essential for both efficient exchange and wise decision-making.⁵ And the **third** is the liberty to implement the alternative that makes the most productive use of our resources without unjustly interfering with others' liberty to do the same. **Practical wisdom, trust, and liberty** are critical factors in information age economies.”

Chapter 1, The Recursionist Strategy, footnote 4, first three sentences

“We can see the importance of **world-view / strategic vision** in the Cold War rivalry beneath the seas. At the beginning of the nuclear submarine era, the Soviets **assumed that NATO submarines had as difficult time detecting their submarines as they did detecting NATO ones. Given this belief, the Soviets** viewed submarines as being like contemporary aircraft.”

was changed to:

“We can see the importance of strategic vision in the Cold War rivalry beneath the seas. At the beginning of the nuclear submarine era, the Soviets viewed submarines as being like contemporary aircraft.”

Chapter 1, Overview, fourth sentence

Changed “means **for** tightening” to “means **of** tightening.”

Chapter 2, footnote 7

“We can think about this complex interplay, which speculator and philanthropist George Soros calls “reflexivity,” as the combination of two universal tendencies of normative intellectual models. The first is the tendency of normative models to become increasingly popular. This is due to their self-fulfilling nature. The second is their tendency to undermine the conditions that make them useful. This is due to their imperfections. When we apply these models repeatedly, they tend to lead us ever further away from ideal paths toward living good lives. **Lao Tzu wrote: “The Way that can be known is not the true Way. / The Way that can be walked is not the eternal**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Way.” In chaos theory terms, the “piling up” of intrinsic errors tends to pull us away from “attractors” that “emerge” from our teleonomic programming. Model quality tends to vary directly with the first tendency and inversely with the second. This explains why large speculative bubbles are the exception rather than the rule.”

was changed to:

“ We can think about this complex interplay, which speculator and philanthropist George Soros calls “reflexivity” (*The Alchemy of Finance*, New York: Simon & Shuster, 1988), as the combination of two universal tendencies of normative intellectual models. The first is the tendency of normative models to become increasingly popular. This is due to their self-fulfilling nature. The second is their tendency to undermine the conditions that make them useful. This is due to their imperfections. When we apply these models repeatedly, they tend to lead us ever further away from ideal paths toward living good lives. Model quality tends to vary directly with the first tendency and inversely with the second. This explains why large speculative bubbles are the exception rather than the rule.

“European philosophers associate the second tendency with Georg Hegel. Chinese philosophers associate it with Lao Tzu. The *Tao Te Ching* opens: “The Way that can be followed is not the true Way. The Way that can be known is not the eternal Way.”

“Trying to follow the Way using theories of it is like trying to “travel down” the transcendental number pi by finding ever better rational approximations of it. Rather than seeking better rational approximations of transcendental numbers such as pi, mathematicians seek more efficient strategies (formulae / instructions) for producing approximations.”

Chapter 5, Economic Viscosity, second paragraph, first sentence

“Previous chapters discussed the roles that moral vision (and related concepts), practical wisdom, and trust play in good decision-making.”

was changed to:

“Previous chapters discussed the roles that practical wisdom and trust play in good decision-making.”

Chapter 5, Economic Viscosity, third paragraph, first sentence

Changed “decision tasks” to “decision-making tasks”

Changes in Version 2004.03.24

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Preface, second paragraph, last sentence

Changed “all of the boxes” to “the boxes.”

Preface, fourth paragraph

Inserted the following paragraph:

“Consider how mathematicians approximate the transcendental number pi. Rather than seeking better *rational approximations* of pi:

$$\begin{array}{c} 3 \\ 22/7, \\ 355/113, \\ \dots \end{array}$$

mathematicians seek better (more rapidly converging) *strategies* for calculating pi:

$$\begin{array}{l} \pi = 4(1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \dots), \\ \pi = 2 \cdot \sqrt{3}(1 - 1/3 \cdot 3 + 1/5 \cdot 3^2 - 1/7 \cdot 3^3 + 1/9 \cdot 3^4 - 1/11 \cdot 3^5 + \dots), \\ \dots \end{array}$$

Chapter 2, footnote 7, third paragraph

“Trying to follow the Way using theories of it is like trying to “travel down” the transcendental number pi by finding ever better rational approximations of it. Rather than seeking better rational approximations of transcendental numbers such as pi, mathematicians seek more efficient strategies (formulae / instructions) for producing approximations.”

was changed to:

“In chaos theory terms, the “piling up” of errors in our theories tends to pull us away from “attractors” that “emerge” from our teleonomic programming.”

and appended to the second paragraph.

Changes in Version 2004.03.25

Preface, fifth paragraph, first sentence

“Consider how mathematicians approximate the transcendental number pi.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Mathematicians face a similar problem when they confront the transcendental number pi. Consider how they approximate pi.”

Preface, fifth paragraph, second sentence

#1. Changed “(more rapidly converging)” to “(algorithms / means).”

#2. Changed “... .” to “... ,

where better strategies are strategies that converge more quickly.”

Chapter 2, Practical Wisdom and Moral Science, sixth paragraph, last sentence

Changed “their quest” to “the quest.”

Chapter 2, *Ultimate Normative Ends of Life*, fifteenth paragraph, fifth sentence

Changed “satisfying the need” to “satisfying our need.”

Chapter 3, *Ultimate Normative Ends of Life*, last paragraph, fifth sentence

“We can easily correct this flaw by eliminating this assumption.”

was changed to:

“Belief in the existence of the infinite Being is a matter of faith, not of reason. We can easily correct Schweitzer’s mistake by eliminating this assumption.”

Chapter 3, *Practical Benefits of Magical Mysticism*, last paragraph, fifth sentence

“The increased clarity and energy of elevated consciousness can trigger further changes in beliefs.”

was changed to:

“The increased clarity and energy of elevated consciousness can trigger changes in beliefs, which can further elevate consciousness, which can trigger further changes in belief, and so on. Thus, a small event can trigger an avalanche of change.”

Chapter 6, Moral Vision, second paragraph, fourth sentence

Changed “useful knowledge” to “commonwealth (commonweal / general welfare).”

Chapter 6, Just Taxation, fifth paragraph, third sentence

Deleted “(commonweal / general welfare).”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 7, second paragraph, third sentence

Changed “achieve our ultimate ends” to “pursue happiness.”

Appendix, last paragraph, last sentence

Added the one sentence paragraph:

“A production team’s reach should always exceed its grasp.”

Appendix, *A Learning Attitude*, last paragraph, last sentence

Added the one sentence paragraph:

“They thrived by **learning** wisely.”

was changed to:

“They thrived by **producing ever more** wisely.”

Changes in Version 2004.03.29

Preface, fourth paragraph, third sentence

Deleted “(algorithms / means).”

Chapter 2, footnote 7, last paragraph, end

Added the sentence:

“Our theories of our teleonomic programming are no more our true teleonomic programming than our rational approximations of pi are pi.”

Chapter 2, Practical Wisdom and Moral Science, last paragraph, second sentence

“Until all of us act wisely, managing this process well requires distinguishing between **theories designed to help us predict, which help us evaluate alternatives, and theories designed to help us explain, which help us formulate alternatives.**”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Until all of us act wisely, managing this process well requires distinguishing between strategies for helping us to follow our teleonomic programming and theories for helping us to predict how others will follow their teleonomic programming.”

Chapter 3, *Ultimate Normative Ends of Life*, tenth paragraph, last sentence

“And because our needs naturally form a hierarchy, we can view cultures as aiming to satisfy what we believe to be our highest need.”

was changed to:

“And because our needs naturally form a hierarchy, we can view cultures as aiming to satisfy what members believe to be their highest need.”

Chapter 3, *Sacrifice versus Prudence*, third and fourth paragraphs

“The one area in which extreme Dionysian means to mystical oneness remains relatively unchecked is when it coincides with the normative end of reverence for life. Even here successful religions teach us to balance the extreme Dionysian with the Apollonian. Too small a willingness to risk ourselves for the sake of others is deemed to be cowardly. Too great a willingness to risk ourselves for others is deemed to be foolhardy or self-destructive. Only the proper balance is deemed to be heroic. *The wise temper sacrifice with prudence.*”

“The most heroic acts are those in which the hero sacrifices his or her life for the sake of others. The heroic death combines the magical and ethical means of satisfying our need for mystical oneness in a single, final act.”

were changed to:

“The one area in which extreme Dionysian means to mystical oneness remains relatively un-sanctioned is heroism. The most heroic acts are those in which the hero sacrifices his or her life for the sake of others. The heroic death combines the magical and ethical means of satisfying our need for mystical oneness in a single, final act. Even here successful religions teach us to balance the extreme Dionysian with the Apollonian. Too small a willingness to risk ourselves for the sake of others is deemed to be cowardly. Too great a willingness to risk ourselves for others is deemed to be foolhardy or self-destructive. Only the proper balance is deemed to be heroic. *The wise temper sacrifice with prudence.*”

Chapter 3, Summary, first (and only) paragraph

Inserted the paragraph:

“We owe it to ourselves to follow our teleonomic programming. Our theories of our teleonomic programming are no more our true teleonomic programming than our

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

rational approximations of pi are pi. We ought to distinguish between our strategies for helping us to follow our teleonomic programming and our theories for helping us to predict how others will follow their teleonomic programming. In humanist terms, we ought to distinguish between our strategies for following natural law and our theories for predicting how others will follow natural law.”

Deleted “that we use to help us identify what we need” from the first sentence.

Chapter 6, Conclusion, second paragraph, second sentence

Deleted the sentence:

“This assumption ignores the complexity involved in learning to live wisely.”

Afterword, last paragraph, first sentence

Changed “maintain” to “refine.”

Afterword, last paragraph, last sentence

Inserted a paragraph break and appended the sentence:

“It argues that freedom is an essential element in the ever-evolving process of discovering, testing, and applying knowledge useful in living good lives.”

Changes in Version 2004.04.13

Preface, fourth paragraph, first two sentences

“Mathematicians face a similar problem when they **confront** the transcendental number pi. **Consider how they approximate pi.**”

was changed to:

“Mathematicians face a similar **(open-ended)** problem when they **seek to evaluate** the transcendental number pi.”

Preface, fourth paragraph, new second sentence

Changed “better” to “**ever** better” in all.

Chapter 1, fourth footnote

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We can see the importance of strategic vision in the Cold War rivalry beneath the seas. At the beginning of the nuclear submarine era, the Soviets viewed submarines as being like contemporary aircraft. Rather than focusing on stealth, they focused on speed and diving capability. In the mid-seventies the Soviets discovered how easily the US Navy tracked their submarines. This discovery led them to build a new fleet of much stealthier submarines, which greatly lowered the probability of a quick NATO victory at sea. The vision of stealthy submarines produced better problems to solve than the vision of fast, deep diving ones.”

was changed to:

“We can see the importance of strategic vision in the difference between attrition and maneuver warfare. Where the former relies on superior military force to grind down adversaries, the latter relies on superior knowledge and agility to defeat adversaries. Confederate Calvary General Nathan Bedford Forrest aptly described maneuver warfare as “getting there firstest with the mostest.” Colonel John R. Boyd, USAF, more aptly described it as “getting inside the enemy’s observe-orient-decide-act (OODA) loop. In attrition warfare, weapons are the most important strategic asset. In maneuver warfare, warriors are the most important strategic asset.”

Chapter 1, Overview, last paragraph, last sentence

Changed “discusses how government policy makers can address this problem” to “outlines how government policy makers ought to approach this issue.”

Afterword, first paragraph, fifth sentence

“When I discuss it with business and military leaders, the topic of interest is the importance of culture and strategic vision in “fast” organizations, especially the need to bolster observation-orientation-decision-action (OODA) loop performance with strategic asset building loops.”

was changed to:

“When I discuss it with business and military leaders, the topic of interest is the importance of culture and strategic vision in “fast” organizations.”

Changes in Version 2004.04.16

Chapter 1, The Recursionist Strategy, last paragraph, fourth sentence

“The second is trust, which is essential for both efficient exchange and wise decision-making.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

was changed to:

“The second is trust, which is essential for **not only** efficient exchange **but also** wise decision-making.”

Chapter 2, fifth paragraph, last sentence

“For more on **this apparent contradiction of David Hume**, read part two of Mortimer Adler’s *Ten Philosophical Mistakes* (New York: Macmillan, 1985).”

was changed to:

“For more on **how teleonomic theories can be both positive and normative**, read part two of Mortimer Adler’s *Ten Philosophical Mistakes* (New York: Macmillan, 1985).”

Chapter 2, Moral Science and Practical Wisdom, first paragraph

Changed “compelled” to “programmed” in all.

Chapter 3, Conclusion (Eliminating Unethical Theories), second sentence

Changed “we can develop rules” to “**then** we can develop rules.”

Chapter 3, Summary

Moved second sentence of first paragraph to end of the second paragraph. Deleted the first paragraph.

Changes in Version 2004.04.19

Chapter 4, Two Means of Pursuing Happiness, second paragraph, eighth sentence

Changed “**action** of sharing” to “act of sharing.”

Chapter 4, Two Means of Pursuing Happiness, second paragraph, last sentence

Changed “**have** too much **knowledge**” to “**learn** too much.”

Chapter 4, Alternatives to Pursuing Happiness, last paragraph, first sentence

Appended sentence to previous paragraph. Changed “We see a compatible distinction in Taoism:” to “In the Taoist tradition,.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 4, Alternatives to Pursuing Happiness, last paragraph, last sentence

Deleted “(a life well lived).”

Chapter 4, Human Capital, Work, and Leisure, first paragraph, first sentence

Changed “*disagreeable*” to “disagreeable.”

Chapter 4, Human Capital, Work, and Leisure, second paragraph, first three sentences

“There is much wisdom in the adage that to be successful, we should discover what it is that we love to do and then figure out how to be paid for it. The wise manager knows that it is in everyone’s best interest to help subordinates find work that they enjoy and to make all work as enjoyable as possible. The wise chief executive knows that establishing and promoting a corporate mission consistent with employees’ ultimate ends and then maintaining ethical standards consistent with this mission makes all employees’ work more satisfying.”

was changed to:

“The fortunate discover early in life what they love to do and how to be paid to do it.”

Chapter 4, Human Capital, Work, and Leisure, last paragraph

“From the recursionist view, human capital is knowledge of how to satisfy our needs, which includes knowledge that increases our income potential. Work is *any* activity that we are paid to perform. Leisure is *any* activity that helps us to satisfy our needs, which includes activities that add to our human capital.”

was changed to:

“From the recursionist view, human capital is knowledge that helps us to satisfy our needs; work is *any* activity that we are paid to perform; and leisure is *time spent* satisfying our needs.”

Chapter 4, Trade, first paragraph, last four sentences

“Increasing excellence in the means of trade is a matter of lowering costs over the life of the trading relationship. We can classify the costs associated with trade into those that vary and do not vary with the number of transactions. The former, variable costs include all the costs involved with a particular transaction and the latter, fixed ones include all of the costs involved in establishing, maintaining, and ending the trading relationship.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We invest in trading relationships in order to lower the cost of transactions. The cost of trading includes not only the cost of establishing trading relationships and the cost of individual transactions but also the cost of unwinding trading relationships. Having a reputation of unwinding trading relationships fairly tends to lower the cost of establishing new trading relationships.”

Chapter 4, Trade, second paragraph

“Often we must choose between trading relationships having relatively high relationship costs but low transaction costs and relationships having relatively low relationship costs but high transaction costs. For example, managers may fill their need for labor by hiring permanent employees or by hiring temporary employees through a temporary employment agency. Changes in the costs associated with the means of trade will prompt wise decision-makers to change their behavior. Using the same hiring decision example, raising the costs of hiring or terminating permanent employees will make hiring temporary employees relatively more attractive. Changes in the expected life of the trading relationship will also prompt wise managers to change their behavior. In general, the shorter or more uncertain the expected life of the trading relationship, the more attractive low fixed cost relationships will be.”

was deleted.

Chapter 4, Trust, first paragraph

“We invest in trading relationships in order to lower transaction costs. For example, grocery stores find it efficient to issue identification cards to credit-worthy customers. This added fixed cost potentially lowers the stores’ cost of each transaction paid for by check.”

was deleted.

Chapter 4, Trust, new first paragraph, first two sentences

“We also invest in trading relationships in order to trade at all. New construction firms usually need to spend time and money convincing potential clients that they are able to complete jobs satisfactorily.”

were deleted.

Chapter 4, Trust, new first paragraph, last sentence

Changed “*act as expected*” to “*perform as expected*.”

Chapter 6, Just Taxation, first paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “as **current** information technology permits” to “as **culture and** information technology permit.”

Changes in Version 2004.04.21

Chapter 2, Practical Wisdom and Moral Science, first paragraph, first sentence

Deleted “by our internal programming.”

Chapter 4, *Trust*, second paragraph

“Trust is a form of useful knowledge. Like other forms of useful knowledge, using it does not deplete it.³ However, unlike other forms of useful knowledge, violating it can destroy it. Because deceit can destroy trust in the immediate relationship, in its victim’s other relationships, and in its witnesses’ relationships, it is the most malignant of all economic ills.”

³ In trade, using trust can increase it. Honest traders and confidence men alike know that if they can establish trust with a small trade they can build on it.”

was changed to:

“Trust differs from other forms of knowledge in two respects. First, using trust can increase it. Honest traders and confidence men alike know that if they can establish trust with a small trade they can build on it. Second, violating a trust can destroy not only it but other trust as well. Deceit can destroy trust in the immediate relationship, in its victim’s other relationships, and in its witnesses’ relationships. It is the most malignant of all economic ills.”

Chapter 4, *Trust*, third paragraph

“Trust plays a particularly important role in information age economies. **There are at least four reasons for this. First**, many forms of knowledge can be easily duplicated, which makes them easy to steal. **Second**, stealing knowledge does not prevent its owner from using it, which makes the theft of knowledge easier to conceal. **Third, legal protections for knowledge are not as complete as they are for scarce resources. Finally**, the legal recourse for stolen knowledge tends to be more expensive than it is for scarce resources, where evidence of theft is more clear-cut.”

was changed to:

“Trust plays a particularly important role in information age economies. **Knowledge is relatively difficult to protect from theft: (1)** many forms of knowledge can be easily duplicated, which makes them easy to steal; **(2)** stealing knowledge does not prevent

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

its owner from using it, which makes the theft of knowledge easier to conceal; and (3) the legal recourse for stolen knowledge tends to be more expensive than it is for scarce resources, where evidence of theft is more clear-cut **and the legal precedents tend to be better established. The more expensive knowledge is to protect from theft, the less of it will be created. Trust lowers the cost of protecting knowledge from theft.**”

Chapter 4, footnote 4

“⁴ The need for information about the conditions of production and the merits and demerits of these conditions creates an opportunity for suppliers, auditing firms, and advocacy groups. Trust in the quality of this information is crucial to the long-term success of suppliers of this information.”

was deleted.

Chapter 5, last paragraph, last sentence

Inserted paragraph break.

Chapter 6, Just Taxation, fifth paragraph

“The case for eliminating personal income taxes is **much** more problematic. **The wise satisfy their needs justly. If humans were perfectly wise, an increase in personal wealth would lead to an equivalent increase in commonwealth.** If humans were as lucid as angels, there would be no need for governments to **redistribute income or wealth. Unfortunately, humans** are not as lucid as angels. This does not mean that we ought to demand that governments **redistribute income or wealth, which would be an unwarranted centralization of decision-making authority.** Rather we ought to demand that governments encourage us to become ever more lucid.”

was changed to:

“The case for eliminating personal income taxes is more problematic. If **we** were as lucid as angels, **we would share our wealth wisely.** There would be no need for governments to **force us to do so. We** are not as lucid as angels. This does not mean that we ought to demand that governments **force us to share our** wealth. Rather we ought to demand that governments encourage us to become ever more lucid.”

Chapter 6, Just Taxation, sixth paragraph, seventh sentence

“Ideally, the government program would shrink to insignificance **over time.**”

was changed to:

“ Ideally, the government program would shrink to insignificance.”

Chapter 6, Conclusion, first paragraph, third sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We also can see it in monetary policy, where those who see a simple trade-off between inflation and unemployment favor centralization, and those who see no such trade-off favor decentralization.”

was deleted.

Changes in Version 2004.04.26

Chapter 4, Human Capital, Work, and Leisure, last paragraph, last sentence

“The fortunate discover early in life what they love to do and how to be paid to do it.”

was changed to:

“In religious terms, discovering one’s true calling is a blessing.”

and appended to the preceding paragraph.

Appendix, A Learning Attitude, first bullet point, last sentence

“Once we learn how to produce good quality at no **extra** cost, **good quality** is less expensive.”

was changed to:

“Once we **have learned** how to produce good quality at no **additional** cost, doing so is less expensive.”

Appendix, A Learning Attitude, first bullet point, last sentence

“Once we **know** how to produce in small batches at no additional cost, doing so is less **costly**.”

was changed to:

“Once we **have learned** how to produce in small batches at no **additional** cost, doing so is less **expensive**.”

Appendix, A Learning Attitude, second bullet point, last sentence

“Again, once we **know** how to make products using fewer material resources at no additional cost, doing so is less expensive.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Again, once we **have learned** how to make products using fewer material resources at no additional cost, doing so is less expensive.”

Changes in Version 2004.05.01

Entire work

As a quick and dirty response to feedback regarding the third chapter, that chapter was moved to an appendix. Appropriate changes were made throughout the work to reflect this change. These were reversed in version 104.05.05.

Preface, second paragraph, last sentence

Inserted paragraph break. Changed:

“In retrospect, I wanted a unified theory of ethics, economics, and politics **that would allow me to think outside the boxes that less complete theories create.**”

to:

“In retrospect, I wanted a unified theory of ethics, economics, and politics. **I have had to settle for what physicist Murray Gell-Mann calls "a crude look at the whole," plus a strategy for refining this vision.**”

Acknowledgments, last paragraph, last sentence

“ Understanding the inconsistency between his conceptual framework and his normative end of free growth and spontaneous evolution helped me better understand the dynamic balance of freedom and progress at the core of the Scottish Enlightenment.”

was deleted.

Chapter 1, fourth footnote, last two sentences

“In attrition warfare, **weapons are** the most important strategic asset. In maneuver warfare, **warriors are** the **most important** strategic asset.”

was changed to:

“In attrition warfare, the most important strategic assets **are men and material.** In maneuver warfare, the **key** strategic assets **are leadership and fighting skills.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 1, Overview, second through fifth sentences

“The next **three** chapters expand on this strategy. *New Foundations* proposes new foundations for science and evolutionary economic explanations. *Eliminating Teleonomic Theories* provides two means of tightening the loose theory on which the strategy rests. *Increasing Excellence in Means* offers recursionist alternatives for several potentially misleading marginalist concepts and apparent precepts.”

was changed to:

“The next **two** chapters expand on this strategy. *New Foundations* proposes new foundations for science and evolutionary economic explanations. *Excellence in Means* offers recursionist alternatives for several potentially misleading marginalist concepts and apparent precepts.”

New Chapter 4, Introduction, first paragraph, third sentence

“Those **dominated by hedonism and sloth become more lucid**; those addicted to mind-altering drugs gain the fortitude to kick their habits; and those suffering from compulsive behaviors come to escape the traps in which they are ensnared.”

was changed to:

“Those **driven to win acceptance or admiration of their neighbors begin to seek happiness**; those addicted to mind-altering drugs gain the fortitude to kick their habits; and those suffering from compulsive behaviors come to escape the traps in which they are ensnared.”

New Chapter 4, Introduction, third paragraph, first sentence

Enclosed “thought experiment” with quotation marks.

New Chapter 4, A Simple Model of Progress and Turbulence, title

Changed title to “A Crude Look at the Whole.”

Afterword, second paragraph, first sentence

“I’ve also learned that if the discussion lasts long enough, it usually drifts to politics, especially to the question of whether **the book** is “liberal” or “conservative” in the **modern American sense**.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“I’ve also learned that if the discussion lasts long enough, it usually drifts to politics, especially to the question of whether I am “liberal” or “conservative” in the way **that these terms are currently used in the United States.**”

Afterword, third through last paragraphs

Changed “liberal / liberals” to “left wing / left wingers / those on the left” and “conservative / conservatives” to “right wing / right wingers / those on the right” throughout.

Afterword, eighth paragraph, first sentence

“For **conservatives**, the major problem is that the dynamic **continues only if each generation chooses increasingly** inclusive (“feminine”) ends.”

was changed to:

“For **those on the right**, the major problem is that this dynamic process **results in a culture based on ever more** inclusive (“feminine”) ends.”

Afterword, eighth paragraph, last sentence

“A more useful explanation is that the United States owes its success to its **natural law** tradition of freedom and progress toward the normative end of reverence for life.”

was changed to:

“A more useful explanation (**in moving toward the ultimate normative end of reverence for life**) is that the United States owes its success **not to any fixed cultural tradition but rather to** its tradition of **political** freedom and **cultural** progress toward the normative end of reverence for life.”

Afterword, last two paragraphs

“Supporters of this tradition of political freedom and cultural progress (process conservatives) seek to refine the dynamic process that made the United States great. Enemies of this tradition are those who seek to gain government favors at the expense of progress (special interests), impose their vision on others (authoritarians), maintain the current state of the world for its own sake (state-of-the-world conservatives), and consider liberty an end in itself rather than a means to justice (libertarians).

“*Wealth in the Information Age* is liberal progressive, classically liberal in means and progressive in ends. It argues that freedom is an essential element in the ever-evolving process of discovering, testing, and applying knowledge useful in living good lives.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“My information age political and cultural position is difficult to describe to those with an industrial age vision. When talking to those on the right, I claim to be a “process conservative” in that I seek to preserve the tradition of political freedom and cultural progress toward the normative end of reverence for life. When talking to those on the left, I claim to be a “liberal progressive” in that I favor (classical) liberal political means and “progressive” cultural ends. Although I am comfortable making these two claims, I am more comfortable defining my position in terms of whom I oppose. I ardently oppose those who seek to use the power of the state to impose their vision on others (“authoritarians”) and those who seek to gain government favors at the expense of progress (“special interests”). I also oppose those who seek to maintain the current state of the world for its own sake (“state-of-the-world conservatives”) and those who consider liberty an end in itself rather than a means to justice (“libertine libertarians”).”

Changes in Version 2004.05.05

Preface, third paragraph, last sentence

“I have had to settle for what physicist Murray Gell-Mann calls "a crude look at the whole," plus a strategy for refining this vision.”

to:

“I have had to settle for **a means of refining** what physicist Murray Gell-Mann calls "a crude look at the whole.””

Preface, fifth paragraph, last sentence

Changed “**strategies** that converge more quickly” to “**those** that converge more quickly.”

Chapter 1, fourth paragraph, last sentence

Changed “scarce resources **at** achieving” to “scarce resources **directed toward** achieving.”

Chapter 1, Mainstream Economics' Blind Spot, fourth paragraph, last sentence

“Managers who do not expect learning **neither** instruct their **workers** to **look for better ways of doing things nor** invest **resources to improve the environment for creating useful knowledge.**”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Managers who do not expect learning **do not** instruct their **subordinates** to **learn**, **much less** invest **in learning-by-doing**.”

Chapter 1, Mainstream Economics' Blind Spot, tenth paragraph, third sentence

“Short setup times have allowed Toyota to produce small batches of parts **during the same shift that they are assembled**.”

was changed to:

“Short setup times have allowed Toyota to produce small batches of parts for almost immediate assembly.”

Chapter 1, Managerial Excellence in Means, third paragraph, fifth sentence

“However, the Americans recognized that **digital television technology was progressing down a much steeper learning curve**.”

was changed to:

“However, the Americans recognized that **the cost of digital technology was likely to continue to fall much quicker than the cost of analog technology**.”

Chapter 1, The Recursionist Strategy, third paragraph, second and third sentences

“The inexhaustibility of knowledge makes it impossible to **know exactly how it will be used in the future, which makes it impossible to measure its** value by measuring the value of the resources it replaces. The best we can do is to measure **our subjective assessment of** its value by using decision science techniques.”

was changed to:

“The inexhaustibility of knowledge makes it impossible to value **knowledge** by measuring the value of the **non-knowledge** resources it replaces. The best we can do is to measure its value **subjectively** using decision science techniques.”

“However, the Americans recognized that **the cost of digital technology was likely to continue to fall much quicker than the cost of analog technology**.”

Chapter 1, fourth footnote

“We can see the importance of strategic vision in the difference between attrition and maneuver warfare. Where the former relies on superior military force to grind down adversaries, the latter relies on superior knowledge and agility to defeat adversaries. Confederate Calvary General Nathan Bedford Forrest aptly described maneuver warfare as “getting there firstest with the mostest.” Colonel John R. Boyd, USAF,

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

more aptly described it as “getting inside” the enemy’s observe-orient-decide-act (OODA) loop. In attrition warfare, the most important strategic assets are men and material. In maneuver warfare, the key strategic assets are leadership and fighting skills.”

was deleted.

Chapter 2, Refining Everyday Thinking, first paragraph

“Toyota’s strategy for learning how to manufacture ever more wisely involves slowly tightening a loose production system by removing ignorance in the form of work-in-process inventory. (See Appendix: The Toyota System.) Similarly, the recursionist strategy for learning how to live ever more wisely involves slowly tightening a loose theory of means by removing ignorance in the form of theories of ultimate ends.”

was changed to:

“The recursionist strategy for learning how to live ever more wisely involves slowly tightening a loose theory of means by removing ignorance in the form of theories of ultimate ends.”

Chapter 2, *Theories produce predictions and explanations.*, sixth paragraph, fourth sentence

Changed “self-fulfilling **quality**” to “self-fulfilling **property of theories.**”

Chapter 2, fourth footnote

“Like mainstream economists, modern Austrian economists believe that our choices reveal our “consumer preferences” and that we cannot explain how we develop these “preferences.” For mainstream economists, this is reasonable for the same reason that predicting that tomorrow’s weather will be just like today’s is reasonable: assuming that we have something called “consumer preferences” and that these remain constant over the period under analysis yields good predictions. However, for modern Austrian economists, who seek to explain human action, this is inadequate.”

was deleted.

Chapter 2, Refining Recursionist Theories, fourth paragraph, last sentence

Changed “**an** internal program **or programs**” to “**our** internal programming.”

Chapter 2, fifth footnote

“Teleonomic theories *describe* our internal programming as it is. Because we owe it to ourselves (ought) to live good lives, these explanations also *prescribe* what we ought

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

to seek. For more on how teleonomic theories can be both positive and normative, read part two of Mortimer Adler's *Ten Philosophical Mistakes* (New York: Macmillan, 1985)."

was deleted.

Chapter 2, Refining Recursionist Theories, last paragraph, end

Added the following paragraphs and footnotes:

"We can eliminate teleonomic theories by developing rules for eliminating those that fall short of our ideals. This requires distinguishing between normative and temporal ends. Normative ends are goals that concern processes. Processes are not bounded in time. In contrast, temporal ends are goals that concern events. Events are bounded in time. Playing basketball well is a normative end. Winning a particular basketball game is a temporal end. Satisfying those things that we need in order to live a good life is a normative end. Satisfying a particular need is a temporal end. The difference between normative and temporal ends is the difference between heading in a particular direction and arriving at a particular destination.⁵

"Moral philosopher John Rawls provides a means of judging normative ends. Rawls asks us to imagine what intellectual tools (theories, rules, customs, etc.) we would choose to govern intelligent life if we were ignorant of the circumstances of our birth.⁶ For this imagined original position of ignorance to produce completely just intellectual tools, we must consider what intellectual tools we would want to guide intelligent life if we were completely ignorant of the circumstances of our birth, which includes ignorance of what species we will be and into what era we will be born.⁷ Under these conditions we would want intelligent beings to satisfy their needs ever more efficiently and to devote themselves to helping other life survive and thrive.⁸ This is consistent with Albert Schweitzer's normative end of reverence for life:

"True ethics are world-wide. All that is ethical goes back to a single principle of morality, namely the maintenance of life at its highest level, and the furtherance of life. The maintenance of one's own life at the highest level by becoming more and more perfect in spirit, and the maintenance at the highest level of other life by sympathetic, helpful self-devotion to it - this is ethics."⁹

"If we can agree on the normative end of reverence for life, then we can develop rules for eliminating unethical theories. For example, we can agree on eliminating teleonomic theories based on too narrow a definition of who "we" are.

"We can also eliminate teleonomic theories by developing rules for eliminating theories that fail to help us identify what we need to achieve our ultimate ends. Psychologist Abraham Maslow provides us a means of identifying our "becoming needs," those things we need to become fully human.¹⁰ He identified these needs by finding the cause of physical and mental illness. In order of immediacy,

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Maslow speculated that these needs are physiological needs (water, food, shelter, sex), safety (security, order, predictability), love (affection, belongingness), and esteem (self-respect, recognition).

“Whether Maslow got these needs exactly right doesn’t matter. What matters is that our needs are complex in that they emerge at more than one level of abstraction. Consider our physical needs and mental needs. Our physical needs emerge at the molecular level. Our need for oxygen, water, and nutrition arise from our molecular processes’ need for oxygen, water, and nutrition. In contrast, our mental needs arise from our minds, not from the molecular processes of our brain cells. The molecular processes of our brain cells have no need for love or self-respect. This suggests that we should eliminate any theory that attributes human motivation to a single level of abstraction. Although such theories can appear to explain much, their incompleteness makes them potentially misleading. They too often fail to help us find the most effective problem to solve. Our teleonomic theories should not focus on our bodies, minds, *or* spirits but rather on our bodies, minds, *and* spirits.

“The remaining theories deserve our tolerance. This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them rather than on the presumed right to do as we please.

⁵ Adler, Mortimer, *Ten Philosophical Mistakes*, (New York, Macmillan, 1985), 137.

⁶ Rawls, John, *A Theory of Justice*, (Cambridge, MA: The Belknap Press of Harvard University, 1971).

⁷ Anything less than complete ignorance will introduce bias. For example, if we simply imagine that we were born into our current society, we will tend to ignore the potential affect of our behavior on members of other human societies, future generations of humans, and non-human life. Using Rawls’s means, we can argue that incomplete forms of ethical mysticism permit unjust predation and exploitation. We also can argue that they permit unjust limitations on cooperation. The most obvious examples are restrictions on “foreign” trade. These limit cooperation with living members of other societies. Less obvious are actions that effectively limit cooperation with future generations of intelligent life.

Justice requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Each generation must seek to maximize the amount of progress for the turbulence it can bear. Shielding a favored group from change violates this agreement. The basis of this complete concept of justice is not a social contract but rather a contract between all intelligent life for the benefit of all life. Whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to an inherently incomplete concept of justice.

⁸ Assuming that other intelligent life governs itself using the same intellectual tools, we would give preference to intelligent life. There is nothing more useful to us in

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

progressing toward the ultimate end of a good life for all than other intelligent life progressing toward the ultimate end of a good life for all.

⁹ Schweitzer, Albert, *Indian Thought and Its Development*, (Gloucester, Mass.: Peter Smith, 1977), 259-62.

¹⁰ Maslow, Abraham H., *Motivation and Personality*, (New York: Harper & Row, 1987), 15-31.”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph, end

Replaced the eleventh footnote:

¹¹ We can think about this complex interplay, which speculator and philanthropist George Soros calls “reflexivity” (*The Alchemy of Finance*, New York: Simon & Shuster, 1988), as the combination of two universal tendencies of normative intellectual models. The first is the tendency of normative models to become increasingly popular. This is due to their self-fulfilling nature. The second is their tendency to undermine the conditions that make them useful. This is due to their imperfections. When we apply these models repeatedly, they tend to lead us ever further away from ideal paths toward living good lives. Model quality tends to vary directly with the first tendency and inversely with the second. This explains why large speculative bubbles are the exception rather than the rule.

“European philosophers associate the second tendency with Georg Hegel. Chinese philosophers associate it with Lao Tzu. The *Tao Te Ching* opens: “The Way that can be followed is not the true Way. The Way that can be known is not the eternal Way.” In chaos theory terms, the “piling up” of errors in our theories tends to pull us away from “attractors” that “emerge” from our teleonomic programming. Our theories of our teleonomic programming are no more our true teleonomic programming than our rational approximations of pi are pi.

with the following paragraphs and footnote:

“We can think about this complex interplay, which speculator and philanthropist George Soros¹¹ and others in the Hegelian tradition call “reflexivity,” as the combination of two universal tendencies of normative intellectual models. The first is the tendency of normative models to become increasingly popular. This is due to their self-fulfilling nature. The second is their tendency to undermine the conditions that make them useful. This is due to their imperfections. When we apply these models repeatedly, they tend to lead us ever further away from ideal paths toward living good lives. Model quality tends to vary directly with the first tendency and inversely with the second. This explains why large speculative bubbles are the exception rather than the rule.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Western philosophers associate the second tendency with George Hegel. Chinese philosophers associate it with Lao Tzu. The *Tao Te Ching* opens: “The Way that can be followed is not the true Way. The Way that can be known is not the eternal Way.” In chaos theory terms, the “piling up” of errors in our theories tends to pull us away from “attractors” that “emerge” from our teleonomic programming.”

“¹¹ Soros, George, *The Alchemy of Finance*, New York: Simon & Shuster, 1988.”

Chapter 3, Introduction, second sentence

Changed “better means to chosen subordinate ends” to “better means to **achieve our** chosen subordinate ends.”

Chapter 4, Managerial Excellence in Means, second paragraph, fourth sentence

“This process would be neither **smooth** nor costless.”

was changed to:

“This **adjustment** process would be neither **immediate** nor costless.”

Chapter 5, Consider the Justice of Interventions, first paragraph, last sentence

“*Authoritarian progressives* (**authoritarian in means, progressive in ends**) pass laws to prescribe just behavior **and** proscribe unjust behavior whenever the direct benefits of enforcing laws exceed the direct costs of enforcing them.”

was changed to:

““**Rational**” **policy makers** pass laws **that** prescribe just behavior **or** proscribe unjust behavior whenever the direct benefits of enforcing laws exceed the direct costs of enforcing them.”

Chapter 5, Consider the Justice of Interventions, third paragraph, last two sentences

“*Liberal progressives* (**liberal in means, progressive in ends**) **believe** that it is better for governments to err on the side of not passing a just law. **In short**, they **believe** that the government that governs least governs best.”

was changed to:

““**Wise**” policy makers know that it is better for governments to err on the side of not passing a just law. **They know** that the government that governs least governs best.”

Chapter 5, Consider the Justice of Interventions, fourth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “liberal progressive” to ““wise.””

Appendix A / former Chapter 3

The entire appendix / chapter was deleted.

Changes in Version 2004.05.07

Preface, last paragraph, fifth sentence

“(See Appendix: The Toyota System.)”

was deleted.

Chapter 1, Modern Economics' Blind Spot, last paragraph

“When knowledge **in use is combined in** a network, this local “lock-in” effect can be significant.”

was changed to:

“When **we combine** knowledge **into** a useful network, this local “lock-in” effect can **become** significant.”

Chapter 2, Refining Recursionist Theories, last paragraph

“The **remaining** theories deserve our tolerance. This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them rather than on the presumed right to do as we please.”

was changed to:

“The theories **that remain after we eliminate unethical and misleading theories** deserve our tolerance. This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them rather than on the presumed right to do as we please. **We owe it to ourselves not to separate our right to choose from our responsibility to choose wisely.**”

“**Many today believe in a Creator who has given us rules for living wisely. How do we know pronouncements of Divine Law are the word of the Creator? How do we know that we have interpreted these pronouncements correctly? Jesus tells us to judge them by their usefulness: "By their fruits you shall know them." (Mathew 7:16)**”

Chapter 2, Practical Wisdom and Moral Science, sixth paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Made this paragraph into a footnote.

Changed “*The Tao Te Ching*” to “**Arguably**, the *Tao Te Ching*.”

Chapter 2, Practical Wisdom and Moral Science, sixth paragraph, last sentence

Changed ““piling up”” to “compounding.”

Chapter 3, Trade, first paragraph, end

Inserted the following paragraph:

“Wealth producing organizations emerge from the complexities of trade. In industrial age economies, the most prominent wealth producing organizations were business firms. In information age economies, business firms are less prominent. The need to adapt quickly to change creates the need to lower the fixed costs of trade. As these costs fall, business firms become less “firm.” In rapidly changing industries in which transportation and communications costs remain major factors, industrial clusters become more prominent than firms. Current examples of such clusters include Hollywood and the Silicon Valley. In industries in which transportation and communication costs are no longer major factors, the industry itself takes the leading role. Wall Street, The City, and Chicago’s pits are rapidly becoming “the international financial market” or, more colorfully, “the electronic herd.””

Chapter 4, Introduction

Moved all but the last two sentences of the last paragraph to the end of the chapter under a new section with the title “A Thought Experiment.”

Changed the remaining two sentences:

“ **Before we can begin considering such strategies, we need to understand more about progress from increasing excellence. This chapter describes** the complex relationship between progress from increasing excellence, economic viscosity, and economic turbulence.”

to:

“**The previous chapters have laid the foundation for understanding whole economies in a new way:** the complex relationship between progress from increasing excellence, economic viscosity, and economic turbulence.”

Chapter 4, Increasing Excellence, second paragraph, last sentence

“Because of this, we cannot predict new applications of knowledge accurately.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

was deleted.

Chapter 4, Increasing Excellence, last paragraph, last sentence

“Like the bow wave of a fast moving ship, aggregate transient inflation in a rapidly progressing economy can appear permanent.”

was deleted.

Chapter 4, Economic Viscosity, third paragraph, first sentence

Inserted the sentence:

“Organizations make most decisions that concern the production of wealth.”

Chapter 4, A Thought Experiment, second paragraph, last sentence

Changed “catastrophe” to “disaster.”

Chapter 4, A Thought Experiment, fifth paragraph, last two sentences

“This is because efficiency in consumption is more important in economies with the potential for rapid learning than in economies without this potential. The better people live, the faster they tend to learn.”

was changed to:

“People living well tend to learn faster than those not living well.”

Afterword, last paragraph, last sentence

Changed “libertine **libertarians**” to “libertines.”

Changes in Version 2004.05.08

Chapter 1, The Recursionist Strategy, first paragraph, third bullet point, third through last sentences

“In theory, **the scope of any decision is boundless in that** all of our decisions concern our ultimate ends. **In practice, we make decisions by means of habit, decision rules (standard procedures, rules of thumb, etc.), and formal deliberations in which we choose subordinate ends. We do not always choose wisely. We can err by choosing decision-making methods poorly; by choosing habits, decision rules, or subordinate ends poorly; or by identifying, judging, or implementing alternatives poorly. In**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

general, the more clearly we think about our ultimate ends and how our decisions relate to them, the better the quality of our decisions. To think clearly about the latter, we need a concept of wealth that concerns what we *need* in order to achieve our ultimate ends. This is in sharp contrast to our current concept of wealth, which concerns what we currently *want*.”

was changed to:

“In theory, all of our decisions concern our ultimate ends. To think clearly about our ultimate ends, we need a concept of wealth that concerns what we *need* in order to achieve our ultimate ends. This is in sharp contrast to our current concept of wealth, which concerns what we currently *want*.”

Chapter 1, The Recursionist Strategy, fifth paragraph

“We do not decide perfectly. Our mistakes waste time and other resources. However, *given a learning attitude*, we learn from our mistakes. Given a learning attitude, waste is a regrettable by-product of learning through experience.”

was changed to:

“We do not decide perfectly. In theory, all of our decisions concern our ultimate ends. In practice, we make decisions by means of habit, decision rules (standard procedures, rules of thumb, etc.), and formal deliberations in which we choose subordinate ends. We do not always choose wisely. We err by choosing decision-making methods poorly; by choosing habits, decision rules, or subordinate ends poorly; or by identifying, judging, or implementing alternatives poorly. Our mistakes waste time and other resources. However, *given a learning attitude*, we learn from our mistakes. Given a learning attitude, waste is a regrettable by-product of learning through experience.”

Chapter 2, Refining Recursionist Theories, seventh footnote

“⁷Anything less than complete ignorance will introduce bias. For example, if we simply imagine that we were born into our current society, we will tend to ignore the potential affect of our behavior on members of other human societies, future generations of humans, and non-human life. Using Rawls’s veil of ignorance, we can argue that incomplete forms of justice permit unjust predation and exploitation. We also can argue that they permit unjust limitations on cooperation. The most obvious examples are restrictions on “foreign” trade. These limit cooperation with living members of other societies. Less obvious are actions that effectively limit cooperation with future generations of intelligent life.

“Justice requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Each generation must seek to maximize the amount of progress for the turbulence it can bear. Shielding a favored group

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

from change violates this agreement. The basis of this complete concept of justice is not a social contract but rather a contract between all intelligent life for the benefit of all life. Whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to an inherently incomplete concept of justice.”

was deleted.

Chapter 2, Refining Recursionist Theories, eighth paragraph, fourth and fifth sentences

“Under these conditions we would want intelligent beings to **satisfy their needs ever more efficiently and to devote themselves to helping other life survive and thrive.**⁸ **This is consistent with** Albert Schweitzer’s normative end of reverence for life:”

“⁸ Assuming that other intelligent life governs itself using the same intellectual tools, we would give preference to intelligent life. There is nothing more useful to us in progressing toward the ultimate end of a good life for all than other intelligent life progressing toward the ultimate end of a good life for all.”

was changed to:

“Under these conditions we would want intelligent beings to **pursue** Albert Schweitzer’s normative end of reverence for life:”

Chapter 2, Refining Recursionist Theories, ninth paragraph

Inserted the following paragraph:

“Schweitzer’s normative end of reverence for life requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Each generation of intelligent life must seek to maximize the amount of progress for the turbulence it can bear. Shielding a favored group from change violates this agreement. From this perspective, whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to an inherently incomplete concept of justice.”

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph, first sentence

“We can think about this complex interplay, **which speculator and philanthropist George Soros¹¹ and others in the Hegelian tradition call “reflexivity,”** as the combination of two universal tendencies of normative intellectual models.

“¹¹ Soros, George, *The Alchemy of Finance*, New York: Simon & Shuster, 1988.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We can think about this complex interplay as the combination of two universal tendencies of normative intellectual models.”

Changes in Version 2004.05.10

Chapter 1, third footnote, second sentence

Changed “owe to ourselves” to “ought.”

Chapter 2, Refining Recursionist Theories, last paragraph

“Many **today** believe in a Creator who has **given** us rules for living wisely. How do we know pronouncements of Divine Law are the word of the Creator? How do we know that we have interpreted these pronouncements correctly? Jesus tells us to judge them by their usefulness: “By their fruits you shall know them.” (**Mathew 7:16**)”

was changed to:

“**Rawls’s “veil of ignorance” aims at discovering objective truth, which some have described as a God’s eye view of the Universe. It competes with mystical revelation in providing us with this view. Many, if not most of us, believe in a Creator who has revealed to us rules for living wisely. How do we know whether given** pronouncements of Divine Law are the word of the Creator? How do we know that we have interpreted these pronouncements correctly? Jesus tells us to judge these pronouncements by their usefulness: “By their fruits you shall know them.” **We ought to use Rawls’s veil of ignorance to judge pronouncements of Divine Law.**”

and placed in the eighth paragraph, second to last sentence, as a footnote.

Chapter 2, Practical Wisdom and Moral Science, second paragraph, third sentence

“Many people believe that science also provides us with objective truth, **which some describe as a God’s eye view of the universe.**”

was changed to:

“Many people believe that science also provides us with objective truth.”

Chapter 3, Vicious and Virtuous Circles, last paragraph, first sentence

“**Thus, there exists a potential virtuous circle of pleasure-in-acting and pleasure-in-being: learning to find pleasure in activities that are good for us encourages us to do these activities, which in turn gives us the potential to do more.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Learning to find pleasure in activities that are good for us encourages us to do these activities. **Performing these activities** in turn gives us the potential to do more.”

Chapter 3, Human Capital, Work, and Leisure, last paragraph, last sentence

Changed “one’s” to “our.”

Chapter 4, A Thought Experiment, title

Changed title to “National Income Accounting.”

Chapter 5, Economic Viscosity, last paragraph, last sentence

Added the following paragraph:

“Mistrust in the economic system’s ability to recover from severe turbulence also worsens viscosity by reducing the quality of decision-making. We can lesson this mistrust by improving our understanding of the relationship between progress, economic viscosity, and economic turbulence.”

Chapter 5, Economic Turbulence, last paragraph, last sentence

“Ignorance and mistrust constrain us from reducing turbulence.¹

¹ **The relationship between economic turbulence and viscosity is a complex one. Economic turbulence makes economies more viscous by reducing people’s trust in the economic system, thereby reducing the quality of decision-making. Viscous economies suffer from greater economic turbulence than fluid ones. The recursive relationship between economic turbulence and viscosity creates a potential vicious circle. We can avoid or break this by improving the quality of decision-making, which includes improving our understanding of economic turbulence.”**

was changed to:

“**Ignorance of means of trade** and **mistrust in potential trading partners’ willingness or ability to live up to their role in the means of trade** constrain us from reducing turbulence.”

Chapter 5, second footnote

“Popular solutions to this problem of democratic governance include limiting terms in office, campaign contributions, and campaign expenditures. None of these solutions addresses the fundamental problem, which is public ignorance and apathy. The surest solution involves creating a culture that considers creating or maintaining programs

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

and policies that benefit special interests at the expense of the general public and future generations to be as evil as dumping toxic industrial waste down storm sewers. Given such a culture, the problem becomes one of exposing those who create or maintain these barriers to progress.”

was deleted.

Chapter 5, third footnote

“Note that a moral vision is not the same as moral values. Where the former recognizes our ignorance, the latter does not. The failure to distinguish between these two has led some famous liberals and progressives to recommend conservative behaviors. Both liberal Thomas Jefferson and progressive Theodore Roosevelt feared that the accumulation of material wealth would destroy American virtue. Their prescription was a set of behaviors meant to impart the “right” moral values. For Jefferson (prior to the War of 1812) this was the life of a gentleman farmer and for Roosevelt it was a periodic return to the vigorous outdoor life of America’s frontier past. Both were blind to the possibility of discovering behaviors that help us satisfy our needs better than existing ones do. In information age economies, what matters most is vision (and related concepts), not values (and related behaviors).”

was deleted.

Chapter 5, fourth footnote

“This question ought to be of particular interest to wise leaders of traditional cultures. Is it possible to skip the hedonistic stage of development? If so, is it wise to discourage lucid ideas from other cultures?”

was deleted.

Appendix, A *Learning Attitude*, last paragraph, second sentence

“Similarly, Japanese manufacturers practicing kaizen performed apparent miracles by rapidly pushing back their *production possibility frontiers*⁵.

⁵ A production possibility frontier is the production output hyperspace surface defined by the most efficient use of a given set of production inputs.”

was changed to:

“Similarly, Japanese manufacturers practicing kaizen performed apparent miracles by rapidly pushing back their *efficiency frontiers*.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Changes in Version 2004.05.11

Chapter 1, The Recursionist Strategy, second to last paragraph, fourth sentence

“Skin tanning, body piercing, dog fighting, gladiatorial games, slavery, and countless forms of conspicuous consumption spring to mind.”

was changed to:

“Slavery, skin tanning, and countless forms of conspicuous consumption spring to mind.”

Chapter 2, Theories are tools for producing useful knowledge., second sentence

Changed “Newtonian dynamics” to “Newtonian mechanics.”

Chapter 2, Refining Recursionist Theories, fifth paragraph, fourth sentence

Changed “fully realized” to “*fully realized.*”

Chapter 2, Refining Recursionist Theories, second to last paragraph, last sentence

“This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them rather than on the presumed right to do as we please. We owe it to ourselves not to separate our right to choose from our responsibility to choose wisely.”

was changed to:

“This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them: In theory, our natural right to choose arises from our natural responsibility to choose wisely. In practice, learning requires the freedom to make mistakes.”

Chapter 2, Practical Wisdom and Moral Science, last paragraph, second sentence

“Until all of us act wisely, managing this process well requires distinguishing between strategies for helping us to follow our teleonomic programming and theories for helping us to predict how others will follow their teleonomic programming.”

was changed to:

“Until all of us act wisely, managing this process well requires distinguishing between intellectual tools for helping us to follow our teleonomic programming and intellectual tools for helping us to predict how others will follow their teleonomic programming.”

Chapter 5, National Income Accounting, seventh paragraph, last two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Macroeconomic policies that aim at promoting growth encourage growth at the expense of learning. They discourage progress from increasing excellence in means.”

was deleted.

Chapter 5, National Income Accounting, last paragraph, first sentence

Changed “same problem” to “same **type of** problem.”

Appended sentence to preceding paragraph.

Changes in Version 2004.05.12

Acknowledgments, fourth paragraph, third sentence

“After **experiencing stagflation and** hearing few objections to Nixon’s wage and price controls, I vowed to take no elective macroeconomics courses.”

was changed to:

“After hearing few objections to Nixon’s wage and price controls **from the Keynesians**, I vowed to take no elective macroeconomics courses.”

Acknowledgments, fifth paragraph, last two sentences

“The question quietly dogged me through business school and on through a business career turning around a small business systems company and managing information systems and human resources for a highly successful computer paper manufacturing firm. **I finally gave Gordon his term paper, an early version of this work, seventeen years late.**”

was changed to:

“**I was too shy and too upset to raise this question with Gordon, who likely would have directed me to Friedman’s *The Methodology of Positive Economics*.** The question quietly dogged me through business school and on through a business career turning around a small business systems company and managing information systems and human resources for a highly successful computer paper manufacturing firm.”

Chapter 1, Managerial Excellence in Means, first paragraph, last two sentences

“Instead of thinking about excellence in means as efficiency, we can think about it as the managerial combination of efficiency and effectiveness. **Here**, efficiency is a matter of choosing the means that uses the least valuable resources in achieving a

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

given *subordinate* end, and effectiveness is a matter of choosing subordinate ends well.³

“³ Note that the distinction between efficiency and effectiveness varies with the scale of the problems being considered. The focus here is on the problems of individual economic agents, which includes the problem of what individuals ought to want of government. The scale is that of microeconomics.”

was changed to the following:

“Instead of thinking about excellence in means as efficiency, we can think about it as the managerial combination of efficiency and effectiveness, **where (1)** efficiency is a matter of choosing the means that uses the least valuable resources in achieving a given *subordinate* end and **(2)** effectiveness is a matter of choosing subordinate ends well.

“Imagine a hierarchical organization that defined matters of efficiency and effectiveness entirely in terms of its members’ freedom to decide. All members of this organization would seek to be efficient. All but the person at the very top of the organization would leave matters of effectiveness to their superiors. The distinction between efficiency and effectiveness would depend on one’s level in the hierarchy. As members rose or fell in the hierarchy, what they considered to be matters of efficiency as opposed to matters of effectiveness would change.

“The managerial distinction between efficiency and effectiveness implies a constraint on decision-making. Something constrains us from basing our decisions on our ultimate ends. Regardless of how materially wealthy and politically free we are, we are still constrained by our ignorance of how best to live a good life. The managerial concepts of efficiency and effectiveness allow us to parse the overwhelmingly complex problem of how best to live a good life into smaller, more comprehensible problems.”

Chapter 1, Managerial Excellence in Means, second paragraph, third through eighth sentences

“Mainstream economists use ‘rationality’ as a synonym for “efficiency.” “Rational” people **are** those who **are efficient at satisfying their wants**. In contrast, we commonly use ‘wise’ to describe those people who **are** not only “rational,” but also want the “right” things. “Wise” people are not only efficient in satisfying their wants, they are effective in choosing them. The decision to smoke cigarettes “efficiently” is “rational,” but “foolish.””

was changed to:

“Mainstream economists **define** “rational” people **as** those who **satisfy their want efficiently**. In contrast, we commonly use ‘wise’ to describe those people who **not only**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

satisfy their wants efficiently but also want the “right” things. “Wise” people are not only efficient in satisfying their wants, they are effective in choosing them. For example, the decision to smoke cigarettes efficiently is “rational,” but “foolish.””

Chapter 1, The Recursionist Strategy, last paragraph, third footnote

“³ Consider the importance of the rule of law in decision-making: the rule of law increases the quality of decision-making by lowering the uncertainty associated with how authorities will respond to a given circumstance.”

was placed in parentheses and promoted back to the text.

Chapter 2, Theories are tools for producing useful knowledge., second sentence

Changed “Newtonian dynamics” to “Newtonian mechanics.”

Chapter 2, Theories produce predictions and explanations., third paragraph, last sentence, footnote

“¹ In decision analysis terms, better predictions improve the quality of a given decision tree structure and better explanations improve the structure of the decision tree.”

was promoted back to the text.

Chapter 2, Theories are refinements of everyday thinking., eighth paragraph, third sentence

Changed “Pope did when he wrote” to “Pope did in his intended epitaph for Newton.”

Chapter 4, Avalanche Catastrophes, end

Added the paragraph:

“Those who would give up essential liberty to purchase a little temporary safety put themselves and others at risk. As Benjamin Franklin observed, they deserve neither liberty nor safety.”

Chapter 4, National Income Accounting, fifth paragraph, last sentence

“People living well tend to learn faster than those not living well.”

was changed to:

“Those who fail to focus on efficiency in consumption will fail to realize the full potential of learning.”

Changes in Version 2004.05.15

Chapter 4, Introduction

“The previous chapters have laid the foundation for understanding whole economies **in a new way**: the complex relationship between progress from increasing excellence, economic viscosity, and economic turbulence.”

was changed to:

“The previous chapters have laid the foundation for understanding whole economies **as** the complex relationship between progress from increasing excellence, economic viscosity, and economic turbulence.”

Chapter 4, Increasing Excellence, third paragraph, second sentence

“**Because of the nonlinear way in which we change marginal increases in information into new applications of knowledge,** these ripples can interfere with one another.”

was changed to:

“**T**hese ripples can interfere with one another in unpredictable ways.”

Chapter 4, Increasing Excellence, third paragraph, last two sentences

“**When the pace of change increases, ripples of change begin interfering with each other in unpredictable ways. In short,** increasing excellence causes turbulence in the flow of economic resources.”

was changed to:

“Increasing excellence causes turbulence in the flow of economic resources.”

Chapter 4, National Income Accounting, fourth through sixth paragraphs

“Economists face two major technical problems in measuring aggregate production. The first concerns measuring the value of inputs rather than outputs when measuring services. According to this logic, hiring a surgical team to remove a brain tumor for twenty thousand dollars is twice as valuable as hiring the same team to do the same surgery for ten thousand dollars. The second concerns measuring changes in quality of goods and services. How much more valuable is a one thousand dollar personal computer purchased today than a similarly priced personal computer purchased ten years ago? **Most do not recognize that its ever increasing potential for rapid learning**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

worsens both. Focusing on efficiency in consumption requires viewing consumer goods and services as means to a good life rather than ends in themselves.”

“Most mainstream economists recognize that the information age’s trend toward services exacerbates the first measurement problem and its trend toward ever higher quality exacerbates the second. Most do not recognize that its ever increasing potential for rapid learning worsens both of these measurement problems.”

“Focusing on efficiency in consumption requires viewing consumer goods and services as means to a good life rather than ends in themselves. The problem of measuring inputs rather than outputs is universal. Worse, measuring the satisfaction of human needs is far more difficult than measuring the satisfaction of consumer wants.”

were reduced to the following footnote:

“³ Economists face two major technical problems in measuring aggregate production. The first concerns measuring the value of inputs rather than outputs when measuring services. According to this logic, hiring a surgical team to remove a brain tumor for twenty thousand dollars is twice as valuable as hiring the same team to do the same surgery for ten thousand dollars. The second concerns measuring changes in quality of goods and services. How much more valuable is a one thousand dollar personal computer purchased today than a similarly priced personal computer purchased ten years ago? Focusing on efficiency in consumption requires viewing consumer goods and services as means to a good life rather than ends in themselves. The problem of measuring inputs rather than outputs is universal. Worse, measuring the satisfaction of human needs is far more difficult than measuring the satisfaction of consumer wants.”

Changes in Version 2004.05.18

Chapter 1, Managerial Excellence in Means, second paragraph

“These two managerial terms become meaningful only after we define the scale of what we consider to be a subordinate end. What is a matter of efficiency at one scale is a matter of effectiveness at another: Imagine a hierarchical organization that defined matters of efficiency and effectiveness entirely in terms of its members’ freedom to decide. All members of this organization would seek to be efficient. All but the person at the very top of the organization would leave matters of effectiveness to their superiors. The distinction between efficiency and effectiveness would depend on one’s level in the hierarchy. As members rose or fell in the hierarchy, what they considered to be matters of efficiency as opposed to matters of effectiveness would change.”

was reduced to a footnote.

Chapter 1, Managerial Excellence in Means, new second paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The managerial **distinction between** efficiency and effectiveness **implies a constraint on decision-making. Something constrains us from basing our decisions on our ultimate ends. Regardless of how materially wealthy and politically free we are, we are still constrained by** our ignorance of how best to **live a good life**. The managerial concepts **of efficiency and effectiveness** allow us to parse the overwhelmingly complex problem of how best to live a good life into smaller, more comprehensible problems.”

was changed to:

“**Our need for** the managerial **concepts of** efficiency and effectiveness **arises from** our ignorance of how best to **achieve our ultimate ends**. **These two** managerial concepts allow us to parse **this** overwhelmingly complex problem into smaller, more tractable problems.”

Chapter 4, Introduction

“The **previous chapters have laid the foundation for understanding whole economies as** the complex relationship between progress from increasing excellence, economic **viscosity**, and economic **turbulence**.”

was changed to:

“This chapter **presents a normative view of macroeconomics, which focuses on** the complex relationship between progress from increasing excellence, economic **turbulence**, and economic **viscosity**.”

Chapter 4, Increasing Excellence, last paragraph, last sentence

“Everything else being equal, periods of heavy investment in new means tend to coincide with rising prices, and periods of little or no investment in new means tend to coincide with declining ones.”

was deleted.

Chapter 4, Increasing Excellence, last two paragraphs

Reversed order of paragraphs.

Chapter 4, Economic Viscosity; Economic Turbulence

Reversed order of sections.

Chapter 4, Economic Turbulence, third paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Because economic turbulence wastes time and other resources, economic agents potentially can profit by reducing it.”

was changed to:

“Economic turbulence wastes time and other resources. Hence, economic agents can profit by reducing it.”

Chapter 4, Economic Turbulence, second paragraph, last sentence

“Again, the worse the decision, the greater economic turbulence is likely to be.”

was deleted.

Chapter 4, Economic Viscosity, third paragraph

“Organizations make most decisions that concern the production of wealth.

Organizational decision-making is more complex than individual decision-making in that it requires a decision strategy, a plan that outlines who performs what decision-making tasks under what incentives. In formulating a decision strategy, management must consider the practical wisdom of the members of their organization, available information technology, members’ time constraints, available decision tools, trade relationships, and a myriad of other factors. For example, management must consider the costs and benefits of involving those implementing a given decision in the problem finding and selection process. To do their jobs well, those implementing the selected alternative must understand what they are required to do. It also helps if they approve of the solution. Including them in the processes of defining the problem, formulating alternatives, and selecting the best alternative increases their understanding and approval. However, it also tends to increase the time and expense of decision-making significantly. In addition to such internal issues, managers must also consider the threats and opportunities the organization faces, which determine what types of decisions the organization must make.”

was changed to:

“Many important decisions occur within organizations. Organizational decision-making is more complex than individual decision-making in that it requires a decision strategy, a plan that outlines who performs what decision-making tasks under what incentives.

“In formulating a decision strategy, management must consider the threats and opportunities the organization faces, which determine what types of decisions the organization must make. Management must also consider the practical wisdom of the members of their organization, available information technology, members’ time constraints, available decision tools, trade relationships, and a myriad of other factors. For example, management must consider the costs and benefits of involving those

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

implementing a given decision in the problem finding and selection process. To do their jobs well, those implementing the selected alternative must understand what they are required to do. It also helps if they approve of the solution. Including them in the processes of defining the problem, formulating alternatives, and selecting the best alternative increases their understanding of and enthusiasm for the chosen solution. However, it also tends to increase the time and expense of decision-making significantly.”

Chapter 4, Economic Viscosity, sixth paragraph

Changed “Technological advances” to “Advances.”

Chapter 4, Economic Viscosity, seventh paragraph, first three sentences

“Increases in trust that speed response also can change decision strategies in ways that reduce turbulence. Again, responding to change rapidly tends to reduce turbulence. One way to speed response is to decentralize decision-making.”

was changed to:

“Advances in trade that decentralize decision-making also can change decision strategies in ways that reduce turbulence.”

Chapter 4, Economic Viscosity, last paragraph

“Mistrust in the economic system’s ability to recover from severe turbulence also worsens viscosity by reducing the quality of decision-making. We can lesson this mistrust by improving our understanding of the relationship between progress, economic viscosity, and economic turbulence.”

was deleted.

Chapter 4, National Income Accounting

This section was deleted.

Changes in Version 2004.05.19

Preface, last paragraph, fourth sentence

Added the sentence:

“(See Appendix A.)”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 2, Refining Recursionist Theories, tenth paragraph, first sentence

Added the sentence:

“(See Appendix B.)”

Chapter 3, Production, last sentence

Changed “Appendix: **The Toyota System**” to “Appendix **A**.”

Chapter 4, Avalanche Catastrophes, last paragraph, first sentence

Changed “at risk” to “at **greater** risk.”

Chapter 4, Avalanche Catastrophes, last paragraph, last sentence

Changed “observed” to “wrote.”

Appendix, title

Changed “Appendix: The Toyota System” to “Appendix **A** <line break> The Toyota System.”

Appendix B

Added appendix, which was derived from the first half of the former Chapter 3, *Eliminating Teleonomic Theories*.

Appendix C

Added appendix, which was derived from the former last section of Chapter 4, *National Income Accounting*.

Changes in Version 2004.05.20

Chapter 2, Practical Wisdom and Moral Science, second paragraph, last sentence

Changed “our need” to “our **spiritual** need.”

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph, last sentence

“This explains why **large** speculative bubbles **are the exception rather than the rule**.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“This explains why speculative bubbles based on a single model (as opposed to a common assumption¹⁰) are relatively rare.

“¹⁰ The unsustainable Asian boom and subsequent bust of the nineteen nineties illustrates this difference. The "model story" is that media hype about the coming Asian Century was responsible for causing individual investors to invest too much money in Asia. The "assumption story" is that a simplifying assumption about how capital markets work within the widely used Black Scholes model caused decision-makers to underestimate the risks of investing in less than perfect capital markets.”

Chapter 2, Practical Wisdom and Moral Science, seventh paragraph, last sentence

“It also requires that they abandon the quest for objective truth.”

was changed to:

“It also requires that they limit themselves to seeking what is useful in helping us to predict.”

Chapter 3, Trade, second paragraph, first sentence

“Wealth producing organizations emerge from the complexities of trade.”

was changed to:

“We form wealth producing organizations by forming relatively high fixed cost, relatively low variable cost trading relationships. The nature of these wealth producing organizations emerges from the complexities of trade and production. <paragraph break>”

Chapter 3, Trade, second paragraph, last sentence

“Wall Street, The City, and Chicago’s pits are rapidly becoming “the international financial market” or, more colorfully, “the electronic herd.””

was changed to:

“Wall Street, The City, and Chicago’s pits are rapidly becoming “the international financial market.” Within these new organizations, “extraordinary” change is ordinary.”

Chapter 3, Trust, first paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“In addition, the parties must trust one another to live up to their roles in the trading relationship.”

was changed to:

“Trading partners must also trust one another to fulfill their roles in the trading relationship.”

Chapter 4, Introduction

“This chapter presents a normative view of macroeconomics, which focuses on the complex relationship between progress from increasing excellence, economic turbulence, and economic viscosity.”

was changed to:

“This chapter presents a normative view of macroeconomics, which focuses on the relationship between progress from increasing excellence and economic turbulence.”

Chapter 4, A Crude Look at the Whole, first paragraph, last sentence

“The system will create what appears to be (but isn't) an exploitable trade-off between transient inflation and unemployment, a Phillips curve.”

was changed to:

“Except for the occasional major avalanche catastrophe, the economy will produce what appears to be (but isn't) an exploitable trade-off between transient inflation and unemployment, a Phillips curve.”

Changes in Version 2004.05.21

Chapter 1, Managerial Excellence, second paragraph, first two sentences

“Our need for the managerial concepts of efficiency and effectiveness arises from our ignorance of how best to achieve our ultimate ends. These two managerial concepts allow us to parse this overwhelmingly complex problem into smaller, more tractable problems.”

was changed to:

“The managerial concepts of efficiency and effectiveness help us to parse the problem of how best to achieve our ultimate ends into smaller, more tractable problems. These

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

two concepts help us to manage our lives. Our need for these concepts arises from our ignorance of our ultimate ends and how best to achieve them.”

Chapter 4, Economic Viscosity, title

Changed “Viscosity” to “Fluidity.”

Chapter 4, Economic Viscosity, first paragraph, last three sentences

“Economic fluidity concerns the quality of decision-making. Poor decisions are poor in that they fail to advance us, fail to relieve the stress completely, or create unnecessary stress. Increasing the factors of good decision-making tends to decrease economic viscosity.”

was changed to:

“Economic fluidity concerns the quality of decision-making: decisions are good not only because they increase excellence but also because they relieve stress quickly and efficiently. Increasing the factors of good decision-making tends to increase economic fluidity.”

Chapter 4, Avalanche Catastrophes, fourth paragraph, first sentence

Changed “increasing viscosity” to “decreasing fluidity.”

Changes in Version 2004.05.22

Preface, second paragraph, second sentence

Changed “in Sunday school” to “in Congregationalist Sunday school.”

Chapter 1, Managerial Excellence in Means, title

Deleted “in Means.”

Chapter 1, Managerial Excellence, first paragraph, first sentence

“In the EOQ model example above, the problem concerns the unstated assumption that the best means is the most “efficient” means.”

was deleted.

Chapter 1, Managerial Excellence, third paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The distinction between marginalist “**efficiency**” and managerial “**efficiency and effectiveness**” may be made clearer by thinking about the difference between how mainstream economists use ‘rationality’ and how we commonly use ‘wisdom.’”

was changed to:

“The distinction between marginalist and managerial **excellence** may be made clearer by thinking about the difference between how mainstream economists use ‘rationality’ and how we commonly use ‘wisdom.’”

Chapter 1, Managerial Excellence, fourth paragraph, first sentence

“**This managerial** concept of excellence in means **permits** learning.”

was changed to:

“**Unlike the marginalist** concept of excellence in means, **the managerial concept includes** learning **by doing**.”

Chapter 1, Managerial Excellence, fourth paragraph, fourth through last sentences

“A few years later, the Americans settled on a more versatile **digital** standard. **At the time**, digital television was far more expensive than analog. **However**, the Americans recognized that the cost of digital technology was likely **to continue** to fall much **quicker** than the cost of analog technology. Within a few years advances in digital technology would eliminate most of analog television’s cost advantage. **The “rational” choice was analog, but the “wise” choice was digital.** *By considering what they would do if they had more knowledge, the Americans found a better problem to solve.*”

was changed to:

“A few years later, the Americans settled on a more versatile **digital** standard. **Although** digital television was far more expensive than analog, the Americans recognized that **digital technology was relatively immature and so** the cost of digital technology was likely to fall much faster than the cost of analog technology. *By considering what they what they were likely to learn, the Americans found a better problem to solve.*”

Chapter 1, The Recursionist Strategy, first paragraph, first sentence

“Changing our concept of excellence in means from **the** marginalist **concept of** efficiency to **the** managerial **concept of** efficiency and effectiveness requires making profound changes to how we think about economics:”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” requires making profound changes to how we think about economics:”

Chapter 1, The Recursionist Strategy, first paragraph, last sentence

“In short, **changing our concept of excellence in means to “efficiency and effectiveness” changes** the universal (global) economic problem **into one of** how we, **the members of the community of beings capable of using the knowledge that we create,** choose to progress toward our ultimate ends.”

was changed to:

“In short, the universal (global) economic problem **concerns** how we **intelligent beings** choose to progress toward our ultimate ends.”

Chapter 1, Overview, first sentence

Deleted “all of.”

Chapter 1, Overview, fourth sentence

Changed “*Excellence in Means*” to “*Managerial Excellence*.”

Chapter 1, Overview, last two sentences

“The final two chapters discuss **macroeconomic issues**. *Progress and Turbulence* argues that the **fundamental such** issue ought to be how we can progress toward our ultimate ends with the least amount of economic turbulence **and** *Government Policy* outlines how government policy makers ought to **approach** this issue.”

was changed to:

“The final two chapters discuss **policy**. *Progress and Turbulence* argues that the **primary policy** issue ought to be how we can progress toward our ultimate ends with the least amount of economic turbulence. *Government Policy* outlines how government policy makers ought to **address** this issue.”

Chapter 2, Refining Recursionist Theories, eighth paragraph, second sentence

“Rawls asks us to imagine what **intellectual tools** (theories, rules, customs, etc.) we would choose to govern **intelligent life** if we were ignorant of the circumstances of our birth.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Rawls asks us to imagine what theories, rules, customs, etc. we would choose to govern us if we were ignorant of the circumstances of our birth.”

Chapter 2, Refining Recursionist Theories, last paragraph, last three sentences

“This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them: **In theory, our natural right to choose arises from our natural responsibility to choose wisely. In practice, learning requires the freedom to make mistakes.**”

was changed to:

“This tolerance is based on our incomplete knowledge of our ultimate ends and the best means to them **rather than the presumed right to do as we please.**”

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph, last sentence

Moved footnote reference to end of the sentence. Deleted “(as opposed to a common assumption).”

Chapter 2, footnote 10

“The **unsustainable Asian** boom and subsequent bust of the nineteen nineties **illustrates this difference. The “model story” is that media hype about the coming Asian Century was responsible for causing individual investors to invest too much money in Asia. The “assumption story” is that a simplifying assumption about how capital markets work within the widely used Black Scholes model caused decision-makers to underestimate the risks of investing in less than perfect capital markets.**”

was changed to:

“**This is not to say that speculative bubbles caused by common assumptions are rare. For example,** a simplifying assumption about capital markets within the widely used Black-Scholes option pricing model causes **those who use it** to underestimate the risks of investing in less than perfect capital markets.”

Chapter 3, Excellence in Means, title

Changed “**Excellence in Means**” to “**Managerial Excellence.**”

Chapter 3, Introduction, first sentence

“**Excellence in means** is the wise use of resources in **satisfying our needs.**”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“**Managerial** excellence is the wise use of resources in **achieving our ultimate ends.**”

Chapter 3, Consumption, first paragraph, first sentence

“The humanistic ethics of recursionist economics differs markedly from the utilitarian ethics of marginalist economics.”

was deleted.

Chapter 3, Three Common Misbeliefs, first paragraph, fourth sentence

Changed “excellence **in means**” to “**managerial** excellence.”

Chapter 4, A Crude Look at the Whole, first paragraph, last sentence

Deleted “, a Phillips curve.”

Changes in Version 2004.05.24

Chapter 1, Managerial Excellence, first paragraph, first sentence

“In the EOQ model example above, the problem concerns the unstated assumption that the best means is the most “efficient” means.”

was deleted.

Chapter 1, Managerial Excellence, second paragraph

“The managerial concepts **of efficiency and effectiveness** help us to parse the problem of how best to achieve our ultimate ends into smaller, more tractable problems. **These two concepts help us to manage our lives.** Our need for these concepts arises from our ignorance of our ultimate ends and how best to achieve them.”

was changed to:

“These managerial concepts help us to parse the problem of how best to achieve our ultimate ends into smaller, more tractable problems. Our need for them arises from our ignorance of our ultimate ends and how best to achieve them.”

and appended to preceding paragraph.

Chapter 1, Managerial Excellence, new second paragraph, first three sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The distinction between marginalist and managerial excellence may be made clearer by thinking about the difference between how mainstream economists use ‘rationality’ and how we commonly use ‘wisdom.’ Mainstream economists define “rational” people as those who satisfy their wants efficiently. In contrast, we commonly use ‘wise’ to describe those people who not only not only satisfy their wants efficiently but also want the “right” things.”

was changed to:

“Mainstream economists commonly use “rational” to describe people who satisfy their wants efficiently. In contrast, we commonly use ‘wise’ to describe those who not only satisfy their wants efficiently but also want the “right” things.”

and appended to preceding paragraph.

Chapter 1, Managerial Excellence, last paragraph, first sentence

“Unlike the marginalist concept of excellence in means, the managerial concept includes learning by doing.”

was changed to:

“Unlike the marginalist concept of excellence, the managerial concept includes learning by doing.”

Chapter 2, Refining Recursionist Theories, fourth paragraph, first sentence

Changed “deficiency” to “problem.”

Changes in Version 2004.05.25

Chapter 1, The Recursionist Strategy, last paragraph, seventh sentence

“(Consider the importance of the rule of law in decision-making: the rule of law increases the quality of decision-making by lowering the uncertainty associated with how authorities will respond to a given circumstance.)”

was returned to a footnote.

Chapter 2, Theories produce predictions and explanations., second paragraph, third and fourth sentences

“Mathematical models of deterministic chaotic systems explain why they are predictable at low levels of energy and why they become practically unpredictable at

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

higher levels of energy. **The reason that they become practically unpredictable is that any deviation between actual initial conditions of these systems and our estimates of these conditions grows over time.**”

to:

“Mathematical models of deterministic chaotic systems explain why they are practically unpredictable.”

Chapter 2, Refining Recursionist Theories, footnote 6

“Rawls’s “veil of ignorance” aims at discovering objective truth, which some have described as a God’s eye view of the Universe. It competes with mystical revelation in providing us with this view. Many, if not most of us, believe in a Creator who has revealed to us rules for living wisely. How do we know whether given pronouncements of Divine Law are the word of the Creator? How do we know that we have interpreted these pronouncements correctly? Jesus tells us to judge these pronouncements by their usefulness: “By their fruits you shall know them.” We ought to use Rawls’s veil of ignorance to judge pronouncements of Divine Law.”

was deleted.

Chapter 2, Refining Recursionist Theories, tenth paragraph, first two sentences

“If we can agree on the normative end of reverence for life, then we can develop rules for eliminating unethical theories. **(See Appendix B.)**”

to

“If we can agree on the normative end of reverence for life **(Appendix B)**, then we can develop rules for eliminating unethical theories.”

Chapter 2, Refining Recursionist Theories, twelfth paragraph, second sentence

Changed “physical **needs** and mental needs” to “physical and mental needs.”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph plus first sentence of fifth paragraph

“Scientists have long struggled with how best to study evolving systems, **particularly economies. What makes economies especially difficult to study is the fact** that we humans use intellectual models to help us formulate alternatives. The **complex interplay of these** models and reality gives rise to a wide variety of phenomena, which range from relatively simple speculative bubbles to complex “ecosystems” of businesses.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We can think about this **complex interplay** as the **combination** of two universal tendencies of normative **intellectual** models.”

to

“Scientists have long struggled with how best to study evolving systems. **Studying evolution in human systems is especially difficult in that we humans use intellectual models to help us formulate alternatives. The difficulty here is that there is a reflexive / recursive relationship between our normative models and reality: We base normative models on reality. Our actions change reality.**

The **relationship between** our normative models and reality gives rise to a wide variety of phenomena, which range from relatively simple speculative bubbles to complex “ecosystems” of businesses. We can think about this **relationship** as the complex interplay of two universal tendencies of normative models.”

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph, new fifth sentence

“When we apply these models repeatedly, they tend to lead us ever further away from ideal paths toward living good lives.”

to

“ When we apply these models repeatedly without considering how our recent actions have changed reality, these models tend to lead us ever further away from ideal paths toward living good lives.”

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph, last sentence

“Model quality tends to vary directly with the first tendency and inversely with the second. This explains why speculative bubbles based on a single model are relatively rare.”

was sent to the new footnote 9.

Chapter 3, Three Common Misbeliefs, third paragraph

“A third common belief that hinders increasing excellence in trade is the belief that competition **is the opposite of** cooperation. **Economic competition is the market system’s way of determining which means are most efficient and effective. Like academic peer review, competition helps to insure that the best methods become part of the complex web of human knowledge. Although excessive competition can harm cooperation and excessive cooperation can harm competition, they are not opposites. Increasing one does not necessarily decrease the other. In fact, increasing competition often increases cooperation.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“A third common belief that hinders increasing excellence in trade is the belief that **increasing** competition **decreases** cooperation. Competition is the **process of** determining which **competitor is best**. **Whether the contest involves breakfast cereals or theories of human behavior**, competition insures the integrity of the complex web of human knowledge. **Increasing** competition **may decrease** cooperation. **However**, increasing competition **may also** increase cooperation.”

Chapter 3, Three Common Misbeliefs, fourth paragraph

“Consider **the roles that competition and cooperation play in** the game of basketball. Playing basketball well requires cooperation in the form of teamwork. **Such cooperation is more likely to break down when a team is either far ahead of or far behind its opponents, that is, when competition wanes. Further, the need to cooperate does not prevent two players vying for the same position from competing vigorously - they compete for the opportunity to cooperate with their teammates by cooperating well.**”

was changed to:

“Consider the game of basketball. Playing basketball well requires cooperation in the form of teamwork. **Players compete by cooperating well. The level of play, including the level of teamwork, tends to rise with closeness of the score.**”

Chapter 4, throughout

Changed “increasing excellence” to “increasing **managerial** excellence.”

Changes in Version 2004.05.27

Chapter 1, footnote 3, second through fourth sentences

“What is a matter of efficiency at one scale is a matter of effectiveness at another: Imagine a hierarchical organization that defined **matters of efficiency and effectiveness entirely** in terms of its members’ freedom to decide. All members **of this organization** would seek to be efficient. All **but** the person at the **very top of the organization** would leave matters of effectiveness to their superiors.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“What is a matter of efficiency at one **problem** scale is a matter of effectiveness at another: Imagine a hierarchical organization that defines **the scale of problems** in terms of its members’ freedom to decide. All **organization** members would seek to be efficient. All **save** the person at the top would leave matters of effectiveness to their superiors.”

Chapter 1, The Recursionist Strategy, first paragraph, last sentence

“In short, the universal (global) economic problem **concerns** how we intelligent beings choose to progress toward our ultimate ends.”

was changed to:

“In short, the universal (global) economic problem **becomes one of** how we intelligent beings choose to progress toward our ultimate ends.”

Chapter 1, The Recursionist Strategy, second and third paragraphs

“**Mathematicians** solve such open-ended problems by finding **a** process that **they** can apply recursively **an infinite number of times**. **To prove that there is no highest number, for example, mathematicians invent a process that takes a number (x) and yields a higher number (y). The simplest such process is to add ‘1’ to the number (x + 1 = y). Because there is no limit to how many times this process can be applied, there can be no highest number.**

“The obvious choice **for a process to apply recursively** is decision-making, understood as the process that begins with finding a problem to solve and ends with reviewing the decision process. **Decision scientists tell us that** formal decision-making consists of (1) finding a problem to solve, (2) identifying alternative solutions, (3) selecting an alternative, (4) implementing the selected alternative, and (5) reviewing the first four steps. Of course, not all decisions warrant the scarce resources necessary for formal decision-making. Less important decisions ought to be made by habit, standard procedure, or decision rules. The decision to employ these cheaper means under certain conditions is itself a decision, which often warrants formal deliberation.”

was changed to:

“**We** solve such open-ended problems by finding progressive processes that **we** can apply recursively (**repetitively**). The obvious choice **here** is decision-making, understood as the process that begins with finding a problem to solve and ends with reviewing the decision process.

“**F**ormal decision-making consists of (1) finding a problem to solve, (2) identifying alternative solutions, (3) selecting an alternative, (4) implementing the selected alternative, and (5) reviewing the first four steps. Of course, not all decisions warrant the scarce resources necessary for formal decision-making. Less important decisions

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

ought to be made by habit, standard procedure, or decision rules. The decision to employ these cheaper means under certain conditions is itself a decision, which often warrants formal deliberation.”

Chapter 2, Practical Wisdom and Moral Science, sixth paragraph, second and third sentences

Deleted “rightly.”

Chapter 4, Economic Turbulence, third paragraph, last sentence

“For example, because the simultaneous rise in the price of steel and the fall in the price of plastic creates a bigger shock than if these two events occur sequentially, this combination of events is likely to cause a more rapid substitution of plastic for steel.”

was changed to:

“For example, because the simultaneous rise in the price of steel and the fall in the price of plastic creates a bigger shock than if these two events occur sequentially, this combination of events is likely to cause a more rapid substitution of plastic for steel.”

Chapter 4, Economic Turbulence, third paragraph, last sentence

“For example, where information about future production requirements allows vendors to increase excellence by reducing turbulence, customers can trade longer delivery periods for price concessions.”

was changed to:

“For example, when information about future production requirements allows manufacturers to reduce turbulence, they can offer their customers discounts in return for extended delivery periods.”

Appendix C

Removed appendix C.

Changes in Version 2004.05.28

Chapter 1, Marginalist Economics' Blind Spot, ninth paragraph, last sentence

“In general, determining the value of useful knowledge is a complex open-ended problem. Thus, the possibility of learning makes what otherwise would be a simple closed-ended problem into a complex open-ended one.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“The possibility of learning makes what otherwise would be a simple closed-ended problem into a complex open-ended one.”

Chapter 1, Managerial Excellence, third paragraph, third sentence

“After considering the problem for decades, the Japanese settled on a high definition standard **that used the same height to width aspect ratio as widescreen movies.**”

was changed to:

“ After considering the problem for decades, the Japanese settled on a high definition standard.”

Chapter 1, The Recursionist Strategy, third and fourth paragraphs

“**Formal decision-making consists of (1) finding a problem to solve, (2) identifying alternative solutions, (3) selecting an alternative, (4) implementing the selected alternative, and (5) reviewing the first four steps. Of course, not all decisions warrant the scarce resources necessary for formal decision-making. Less important decisions ought to be made by habit, standard procedure, or decision rules. The decision to employ these cheaper means under certain conditions is itself a decision, which often warrants formal deliberation.**

“**We do not decide perfectly. In theory, all of our decisions concern our ultimate ends. In practice, we make decisions by means of habit, decision rules (standard procedures, rules of thumb, etc.), and formal deliberations in which we choose subordinate ends. We do not always choose wisely. We err by choosing decision-making methods poorly; by choosing habits, decision rules, or subordinate ends poorly; or by identifying, judging, or implementing alternatives poorly. Our mistakes waste time and other resources. However, given a learning attitude, we learn from our mistakes. Given a learning attitude, waste is a regrettable by-product of learning through experience.**”

was changed to:

“We do not decide perfectly. Our mistakes waste time and other resources. However, *given a learning attitude*, we learn from our mistakes. Given a learning attitude, waste is a regrettable by-product of learning through experience.”

Chapter 2, Theories produce predictions and explanations., second paragraph, second sentence

“Mathematical models of deterministic chaotic systems explain why they become practically unpredictable at higher levels of energy.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was deleted.

Chapter 2, *Theories produce predictions and explanations.*, third paragraph, last sentence

“In decision analysis terms, better predictions improve the quality of a given decision tree structure and better explanations improve the structure of the decision tree.”

was deleted.

Chapter 2, *Theories are refinements of everyday thinking.*, second paragraph, first sentence

“We can analyze everyday thinking by classifying worldly knowledge into sets based on the processes that we use to refine **worldly knowledge**.”

was changed to:

“We can analyze everyday thinking by classifying worldly knowledge into sets based on the processes that we use to refine **it**.”

Chapter 2, *Theories are refinements of everyday thinking.*, third paragraph, first sentence

Changed “**as either** words or symbols” to “**in** words or symbols.”

Chapter 2, *Theories are refinements of everyday thinking.*, third paragraph, last sentence

“This set includes both narratives that help us predict the world and narratives that help us explain the world.”

was deleted.

Chapter 2, *Theories are refinements of everyday thinking.*, fifth paragraph, second sentence

Changed “process **that** requires” to “process, **which** requires.”

Chapter 2, *Theories are refinements of everyday thinking.*, sixth paragraph, second sentence

Changed “process **that** requires” to “process, **which** requires.”

Chapter 2, *Theories are refinements of everyday thinking.*, seventh paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “pragmatic **approach to science**” to “pragmatic **methodology**.”

Chapter 2, *Theories are refinements of everyday thinking.*, seventh paragraph, last two sentences

“However, we would not have rejected **the idea of the planets traveling around the sun** as a means of explaining the solar system. **Like the digital approach to television in the early nineteen nineties, the heliocentric approach had advantages (simplicity and elegance) over Ptolemaic theories. Also like the digital approach to television in the early nineties, it was less thoroughly explored and so offered a greater possibility for improvement.**”

was changed to:

“However, we would not have rejected **it** as a means of explaining the solar system **because it was simpler, more elegant, and less thoroughly developed than Ptolemaic competitors.**”

Chapter 2, *Theories are refinements of everyday thinking.*, eighth paragraph, last two sentences

“We would **not** have **rejected** it as **either** a theory that predicts or one that explains. **Instead, we** would have used it to cull lesser theories in both categories.”

was changed to:

“We would have **accepted** it as **both** a theory that predicts and one that explains. **We also** would have used it to cull lesser theories in both categories.”

Chapter 2, *Theories are refinements of everyday thinking.*, ninth paragraph, first two sentences

“Kepler’s theory helped Newton formulate his **theory** of gravity. Given the greater depth and breadth of Newton’s theories **of gravity and mechanics**, we would have accepted them as the leading theories that predict and explain.”

was changed to:

“Kepler’s theory helped Newton formulate his **theories** of gravity **and mechanics**. Given the greater depth and breadth of Newton’s theories, we would have accepted them as the leading theories that predict and explain.”

Chapter 2, *Refining Recursionist Theories*, seventh paragraph, third and fifth sentences

“Processes are not bounded in time.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

“Events are bounded in time.”

were deleted.

Chapter 2, Refining Recursionist Theories, ninth paragraph, second sentence

“Each generation of intelligent life must seek to maximize the amount of progress for the turbulence it can bear. Shielding a favored group from change violates this agreement.”

was deleted.

Chapter 2, Refining Recursionist Theories, eleventh paragraph, last sentence

“In order of immediacy, Maslow speculated that these needs are physiological needs (water, food, shelter, sex), safety (security, order, predictability), love (affection, belongingness), and esteem (self-respect, recognition).”

was deleted.

Chapter 2, Refining Recursionist Theories, twelfth paragraph, first two sentences

“What matters here is that our needs are complex in that they emerge at more than one level of abstraction. Consider our physical and mental needs.”

were deleted.

Chapter 2, Practical Wisdom and Moral Science, sixth paragraph

“The two most prominent schools of evolutionary economics, the Marxist and Austrian schools, reject the need to test economic theories. Mainstream economists criticize these two evolutionary schools for being unscientific. In turn, Marxist and Austrian economists criticize mainstream economics for ignoring evolutionary aspects of economies, e.g., learning by doing. When decision-makers use marginalist intellectual tools to help them formulate alternatives, they create the conditions for catastrophe. Marginalist efficiency cannot long compete against managerial excellence.”

was deleted.

Chapter 3, Pleasure and Pain, last paragraph, fourth sentence

“Relief is the state that arises from satisfying our most basic needs, contentment the one that arises from satisfying higher needs, and bliss the ideal state that arises from satisfying all of our needs.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“Relief is the state that arises from satisfying our most basic needs; contentment is the state that arises from satisfying our higher needs; and bliss is the ideal state that arises from satisfying all of our needs.”

Chapter 3, Alternatives to Pursuing Happiness, first paragraph, fourth sentence

“In economic parlance, they are happiness “satisficers” rather than “maximizers.””

was deleted.

Chapter 3, Trust, second and third paragraphs

“We form wealth producing organizations by forming relatively high fixed cost, relatively low variable cost trading relationships. The nature of these wealth producing organizations emerges from the complexities of trade and production.

In industrial age economies, the most prominent wealth producing organizations were business firms. In information age economies, business firms are less prominent. The need to adapt quickly to change creates the need to lower the fixed costs of trade. As these costs fall, business firms become less “firm.” In rapidly changing industries in which transportation and communications costs remain major factors, industrial clusters become more prominent than firms. Current examples of such clusters include Hollywood and the Silicon Valley. In industries in which transportation and communication costs are no longer major factors, the industry itself takes the leading role. Wall Street, The City, and Chicago’s pits are rapidly becoming “the international financial market.” Within these new organizations, “extraordinary” change is ordinary.”

was changed to:

“Wealth producing organizations emerge from relatively high fixed cost, low variable cost trading relationships. In industrial age economies, the most prominent form of wealth producing organization is the business firm. In information age economies, the pace of change makes business firms less prominent. The need to adapt quickly to change creates the need to lower the fixed costs of trade. As these costs fall, business firms become less “firm.” In rapidly changing sectors in which transportation and communications costs remain major factors, geographical clusters such as Hollywood and the Silicon Valley become more prominent than firms. In sectors in which transportation and communication costs are no longer major factors, the sector itself takes the leading role. Wall Street, The City, and Chicago’s pits are rapidly becoming “the international financial market.”

Chapter 3, Three Common Misbeliefs, first paragraph, fifth sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted “not as a learning-by-doing strategy but rather.”

Chapter 3, Three Common Misbeliefs, first paragraph, last sentence

“The Toyota system is much **more** than a collection of techniques for minimizing WIP inventories.”

was changed to:

“The Toyota system is a more than a collection of techniques for minimizing WIP inventories. **It is a strategy for learning by doing.**”

Chapter 3, Three Common Misbeliefs, third paragraph, last two sentences

“**Increasing competition may decrease** cooperation. **However**, increasing competition may **also** increase cooperation.”

was changed to:

“**When managerial excellence includes** cooperation, increasing competition may increase cooperation.”

Chapter 3, Three Common Misbeliefs, last paragraph, first sentence

Changed “**often** increases” to “**may** increase.”

Changes in Version 2004.06.02

Chapter 1, The Recursionist Strategy, third paragraph, last sentence

Changed “reviewing the **decision process**” to “reviewing the **results of the chosen alternative.**”

Chapter 1, The Recursionist Strategy, fourth paragraph, second sentence

Changed “**formation of a** speculative bubble” to “**the** speculative bubble.”

Chapter 1, The Recursionist Strategy, fourth paragraph, last sentence

Changed “creating knowledge” to “creating **and applying** knowledge.”

Chapter 1, The Recursionist Strategy, last paragraph, fourth and fifth sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The second is trust, which is essential for not only efficient exchange but also wise decision-making.⁴ And the third is the liberty to implement the alternative that makes the most productive use of our resources without unjustly interfering with others’ liberty to do the same.”

were changed to:

“The second is trust and the third is the liberty to implement the alternative that makes the most productive use of our resources without unjustly interfering with others’ liberty to do the same.”

Chapter 2, *Theories produce predictions and explanations.*, second paragraph, third through last sentences

“In order to be able to predict these systems in their chaotic mode, we would have to know initial conditions with infinite precision. Our inability to know initial conditions precisely limits our ability to predict the trajectory of the system, the “weather.” In the long term, the best we can hope to do is to predict the bounds of the trajectory, the “climate.””

were changed to:

“In their chaotic mode, tiny disturbances to these systems grow rapidly. In the long term, predicting “the weather” (trajectory in phase space) requires knowing initial conditions with infinite precision, which is impossible. The best we can hope to do is to predict the “climate” (bounds of the trajectory in phase space).”

Chapter 2, *Theories that explain are partial descriptions.*

“*Theories that explain are partial descriptions.* Ideally, a single theory explains and predicts everything about a system: theories that explain are simply theories that predict “written backwards.” We test theories that explain by how well they predict. Practically, theories that explain are partial descriptions of our world that we use to find problems to solve. We test theories by how well they perform their function. We test theories that explain by how well they help us find problems to solve.”

was deleted.

Chapter 2, *Theories are refinements of everyday thinking.*, second paragraph, third sentence

Added the Venn diagram label (1) to the end of the sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, Venn diagram

Modified the Venn diagram to show universal set as (U).

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Copied Venn diagram (see below).

Modified the Venn diagram to show only a single set of scientific theories.

Chapter 2, *Theories are refinements of everyday thinking.*, third and fourth paragraphs

“We refine the universal set of worldly knowledge, (1), by rejecting all worldly knowledge that we cannot express in words or symbols. What remains is the set of worldly narratives, (2).

“We refine the set of all narratives **that help us explain the world** by rejecting those that fail to meet **certain rules and standards of construction**. **We call narratives that conform to these rules “logical” and those that conform to these standards “elegant” or “beautiful.”** What remains is the set of philosophical theories.”

were changed to:

“We refine the universal set of worldly knowledge by rejecting all worldly knowledge that we cannot express in words or symbols. What remains is the set of worldly narratives, (2). We refine the set of **worldly** narratives by rejecting those that fail to meet standards **for logic and elegance**. What remains is the set of philosophical theories, (3). **We also refine worldly narratives by testing them against empirical standards. What remains is the set of scientific theories, (4).**”

Chapter 2, *Theories are refinements of everyday thinking.*, fifth and sixth paragraphs

“We refine the set of testable philosophical theories by rejecting those that fail to meet empirical standards for explaining. Unlike previous refinements, this one is an ongoing process that requires us not only to reject candidates but also to reject previously accepted theories in light of new information and newly accepted theories. Practically, we test philosophical theories by how well they help us find problems to solve. After rejecting philosophical theories that fail to meet our empirical criteria, we are left with the set of scientific theories that explain, (4). This set includes Darwin’s theory of evolution and Wegener’s theory of plate tectonics.

“We refine the set of narratives that predict by rejecting those that fail to meet empirical standards for predicting. This is a matter of producing and testing hypotheses. Like the previous refinement process, this one is an ongoing process, which requires us not only to reject candidates but also to reject previously accepted theories in light of new information and newly accepted theories. What remains is the set of scientific theories that predict, (5). Good researchers distinguish between these scientific theories and those that explain. When talking about scientific theories that predict but do not explain, they are careful to say that a set of factors *correlates with* rather than *causes* the result.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

were changed to:

“Much testing of worldly narratives has become the province of specialists. Specialists invent ever more sophisticated (1) tools for enhancing our senses, e.g., telescopes, microscopes, cloud chambers, and particle accelerators; (2) tools for enhancing our common sense, e.g., formal logic, algebra, analytical geometry, calculus, statistics, and computer simulation; and (3) procedures for testing, i.e., scientific methodologies.

“Most specialists today believe that science involves testing theories that produce predictions. This conception of science falls short of Einstein’s standard of refined everyday thinking, which produces not only predictions but also problems to solve. Specialists can meet Einstein’s standard by rejecting those philosophical theories that fail to meet empirical standards for finding problems to solve. What remains is the set of scientific theories that explain (4). This set includes Darwin’s theory of evolution and Wegener’s theory of plate tectonics. The wise distinguish between these theories and those that predict: when talking about scientific theories that predict but do not explain, they are careful to say that a set of factors *correlates with* rather than *causes* the result.

[4 set Venn diagram here.]

“Ideally, a single theory explains and predicts everything about a system: theories that explain are simply theories that predict “written backwards.” We test theories that explain by how well they predict. Practically, theories that explain are partial descriptions of our world that we use to find problems to solve. We test theories by how well they perform their function. We test theories that explain by how well they help us find problems to solve.”

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph, first sentence

Changed “Today, scientists” to “Physicists today.”

Chapter 2, Refining Recursionist Theories, fourth paragraph, last sentence

“*Teleonomic theories*, theories that look to our internal programming to explain what motivates us, satisfy both of these conditions.”

were changed to

“Theories that look to our internal programming to explain what motivates us, **which biologists call *teleonomic theories***, satisfy both of these conditions.”

Chapter 2, Refining Recursionist Theories, eleventh paragraph, last two sentences, twelfth paragraph, first two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Psychologist Abraham Maslow provides us a means of identifying our “becoming needs,” those things we need to become fully human.⁷ He identified these needs by finding the cause of physical and mental illness.

“Our physical needs emerge at the molecular level. Our need for oxygen, water, and nutrition arise from our molecular processes’ need for oxygen, water, and nutrition.”

were changed to

“Psychologist Abraham Maslow provides us with a means of identifying our physical and mental needs.⁷ Our physical needs for oxygen, water, and nutrition arise from our molecular processes’ needs for oxygen, water, and nutrition.”

Chapter 2, Refining Recursionist Theories, eleventh paragraph, sixth sentence

Changed “potentially misleading” to “misleading.”

Chapter 2, Practical Wisdom and Moral Science, second paragraph

“One of the most valuable results of this ongoing human research program was the invention of science. Science provides us with tested knowledge that is useful in living good lives. Many people believe that science also provides us with objective truth. The search for objective truth helps us to satisfy our spiritual need to be part of something greater than ourselves.”

was changed to:

“One of the most valuable results of this ongoing human research program was the invention of the division of labor. The division of labor in turn led to countless other inventions, including the invention of ever better scientific methodologies and technologies.”

Chapter 2, Practical Wisdom and Moral Science, third paragraph

“The essence of science is testing. Over the centuries the means of testing has evolved. The earliest scientists tested simple systems using nothing more than their unaided senses and common sense. Later scientists invented tools to enhance their senses. These tools include microscopes, telescopes, cloud chambers, particle accelerators, and gene mapping equipment. They also invented tools to enhance their common sense. These tools include calculus, statistics, and computer simulation.”

was deleted.

Chapter 2, footnote 8

Deleted “The Way that can be followed is not the true Way.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Merged this footnote with footnote 9.

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph, last sentence

Changed “seeking what is useful in helping us to predict” to “scientific theories that predict.”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph, last sentence

Changed “these models tend” to “they tend.”

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph, second sentence

Changed “Friedman’s” to “His.”

Chapter 5, Introduction, first paragraph, last two sentences

“A marginalist view of government tends to blind us to the possibility of increasing justice by increasing practical wisdom. Marginalist economics concerns self-interest, not ever more enlightened self-interest.”

were deleted.

The remaining paragraph was merged with the second paragraph.

Chapter 5, Conclusion, first paragraph, second sentence

“We can see this distinction in manufacturing, where those who see inventory control in terms of the EOQ model favor highly centralized production control (e.g., MRP systems) and those who see it in terms of the rapid tool-setting model favor more decentralized control (e.g., the Toyota Production System).”

was changed to:

“We can see this distinction in manufacturing, where those who see inventory control in terms of the EOQ model favor MRP and MRP II systems and those who see it in terms of the rapid tool-setting model favor the Toyota Production System.”

Changes in Version 2004.06.04

Chapter 1, The Recursive Strategy, second paragraph

“We solve such open-ended problems by finding progressive processes that we can apply recursively (repetitively). The obvious choice here is decision-making,

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

understood as the process that begins with finding a problem to solve and ends with reviewing the results of the chosen alternative.”

was changed to:

“We solve open-ended problems by **repeatedly applying** progressive processes, **processes that move us ever closer to the solution**. The obvious choice **for a progressive process to solve this open-ended problem** is decision-making, understood as the process that begins with finding a problem to solve and ends with reviewing the results of the chosen alternative.”

Chapter 1, The Recursionist Strategy, last paragraph, third sentence

Changed “our ability to **think clearly, choose prudently, and behave continently**” to “our **willingness and** ability to **act wisely**.”

Chapter 2, Theories produce predictions and explanations., fifth paragraph

“Consider the problem of **managing the production** of a product that has large variations in **sales volume**. **The most obvious problem is determining how to improve sales volume predictions**. Better predictions of **sales volume** may lead us to more efficient production schedules. In contrast, better explanations may lead us to better (more effective) problems to solve. **With a better explanation, we might find ways to decrease variations in sales volumes, such as helping customers manage their inventories or offering discounts on contracts with long delivery times. We also might find ways to keep our production capacity filled during slack times, such as finding new uses for the product or finding new products to fill unused production capacity.** For example, to keep sponge cake machinery busy during the off-season for strawberries, James Dewar invented the Hostess Twinkie. **Finally, we might find ways to reorganize our manufacturing process so that we can produce efficiently over a wide range of sales volumes.** In current business vernacular, better explanations help us to “think outside the box.””

was changed to:

“Consider the problem of **producing** a product that has large variations in **demand**. Better predictions of **demand** may lead us to more efficient production schedules. In contrast, better explanations may lead us to better (more effective) problems to solve. For example, to keep sponge cake machinery busy during the off-season for strawberries, James Dewar invented the Hostess Twinkie. In current business vernacular, better explanations help us to “think outside the box.””

Chapter 2, Theories produce predictions and explanations., sixth paragraph, second through fourth sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Economics differs from the physical sciences in that theories about our behavior tend to be self-fulfilling. We saw this in the EOQ model example, where the assumption that we do not learn from experience tended to blind us to the possibility of learning through experience. This self-fulfilling property of theories creates the need to separate economic theories into those that predict and those that explain:”

were deleted.

Chapter 2, *Theories produce predictions and explanations.*, sixth paragraph, last sentence

“Again, we need to explain based not on *how we expect we will act*, but on *how the wise would act*.”

was deleted.

Chapter 2, *Theories are refinements of everyday thinking.*, fourth paragraph, first sentence

Changed “specialists **in testing**” to “specialists.”

Chapter 2, Refining Recursionist Theories, eleventh paragraph, third sentence

Changed “Psychologist Abraham Maslow” to “**For example**, psychologist Abraham Maslow.”

Chapter 2, Refining Recursionist Theories, eleventh paragraph, fourth through last sentences

“In contrast, our mental needs arise from our minds, not from the molecular processes of our brain cells. **The molecular processes of our brain cells have no need for love or self-respect. This suggests that we should eliminate any theory that attributes human motivation to a single level of abstraction. Although such theories can appear to explain much, their incompleteness makes them misleading. They too often fail to help us find the most effective problem to solve. Our teleonomic theories should not focus on our bodies, minds, *or* spirits **but rather** on our bodies, minds, *and* spirits.**”

were changed to:

“In contrast, our mental needs **for love and self-respect** arise from our minds, not from the molecular processes of our brain cells. ***We ought to eliminate any theory that attributes human motivation to a single level of abstraction.*** Teleonomic theories should focus on our bodies, minds, ***and*** spirits, **not** on our bodies, **on our** minds, ***or on our*** spirits.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Practical Wisdom and Moral Science, second and third paragraphs, first sentence

Changed “evolution in human systems” to “evolving human systems.”

Chapter 2, footnote 8, second paragraph, last sentence

“For example, a simplifying assumption about capital markets within the widely used Black-Scholes option pricing model causes those who use it to underestimate the risks of investing in less than perfect capital markets.”

were changed to

“For example, by blinding users to the risk of market failure, a simplifying assumption in the Black-Scholes option pricing model created the late twentieth century developing market bubble.”

Chapter 3, *Vicious and Virtuous Circles*, second and third paragraphs, first sentence

Changed “itself, but” to “itself but.”

Chapter 3, *Vicious and Virtuous Circles*, second paragraph, last sentence

“They want the pleasure of swimming for itself, but also want it because it makes them want an activity that satisfies a current need.”

was changed to:

“They want the pleasure of swimming not only for itself but also because it makes them want an activity that satisfies a current need.”

Chapter 3, Two Means of Pursuing Happiness, fourth paragraph, last sentence

“Not surprisingly, the world’s Alexanders prefer Aristotle’s ethics, while the world’s Einsteins prefer Spinoza’s.”

was changed to:

“Not surprisingly, aspiring Alexanders prefer Aristotle’s ethics and aspiring Einsteins prefer Spinoza’s.”

Chapter 3, Profits, first sentence

“Profits are the result of acting wisely. The profits from consuming wisely are just as real as those from trading or producing wisely. In the words of Benjamin Franklin, “A

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

penny saved is a penny earned.” To live wisely is to seek to live ever more wisely. We ought to be entrepreneurs in the business of life.”

was changed to:

“**We profit from** acting wisely. The profits from consuming wisely are just as real as those from trading or producing wisely. In the words of Benjamin Franklin, “A penny saved is a penny earned.”

“To live wisely is to seek to live ever more wisely. We ought to be entrepreneurs in the business of life.”

Chapter 4, Increasing Managerial Excellence, third paragraph

“Each **implementation of better means** causes a ripple of change to flow through an economy. These ripples **can** interfere with one another in unpredictable ways. For example, **because** the simultaneous rise in the price of steel and **the** fall in the price of plastic **creates a bigger shock than if these two events occur sequentially, this combination of events** is likely to cause a more rapid substitution of plastic for steel. **Increasing managerial excellence causes turbulence in the flow of economic resources.**”

was changed to:

“Each **increase in managerial excellence** causes a ripple of change to flow through an economy. These ripples interfere with one another in unpredictable ways. For example, the simultaneous rise in the price of steel and fall in the price of plastic is likely to cause a more rapid substitution of plastic for steel **than if the price of steel rises a week after the price of plastic falls.**”

Chapter 4, Increasing Managerial Excellence, fourth paragraph, first sentence

“**Implementing better means** has both deflationary and inflationary effects. In itself, a better means increases the amount or quality of goods, and so is deflationary. However, implementing it requires reallocating resources, a process that uses scarce resources without increasing output, and so is inflationary. Because the cost of reallocating resources tends to overwhelm the benefit of the new means in the short run, **implementing better means tends** to create a “bow wave” of inflation. The greater the cost of reallocating resources, the greater this bow wave is likely to be.”

was changed to:

“**Increasing managerial excellence** has both deflationary and inflationary effects. In itself, a better means **either decreases the demand for goods and services or increases the amount or quality of goods and services available for sale**, and so is deflationary. However, implementing it requires reallocating resources, a process that uses scarce

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

resources without increasing output, and so is inflationary. Because the cost of reallocating resources tends to overwhelm the benefit of the new means in the short run, **increasing managerial excellence** tends to create a “bow wave” of inflation. The greater the cost of reallocating resources, the greater this bow wave is likely to be.”

Chapter 4, Increasing Managerial Excellence, fifth, first sentence

Changed “innovation” to “increasing managerial excellence.”

Chapter 4, Increasing Managerial Excellence, last two paragraphs

The order of these paragraphs was reversed.

Chapter 4, Economic Turbulence, third and fourth paragraphs

“Economic turbulence wastes time and other resources. **Hence, economic agents can profit by reducing it. Capturing the benefit of reducing turbulence may require trading with those hurt by it. For example, where information about future production requirements allows vendors to increase excellence by reducing turbulence, customers can trade longer delivery periods for price concessions.**

“Capturing the benefit of reducing turbulence requires knowledge of how to do so. When capturing this benefit requires trading with those hurt by turbulence, it also requires the trust necessary to make such trades. Ignorance of means of trade and mistrust in potential trading partners’ willingness or ability to live up to their role in the means of trade constrain us from reducing turbulence.”

were changed to:

“Economic turbulence wastes time and other resources. **Reducing it is beneficial.** Capturing the benefit of reducing turbulence requires knowledge of how to do so. When capturing this benefit requires trading with those hurt by turbulence, it also requires the trust necessary to make such trades. Ignorance of means of trade and mistrust in potential trading partners’ willingness or ability to live up to their role in the means of trade constrain us from reducing turbulence.”

Chapter 4, Economic Fluidity, fifth paragraph, last sentence

“(Such compensation systems address John Maynard Keynes’s problem of “sticky wages.”)”

was deleted.

Chapter 5, Decentralization, first paragraph, first two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Learning how to progress toward our ultimate ends ever more wisely, like learning how to manufacture batches of different goods ever more wisely, is an infinitely large, amorphous problem. Such problems yield more readily to many average minds acting in unison to a few exceptional minds directing many hands.”

were changed to:

“The Toyota experience teaches us that collective ignorance yields more readily to jazz harmony than to formal orchestration.”

Chapter 5, *Consider the Justice of Interventions*, second paragraph, second sentence

Changed “From this perspective” to “Further.”

Chapter 5, *Control the Money Supply Passively*, second paragraph, second sentence

“Monetary authorities ought to choose the policy that increases the quality of decision-making most efficiently.”

was deleted.

Chapter 5, *Free Association*, first paragraph, last sentence

Changed “countervailing” to “less noble.”

Changes in Version 2004.06.08

Chapter 5, *Conclusion*, second paragraph, first sentence

“From the recursionist perspective, all current economic theories, including those of the modern Austrians, are too simple in that they include the assumption that “consumer preferences” are either fixed or change in ways that are independent of economic policy.”

was changed to:

“All current economic theories, including those of the Austrian school, are too simple in that they include the assumption that “consumer preferences” are either fixed or change in ways that are independent of economic policy.”

Chapter 5, *Conclusion*, second paragraph, second sentence

Deleted “and MRP II.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 5, Conclusion, third paragraph, first sentence

“In a just system, our right to choose cannot be separated from our responsibility to live wisely.”

was changed to:

“We cannot separate our right to choose from our responsibility to live wisely.”

and appended to the end of the second paragraph.

Appendix B, Introduction, third paragraph

Inserted the paragraph:

“Materialists find support for their position in analytical science, science that reduces the world to elemental parts and basic principles. The greatest mystery here is what lies behind and beneath quantum level phenomena. Dualists find support for their position in synthetic science, science that focuses on how structures and phenomena emerge from the interactions of elemental parts and basic principles. Here, the greatest mystery is what lies behind and beyond consciousness. Beneath and beyond both great mysteries is an even greater one: does what lies beyond our consciousness connect us to what lies beneath quantum level phenomena?”

Changes in Version 2004.06.10

Preface, third paragraph, second sentence

Changed “means of refining” to “strategy for refining.”

Chapter 2, Refining Everyday Thinking, first paragraph, first sentence

Changed “slowly tightening a loose theory of means” to “refining our ultimate ends.”

Chapter 2, *Theories produce predictions and explanations.*, second paragraph, third sentence

“In their chaotic mode, tiny disturbances to these systems grow rapidly.”

was deleted.

Chapter 2, *Theories produce predictions and explanations.*, third paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “.” to “.”

Chapter 2, Refining Recursionist Theories, title

Changed “Recursionist Theories” to “Ultimate Ends.”

Chapter 2, Refining Ultimate Ends, fifth paragraph, fifth sentence

Changed “*fully realized*” to “fully realized.”

Chapter 2, Refining Ultimate Ends, sixth paragraph, last two sentences

“Rather than basing evolutionary explanations on what we currently want, which ignores the possibility of solving problems by learning to live more wisely, we can base them on the set of all teleonomic theories. Over time we can tighten these loose explanations by eliminating members of this set.”

were returned to standard formatting.

Chapter 2, Refining Ultimate Ends, seventh paragraph, fourth sentence

Changed “**In contrast**, temporal ends” to “**T**emporal ends.”

Chapter 2, Practical Wisdom and Moral Science, third paragraph

“Scientists have long struggled with how best to study evolving systems. **Studying** evolving **human** systems **is especially difficult in** that **we** humans use intellectual **models** to **help us** formulate alternatives. The difficulty **here** is that there is a reflexive / recursive relationship between normative models and reality: We base normative models on reality. Our actions change reality.”

were changed to:

“Scientists have long struggled with how best to study evolving systems, **particularly** evolving systems that **involve humans** using intellectual **tools** to formulate alternatives. The **great** difficulty **in studying these human systems** is that there is a **complex** (reflexive / recursive) relationship between normative models and reality: We base our normative models on reality. Our actions change reality.”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph, second sentence

Changed “**complex** interplay” to “interplay.”

Chapter 2, eighth footnote, first paragraph, first two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Western philosophers associate the second tendency with George Hegel. Chinese philosophers associate it with Lao Tzu. *Arguably, the Tao Te Ching opens:*”

were changed to:

“Western philosophers associate the second tendency with George Hegel’s *internal contradictions of theories*. Chinese philosophers associate it with Lao Tzu:”

Chapter 2, eighth footnote, second paragraph, last two sentences

“This is not to say that speculative bubbles *caused by* common assumptions are rare. *For example, by blinding users to the risk of market failure*, a simplifying assumption in the Black-Scholes option pricing model created the late twentieth century developing market bubble.”

were changed to:

“This is not to say that speculative bubbles *based on* common assumptions are rare. *Arguably*, a simplifying assumption in the Black-Scholes option pricing model created the late twentieth century developing market bubble *by blinding users to the risk of markets failing to clear*.”

Chapter 5, Moral Vision, second paragraph, fourth sentence

Changed “as *we accumulate commonwealth (commonweal / general welfare)*” to “as *the general level of wealth rises*.”

Chapter 5, Just Taxation, sixth paragraph, first sentence

“A just system ensures both minimum standards of welfare and ever wiser means of *producing commonwealth*.”

was changed to:

“A just system ensures both minimum standards of *individual* welfare and ever wiser means of *raising the general level of welfare*.”

Chapter 6, first paragraph, last two sentences

“*To progress readily, we need recursionist theories, theories that produce loose evolutionary explanations of means founded on teleonomic theories of ends. Over time, we can tighten recursionist theories and the explanations they produce by discovering more about our needs and the best means of satisfying them.*”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We need a strategy for learning what it is we ought to seek and how best to do so.”

Chapter 6, second paragraph

“Recursionist theories differ markedly from current economic theories. Where current marginalist microeconomic theories help us evaluate alternatives, recursionist theories help us formulate them. And where current macroeconomic theories attempt to help government officials achieve their ends, recursionist theories help officials design decision strategies to help all of us pursue happiness with a minimum amount of wasteful turbulence in the flow of resources. They tell us that we should judge the interventions of governments rather than the actions of individuals and that we should err on the side of not intervening justly rather than intervening unjustly. Equally important, they remind us that wise decision-making requires moral vision.”

was changed to:

“The recursionist strategy differs markedly from current economic theories. Where current marginalist microeconomic theories help us evaluate alternatives, the recursionist strategy helps us formulate them. And where current macroeconomic theories attempt to help government officials achieve their ends, the recursionist strategy helps policy makers design decision strategies to help all of us pursue happiness with a minimum amount of wasteful turbulence in the flow of resources. It tells us that policy makers should judge interventions rather than the actions of individuals and that they should err on the side of not intervening justly rather than intervening unjustly. Equally important, it reminds us that wise decision-making requires moral vision.”

Changes in Version 2004.06.12

Chapter 2, Refining Ultimate Ends, ninth paragraph, second sentence

Changed “From this perspective” to “Hence.”

Chapter 2, Refining Ultimate Ends, first paragraph, last sentence

“The only school of economics that comes close to producing such theories is the Austrian school of evolutionary economics.”

was appended to the second paragraph and changed to:

“The Austrian school of evolutionary economics comes close to producing such theories.”

Chapter 2, Refining Ultimate Ends, fourth paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“To do so, the explanations that we use to **help us** satisfy our needs and **the explanations** that we use to **define** our needs must both fit together and work together.”

was changed to:

“To do so, the explanations that we use to **think about how best to** satisfy our needs and **those** that we use to **identify** our needs must both fit together and work together.”

Chapter 2, Refining Ultimate Ends, second to last paragraph, last sentence

“**Teleonomic theories should** focus on **our** bodies, minds, *and* spirits, not on our bodies, on **our** minds, *or* on **our** spirits.”

was made into a new paragraph and changed to:

“**When considering what they need to live a good life, the wise** focus on **their** bodies, minds, *and* spirits, not on **their** bodies, on **their** minds, *or* on **their** spirits.”

Chapter 3, Pleasure and Pain, fourth paragraph, last two sentences

“Finding pleasure in an activity can improve the performance of that activity. Becoming absorbed in **swimming** can help **competitive swimmers swim faster**. **Performance** usually suffers when something painful, such as a **sore shoulder**, interferes with becoming absorbed in **swimming**. Similarly, becoming absorbed in **thinking makes it easier to solve problems**. We **are** usually **less able to solve a problem if** something painful, such as a headache, impedes losing ourselves in **thinking**.”

were changed to:

“Finding pleasure in an activity can improve the performance of that activity. Becoming absorbed in thinking can help **us think better**. **Our ability to think clearly** usually suffers when something painful, such as a headache, interferes with becoming absorbed in thinking. Similarly, becoming absorbed in **a sporting activity helps us perform better**. We usually **perform less well when** something painful, such as a sore shoulder, impedes losing ourselves in **sport**.”

Chapter 4, Avalanche Catastrophes, last paragraph, last sentence

Changed “As Benjamin Franklin wrote” to “As Benjamin Franklin wrote **to the Governor of Pennsylvania in 1755**.”

Chapter 6, third paragraph, first sentence

Changed “moral vision **inherent in recursionist economics**” to “**recursionist** moral vision.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Appendix B, Introduction, third paragraph

Changed “consciousness” to “normal consciousness” in all.

Changes in Version 2004.06.15

Acknowledgments, last paragraph, end

Added the following:

“Hayek warned us to beware of scientism. The Oxford English Dictionary defines scientism as “a term applied (freq. in a derogatory manner) to a belief in the omnipotence of scientific knowledge and techniques; also to the view that the methods of study appropriate to physical science can replace those useful in other fields such as philosophy and, esp., human behaviour and the social sciences.” Given the work of such skeptics as David Hume, Frank Knight, Karl Popper, Thomas Kuhn, Imre Lakatos, and Paul Feyerabend, I prefer to define scientism as the magical quest for objective truth, a God’s eye view of the Universe, solely by means of understanding isolated bits amenable to complete understanding. Scientism is true belief in scientific analysis.”

Chapter 2, *Theories are refinements of everyday thinking.*, fifth paragraph, third sentence

Changed “Specialists can meet” to “These specialists can rise to.”

Chapter 2, *Theories are refinements of everyday thinking.*, sixth paragraph, third sentence

Changed “partial descriptions of our world” to “partial descriptions of reality.”

Changes in Version 2004.06.22

Chapter 4, A Crude Look at the Whole, last paragraph

“We ought to learn to thrive in winds and survive in gales of creative destruction.”

was changed to:

“Conclusion

During the last half of the twentieth century many intellectuals preached that (1)

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

wealth is consumer goods and the capacity to produce consumer goods; (2) the *wealthy* are willing to give up some wealth producing liberty in order to purchase economic security and (3) socialism would eliminate what Joseph Schumpeter called capitalism's "gales of creative destruction."

"These widely-held beliefs are not the most useful for progressing toward the ultimate end of reverence for life. More useful are the beliefs that (1) wealth is what we need to progress toward the ultimate end of reverence for life; (2) the *wise* are willing to accept economic turbulence as a regrettable consequence of progress; and (3) socialism postpones turbulence by retarding progress, which is unwise as well as unjust.

"We ought to learn to live ever more wisely. We ought to learn to thrive in winds and survive in gales of creative destruction.

Changes in Version 2004.06.28

Acknowledgments, last paragraph, second to last sentence

Added "George Soros."

Chapter 3, Pleasure and Pain, second paragraph, end

Added the sentence:

"We commonly refer to pleasure-in-acting as "pleasure" and pleasure-in-being as "joy.""

Chapter 3, Pleasure and Pain, last paragraph, third sentence

"Pleasure-in-being, which we commonly call "joy," ranges from relief to bliss."

was changed to:

"Joy ranges from relief to bliss."

Chapter 3, Alternatives to Pursuing Happiness, last paragraph, last sentence

"In the Taoist tradition, yin corresponds to pursuing pleasure-in-being (joy); yang corresponds to pursuing pleasure-in-acting (pleasurable activity); and the balance of yin and yang corresponds to pursuing happiness."

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“In the Taoist tradition, yin corresponds to pursuing joy (pleasure-in-being); yang corresponds to pursuing pleasure (pleasure-in-acting); and the balance of yin and yang corresponds to pursuing happiness.”

Chapter 3, Pleasure and Pain, entire chapter

Changed “pleasure-in-acting” to “pleasure.”

Changed “pleasure-in-being” to “joy.”

with exceptions noted above.

Appendix B, Introduction, third paragraph

“Materialists find support for their position in analytical science, science that reduces the world to elemental parts and basic principles. The greatest mystery here is what lies behind and beneath quantum level phenomena. Dualists find support for their position in synthetic science, science that focuses on how structures and phenomena emerge from the interactions of elemental parts and basic principles. Here, the greatest mystery is what lies behind and beyond normal consciousness. Beneath and beyond both great mysteries is an even greater one: does what lies beyond our normal consciousness connect us to what lies beneath quantum level phenomena?”

was reduced to a footnote to the second paragraph and changed to:

“Materialists find support for their position in analytical science, science that reduces the world to elemental parts and basic principles. The greatest mystery here is what lies behind and beneath quantum level phenomena. Dualists find support for their position in synthetic science, science that focuses on how structures and phenomena emerge from the interactions of elemental parts and basic principles. Here, the greatest mystery is what lies behind and beyond normal consciousness. Beneath and beyond both great mysteries is an even greater one: does what lies beyond our normal consciousness connect us to what lies beneath quantum level phenomena?”

“Foolish materialists claim that such recent developments in biology as the creation of a virus containing synthetic genetic material prove the materialist case. The dualist counter is that the potential for life exists everywhere. Wise materialists claim that their view is more scientific because materialist assumptions are easier to disprove than dualist assumptions are. Wise dualists counter that this does not mean that materialist assumptions are true, only that they have yet to be proven false.”

Appendix B, Introduction, last paragraph, first sentence

“If we seek what is true in the way that mainstream economists use this term, the materialist and dualist belief systems are irreconcilable: If the fundamental materialist proposition that no part of us survives the death of our bodies is true, then the

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

fundamental dualist proposition that some part of us survives the death of our bodies must be false.”

was changed to:

“*If we seek what is true*, the materialist and dualist belief systems are irreconcilable. If the fundamental materialist proposition that no part of us survives the death of our bodies is true, then the fundamental dualist proposition that some part of us survives the death of our bodies must be false.”

Appendix B, Introduction, last paragraph, last sentence

“**However, if we seek what is useful**, we can reconcile these two logically incompatible belief systems by finding a common ultimate end.”

was made into a new paragraph and changed to:

“*If instead we seek what is useful*, we can reconcile these two logically incompatible belief systems by finding a common ultimate end.”

Changes in Version 2004.06.29

Chapter 5, Conclusion

Inserted the section on foreign policy.

Afterword, last paragraph, last sentence

Changed: “an end **in itself** rather than a **means to justice**” to “an end rather than a **critical factor in wise decision-making**.”

Changes in Version 2004.06.30

Preface, last paragraph, last sentence

Changed: “in Congregationalist Sunday school” to “from my parents.”

Acknowledgments, fifth paragraph, last sentence

“I was too shy and too upset to raise this **question** with Gordon, who likely would have directed me to Friedman’s *The Methodology of Positive Economics*. This

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

question quietly dogged me through business school and on through a business career turning around a small business systems company and managing information systems and human resources for a highly successful computer paper manufacturing firm.”

was changed to:

“I was too shy and too upset to raise this **issue** with Gordon, who likely would have directed me to **Milton** Friedman’s *The Methodology of Positive Economics*. This **issue** quietly dogged me through business school and on through a business career turning around a small business systems company and managing information systems and human resources for a highly successful computer paper manufacturing firm.”

Acknowledgments, last paragraph, second to last sentence

Changed: “bits” to “parts.”

Chapter 2, Refining Ultimate Ends, last sentence

Added the following footnote:

“^s True believers in scientific analysis will deny this. They believe that we can understand complex adaptive systems completely by understanding the smallest parts completely. The more enlightened true believers recognize that phenomena worthy of attention emerge at higher levels of abstraction, but deny that what emerges at higher levels can affect the lowest level. We can test this belief. We can test whether the willful acts of our minds can affect our brain chemistry. We also can test whether macroeconomic policies can affect the culture underlying microeconomic behavior.”

Chapter 2, Foreign Policy, title

Changed title to “International Cooperation.”

Chapter 5, Conclusion

“Economist Thomas Sowell observes that those who view the world as being relatively simple tend to support centralization and those who view it as relatively complex tend to support decentralization.² We can see this distinction in manufacturing, where those who see inventory control in terms of the EOQ model favor MRP systems and those who see it in terms of the rapid tool-setting model favor the Toyota Production System. This conflict is one of vision, of how people perceive the world. The centralizers perceive a world filled with simple problems that are not being solved, hence they desire to give someone who recognizes the problems they see the power to solve them. In contrast, the decentralizers perceive a world filled with complex problems, which are best solved through decentralization.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“All current economic theories, including those of the Austrian school, are too simple in that they include the assumption that “consumer preferences” are either fixed or change in ways that are independent of economic policy. Relaxing this simplifying assumption strengthens the case for decentralization. However, the case for decentralization itself depends on the assumption that we seek to live wisely. We cannot separate our right to choose from our responsibility to live wisely.

“In theory, we naturally seek to live wisely, which gives us the natural right to choose how best to do so. In practice, the greater our propensity to live wisely, the more freedom we deserve. The strategy put forth in this work aims to increase this propensity.”

was changed to:

“In previous chapters we learned that non-knowledge resources are poor substitutes for inexhaustible knowledge resources. We increase excellence by replacing non-knowledge resources with knowledge resources.

“If we all were to choose wisely all of the time, no government would be necessary. Government is a substitute for practical wisdom.

“Non-knowledge government resources are poor substitutes for the inexhaustible knowledge resource of practical wisdom. We increase excellence by replacing non-knowledge government resources with practical wisdom.”

Appendix A, Ever Leaner Production, last paragraph, last sentence

Changed: “a bit about” to “something about.”

Afterword, fourth paragraph, third sentence

“**For example, several years ago there was** a series of commuter airline crashes.”

was changed to:

“**We can see this distinction in manufacturing, where those who see inventory control in terms of the EOQ model favor MRP systems and those who see it in terms of the rapid tool-setting model favor the Toyota Production System. We can also see it in the response to a series of commuter airline crashes several years ago.**”

Afterword, fifth paragraph

Inserted the paragraph:

“From this perspective, all current economic theories, including those of the Austrian school, are too simple in that they include the assumption that “consumer preferences”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

are either fixed or change in ways that are independent of economic policy. Relaxing this simplifying assumption strengthens the case for decentralization. However, the case for decentralization itself depends on the assumption that we seek to live wisely. We cannot separate our right to choose from our responsibility to live wisely.”

Afterword, last paragraph, first sentence

“My **information age** political and cultural position is difficult to describe to those **with an industrial age vision.**”

was changed to:

“My political and cultural position is difficult to describe to those **who do not share my information age perspective.**”

Afterword, end

Inserted three paragraphs on religion and reductionism.

Changes in Version 2004.07.09

Chapter 1, The Recursionist Strategy, fourth paragraph

Changed “embed pockets of ignorance” to “can embed mistakes” in the first sentence.

Changed “ignorance” to “mistakes” in the balance of the paragraph.

Chapter 5, Introduction, first paragraph, first two sentences

“**The normative end of government is justice. From the recursionist perspective put forth in this work, government policy makers administer justice by** deciding who makes what decisions under what incentives.”

were changed to:

“**We increase excellence by replacing non-knowledge resources with knowledge resources. Government policy makers help us increase excellence by administering justice, which is a matter of** deciding who makes what decisions under what incentives. Excellence in administering justice is a matter of continuously improving the quality of decision-making.”

Chapter 5, Introduction, second paragraph, last sentence

Changed “and just taxation” to “**international cooperation,** and just taxation.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 5, Just Taxation, fifth paragraph

“The case for eliminating personal income taxes is more problematic. If we were as lucid as angels, we would share our wealth wisely. There would be no need for governments to force us to do so. We are not as lucid as angels. This does not mean that we ought to demand that governments force us to share our wealth. Rather we ought to demand that governments encourage us to become ever more lucid.”

was changed to:

“The case for eliminating personal income taxes is more problematic. It is also more enlightening in that it gets to the heart of the reason that we have governments.

“If we were as lucid as angels, if we were to choose wisely all of the time, no government would be necessary. *Government is an imperfect substitute for perfect practical wisdom.*

“If we were as lucid as angels, we would share our wealth wisely. There would be no need for governments to force us to do so. Unfortunately, we are not as lucid as angels. This does not mean that we ought to demand that governments expend non-knowledge resources in order to force us to share our wealth. Non-knowledge government resources are poor substitutes for the inexhaustible knowledge resource of practical wisdom. We ought to demand that governments encourage us to become ever more lucid.”

Chapter 5, Just Taxation, fifth paragraph, second to last sentence

Changed “government program” to “government safety net program.”

Chapter 5, International Cooperation, first paragraph

“The world of nation states is not a global village. Nation states are not leviathans with human characteristics. Nevertheless, the basic principles underlying international affairs are the same as those underlying domestic affairs. The governments of nation states ought to consider the justice of intervening in the affairs of other states rather than the justice of the actions of other states. They also ought to consider the great benefits of living under the rule of international law as opposed to the rule of nation states. Most importantly, international cooperation ought to be a means to wise decision-making and not an end in itself.”

was changed to:

“Nation states are not leviathans with human characteristics living in a global village. Nevertheless, the basic principles underlying international affairs are the same as those underlying domestic affairs. Government officials ought to consider the justice of intervening in the affairs of other states rather than the justice of the actions of other

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

states. They ought to consider the **advantages** of living under the rule of international law rather than the rule of nation states. Most importantly, **they ought to consider** international cooperation to be a means **of improving the quality of** decision-making and not an end in itself.”

Chapter 5, International Cooperation, second paragraph, second sentence

“Inevitably, **the forces of** hedonism and tradition will cynically accept the mission **of improving decision-making** while **crippling** the means **to fulfill** it.”

was changed to:

“Inevitably, **groups dominated by** hedonism and tradition will cynically accept the **most lucid of** missions while **denying** the means **of accomplishing** it.”

Chapter 5, International Cooperation, second paragraph, fourth sentence, end

Added: “, which mocked the Preamble.”

Chapter 5, International Cooperation, second paragraph, last sentence

“**The only ignorance as** difficult to **remove as** ignorance locked into **Constitutional law is** ignorance locked into **widely held interpretations of Divine law.**”

was deleted.

Chapter 5, International Cooperation

This section was moved ahead of the Just Taxation section.

Chapter 5, Conclusion

“In previous chapters we learned that non-knowledge resources are poor substitutes for inexhaustible knowledge resources. We increase excellence by replacing non-knowledge resources with knowledge resources.

“If we all were to choose wisely all of the time, no government would be necessary. Government is a substitute for practical wisdom.

“Non-knowledge government resources are poor substitutes for the inexhaustible knowledge resource of practical wisdom. We increase excellence by replacing these resources with practical wisdom.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Government policy makers administer justice by deciding who makes what decisions under what incentives. Excellence in administering justice is a matter of continuously improving the quality of decision-making, *which includes increasing excellence by replacing non-knowledge government resources with practical wisdom.* Until we understand this and choose our policy makers accordingly, we will not get the kind of government that encourages the better angels of our natures.”

Afterword, eleventh paragraph, first sentence

Added “(Appendix B).”

Appendix B, first footnote, second paragraph, last sentence

Changed “Wise dualists counter” to “The wise dualist counter is.”

Changes in Version 2004.07.10

Acknowledgments, fifth paragraph, last sentence

“This issue quietly dogged me through business school and on through a business career turning around a small business systems company and managing information systems and human resources for a highly successful computer paper manufacturing firm.”

was changed to:

“This issue quietly dogged me through business school and on through my business career.”

Chapter 1, title quotation, attribution

Added the footnote:

¹ Jaspers, Karl, *Socrates, Buddha, Confucius, Jesus*, (New York: Harcourt Brace Jovanovich, 1962), 52.”

Chapter 2, eighth footnote, third sentence

Changed “but deny” to “but they deny.”

Chapter 3, title quotation, attribution

Added the footnote:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

¹ *The Bhagavad Gita*. Trans. Barbara Stoler Miller. (New York: Bantam Books, 1986), fourteenth teaching, paragraph 18.”

Chapter 4, title quotation, attribution

Added the footnote:

¹ Richardson, Lewis F., *Weather Prediction by Numerical Processes*, (London: Cambridge University Press, 1922).”

Chapter 5, title quotation, attribution

Changed attribution from “*James Madison*” to “*Publius*.”

Added the footnote:

¹ *The Federalist Papers*, No. 51. Note that historians cannot agree on whether James Madison or Alexander Hamilton wrote the *New York Packet* article of February 8, 1788 titled “The Structure of the Government Must Furnish the Proper Checks and Balances Between the Different Departments.””

Afterword, title quotation, attribution

Added the footnote:

¹ Pierson, George W., *Tocqueville and Beaumont in America*, (New York: Oxford University Press, 1938), 119.”

Appendix A, title quotation, attribution

Added the footnote:

¹ Browning, Robert, “Andrea Del Sarto,” in *Robert Browning: A Critical Edition of the Major Works* (Oxford and New York: Oxford University Press, 1977), line 78.”

Afterword, eleventh paragraph, first sentence

Added “(Appendix B).”

Changes in Version 2004.07.20

Preface, seventh paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**is likely to** be resisted by **intellectuals**” to “**will** be resisted by **scholars**” in the first sentence.

Changed “**Only a strategy for solving an open-ended problem**” to “**A strategy**” in the fifth sentence.

Acknowledgments, fifth paragraph, last sentence

“This issue quietly dogged me through business school and on through **a business career turning around a small business systems company and managing information systems and human resources for a highly successful computer paper manufacturing firm.**”

was changed to:

“This issue quietly dogged me through business school and on through **my** business career.”

Acknowledgments, last paragraph, third sentence

“Hayek **warned us to beware of** scientism.”

was changed to:

“Hayek **condemned** scientism.”

Acknowledgments, last paragraph, second to last sentence

“**Given the work of such skeptics as David Hume, Frank Knight, Karl Popper, Thomas Kuhn, Imre Lakatos, Paul Feyerabend, and George Soros, I prefer to define scientism as the magical** quest for objective truth, a God’s eye view of the Universe, solely by means of understanding isolated parts amenable to complete understanding.”

was changed to:

“**Members of the cult of scientism satisfy their human need for mystical oneness by pursuing a quixotic** quest for objective truth, a God’s eye view of the Universe, solely by means of understanding isolated parts amenable to complete understanding.”

Chapter 2, eighth footnote, last six sentences

“True believers in scientific analysis **will deny this. They believe that we can understand complex adaptive systems completely by understanding the smallest parts completely. The more enlightened true believers recognize that phenomena worthy of attention emerge at higher levels of abstraction, but they deny that what emerges at higher levels can affect the lowest level. We can test this belief. We can test whether**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

the willful acts of our minds can affect our brain chemistry. We also can test whether macroeconomic policies can affect the culture underlying microeconomic behavior.”

were changed to:

“True believers in scientific analysis (reductionism) deny a core belief of scientific synthesis (holism), which is that phenomena that emerge at higher levels of abstraction can affect what happens at the lowest level of abstraction. To reject useful theories simply because they conflict with a key assumption of the reductionist research program is foolish. Further, to reject any theory because it conflicts with the reductionist research program is unscientific. Science involves rejecting theories by disproving hypotheses, not by whether they fit a particular research program. If the defining characteristic of religious cults is unthinking adherence to dogma in the pursuit of religious ends, scientism is a religious cult.”

Chapter 2, Refining Ultimate Ends, second to last paragraph

“When considering what they need to live a good life, the wise focus on their bodies, minds, *and* spirits, not on their bodies, on their minds, *or* on their spirits.”

was merged into the preceding paragraph.

Chapter 5, Decentralization, first paragraph, first sentence

“The Toyota experience teaches us that collective ignorance yields more readily to jazz harmony than to formal orchestration.”

was changed to:

“The Toyota experience teaches us that efficiency frontiers yield more readily to jazz harmony than to formal orchestration.”

Chapter 5, International Cooperation, second paragraph

“The great danger of establishing a confederal or federal solution to the problem of improving the quality of decision-making today is not that the solution will fail but that it will succeed. Inevitably, groups dominated by hedonism and tradition will cynically accept the most lucid of missions while denying the means of accomplishing it. The classic example is the so-called three-fifths compromise in the United States Constitution, which counted slaves as three-fifths of a person for the purpose of representation in the House of Representatives and Electoral College. This compromise guaranteed that the slave states could prevent the federal government from interfering with the “peculiar institution” of slavery, which mocked the Preamble. It took the bloodiest war in United States history to erase this compromise from the Constitution.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“**At this point in our development** the great danger of establishing a confederal or federal solution to the problem of improving the quality of decision-making is not that the solution will fail but that it will succeed. Inevitably, **special interest** groups will cynically accept the most lucid of missions while **effectively** denying the means of accomplishing it. The classic example is the so-called three-fifths **clause** in the United States Constitution, which counted slaves as three-fifths of a person for the purpose of representation in the House of Representatives. This **clause** guaranteed that the slave states could prevent the federal government from interfering with the “peculiar institution” of slavery, which mocked the Preamble. It took the bloodiest war in United States history to **cleanse** this **stain** from the Constitution.”

Appendix C

Restored Appendix C, National Income Accounting.

Changes in Version 2004.07.26

Chapter 4, Increasing Managerial Excellence, last paragraph, last sentence

“Another reason is a major innovation can trigger **hundreds of other innovations**, e.g., the **switch from vacuum tubes to solid-state electronics** has spawned **many new inventions and innovations** in **countless** existing products.”

was changed to:

“Another reason is a major invention can trigger **waves of increases in excellence**, e.g., the **invention of the transistor** spawned **countless inventions, innovations, and improvements**.”

Chapter 4, Economic Turbulence, second paragraph, fourth sentence

“However, if they fail to adopt the new process, **which encourages new firms to** enter the industry, the result is likely to be inflation followed by unemployment.”

was changed to:

“However, if they fail to adopt the new process **and other firms enter the industry to exploit this mistake**, the result is likely to be **a rise in the inflation rate and a fall in the unemployment rate** followed by **a fall in the inflation rate and a rise in the unemployment rate**.”

Chapter 4, Economic Turbulence, second paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**transient** inflation **will** be” to “inflation **is likely to** be.”

Chapter 4, Economic Turbulence, last paragraph, second sentence

“Reducing it is beneficial.”

was deleted.

Afterword, second to last paragraph, third sentence

Deleted “, which requires complementing scientific analysis with synthesis.”

Afterword, second to last paragraph, fourth sentence

“Accordingly, I have **combined a wide variety of views of practical wisdom in order to** develop a strategy for learning what we ought to seek and how best to do so.”

was changed to:

“Accordingly, I have developed **a holistic** strategy for learning more about what we ought to seek and how best to do so.”

Changes in Version 2004.07.31

Preface, fifth paragraph

Changed “*rational approximations*” to “rational approximations.”

Changed “*strategies*” to “strategies.”

Preface, sixth paragraph

Changed “**general** plan” to “plan.”

Preface, second to last paragraph, fifth sentence

Changed “**A** strategy” to “**However, a** strategy.”

Chapter 2, *Theories produce predictions and explanations.*, second paragraph, last sentence

Changed “**bounds** of the trajectory” to “**pattern** of the trajectory.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, *Theories are refinements of everyday thinking.*

Relabeled Venn diagram.

Changed “tested them against” to “rejecting those that fail to meet” in the third paragraph, fifth sentence.

Changed “testing of worldly narratives” to “scientific testing” in the fourth paragraph, first sentence.

Changed “procedures for testing” to “procedures” in the fourth paragraph, last sentence.

Changed “procedures for testing” to “testing procedures” in the fourth paragraph, last sentence.

Inserted $(C \cap B)$ ” in the fifth paragraph and $(C \cap D)$ ” in the sixth paragraph.

Deleted (“Spirographic”)” in the seventh paragraph.

Chapter 2, *Theories are refinements of everyday thinking.*, fifth paragraph, second two sentences

“This conception of science falls short of Einstein’s **standard** of refined everyday thinking, **which produces not only predictions but also problems** to solve. **These specialists can rise to Einstein’s standard** by rejecting those philosophical theories that fail to meet empirical standards for finding problems to solve.”

were changed to:

“This conception of science falls short of Einstein’s **ideal** of refined everyday thinking **in that it forces us to choose between science and philosophy in helping us to find the best** problem to solve. **We can correct this** by rejecting philosophical theories that fail to meet empirical standards for finding problems to solve.”

Chapter 2, footnote 9, second paragraph, last sentence

“Arguably, a simplifying assumption in the Black-Scholes option pricing model created the late twentieth century developing market bubble by blinding users to the risk of markets failing to clear.”

was changed to:

“These include the assumptions that there will always be greater fools around to buy overpriced investments and that investment markets will clear.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 5, Introduction, second paragraph, last sentence

Changed “international cooperation, and just taxation” to “just taxation, and international cooperation.”

Chapter 5, International Cooperation

Moved section back to behind the Just Taxation section.

Chapter 5, Moral Vision, first paragraph, last sentence

Changed “just government” to “wise government.”

Chapter 5, International Cooperation, first paragraph, last sentence

Changed “and not” to “rather than.”

Chapter 5, International Cooperation, second paragraph, first two sentences

“At this point in our development the great danger of establishing a confederal or federal government solution to the problem of improving the quality of decision-making is not that the solution will fail but that it will succeed. Inevitably, special interest groups will cynically accept the most lucid of missions while effectively denying the means of accomplishing it.”

were changed to:

“Many today advocate the creation of a federal world government. This solution to the problem of improving the quality of decision-making is problematic. In theory, government is an expensive substitute for practical wisdom. In practice, special interest groups will cynically accept the most lucid of missions while effectively denying the means of accomplishing it.”

Chapter 5, Conclusion, second sentence

Changed “which includes increasing excellence by replacing non-knowledge government resources with practical wisdom.” to “which includes increasing excellence by replacing government with practical wisdom.”

Chapter 6, first paragraph, last sentence

Changed “what it is we ought to seek and how best to do so” to “what we ought to seek and how best to seek it.”

Chapter 6, second paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**Equally important, it reminds**” to “**It also reminds.**”

Afterword, first paragraph, second sentence

Changed “**it on the Internet five years**” to “**working drafts on the Internet six years.**”

Afterword, first paragraph, last two sentences

“With **philosophers of science and** scientists investigating complex adaptive systems, it is the importance of **world-view, concepts, and methodology.** With **economists,** it is how **teleonomic theories can be both positive and normative.**”

were changed to:

“With scientists investigating complex adaptive systems, it is the importance of **distinguishing between theories that predict and those that explain.** With **philosophers, especially philosophers of science,** it is how **decision-oriented pragmatism reconciles idealism and pragmatism.**”

Afterword, eleventh paragraph, fifth sentence

“The **clear and present danger** of ignoring this need is the flourishing of secular religions, **e.g., Marxist-Leninism and Maoism, and more exclusive socialist religions, e.g.,** Nazism, Fascism, and Baathism.”

was changed to:

“The danger of ignoring this need is the flourishing of **deeply flawed means of satisfying it. These include such** secular religions **as** Marxist-Leninism, Nazism, Fascism, **Maoism,** and Baathism.”

Changes in Version 2004.08.07

Preface, sixth paragraph, second sentence

“Rather than **trying to find the best theory** of what we ought to seek, we **can create a strategy** for learning what we ought to seek.”

was appended to previous paragraph and changed to:

“Rather than **seeking ever better theories** of what we ought to seek, we **ought to seek ever better strategies** for learning what we ought to seek.”

Chapter 1, Mainstream Economics' Blind Spot, fourth paragraph, last two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The marginalist concept of wealth means consumer goods and the resources for producing them, where consumer goods are those goods and services that we buy to satisfy our wants and desires. The marginalist concept of efficiency means excellence in the use of scarce resources at achieving a given end: the most efficient means to a given end is the one that uses the least valuable scarce resources.”

were changed to:

“Mainstream economists define ‘wealth’ to mean consumer goods and the resources for producing consumer goods, where consumer goods are those goods and services that we buy to satisfy our wants and desires. They define ‘efficiency’ to mean excellence in the use of scarce resources at achieving a given end: the most efficient means to a given end is the one that uses the least valuable scarce resources.”

Chapter 1, Marginalist Efficiency, first paragraph, first sentence

Changed “efficiency” to “marginalist efficiency.”

Chapter 4, Conclusion, first two paragraphs

Merged paragraphs.

Chapter 5, Introduction, first paragraph

“We increase excellence by replacing non-knowledge resources with knowledge resources. Government policy makers help us increase excellence by administering justice, which is a matter of deciding who makes what decisions under what incentives. Excellence in administering justice is a matter of continuously improving the quality of decision-making.”

was changed to:

“Policy makers decide who makes what decisions under what incentives. Excellence in policy making is a matter of continuously improving the quality of decision-making.”

and merged with second paragraph.

Chapter 5, Conclusion, first paragraph, second sentence

Changed “administering justice” to “policy making.”

Afterword, last paragraph, first sentence

Changed “traditional” to “positivist.”

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Appendix B, Practical Benefits of Magical Mysticism, last paragraph, last sentence

Added the footnote:

“⁹ The flood of discordant images and metaphors that sometimes accompanies an epiphany suggests movement through intermediate states beneath normal consciousness.”

Appendix C, last paragraph, fifth sentence

Changed “**Macroeconomic** policies that focus on **aggregate production**” to “**Policies** that focus on **national income**.”

Appendix C, last paragraph, second to last sentence

“**National income accountants** face the same type of problem Soviet central planners faced.”

was changed to:

“**Policy makers relying on national income statistics** face the same type of problem Soviet policy makers faced.”

Changes in Version 2004.08.31

Preface, first paragraph, first sentence

Added “, a quarter century ago.”

Preface, fifth paragraph

Returned paragraph break at the end of the second sentence.

Changed “ought to” back to “can” in the fourth sentence.

Chapter 1, Mainstream Economics' Blind Spot, eighth paragraph

“We can model rapid tool-setting by **adding** an expected learning curve, a function that relates the expected cost of setting up to the cumulative experience of setting up, **to the EOQ model. The standard assumption for expected learning curves is that doubling experience lowers costs** by some constant percentage, e.g., **each time experience doubles, the cost of setting up drops by** twenty percent.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We can model rapid tool-setting by **combining an EOQ model with** an expected learning curve, a function that relates the expected cost of setting up to the cumulative experience of setting up. **Based on empirical studies and Bayesian models of learning, each time that we double our experience we can reasonably expect setup costs to drop** by some constant percentage, e.g., twenty percent.”

Chapter 1, Mainstream Economics' Blind Spot, last paragraph, second to last sentence

Changed “three **days** ago” to “three **weeks** ago.”

Chapter 2, Theories produce predictions and explanations., fifth paragraph

Changed “problem of **producing**” to “problem of **balancing the production**” in the first sentence.

Changed “**better** (more effective)” to “more effective” in the third sentence.

Chapter 2, Theories are refinements of everyday thinking., second through sixth paragraphs

Dropped comma between explanation and parenthetical Venn diagram label throughout.

Chapter 2, Theories are refinements of everyday thinking., fourth paragraph, last sentence

Changed “testing procedures, **i.e., scientific methodologies**” to “testing **methods and procedures**” in the last sentence of the fourth paragraph.

Chapter 2, Theories are refinements of everyday thinking., fifth paragraph

“Consider how we would have used this decision-oriented **scientific** methodology to refine early modern theories about **our** solar system. **Although** Copernicus’s theory of planets traveling around the sun in circular orbits was simpler and more elegant, it could not predict quite as well as the best Ptolemaic theory, which had the sun and other planets traveling around the earth in epicyclical orbits. We would have rejected Copernicus’s theory as a theory that predicts. However, we would not have rejected it as a means of explaining the solar system **because it was simpler, more elegant, and less thoroughly developed than Ptolemaic competitors.**”

to:

“Consider how we would have used this decision-oriented **strategy** (**metamethodology**) to refine early modern theories about **the** solar system. Copernicus’s **simpler, more elegant, and less thoroughly developed** theory of planets

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

traveling around the sun in circular orbits could not predict quite as well as the best Ptolemaic theory, which had the sun and other planets traveling around the earth in epicyclical orbits. We would have rejected Copernicus's theory as a theory that predicts. However, we would not have rejected it as a means of explaining the solar system."

Chapter 2, *Theories are refinements of everyday thinking.*, seventh paragraph

The first sentence,

"Copernicus's **heliocentric approach** proved its worth by helping Kepler formulate his theory of planets traveling around the sun in elliptical orbits."

was merged with the sixth paragraph and changed to:

"Copernicus's **theory eventually** proved its worth **as a theory that explains** by helping Kepler formulate his theory of planets traveling around the sun in elliptical orbits."

The balance of the paragraph was merged with the eighth paragraph.

Chapter 2, *Theories are refinements of everyday thinking.*, ninth paragraph

"**We also would have used it to cull lesser theories in both categories.** Kepler's theory helped Newton formulate his theories of gravity and mechanics. Given the greater depth and breadth of **Newton's** theories, we would have accepted them as the leading theories that predict and explain. However, we would not have enshrined **Newton's theories** as the sacred truth as Alexander Pope did in his intended epitaph for Newton:"

was merged with the eighth paragraph and changed to:

"Kepler's theory **eventually proved its worth as a theory that explains by helping** Newton formulate his theories of gravity and mechanics. Given the greater depth and breadth of **these** theories, we would have accepted them as the leading theories that predict and **the leading theories that** explain. However, we would not have enshrined **them** as the sacred truth as Alexander Pope did in his intended epitaph for Newton:"

Chapter 2, *Refining Ultimate Ends*, seventh to last paragraph

Reversed the unethical and misleading arguments. Adjusted wording of first sentences in new seventh, eighth, and last paragraphs to reflect these changes.

Changed the last two sentences of the seventh paragraph from:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“When considering what they need to live a good life, the wise focus on their bodies, minds, *and* spirits, not on their bodies, on their minds, *or* on their spirits. *We ought to eliminate any theory that attributes human motivation to a single level of abstraction.*”

to:

“Until we understand the complex relationships between our bodies and what we commonly refer to as our minds and our spirits, focusing on one level of abstraction will tend to blind us to needs that emerge on other levels of abstraction. *We ought to eliminate any theory that attributes human motivation to a single level of abstraction.* When considering what they need to live a good life, the wise focus not on their bodies, on their minds, *or* on their spirits, but rather on their bodies, minds, *and* spirits.”

Deleted the new tenth paragraph:

“Schweitzer’s normative end of reverence for life requires a recursive agreement between generations similar in form and spirit to the Confucian canon that we ought to pay the debts that we owe our ancestors to our descendants. Hence, whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to an inherently incomplete concept of justice.”

Chapter 2, new footnote 5, third sentence

“To reject useful theories simply because they conflict with a key assumption of the reductionist research program is **foolish. Further, to reject any theory because it conflicts with the reductionist research program is** unscientific.”

was changed to:

“To reject useful theories simply because they conflict with a key assumption of the reductionist research program is unscientific.”

Chapter 2, Practical Wisdom and Moral Science, third paragraph

“Scientists have long struggled with how best to study evolving systems, **particularly those that involve humans using intellectual tools to formulate alternatives.** The great difficulty in studying these **human** systems is that there is a complex (reflexive / recursive) relationship between **normative** models and reality: We base our normative models on reality. Our actions change reality.”

was changed to:

“Scientists have long struggled with how best to study **our** evolving **cultures.** The great difficulty in studying these systems is that there is a complex (reflexive / recursive) relationship between **our** normative models **(the models of reality that we use to guide**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

our actions) and reality: We base our normative models on reality. Our actions change reality.”

“Soros, George, *The Alchemy of Finance*, (New York: Simon & Schuster, 1988).”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph, first sentence

Changed “relationship” to “complex relationship.”

Chapter 2, Practical Wisdom and Moral Science, fourth paragraph, last sentence

“When we apply these models repeatedly without considering how our recent actions have changed reality, they tend to lead us ever further away from ideal paths toward living good lives.”

was changed to:

“Repeatedly using models to guide our actions without considering how our actions change reality tends to lead us ever further away from ideal paths toward living good lives. Model quality tends to vary directly with the first tendency and inversely with the second. This explains why speculative bubbles based on a single model, e.g., tulips are a good investment, are relatively rare. This is not to say that speculative bubbles based on common assumptions, e.g., there will always be greater fools around to buy overpriced investments, are rare.”

Chapter 2, new tenth footnote, second paragraph

“Model quality tends to vary directly with the first tendency and inversely with the second. This explains why speculative bubbles based on a single model are relatively rare. This is not to say that speculative bubbles based on common assumptions are rare. These include the assumptions that there will always be greater fools around to buy overpriced investments and that investment markets will clear.”

was deleted.

Chapter 2, Practical Wisdom and Moral Science, fifth paragraph

“Fifty years ago Milton Friedman proposed a brilliant, but partial solution to the evolution problem. His solution was to limit economic science to the task of evaluating alternatives.¹¹ This solution requires that economists, as scientists, relinquish the power that comes from helping decision-makers formulate alternatives. It also requires that they limit themselves to scientific theories that predict.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Fifty years ago Milton Friedman proposed a brilliant, but partial solution to **our cultural** evolution problem. His solution was to limit economic science to **theories that predict**.¹ This requires that economists, as scientists, relinquish the power that comes from helping decision-makers formulate alternatives.”

Chapter 2, Practical Wisdom and Moral Science, sixth and seventh paragraphs

Shifted first sentence of sixth paragraph to end of fifth and changed “**heliocentric approach** proved its worth” to “**theory** proved its worth **as a theory that explains**.”

Merged remainder of fifth paragraph with sixth paragraph.

Chapter 3, Vicious and Virtuous Circles, title

Deleted “Vicious and.”

Chapter 3, Virtuous Circles, first paragraph

“Pleasure can overcome pain-in-being as well as pain-in-acting. This is a blessing in that it lets us mask our currently felt needs with activity when we cannot satisfy them. It is a curse in that it makes identifying our currently felt needs more difficult when we are active. It also can tempt us to mask our needs rather than seeking to satisfy them. Habitually masking our needs with pleasurable activity may lead to the vicious circle of compulsive behavior.”

was deleted.

Chapter 3, Virtuous Circles, end

Inserted the subsection, “Harmful Pleasure and Joy:”

“Pleasure and joy are harmful to us when they lead us away from following the virtuous circle of pleasure and joy. They mislead us (1) by masking the pain-in-acting of foolish activities and (2) by masking the pain-in-being of an unsatisfied need that we are able to satisfy wisely.”

Chapter 4, Conclusion, first paragraph, first sentence

Added the footnote:

¹ Schumpeter, Joseph, *Capitalism, Socialism, and Democracy*, (New York: Harper & Row, 1942).”

Afterword, eleventh paragraph, fourth and fifth sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The danger of ignoring this need is the flourishing of **deeply flawed** means of satisfying it. **These include such secular religions** as Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism.”

were changed to:

“The danger of ignoring this **potentially overwhelming** need is the flourishing of such deeply flawed means of satisfying it as Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism.”

Afterword, twelfth paragraph

“True believers in scientific analysis will perceive as utter nonsense my claim of a need to link or relink with something greater than ourselves. They believe that the only way to understand our minds, to say nothing of our spirits, is to understand our brain chemistry.”

was deleted.

Appendix B, Conclusion, end

Added the following sentences:

“This normative end is universal in that it applies to all intelligent life. Whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to a concept of justice that typically falls short of the universal normative end of reverence for life.”

Changes in Version 2004.09.14

Chapter 2, *Theories are refinements of everyday thinking.*, fifth paragraph, first sentence

Changed “decision-oriented strategy (metamethodology)” to “decision-oriented metamethodology (strategy).”

Chapter 2, Refining Ultimate Ends, fourth paragraph, last sentence

“Theories that look to our internal programming to explain what motivates us, **which biologists call teleonomic theories**, satisfy both of these conditions.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Theories that look to our internal programming to explain what motivates us satisfy both of these conditions.”

Chapter 2, Refining Ultimate Ends, fifth paragraph, first three sentences

“Modern biology supports using teleonomic theories as the foundation for **evolutionary explanations**. It tells us that **everything is evolving**. It also tells us that our beliefs and behaviors are evolving at a pace many orders of magnitude faster than the genetic level programming that underlies our higher level internal programming.”

were changed to:

“Modern biology supports using **these** “teleonomic theories” as the foundation for **explaining cultural evolution**. It tells us that our beliefs and behaviors are evolving at a pace many orders of magnitude faster than the genetic level programming that underlies our higher level internal programming.”

Chapter 3, Three Common Misbeliefs, third paragraph, last two sentences

“**Whether the contest involves breakfast cereals or theories of human behavior, competition insures the integrity of the complex web of human knowledge**. When **managerial** excellence includes cooperation, increasing competition **may** increase cooperation.”

were changed to:

“When excellence includes cooperation, increasing competition **tends to** increase cooperation.”

and merged with the fourth paragraph.

Chapter 3, Three Common Misbeliefs, new fourth paragraph, first sentence

“In business as in sports, competition **may** increase cooperation.”

was changed to:

“In business as in sports, competition **tends to** increase cooperation.”

Appendix B, Practical Benefits of Magical Mysticism, first paragraph, last sentence

“In Islamic thought, we see this trend in the withering away of Sufism.”

was deleted.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Appendix B, Practical Benefits of Magical Mysticism, fourth paragraph, first two sentences

“Schweitzer believed that combining magical and ethical mysticism is a logical impossibility in that the former requires us to deny the world and life while the latter requires us to embrace them. He failed to recognize that we can combine the best of magical and ethical mysticism by setting our objectives according to ethical mysticism and then acting according to magical mysticism.”

were changed to:

“We can combine the best of magical and ethical mysticism by setting our objectives according to ethical mysticism and then acting according to magical mysticism.”

Appendix B, Practical Benefits of Magical Mysticism, fifth paragraph, first sentence

Changed “mystical oneness” to “mystical oneness **by means of detachment.**”

Appendix B, ninth footnote

“The flood of discordant images and metaphors that sometimes accompanies an epiphany suggests movement through intermediate states beneath normal consciousness.”

was changed to:

“When the source of the sudden intuitive realization is worldly, whether our brains are more like computers or intelligent receivers does not matter.”

and moved from the sixth sentence of the sixth paragraph to the third sentence of the fifth paragraph.

Changes in Version 2004.09.22

Chapter 2, Refining Ultimate Ends, seventh paragraph, sixth sentence

“*We ought to eliminate any theory that attributes human motivation to a single level of abstraction.*”

was changed to:

“**Hence, we ought to eliminate any theory that attributes human motivation to a single level of abstraction. We ought to eliminate prescriptive theories based solely on sociobiology, which focus on our bodies; prescriptive theories based solely on**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

postmodernism, which focus on our minds; and prescriptive theories based solely on our need to relink with the infinite Being, which focus solely on our spirits.”

Chapter 2, Refining Ultimate Ends, ninth paragraph, end

Added the footnote:

“⁹ From this perspective, whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to a concept of justice that typically falls short of the universal normative end of reverence for life.”

Chapter 5, Decentralization, first paragraph, first sentence

Changed “jazz harmony” to “improvisational harmony.”

Chapter 5, Decentralization, last paragraph, last sentence

“The just seek to postpone turbulence only when turbulence threatens the political stability of the system.”

was deleted.

Chapter 5, Free Association, first paragraph

Removed italics from “tendency” and “trend.”

Chapter 5, Free Association, last paragraph, first sentence

Changed “ruled” to “guided.”

Chapter 5, International Cooperation, last paragraph, first sentence

Changed “federal world government” to “world government.”

Chapter 5, International Cooperation, last paragraph, third sentence

Changed “an expensive substitute” to “a substitute.”

Appendix B, Introduction, last two paragraphs

Removed italics from opening phrases of first sentences.

Appendix B, Ultimate Normative Ends of Life, second to last paragraph, block quote

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“True ethics are world-wide. All that is ethical goes back to a single principle of morality, namely the maintenance of life at its highest level, and the furtherance of life. The maintenance of one’s own life at the highest level by becoming more and more perfect in spirit, and the maintenance at the highest level of other life by sympathetic, helpful self-devotion to it - this is ethics.”

was deleted.

Appendix B, Conclusion, first paragraph

“Materialist and dualists can share a common purpose, which is progress toward a good life for all. This normative end is universal in that it applies to all intelligent life. Whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to a concept of justice that typically falls short of the universal normative end of reverence for life.”

was changed to:

“Materialist and dualists can share the common purpose of progress toward a good life for all. Accepting it as an organizing principle turns postmodern cacophony into improvisational jazz.”

Changes in Version 2004.09.28

Preface, first paragraph, second sentence

Changed “his course” to “his course in ethical decision-making.”

Chapter 5, Just Taxation, sixth paragraph, last sentence

“Government is an imperfect substitute for perfect practical wisdom.”

was changed to:

“Government is a substitute for practical wisdom.”

Chapter 5, International Cooperation, second paragraph, second to last sentence

“This clause guaranteed that the slave states could prevent the federal government from interfering with the “peculiar institution” of slavery, which mocked the Preamble.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This clause guaranteed that the slave states could prevent the federal government from **progressing toward the just ends proclaimed in** the Preamble.”

Changes in Version 2004.09.30

Acknowledgments, sixth paragraph

Changed “for criticizing countless drafts” to “countless critiques” in the first sentence.

Changed “contributed to” to “critiqued” in the second sentence.

Acknowledgments, end

Added the paragraph:

“Unlike true believers in scientific analysis, I believe that interactions of the bits of complex adaptive systems can create phenomena worthy of investigation at higher levels of abstraction. Further, what happens at higher levels of abstraction can affect what happens at lower levels. Hence, we ought to study complex adaptive systems on all levels of abstraction. Accordingly, I have developed a holistic strategy for learning more about what we ought to seek and how best to do so. This strategy complements microeconomic analysis in helping us to decide wisely.”

Chapter 1, Marginalist Economics' Blind Spot, sixth paragraph, first sentence

“Suppose our factory needs two hundred units of a particular part **every working day for at least a year**. At one extreme, we could choose to produce fifty thousand ($200 \times 5 \times 50$) once.”

was changed to:

“Suppose our factory needs two hundred units of a particular part **five days a week for fifty weeks**. At one extreme, we could choose to produce fifty thousand once.”

Chapter 1, Marginalist Economics' Blind Spot, sixth paragraph, last two sentences

“The EOQ model yields the quantity at which the marginal cost and marginal benefit of **holding inventory with respect to** setting up just equal one another. This quantity maximizes the net benefit of **holding inventory** *for our current knowledge of how to set up tools.*”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The EOQ model yields the quantity at which the marginal cost and marginal benefit of setting up just equal one another. This quantity maximizes the net benefit of **setting up** for our current knowledge of how to set up tools.”

Chapter 1, Marginalist Economics' Blind Spot, eighth paragraph, last sentence

“Based on empirical studies and Bayesian models of learning, each time that we double our experience we can reasonably expect setup costs to drop by some constant percentage, e.g., twenty percent.”

was deleted. The eighth and ninth paragraphs were merged. All italics were eliminated.

Chapter 1, Marginalist Excellence, first paragraph, first sentence

Removed italics from “*subordinate*.”

Chapter 1, Marginalist Excellence, second paragraph, first sentence

Changed “, **they are** effective” to “**but also** effective.”

Chapter 1, The Recursionist Strategy, third paragraph, second two sentences

“Our mistakes waste **time and other** resources. However, *given a learning attitude*, we learn from our mistakes. Given a learning attitude, waste is a regrettable by-product of learning through experience.”

was changed to:

“Our imperfect decision-making wastes resources. However, **given a learning attitude**, we learn from our mistakes.”

Chapter 1, Conclusion, first sentence

“This chapter introduced a strategy **that provides us with a conceptual framework for thinking about how best to** progress toward our ultimate ends.”

was changed to:

“This chapter introduced a strategy **for progressing** toward our ultimate ends.”

Chapter 2, *Theories are subjective*.

“**Concepts are tools that focus our attention on certain characteristics of objects by ignoring other characteristics.** We can conceive of the world in many ways. What we conceive depends on the concepts that we use to describe what we perceive. **Because**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

what we conceive depends on the concepts that we use, all conceptual models, hence all theories, are subjective.”

was changed to:

“All theories are conceptual models. We can conceive of the world in many ways. What we conceive depends on the concepts that we use to describe what we perceive. Thus, all theories are subjective.”

Chapter 2, *Theories produce predictions and explanations.*, second paragraph, first sentence

“Some theories explain relatively better than they predict and others predict relatively better than they explain.”

was changed to:

“Other theories explain relatively better than they predict.”

Chapter 2, *Theories produce predictions and explanations.*, third paragraph

Moved paragraph ahead of the second paragraph. Changed “Other” to “Some” in the first sentence.

Chapter 2, *Theories produce predictions and explanations.*, fourth paragraph

Changed “formulate alternatives” to “formulate better alternatives” in the third sentence.

Chapter 2, *Theories produce predictions and explanations.*, last paragraph

“The distinction between predictions and explanations is especially important in economics. We predict our behavior based on the knowledge that we currently possess. If we explain our behavior based on the knowledge we currently possess, we will tend to blind ourselves to the possibility of learning. To avoid this, we need to explain our behavior based on how we would act if we had complete knowledge of what we ought to seek. We need to explain based not on how we expect we will act, but on how the wise would act.”

was changed to:

“The distinction between predictions and explanations is especially important in economics. We predict the behavior of others based on the knowledge that they currently possess. If we explain our behavior based on the knowledge we currently possess, we will tend to blind ourselves to the possibility of learning. To avoid this, we need to explain our behavior based on how we would act if we had complete

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

knowledge of what we ought to seek. **In other words, we need to explain based on how the wise would act.**”

Chapter 2, *Theories are refinements of everyday thinking*, fifth paragraph, second and third sentences

“This conception of science falls short of Einstein’s ideal of refined everyday thinking in that it **forces us to choose between science and philosophy in helping us to find the best** problem to solve. We can remedy this by **rejecting philosophical theories that fail to meet** empirical standards for finding problems to solve.”

was changed to:

“This conception of science falls short of Einstein’s ideal of refined everyday thinking in that it **doesn’t test philosophical theories that aim at helping us find problems to solve**. We can remedy this by testing **these** theories **against** empirical standards for finding problems to solve.”

Chapter 2, *Theories are refinements of everyday thinking*, sixth paragraph, first sentence

Deleted “ $(C \cap D)$.”

Chapter 2, *Theories are refinements of everyday thinking*, seventh paragraph

Changed “metamethodology (**strategy**)” to “metamethodology” in the first sentence.

Changed “**not** have **rejected**” to “have **accepted**” in the fourth sentence.

Chapter 2, Practical Wisdom and Moral Science

Changed title to “Moral Science.”

Changed “**our** cultural evolution problem” to “**the** cultural evolution problem” in the first sentence of the fifth paragraph.

Added the following paragraph to the end:

“Many positivist scientists and philosophers of science will dismiss the recursionist strategy for not being positive, for not describing the world as it is. They ought to consider the nature of scientific research programs. Scientific research programs are positive in their ends, normative in their means, and potentially religious in their effect on researchers. The recursionist strategy is a scientific research program of, by, and for all intelligent life.”

Chapter 3, Harmful Pleasure and Joy, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“They mislead us (1) by masking the pain-in-acting of foolish activities and (2) by masking the pain-in-being of an unsatisfied need that we are able to satisfy wisely.”

was changed to:

“They mislead us by masking the pain of foolish activities. They also mislead us by masking the pain of unsatisfied needs that we are able to satisfy wisely. In short, they allow us to construct fools’ paradises.”

Chapter 3, Three Common Misperceptions, first paragraph, fifth sentence

“For example, most American manufacturers originally perceived the Toyota Production System as a collection of techniques for minimizing WIP inventory.”

was changed to:

“For example, failing to see the benefits of increasing the efficiency of trade caused many American manufacturers to perceive the Toyota Production System as a collection of techniques for minimizing WIP inventory.”

Chapter 5, Moral Vision

Incorporated Moral Vision into Decentralization section.

Chapter 5, Free Association, third paragraph

Changed “practical question for just policy makers” to “practical question” in the last paragraph.

Merged with the fourth paragraph.

Chapter 5, International Cooperation, second paragraph, fourth sentence

“In practice, special interest groups will cynically accept the most lucid of missions while effectively denying the means of accomplishing it.”

was changed to:

“In practice, special interest groups will cynically accept just ends while effectively denying the means of accomplishing them.”

Afterword, first paragraph, fourth sentence

Changed “the topic of interest” to “ the topic of greatest interest.”

Afterword, ninth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“For those on the right, the major problem is that this dynamic process **results in a culture based on** ever more inclusive (“feminine”) ends.”

was changed to:

“For those on the right, the major problem is that this dynamic process **requires** ever more inclusive (“feminine”) **subordinate** ends.”

Afterword, ninth paragraph, last sentence

“(in moving toward the ultimate normative end of reverence for life)”

was deleted.

Afterword, tenth paragraph, third sentence

Changed ““progressive” cultural ends” to “**ever more** “progressive” cultural ends.”

Afterword, last three paragraphs

“My religious position (Appendix B) is equally difficult to describe to those who do not share my information age perspective. I reject the traditional distinction between secular and religious humanism. Secular humanists tend to ignore the very real human need to link or relink to something greater than ourselves. The danger of ignoring this potentially overwhelming need is the flourishing of such deeply flawed means of satisfying it as Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism. Instead, I distinguish between materialist religious humanism and dualist religious humanism. Rather than focusing our attention on the issue of whether we have a need to link or relink with something greater than ourselves, this distinction focuses our attention on how best to do so.”

“Like many others, I believe that interactions of the bits of complex adaptive systems can create phenomena worthy of investigation at higher levels of abstraction. Further, what happens at higher levels of abstraction can affect what happens at lower levels. Hence, we ought to study these systems on all levels. Accordingly, I have developed a holistic strategy for learning more about what we ought to seek and how best to do so. This strategy complements microeconomic analysis in helping us to decide wisely.”

“Many positivist scientists and philosophers of science will dismiss the recursionist strategy for not being positive, for not describing the world as it is. They ought to consider the nature of scientific research programs. Scientific research programs are positive in their ends; normative in their means; and potentially religious in their effect on researchers. The recursionist strategy is a scientific research program of, by, and for all intelligent life.”

were deleted.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Appendix A, Introduction, second paragraph, first sentence

Removed italics from “and consumption.”

Appendix B, Ultimate Normative Ends of Life, fourth paragraph, last sentence

Changed “**illusive spiritual** needs” to “**mysterious** needs.”

Appendix B, Benefits of Magical Mysticism, footnote 9

“When the source of the sudden intuitive realization is worldly, whether our brains are more like computers or intelligent receivers does not matter.”

was deleted.

Appendix B, Conclusion, first paragraph

Inserted the paragraph:

“Secular humanists tend to ignore our very real need to link or relink to something greater than ourselves. The danger of ignoring this potentially overwhelming need is the flourishing of such deeply flawed means of satisfying it as Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism. Rather than distinguishing between secular and religious humanism, we ought to distinguish between materialist and dualist religious humanism.”

Changes in Version 2004.10.15

Preface, fifth paragraph

“Mathematicians face a similar (open-ended) problem when they seek to evaluate the transcendental number pi. Rather than seeking ever better rational approximations of pi:

3,
22/7,
355/113,
...,

“mathematicians seek ever better strategies for calculating pi:

$\pi = 4(1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \dots),$
 $\pi = 2 \cdot \sqrt{3}(1 - 1/3 \cdot 3 + 1/5 \cdot 3^2 - 1/7 \cdot 3^3 + 1/9 \cdot 3^4 - 1/11 \cdot 3^5 + \dots),$
...,

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“where better strategies are those that converge more quickly.”

was deleted.

Preface, new sixth paragraph, first sentences

“This radical solution will be resisted by scholars who believe that it takes a theory to beat a theory. They ought to consider the **following**:

An intellectual tool for helping us formulate alternatives ought to address all uncertainty. No theory can address the uncertainty of all of its own fundamental propositions. **However**, a strategy can address all uncertainty.”

were changed to:

“This radical solution will be resisted by scholars who believe that it takes a theory to beat a theory. They ought to consider **the nature of decision-making. The foremost task of decision-making is defining the global / universal problem we face, the problem that defines our ultimate ends.** The intellectual tool **that we use to define this problem** ought to address all uncertainty. No theory can address the uncertainty of all of its own fundamental propositions. **Only** a strategy **for learning** can address all uncertainty.”

Preface, new seventh paragraph

Changed “They” to “**These scholars**” in the first sentence.

Changed “**The strategy**” to “**Toyota’s strategy for learning**” in the last sentence.

Changed “theories” to “theories **for allocating**” in the last sentence.

Preface, new eighth paragraph, second sentence

Changed “**the Toyota production system**” to “**Toyota’s strategy for learning.**”

Preface, end

Moved the last two paragraphs of the Acknowledgments to the end of the Preface.

Preface, new last paragraph

“Unlike true believers in scientific analysis, I believe that interactions of the bits of complex adaptive systems can create phenomena **worthy of investigation** at higher levels of abstraction. Further, what happens at higher levels of abstraction can affect what happens at lower levels. Hence, we ought to study **complex adaptive** systems on all levels of abstraction. Accordingly, I have developed a holistic strategy for learning

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

more about what we ought to seek and how best to do so. This strategy complements microeconomic analysis in helping us to decide wisely.”

was changed to:

“Unlike true believers in scientific analysis, I believe that **the** interactions of the bits of complex adaptive systems (**quantum or subquantum particles**) can create phenomena **useful to understand** at higher levels of abstraction (**e.g., organisms, economies and ecosystems**). Further, what happens at higher levels of abstraction can affect what happens at lower levels. Hence, we ought to study all **useful** levels of abstraction. Accordingly, I have developed a holistic strategy for learning **ever** more about what we ought to seek and how best to do so. This strategy complements microeconomic analysis in helping us to decide wisely.”

Chapter 1, Mainstream Economics' Blind Spot, eighth paragraph

“In contrast, managers practicing rapid tool-setting instruct their workers to look for better ways of setting up **and** ways to improve the environment for learning to setup more quickly. We can model rapid tool-setting by combining an EOQ model with an expected learning curve, a function that relates the expected cost of setting up to the cumulative experience of setting up. This rapid tool-setting model is very disturbing for those who like neat solutions. It tells us that we can choose to learn more quickly by setting up more often. **The difficulty is that we cannot determine the value of learning more quickly without knowing** the value of what we learn. The inexhaustibility of knowledge, the fact that using a pattern does not wear it out, makes determining the value of this knowledge problematic. Although we can measure the value of a scarce resource by measuring the value of resources it replaces, we cannot do the same with useful knowledge, except in the special case where we know exactly when and how the knowledge will be used in the future. Here, we do not know exactly when and how: (1) we will use new knowledge of how to set up more quickly, (2) we will use new knowledge of how to learn more quickly, and (3) fellow workers will use both types of new knowledge. **The possibility of learning makes what otherwise would be a simple closed-ended problem into a complex open-ended one.**”

was appended to the seventh paragraph and changed to:

“In contrast, managers practicing rapid tool-setting instruct their workers to look for better ways of setting up. **They also look** for ways to improve the environment for learning to setup more quickly.

“We can model rapid tool-setting by combining an EOQ model with an expected learning curve, a function that relates the expected cost of setting up to the cumulative experience of setting up. This rapid tool-setting model is very disturbing for those who like neat solutions. It tells us that we can choose to learn more quickly by setting up more often. **To determine the how often we should set up, we need to determine** the value of what we expect to learn. The inexhaustibility of knowledge, the fact that

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

using a pattern does not wear it out, makes determining the value of what we expect to learn problematic. We cannot measure the value of useful knowledge by measuring the value of resources it replaces, except in the very special case where we know exactly when and how the knowledge will be used in the future. Here, we do not know exactly when and how: (1) we will use new knowledge of how to set up more quickly, (2) we will use new knowledge of how to learn more quickly, and (3) fellow workers will use both types of new knowledge. *The possibility of learning makes what otherwise would be a simple closed-ended problem into a complex open-ended one.*”

Chapter 1, The Recursionist Strategy, title

Changed “The **Recursionist** Strategy” to “The Strategy.”

Chapter 1, The Strategy, first two paragraphs

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” requires making profound changes to how we think about **economics**:

- **The scope of economics must change.** The inexpensive replication of many types of useful knowledge makes it impossible to separate what happens in our society today from what will happen across the world next week or fifty years from now: discoveries travel around the globe and provide benefits until they are superseded or forgotten. Only the ability and willingness to use knowledge constrains its use. The scope of **economics** must broaden from living members of a given society to current and future members of the community of beings capable of using the knowledge that its members create.
- **The focus of economics must change.** The inexhaustibility of knowledge makes it impossible to value knowledge by measuring the value of the non-knowledge resources it replaces. The best we can do is to measure its value subjectively using decision science techniques. The focus of **economics** must change from studying *states of the world* to the *process of decision-making*.
- **The ultimate end of economics must change.** This is to say that the meaning of ‘wealth’ must change if it is to remain the term that we use to describe what we seek. **In theory, all of our decisions concern our ultimate ends.** To think clearly about our ultimate ends, we need a concept of wealth that concerns what we *need* in order to achieve our ultimate ends. This is in sharp contrast to our current concept of wealth, which concerns what we currently *want*.

“In short, the universal (**global**) **economic** problem becomes one of how we intelligent beings choose to progress toward our ultimate ends.

“We solve open-ended problems by repeatedly applying progressive processes, processes that move us ever closer to the solution. The obvious choice for a progressive process to solve this open-ended problem is decision-making, understood as the process that begins with finding a problem to solve and ends with reviewing the results of the chosen alternative.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

were changed to:

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” requires making profound changes to how we think about the universal problem **we face, the problem that defines our ultimate ends:**

- **The scope must change.** The inexpensive replication of many types of useful knowledge makes it impossible to separate what happens in our society today from what will happen across the world next week or fifty years from now: discoveries travel around the globe and provide benefits until they are superseded or forgotten. Only the ability and willingness to use knowledge constrains its use. The scope of **the universal problem** must broaden from living members of a given society to current and future members of the community of beings capable of using the knowledge that its members create.
- **The focus must change.** The inexhaustibility of knowledge, **the fact that using a pattern does not deplete it**, makes it impossible to value knowledge by measuring the value of the non-knowledge resources it replaces. The best we can do is to measure its value subjectively using decision science techniques. The focus of **the universal problem** must change from studying *states of the world* to the *process of decision-making*.
- **The ultimate end must change.** This is to say that the meaning of ‘wealth’ must change if it is to remain the term that we use to describe what we seek. To think clearly about our ultimate ends **and how best to achieve them**, we need a concept of wealth that concerns what we *need* in order to achieve our ultimate ends. This is in sharp contrast to our current concept of wealth, which concerns what we currently *want*.

“In short, the universal problem **we face** becomes one of how we intelligent beings choose to progress toward our ultimate ends.

“**The problem we face in progressing toward our ultimate ends is an open-ended one. Mathematicians face a similar problem when they seek to evaluate the transcendental number pi. Rather than seeking ever better rational approximations of pi:**

3,
22/7,
355/113,
...,

“**they seek ever better means of calculating pi:**

$$\begin{aligned} \pi &= 4(1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \dots), \\ \pi &= 2 \cdot \sqrt{3}(1 - 1/3 \cdot 3 + 1/5 \cdot 3^2 - 1/7 \cdot 3^3 + 1/9 \cdot 3^4 - 1/11 \cdot 3^5 + \dots), \\ &\dots \end{aligned}$$

“**where better means are those that converge more quickly.**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Mathematicians progress toward pi by applying a process (formula) recursively. Similarly, we progress toward our ultimate ends by applying a process (decision-making) recursively.”

Chapter 1, The Strategy, third paragraph, beginning

Added the sentence:

“Decision-making begins with finding a problem to solve and ends with learning from the experience of implementing the chosen solution.”

Chapter 1, The Strategy, second to last paragraph, last sentence

Changed “creating **and applying** knowledge” to “creating knowledge.”

Chapter 1, The Strategy, last paragraph

“**The recursionist strategy aims at** improving decision-making by improving the factors of **good** decision-making. Three of these strategic assets are **worth mentioning here**. The first is practical wisdom — our willingness and ability to act wisely. Practical wisdom includes a strategic vision of our ultimate ends and the best means of achieving them. The second is trust **and** the third is the liberty to implement the alternative that makes the most productive use of our resources without unjustly interfering with others’ liberty to do the same. **Practical wisdom, trust, and liberty are critical factors in information age economies.**”

was changed to:

“**We can improve the quality of** decision-making by improving the factors of **wise** decision-making. Three of these strategic assets are **especially important in information age economies**. The first is practical wisdom — our willingness and ability to act wisely. Practical wisdom includes a strategic vision of our ultimate ends and the best means of achieving them. The second is trust, **which includes the rule of law**. The third is the liberty to implement the alternative that makes the most productive use of our resources without unjustly interfering with others’ liberty to do the same. **The strategy put forth in this work aims at improving decision-making by improving these and other factors of wise decision-making.**”

Chapter 1, Overview, first sentence

Changed “a strategy” to “a **recursionist** strategy.”

Chapter 2, Refining Ultimate Ends, first paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Formal decision-making consists of (1) finding a problem to solve, (2) **identifying** alternative **solutions**, (3) **selecting** an alternative, (4) implementing the **selected** alternative, and (5) **reviewing the first four steps**.”

was changed to:

“Formal decision-making consists of (1) finding a problem to solve, (2) formulating alternatives, (3) **choosing** an alternative, (4) implementing the **chosen** alternative, and (5) **learning from the experience**.”

Chapter 2, Refining Ultimate Ends, ninth paragraph, second sentence

Deleted “to govern us.”

Chapter 2, Refining Ultimate Ends, tenth paragraph, last sentence

Changed “**agree on eliminating**” to “eliminate.”

Chapter 2, Moral Science, third paragraph, second sentence

Changed “**our normative models** (the models of reality that we use to guide our actions)” to “the models of reality that we use to guide our actions.”

Chapter 3, *Two Means of Pursuing Happiness*, third paragraph

“Spinoza believed that true freedom and happiness **come from** understanding the causes of our emotions. **If we can learn to understand the source of our emotions, we can learn to control them. Further, he believed that all emotions concern movements toward or away from perfection.** In terms of our needs model, **we achieve happiness by satisfying our needs, and** we develop moral virtue by learning to understand our needs and the best means of satisfying them.”

was changed to:

“Spinoza believed that **all emotions concern movements toward or away from perfection. We achieve** true freedom and happiness **by addressing** the causes of our emotions **rationally**. In terms of our needs model, we develop moral virtue by learning to understand our needs and the best means of satisfying them. **We achieve true freedom and happiness by satisfying our needs rationally.**”

Chapter 3, *Two Means of Pursuing Happiness*, last paragraph, first sentence

Changed “but” to “but **rather**.”

Chapter 3, *Alternatives to Pursuing Happiness*, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The two major alternatives to pursuing happiness are pursuing pleasurable activities and pursuing nothing. Like the wise, those who pursue pleasurable activities (hedonists) understand that satisfying their needs increases their ability to pursue pleasurable activities. Unlike the wise, they choose to mask pain-in-being with pleasure, which breaks the virtuous circle of pleasure and pain. Because they often choose to mask pain-in-being with pleasure, they are vulnerable to the vicious circle of compulsive behavior, which is habitually responding to a need with an activity that fails to satisfy it.”

was changed to:

“The wise pursue happiness by pursuing the virtuous circle of pleasure and joy. The two major alternatives to pursuing happiness are pursuing pleasure (per se) and pursuing nothing. Those who pursue pleasure too often choose to mask pain-in-being with pleasure, which breaks the virtuous circle of pleasure and joy. Their pursuit of pleasure makes them vulnerable to the vicious circle of mindlessly responding to a need with an activity that fails to satisfy it.”

Chapter 3, *Alternatives to Pursuing Happiness*, second paragraph

“Those who pursue nothing blindly follow their traditions or leaders. Because they seldom consider whether their actions are just or efficient, they tend to develop even less practical wisdom than hedonists do. Lacking practical wisdom, they have the most difficulty adapting to change and so are the most prone to fall into the cycle of poverty.”

was changed to:

“Those who pursue nothing either pursue oblivion or mindlessly follow their traditions or leaders. They seldom consider whether their actions are just or efficient. Lacking practical wisdom, they are the most likely to fall into the cycle of poverty.”

Chapter 3, *Alternatives to Pursuing Happiness*, third paragraph, first sentence

“This distinction between pursuing happiness, pursuing pleasurable activity, and following traditions or leaders is more than a relic of Western civilization.”

was changed to:

“The distinction between pursuing happiness, pursuing pleasure, and pursuing nothing is more than an artifact of Western civilization.”

Chapter 3, *Alternatives to Pursuing Happiness*, third paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“In the Taoist tradition, **yin corresponds to pursuing joy (pleasure-in-being); yang corresponds to pursuing pleasure (pleasure-in-acting); and the balance of yin and yang corresponds to pursuing happiness.**”

was moved to a new paragraph and changed to:

“In the Taoist tradition, pursuing happiness **is a matter of maintaining a dynamic balance of yin and yang. Those who pursue pleasure activities have too much yang. Those who pursue nothing have too much yin.**”

Chapter 4, Conclusion, last paragraph

Changed “**ought**” to “**owe it to ourselves.**”

Chapter 4, throughout (three occurrences)

Changed “**good** decision-making” to “**wise** decision-making.”

Chapter 4, Conclusion, last paragraph (two occurrences)

Changed “**ought**” to “**owe it to ourselves.**”

Afterword, fourth paragraph, first six sentences

“In *A Conflict of Visions, Ideological Origins of Political Struggles*, Sowell describes the difference in terms of how each side views the size of problems relative to our human ability to solve them. **Right-wingers see the world filled with relatively complex and amorphous problems, which are best solved through decentralized decision-making. We can see this distinction in manufacturing, where those who see inventory control in terms of the EOQ model favor MRP systems and those who see it in terms of the rapid tool-setting model favor the Toyota Production System. We can also see it** in the response to a series of commuter airline crashes several years ago. Left-wingers asked why commuter airlines were not subject to the same regulations as major airlines. Right-wingers **asked a bigger question, would the additional regulatory burden proposed by the left-wingers save lives?**”

was moved to a new paragraph and changed to:

“In *A Conflict of Visions, Ideological Origins of Political Struggles*, Sowell describes the difference in terms of how each side views the size of problems relative to our human ability to solve them. **Left-wingers see the world filled with relatively simple problems that are not being solved. In contrast,** right-wingers see the world filled with relatively complex and amorphous problems, which are best solved through decentralized decision-making. We can see this **difference** in the **differing** responses to a series of commuter airline crashes several years ago. Left-wingers asked why

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

commuter airlines were not subject to the same regulations as major airlines. Right-wingers **recognized a more complex problem.**”

Afterword, fifth paragraph

“From this perspective, all current economic theories, including those of the Austrian school, are too simple in that they include the assumption that “consumer preferences” are either fixed or change in ways that are independent of economic policy. Relaxing this simplifying assumption strengthens the case for decentralization. However, the case for decentralization itself depends on the assumption that we seek to live wisely. We cannot separate our right to choose from our responsibility to live wisely.”

was deleted.

Afterword, new fifth paragraph, fourth sentence

Changed “relatively distant” to “relatively distant (**“cosmic”**).”

Afterword, new eighth paragraph, first sentence

“For those on the right, the major problem is that **this dynamic process requires ever more inclusive (“feminine”) subordinate ends.**”

was separated from the balance of the paragraph and changed to:

“ For those on the right, the major problem is that **the case for freedom depends on the assumption that we seek to live wisely. We cannot separate our right to choose from our responsibility to live wisely.**”

Afterword, ninth paragraph, fourth sentence

“A **more useful** explanation is that the United States owes its success not to any fixed cultural tradition but rather to its tradition of **political** freedom and **cultural** progress toward the normative end of reverence for life.”

was changed to:

“A **wiser** explanation is that the United States owes its success not to any fixed cultural tradition but rather to its tradition of freedom and progress toward the normative end of reverence for life.”

Afterword, last paragraph, second sentence

“When talking to those on the right, I claim to be a “process conservative” in that I seek to preserve the **tradition of political freedom and cultural progress toward the normative end of reverence for life.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“When talking to those on the right, I claim to be a “process conservative” in that I seek to preserve the **dynamic process that made the United States what it is today.**”

Afterword, last paragraph, third sentence

Changed “**political** means” to “means.”

Changed “**cultural** ends” to “**subordinate** ends.”

Afterword, last paragraph, fifth sentence

Changed “their **vision**” to “their **plans**.”

Appendix C, last paragraph, last sentence

“Ultimately, the solution to their problem **is the same, which is the adoption of an economic strategy that doesn't depend on problematic measurements.**”

was changed to:

“Ultimately, the solution to their problem **will be** the same.”

Changes in Version 2004.10.18

Preface, first paragraph, first sentence

“*Wealth in the Information Age, The Economics of Practical Wisdom* is the book that I wish I had read in George Leland Bach’s normative economics course, *Business, Government, and the Changing Environment*, **a quarter century ago.**”

was changed to:

“*Wealth in the Information Age, The Economics of Practical Wisdom* is the book that I wish I had read **twenty-six years ago** in George Leland Bach’s normative economics course, *Business, Government, and the Changing Environment*.”

Preface, first paragraph, last sentence

“It was only after we finished the last case that he cautiously recommended three rules that he used to test the morality of decision alternatives.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“It was only after we finished the last case that he cautiously recommended three rules that he used to test the morality of decision alternatives: (1) the golden rule (*Do unto others as you would have them do unto you.*); (2) the television rule (*Act as if everything that you do will eventually become public knowledge.*); and (3) the anti-expediency rule (*Don’t eat your seed corn.*)”

Preface, second through fifth paragraphs

“I was already familiar with Bach’s three rules. I had learned the golden rule from my parents; the television rule from Wilfred McNeil, comptroller of the United States Department of Defense under its first six Secretaries; and the anti-expediency rule from Harry Carroll, professor of classical Western history, art, languages, and philosophy. I wanted more. I wanted an overarching theory of moral philosophy, a strategic theory that would tell me when the tactical theories I used to solve immediate problems were leading me astray.

“In retrospect, I wanted a unified theory of ethics, economics, and politics. I have had to settle for a strategy for refining what physicist Murray Gell-Mann calls “a crude look at the whole.””

“To be most effective, intellectual tools for helping us formulate alternatives must be based on what we would do if we had complete knowledge of what we ought (owe to ourselves) to seek. How can we know what we don’t know?”

“A strategy is a plan for solving a problem that is too large or too complex for a specific solution. Rather than seeking ever better theories of what we ought to seek, we can seek ever better strategies for learning what we ought to seek. How can we know what we don’t know? We can learn by doing.”

were changed to:

“I was already familiar with Bach’s three decision rules. I had learned the first from my parents; the second from Wilfred McNeil, comptroller of the United States Department of Defense under its first six Secretaries; and the third from Harry Carroll, professor of classical Western history, art, languages, and philosophy. I wanted more than these simple rules. I wanted an overarching theory of moral philosophy, a strategic theory that would tell me when the tactical theories I used to solve immediate problems were leading me astray.

“Over the last quarter century I’ve learned that I my desire for an overarching theory of moral philosophy was misguided. Rather than seeking ever better strategic theories, we ought to seek ever better strategies for learning.”

Preface, new fifth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “radical solution” to “radical approach to normative economics.”

Preface, new sixth paragraph

“At the dawn of the industrial age, Adam Smith’s example of a pin factory demonstrated the wisdom of pursuing the virtuous circle of the division of labor and the expansion of market size. Today, Toyota’s strategy for learning demonstrates the wisdom of pursuing the virtuous circle of **increasing excellence in production and trade and increasing excellence in consumption**. Good people produce good products. Good products, *including good intellectual tools*, produce good people. (See Appendix A.) Given this new reality, we owe it to ourselves to **know** more about what makes people good. We owe it to ourselves to learn more about what enlightened self-interest truly is.”

was changed to:

“At the dawn of the industrial age, Adam Smith’s example of a pin factory demonstrated the wisdom of pursuing the virtuous circle of the division of labor and the expansion of market size. Today, Toyota’s strategy for learning demonstrates the wisdom of pursuing the virtuous circle of good people and good products: Good people produce good products. Good products, *including good intellectual tools*, produce good people. Given this new reality, we owe it to ourselves to **know** more about what makes people good. We owe it to ourselves to learn more about what enlightened self-interest truly is.”

Preface, last two paragraphs

“Students of F. A. Hayek will recognize the homage I paid him in the dedication. Although I finished my first draft before reading any of his works, I owe more to this self-proclaimed member of the party of life than to any other economist. Hayek condemned scientism. The Oxford English Dictionary defines scientism as “a term applied (freq. in a derogatory manner) to a belief in the omnipotence of scientific knowledge and techniques; also to the view that the methods of study appropriate to physical science can replace those useful in other fields such as philosophy and, esp., human behaviour and the social sciences.” Members of the cult of scientism satisfy their human need for mystical oneness by pursuing a quixotic quest for objective truth, a God’s eye view of the Universe, solely by means of understanding isolated parts amenable to complete understanding. Scientism is true belief in scientific analysis.

“Unlike true believers in scientific analysis, I believe that the interactions of the bits of complex adaptive systems (quantum or subquantum particles) can create phenomena useful to understand at higher levels of abstraction (e.g., organisms, economies and ecosystems). Further, what happens at higher levels of abstraction can affect what happens at lower levels. Hence, we ought to study all useful levels of abstraction. Accordingly, I have developed a holistic strategy for learning ever more about what

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

we ought to seek and how best to do so. This strategy complements microeconomic analysis in helping us to decide wisely.”

were deleted.

Acknowledgments, last paragraph

Inserted the paragraph:

“The sixth is F. A. Hayek. Students of Hayek will recognize the homage I paid him in the dedication. Although I finished my first draft before reading any of his works, I owe more to this self-proclaimed member of the party of life than to any other economist.”

Chapter 1, The Strategy, first paragraph, first sentence

Changed “making profound changes **to** how we think” to “making profound changes **in** how we think.”

Chapter 2, Theories produce predictions and explanations., end

“In **other words**, we need to explain based on how the wise would act.”

was changed to:

“In **short**, we need to explain **our behavior** based on how the wise would act.”

Changes in Version 2004.10.25

Title Page

Changed “Scott Maynard Harris” to “S. M. Harris.”

Acknowledgments, first paragraph, second sentence

Changed “Fredrick Sontag” to “Frederick Sontag.”

Chapter 2, Theories produce predictions and explanations., last paragraph

“The distinction between predictions and explanations is especially important in economics. We predict **the behavior of others** based on the knowledge that **they** currently possess. If we explain **our behavior** based on the knowledge we currently possess, we will tend to blind ourselves to the possibility of learning. To avoid this, **we** need to explain our behavior based on how we would act if we **had complete**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

knowledge of what we ought to seek. In other words, we need to explain based on how the wise would act.”

was changed to:

“The distinction between predictions and explanations is especially important in economics. We predict what happens in economies based on the knowledge that we (economic agents) currently possess. If we explain what happens in economies based on the knowledge we currently possess, we will tend to blind ourselves to the possibility of learning. To avoid this, we need to explain what happens in economies based how we would act if we had complete knowledge of what we ought to learn. In short, we need to explain based on how the wise would act.”

Chapter 2, The Strategy, first paragraph, first sentence

Changed “metamethodology” to “concept of scientific testing.”

Chapter 2, Theories are refinements of everyday thinking., seventh paragraph, first sentence

“True believers in scientific analysis (reductionism) deny a core belief of scientific synthesis (holism), which is that phenomena that emerge at higher levels of abstraction can affect what happens at the lowest level of abstraction. To reject useful theories simply because they conflict with a key assumption of the reductionist research program is unscientific. Science involves rejecting theories by disproving hypotheses, not by whether they fit a particular research program. If the defining characteristic of religious cults is unthinking adherence to dogma in the pursuit of religious ends, scientism is a religious cult.”

was changed to:

“True believers in scientific analysis want to restrict science to systems that fit their (reductionist) research program, which is based on the ideal of understanding everything about a system. To reject empirically testable theories simply because they don’t fit a particular research program is unscientific. Science involves rejecting theories by disproving hypotheses, not by whether they fit a particular program.”

and moved to the end of the sixth paragraph of *Theories are refinements of everyday thinking*.

Chapter 2, Moral Science, fourth paragraph, last three sentences

“Model quality tends to vary directly with the first tendency and inversely with the second. This explains why speculative bubbles based on a single model, e.g., tulips are a good investment, are relatively rare. This is not to say that speculative bubbles based

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

on common assumptions, e.g., there will always be greater fools around to buy overpriced investments, are rare.”

were deleted.

Chapter 3, Alternatives to Pursuing Happiness, last paragraph, first sentence

Changed “yin and yang” to “yin (joy / pleasure-in-being) and yang (pleasure / pleasure-in-acting).”

Chapter 5, Consider the Justice of Interventions, third paragraph

“Given the difficulty of determining the justice of government intervention, legislators can choose to err on the side of passing an unjust law or not passing a just law. “Wise” policy makers know that it is better for governments to err on the side of not passing a just law. They know that the government that governs least governs best.”

was changed to:

“Determining the justice of government intervention is difficult. Legislators can choose to err on the side of passing an unjust law or not passing a just law. Wise policy makers know that it is better for governments to err on the side of not passing a just law. They know that the government that governs best governs least.”

Chapter 5, Consider the Justice of Interventions, fourth paragraph, first sentence

Changed “the “wise” case” to “erring on the side of not intervening.”

Appendix B, Conclusion, first paragraph

“Secular humanists tend to ignore our very real need to link or relink to something greater than ourselves. The danger of ignoring this potentially overwhelming need is the flourishing of such deeply flawed means of satisfying it as Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism. Rather than distinguishing between secular and religious humanism, we ought to distinguish between materialist and dualist religious humanism.”

was moved to the end of the Sacrifice versus Prudence section.

Appendix C, last paragraph

“An accounting truism holds that policies that seek to maximize what is measured encourage production of what is measured at the expense of what is not measured. The Soviets learned this the hard way. When central planners set screw factory quotas by the number of screws produced, the factories produced too few big screws and too many small screws. When they set quotas by the weight of screws produced, the

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

factories produced too many big screws and too few small screws. Policies that focus on national income statistics encourage the production of what national income accountants measure at the expense of what they do not measure. The wise consider forms of wealth not measured by national income accountants. These include practical wisdom, trust, leisure skills, trading methods, and much production technology. Policy makers relying on national income statistics face the same type of problem Soviet policy makers faced. Ultimately, the solution to their problem will be the same.”

was changed to:

“An accounting truism holds that policies that seek to maximize what is measured encourage production of what is measured at the expense of what is not measured. Soviet central planners learned this the hard way. When they set screw factory quotas by the number of screws produced, the factories produced too few big screws and too many small screws. When they set quotas by the weight of screws produced, the factories produced too many big screws and too few small screws. National income accounting statistics fail to capture improvements in practical wisdom, trust, leisure skills, trading methods, and much production technology. Whether national income accounting will yield as spectacular an avalanche catastrophe as that of Soviet central planning is open to debate.”

Changes in Version 2004.10.28

Preface, second paragraph, second sentence

Changed “simple rules” to “three rules.”

Preface, third paragraph, second sentence

Changed “ought” to “owe it to ourselves (ought).”

Preface, fifth paragraph, first sentence

Changed “intellectual production tools” to “production management tools.”

Preface, last paragraph, last sentence

Changed “owe it to ourselves” to “ought.”

Chapter 1, Managerial Excellence, second paragraph

“Mainstream economists commonly use “rational” to describe people who satisfy their wants efficiently. In contrast, we commonly use ‘wise’ to describe those who not only satisfy their wants efficiently but also want the “right” things. “Wise” people are not

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

only efficient in satisfying their wants but also effective in choosing them. For example, the decision to smoke cigarettes efficiently is “rational,” but “foolish.” The “wise” choice is not to smoke. Choosing the right problem to solve is as important as choosing the right solution to a given problem.”

was promoted to the first paragraph.

Chapter 1, Managerial Excellence, new second paragraph, second and third sentences

“These managerial concepts help us to parse the problem of how best to achieve our ultimate ends into smaller, more tractable problems. Our need for them arises from our ignorance of our ultimate ends and how best to achieve them.”

were changed to:

“This pair of managerial concepts helps us parse the problem of how best to achieve our ultimate ends into smaller, more tractable problems without losing sight of our ultimate ends.”

Chapter 1, Managerial Excellence, end

Added the paragraph:

“Note that the distinction between managerial efficiency and effectiveness depends on the scale of the subordinate problem being considered. What is a matter of efficiency at one problem scale is a matter of effectiveness at another. Imagine a hierarchical organization that defines the scale of subordinate problems in terms of each member’s freedom to decide. All organization members would seek to be efficient. All members with superiors would leave matters of effectiveness to their superiors. The distinction between efficiency and effectiveness would depend on one’s level in the hierarchy. *Failure to define a problem scale can cause great confusion.*”

Chapter 1, third footnote (fourth in online version)

“These two managerial terms become meaningful only after we define the scale of what we consider to be a subordinate end. What is a matter of efficiency at one problem scale is a matter of effectiveness at another: Imagine a hierarchical organization that defines the scale of problems in terms of its members’ freedom to decide. All organization members would seek to be efficient. All save the person at the top would leave matters of effectiveness to their superiors. The distinction between efficiency and effectiveness would depend on one’s level in the hierarchy. As members rose or fell in the hierarchy, what they considered to be matters of efficiency as opposed to matters of effectiveness would change.”

was deleted.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 1, Managerial Excellence, last paragraph, first sentence

“Unlike the marginalist concept of excellence, the managerial concept includes learning by doing.”

was changed to

“Unlike the marginalist concept of **efficiency**, the managerial concept of **efficiency and effectiveness** includes learning by doing.”

Chapter 2, second footnote, last sentence

Changed “program” to “**research** program.”

Chapter 2, Refining Ultimate Ends, seventh paragraph, last

“**When considering what they need to live a good life**, the wise focus not on their bodies, on their minds, *or* on their spirits, but rather on their bodies, minds, *and* spirits.”

were changed to:

“**The** wise focus not on their bodies, on their minds, *or* on their spirits, but rather on their bodies, minds, *and* spirits.”

Chapter 2, Refining Ultimate Ends, ninth footnote (tenth paragraph, end)

“From this perspective, whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to a concept of justice that typically falls short of the normative end of reverence for life.”

was promoted to the body of the text to form a new tenth paragraph.

Chapter 2, Moral Science, last paragraph, last sentence

Changed “Many **positivist** scientists” to “Many scientists.”

Chapter 4, Managerial Excellence, fourth paragraph, last sentence

Changed “of decision-making” to “of **these** decision-making **processes**.”

Chapter 4, Managerial Excellence, seventh paragraph

“Advances **in trade** that decentralize decision-making also can change decision strategies in ways that reduce turbulence. **Successful decentralization requires that top management trusts others to choose wisely and that decision-makers trust their bosses**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

to judge them on the quality of their decisions. (If decision-makers believe they will be judged solely on results, they will tend to be too cautious.)”

was changed to:

“Advances that **promote** decentralized decision-making also can change decision strategies in ways that reduce turbulence. **For example, the invention of a decision-management tool that improves managers ability to judge the quality of subordinates’ decision-making will tend to improve decision-making by encouraging subordinates to focus more on making better decisions and less on covering their backsides.**”

Chapter 4, Managerial Excellence, last paragraph, last sentence

Changed “Thus,” to “Hence,.”

Chapter 5, International Cooperation, last paragraph, end

Added the sentence:

“The world has yet to attain a sufficient level of lucidity to maintain a just world government.”

Appendix A, fourth footnote (fifth in online version)

“It is also possible to learn how to produce using less WIP inventory by reducing the production size of each kanban. Doing so is a major undertaking in that it involves changing the entire system at once. While learning to produce using fewer kanban makes a Toyota system more like continuous process manufacturing, learning to produce using smaller batch sizes makes it more like custom manufacturing.”

was deleted.

Appendix B, first footnote, second paragraph

“Foolish materialists claim that such recent developments in biology as the creation of a virus containing synthetic genetic material prove the materialist case. The dualist counter is that the potential for life exists everywhere. Wise materialists claim that their view is more scientific because materialist assumptions are easier to disprove than dualist assumptions are. The dualist counter is that this does not mean that materialist assumptions are true, only that they have yet to be proven false.”

was deleted.

Appendix B, Divine Law, second paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Jesus tells us to judge them by their usefulness: “By their fruits you shall know them.” (Mathew 7:16)”

was changed to:

“In Mathew 7:16, Jesus tells us to judge them by their usefulness: “By their fruits you shall know them.””

Appendix B, Divine Law, last paragraph, last sentence

“In short, we would want intelligent life to pursue Schweitzer’s normative end of reverence for life.”

was deleted.

Changes in Version 2004.11.02

Preface, third paragraph, last sentence

“Rather than **seeking ever better** strategic theories, we **owe it to ourselves** (ought) to seek **ever better** strategies for learning.”

was changed to:

“Rather than *strategic theories*, we **ought** to seek *strategies for learning*.”

Preface, fourth paragraph, second sentence

Changed “They **ought**” to “They **owe it to themselves**.”

Preface, fifth paragraph, first sentence

Changed “These scholars also **ought**” back to “These scholars also **owe it to themselves**.”

Preface, last paragraph, last sentence

Changed “ought” back to “owe it to ourselves.”

Acknowledgments, fourth paragraph, second sentence

Changed “In the early seventies,” to “In the early seventies.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Acknowledgments, sixth paragraph, first sentence

Changed “F. A. Hayek” to “Friedrich Hayek.”

Chapter 1, Managerial Excellence, last paragraph

“Note that the distinction between managerial efficiency and effectiveness depends on the scale of the subordinate problem being considered. What is a matter of efficiency at one problem scale is a matter of effectiveness at another. Imagine a hierarchical organization that defines the scale of subordinate problems in terms of each member’s freedom to decide. All organization members would seek to be efficient. All members with superiors would leave matters of effectiveness to their superiors. The distinction between efficiency and effectiveness would depend on one’s level in the hierarchy. *Failure to define a problem scale can cause great confusion.*”

was once again returned to a footnote (#3 -- #4 online).

Chapter 1, The Strategy, first paragraph

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” requires making profound changes to how we think about the universal problem we face, the problem that defines our ultimate ends:

- **The scope must change.** The inexpensive replication of many types of useful knowledge makes it impossible to separate what happens in our society **today** from what **will happen across the world next week or fifty years from now: discoveries travel around the globe and provide benefits until they are superseded or forgotten. Only the ability and willingness to use knowledge constrains its use. The scope of the universal problem must broaden from living members of a given society to current and future members of the community of beings capable of using the knowledge that its members create.**
- **The focus must change.** The inexhaustibility of knowledge, the fact that using a pattern does not deplete it, makes it impossible to value knowledge by measuring the value of the non-knowledge resources it replaces. The best we can do is to measure its value subjectively using decision science techniques. The focus of the universal problem must change from studying *states of the world* to *the process of decision-making*.
- **The ultimate end must change.** This is to say that the meaning of ‘wealth’ must change if it is to remain the term that we use to describe what we seek. To think clearly about our ultimate ends and how best to achieve them, we need a concept of wealth that concerns what we *need* in order to achieve our ultimate ends. This is in sharp contrast to our current concept of wealth, which concerns what we currently *want*.

In short, the universal problem we face **becomes** one of how we intelligent beings choose to progress toward our ultimate ends.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” requires making profound changes to how we think about the universal problem we face, the problem that defines our ultimate ends. The inexhaustibility of knowledge, the fact that using a pattern does not deplete it, makes it impossible to separate what happens today from what happens one hundred years from now. We must consider not only the living but also future generations. Further, the inexpensive replication of many types of useful knowledge makes it impossible to separate what happens in our society from what happens in other societies. We must consider not only members of our society but also all other members of the community capable of using the knowledge that it creates. From the managerial perspective, the universal problem we face is one of how we intelligent beings choose to progress toward our ultimate ends.”

Chapter 1, The Strategy, second paragraph, first sentence

“The problem we face in progressing toward our ultimate ends is an open-ended one.”

was changed to:

“This universal problem is an open-ended one.”

Chapter 2, Refining Everyday Thinking, second paragraph, first sentence

“The recursionist strategy for learning how to live ever more wisely involves refining our ultimate ends by removing ignorance in the form of theories of ultimate ends.”

was changed to:

“The Toyota strategy for learning how to produce ever more wisely involves refining production operations by removing ignorance in the form of work-in-process inventory. (See Appendix A.) Similarly, the recursionist strategy for learning how to live ever more wisely involves refining our ultimate ends by removing ignorance in the form of theories of ultimate ends.”

Chapter 2, Theories produce predictions and explanations., sixth paragraph, fourth sentence

Changed “ought ” back to “owe to ourselves (ought).”

Chapter 2, second footnote, first sentence

“True believers in scientific analysis want to restrict science to systems that fit their (reductionist) research program, which is based on the ideal of understanding everything about a system.”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“True believers in scientific analysis want to restrict science to **theories** that fit their reductionist research program, which is based on the ideal of understanding everything about a system.”

Chapter 2, Moral Science, first paragraph, second sentence

Changed “**human** program ” to “program.”

Chapter 2, Moral Science, second paragraph, first sentence

Changed “**human** research program” to “research program.”

Chapter 2, Moral Science, second paragraph, last sentence

Changed “scientific methodologies and technologies” to “means of studying (our sensations of) reality.”

Chapter 2, Moral Science, third paragraph, first sentence

Changed “Scientists” to “Specialists.”

Chapter 3, Introduction, last sentence

“This chapter proposes recursionist alternatives to **four** of these concepts: consumption, trade, production, and profit.”

was changed to:

“This chapter proposes recursionist alternatives to **five** of these concepts: **wealth**, consumption, trade, production, and profit.”

Chapter 3, Consumption

Inserted the following section titled Wealth:

“To think clearly about our ultimate ends and how best to achieve them, we need a concept of wealth that concerns what we need to progress toward our ultimate ends. Recursionist wealth is goods and the resources to produce goods, where goods are *things that we humans need to progress toward our ultimate ends*. In sharp contrast, marginalist wealth is goods and the resources to produce goods, where goods are *economic goods that we consumers want*.”

Chapter 5, Decentralization, first paragraph, second sentence

Changed “**F. A.** Hayek” to “**Friedrich** Hayek.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Afterword, last paragraph, third and fourth sentences

“When talking to those on the left, I claim to be a “liberal progressive” in that I favor (classical) liberal means and ever more “progressive” subordinate ends. Although I am comfortable making these two claims, I am more comfortable defining my position in terms of whom I oppose.”

was changed to:

“When talking to those on the left, I claim to be a “classical liberal progressive” in that I favor classical liberal means and ever more “progressive” subordinate ends. Although I am comfortable making these two claims, I am more comfortable defining my position by defining whom I oppose.”

Afterword, last paragraph, end

Added the sentence:

“In terms of the current political spectrum, I am a radical centrist.”

Appendix B, Practical Benefits of Magical Mysticism, last paragraph, last sentence

Changed “rivets” to “connects.”

Appendix B, Ultimate Normative Ends of Life, eleventh paragraph, first sentence

Changed ““the need for self-actualization”” to “the need for "self-actualization".”

Appendix C, first paragraph, last sentence

“The biologist, having realized that wealth is human goods and the capacity to produce human goods, decides to market the tea at an affordable price.”

was deleted.

Appendix C, last paragraph, last sentence

“Whether national income accounting will yield as spectacular an avalanche catastrophe as that of Soviet central planning is open to debate.”

was changed to:

“Ultimately, the solution to this measurement problem will be the same as that of Soviet central planning, which is the replacement of the decision-making system with a system that is less dependent on problematic measurements.”

Changes in Version 2004.11.13

Preface, third paragraph, last sentence

“Rather than *strategic theories*, we ought to seek *strategies for learning*.”

was changed to:

“Rather than *strategic theories*, we ought to seek *ever better strategies for learning*.”

Preface, fourth paragraph, third and fourth sentences

“The foremost task of decision-making is defining the universal problem we face, the problem that defines our ultimate ends. The intellectual tool that we use to define this problem ought to address all uncertainty.”

were changed to:

“The foremost task of decision-making is to define our ultimate ends. The intellectual tool that we use to define our ultimate ends ought to address all uncertainty.”

Acknowledgments, first paragraph, last sentence

Changed “time” to “most precious resource, time.”

Chapter 1, Managerial Excellence, second paragraph, last sentence

Changed “parse” to “divide.”

Chapter 1, The Strategy, first paragraph, second sentence

Changed “one hundred” to “one thousand.”

Chapter 1, Overview, first sentence

Changed “recursionist strategy for progressing toward our ultimate ends” to “managerial strategy for learning how to progress toward our ultimate ends ever more wisely.”

Chapter 1, Overview, fourth sentence

Changed “recursionist alternatives” to “managerial alternatives.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Refining Everyday Thinking, first paragraph, third sentence

Changed “**recursionist** strategy for learning how to **live** ever more wisely” to “**managerial** strategy for learning how to **progress toward our ultimate ends** ever more wisely.”

Chapter 2, Refining Ultimate Ends, first paragraph, first sentence

Changed “**recursionist** strategy” to “**managerial** strategy for learning how to **progress toward our ultimate ends ever more wisely.**”

Chapter 2, Refining Ultimate Ends, third paragraph, last sentence

Changed “to **live** more wisely” to “to **consume** more wisely.”

Chapter 2, Refining Ultimate Ends, fourth paragraph, first sentence

Changed “subjectivist **foundation**” to “subjectivist **theory of consumption.**”

Chapter 2, Moral Science, sixth paragraph, second sentence

“Until all of us act wisely, managing this **process** well requires distinguishing between intellectual tools for helping us **to** follow our teleonomic programming and intellectual tools for helping us to predict how others will follow their teleonomic programming.”

was changed to:

“Until all of us act wisely, managing this **study** well requires distinguishing between intellectual tools for helping us follow our teleonomic programming (**e.g., intellectual tools that explain how to live ever more wisely**) and intellectual tools for helping us to predict how others will follow their teleonomic programming.”

Chapter 2, Moral Science, last paragraph, first sentence

Changed “**recursionist strategy**” to “**this definition of economic science.**”

Chapter 2, Moral Science, last paragraph, last sentence

Changed “**recursionist strategy**” to “**study of the ever-evolving process of discovering, testing, and applying knowledge useful in living good lives.**”

Chapter 3, Introduction, first sentence

Changed “**achieving** our ultimate ends” to “**pursuing** our ultimate ends.”

Chapter 3, Introduction, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**recursionist** alternatives” to “**managerial** alternatives.”

Chapter 3, Wealth, second sentence

Changed “**Recursionist** wealth” to “**Managerial** wealth.”

Chapter 3, Consumption, second sentence

Changed “**recursionist** view” to “**managerial** view.”

Chapter 3, *Human Capital, Work, and Leisure*, second paragraph, first sentence

Changed “**recursionist** view” to “**managerial** view.”

Chapter 4, Avalanche Catastrophes, last paragraph, last sentence

Changed “**G**overnor” to “governor.”

Chapter 5, *Consider the Justice of Interventions*, second paragraph, first sentence

Changed “**recursionist** perspective” to “**managerial** perspective.”

Chapter 5, Just Taxation, fourth paragraph, last sentence

Changed “wise consumption” to “lucidity.”

Chapter 5, International Cooperation, second paragraph

Changed “**solution to the problem**” to “**means**” in the second sentence.

Reduced paragraph to a footnote.

Chapter 6, first paragraph, first sentence

Changed “how we **progress toward our ultimate ends**” to “how we **ought to live**.”

Chapter 6, first paragraph, last sentence

Changed “**what we ought to seek and how best to seek it**” to “**how to live ever more wisely**.”

Chapter 6, second paragraph

Changed “**recursionist** strategy” to “**managerial** strategy **for learning how to live ever more wisely**” in the first sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**recursionist** strategy” to “**managerial** strategy” in the balance of the paragraph.

Chapter 6, last paragraph, first sentence

Changed “**recursionist** moral vision” to “moral vision **put forth in this work.**”

Afterword, second to last paragraph, last sentence

Changed “normative end” to “normative **ultimate** end.”

Changes in Version 2004.11.15

[ClearEdits® review of Preface through Chapter 3.]

Preface, first paragraph, last sentence

*“**Act as if everything** that you **do will eventually** become **public knowledge.**”*

was changed to:

*“**Assume** that your **actions** will become **widely known.**”*

Preface, third paragraph, first sentence

Changed “**three** rules” to “rules.”

Preface, third paragraph, first sentence

Changed “**desire**” to “**wish.**”

Preface, fourth paragraph, fifth sentence

Changed “all of its own fundamental propositions” to “basic assumptions.”

Preface, last paragraph

Changed “**demonstrated**” to “showed” in the first sentence.

Changed “**demonstrates**” to “shows” in the second sentence.

Acknowledgments, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“I would like to acknowledge **a few** people who have **been especially helpful in writing** this **book**. The first is Frederick Sontag, Pomona College’s much beloved professor of philosophy and theology. **Fred was** extremely generous with his most precious resource, time.”

was changed to:

“**A poster in my high school physics classroom proclaimed: “*The problem, once solved, is simple.*” To this I add: “*The problem, once found, is obvious.*”**”

I would like to acknowledge **several** people who have **helped me find the problems that led to this treatise**. The first is Frederick Sontag, Pomona College’s much beloved professor of philosophy and theology. **Fred has long encouraged me to become more than I am. In helping me do so he has been** extremely generous with his most precious resource, **his** time.”

Acknowledgments, fourth paragraph

Changed “who” to “whom” in the fourth sentence.

Deleted the last two sentences: “**A poster in my high school physics classroom proclaimed: “*The problem, once solved, is simple.*” To this I add: “*The problem, once found, is obvious.*”**”

Acknowledgments, last paragraph, last sentence

Changed “**thinking**” to “**beliefs.**”

Chapter 1, Mainstream Economics' Blind Spot, first paragraph

Changed “**effectively**” to “**well**” in the first sentence.

Chapter 1, Mainstream Economics' Blind Spot, second paragraph

Changed “**fundamental**” to “**very important**” in the first sentence.

Chapter 1, Mainstream Economics' Blind Spot, fourth paragraph

Deleted “**and desires**” in the third sentence.

Changed “**in the use of**” to “**using**” in the last sentence.

Changed “**achieving**” to “**reaching**” in the last sentence.

Chapter 1, Mainstream Economics' Blind Spot, fifth paragraph, second sentence

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Changed “**achieve**” to “**reach**.”

Chapter 1, Mainstream Economics' Blind Spot, sixth paragraph, first sentence

Changed “**units of a particular part**” to “**widgets**.”

Chapter 1, Mainstream Economics' Blind Spot, eighth paragraph

Changed “**determine the value of**” to “**evaluate**” in the fourth sentence.

Deleted “**, the fact that using a pattern does not wear it out,**” in the fifth sentence.

Deleted “**in the future**” in the sixth sentence.

Chapter 1, Mainstream Economics' Blind Spot, last paragraph

Deleted “**thinking in terms of**” in the first sentence.

Changed “**reduced**” to “**cut**” in the second sentence.

Changed “**who still require**” to “**with**” in the fourth sentence.

Deleted “**several days before the first of these parts is assembled**” in the fourth sentence

Changed “**Holding this much inventory**” to “**This**” in the fifth sentence.

Changed “**increases**” to “**support**” in the sixth sentence.

Deleted “**the pace of**” in the sixth sentence

Deleted “**by retarding feedback**” in the seventh sentence

Chapter 1, Managerial Excellence, second paragraph

Changed “**Instead of**” to “**Rather than**” in the first sentence.

Changed “**achieving**” to “**reaching**” in the first sentence.

Changed “**achieve**” to “**pursue**” in the last sentence.

Chapter 1, Managerial Excellence, last paragraph, second sentence

Deleted “**the next generation of.**”

Chapter 1, Managerial Excellence, last paragraph, fifth sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted “digital technology was relatively immature and so.”

Chapter 1, The Strategy, first paragraph

Changed “requires” to “calls for” in the first sentence

Deleted “, the fact that using a pattern does not deplete it,” in the second sentence.

Changed “inexpensive replication of” to “low cost of copying” in the fourth sentence.

Chapter 1, The Strategy, fourth paragraph

Changed “begins” to “starts” in the first sentence.

Deleted “of carrying out the chosen solution” in the first sentence.

Changed “However” to “But” in the fourth sentence.

Chapter 1, The Strategy, fifth paragraph

Deleted “mistakes in the form of” in the second sentence.

Deleted “mistakes in the form of” in the third sentence.

Chapter 1, The Strategy, last paragraph

Changed “achieving” to “pursuing” in the fourth sentence.

Changed “implement” to “carry out” in the fourth sentence.

Chapter 1, Overview, sixth sentence

Deleted “amount of.”

Chapter 2, Refining Everyday Thinking

Deleted “ignorance in the form of” in the first sentence.

Deleted “ignorance in the form of” in the third sentence.

Changed “requires” to “calls for” in the last sentence.

Deleted “the nature of” in the last sentence.

Chapter 2, *Theories are tools for producing useful knowledge.*, first paragraph, second sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Although Einstein’s theory of relativity provides more accurate answers **than** Newtonian mechanics, **the latter** is the more useful for plotting a spacecraft’s trajectory.”

was changed to:

“Although Einstein’s theory of relativity provides more accurate answers, Newtonian mechanics is the more useful for plotting a spacecraft’s trajectory.”

Chapter 2, *Theories produce predictions and explanations.*, second paragraph

Deleted “**relatively**” in the first sentence.

Deleted “**currently**” in the last sentence.

Deleted “, e.g., **string and complexity theories**” in the last sentence

Chapter 2, *Theories produce predictions and explanations.*, third paragraph

Deleted “**relatively**” in the first sentence.

Changed “In *deterministic chaotic systems*, we can explain without being able to predict equally well.” to “Chaos theory provides a means of explaining *deterministic chaotic systems* without being able to predict these systems equally well.”

Chapter 2, *Theories produce predictions and explanations.*, fifth paragraph

Changed “**balancing the production of**” to “**producing**” in the first sentence.

Chapter 2, *Theories produce predictions and explanations.*, last paragraph

Deleted “**currently**” in the second sentence.

Deleted “**under particular circumstances**” in the second sentence.

Deleted “**currently**” in the third sentence.

Changed “**complete**” to “greater” in the fourth sentence.

Changed “**In short**” to “**In other words**” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, first paragraph

Deleted “**the nature of**” in the second sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, second paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted “the process of” in the second sentence.

Changed “cannot describe, but can nevertheless identify, ” to “identify but not describe” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, second paragraph

Deleted “the process of” in the second sentence.

Changed “ cannot describe, but can nevertheless identify, ” to “identify but not describe” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, third paragraph

Changed “the universal set of worldly knowledge” to “worldly knowledge (U)” in the first sentence.

Changed “is the set of ” to “are” in all (three occurrences).

Changed “refine worldly narratives” to “refine worldly narratives (A)” in all (two occurrences).

Chapter 2, *Theories are refinements of everyday thinking.*, fourth paragraph

Much scientific testing has become the province of specialists. Specialists invent ever more sophisticated (1) tools for enhancing our senses, e.g., telescopes, microscopes, cloud chambers, and particle accelerators; (2) tools for enhancing our common sense , e.g., formal logic, algebra, analytical geometry, calculus, statistics, and computer simulation; and (3) testing methods and procedures.

was deleted.

Chapter 2, *Theories are refinements of everyday thinking.*, new fourth paragraph

Changed “specialists” to “scientists” in the first sentence.

Changed “is the set of ” to “are” in the fourth sentence.

Deleted the last two sentences: “The wise distinguish between these theories and those that predict: when talking about scientific theories that predict but do not explain ($C \cap B'$), they are careful to say that a set of factors *correlates with* rather than *causes* the result.”

Chapter 2, *Theories are refinements of everyday thinking.*, new fifth paragraph

Inserted: “($C \cap D$)” in the first sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed the last three sentences from:

“Practically, theories that explain are partial descriptions of reality that we use to find problems to solve. We test theories by how well they perform their function. We test theories that explain by how well they help us find problems to solve.”

were promoted to a new paragraph and changed to

“Practically, we test theories by how well they perform their function. We test theories that predict (C) by how well they help us predict. We test theories that explain (D) by how well they help us find problems to solve.”

Chapter 2, *Theories are refinements of everyday thinking.*, new sixth paragraph

Changed “concept of scientific testing” to “metamethodology” in the first sentence.

Deleted “quite” in the second sentence.

Changed “quite as well as” to “better than” in the second sentence.

Changed “However,” to “But” in the fourth sentence.

Changed “eventually” to “later” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, new seventh paragraph

Changed “both a theory that predicts and one that explains” to “a theory that explains and one that predicts” in the second sentence.

Changed “eventually” to “later” in the third sentence.

Deleted “predict and the leading theories that” in the fourth sentence.

Changed “. However, we” to “, but” in the last sentence.

Chapter 2, *Refining Ultimate Ends*, first paragraph

Changed “implementing” to “carrying out” in the second sentence.

Chapter 2, *Refining Ultimate Ends*, second paragraph, fifth and sixth sentences

“There is truth in both views. To obtain a more useful truth, we need an explicitly moral theory of evolutionary economics — one that removes the artificial barrier separating excellence in what economists currently deem to be consumption, from excellence in what they deem to be production and trade.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

were promoted to a new paragraph and changed to

“To **progress most readily**, we need an explicitly moral theory of evolutionary economics — one that removes the artificial barrier separating excellence in what **Austrian** economists deem to be consumption, from excellence in what they deem to be production and trade.”

Chapter 2, Refining Ultimate Ends, new fourth paragraph

Changed “**require**” to “**call for**” in the first sentence.

Deleted “**fundamental**” in the second sentence.

Chapter 2, Refining Ultimate Ends, new fifth paragraph

“We can correct this problem by replacing Austrian economics’ subjectivist theory of consumption with an evolutionary one. **To do so**, the explanations that we use to think about how best to satisfy our needs and those that we use to identify our needs must both fit together and work together. We can insure that these two types of explanations fit together by defining our needs and ultimate ends tautologically: *our needs are those things we need to progress toward our ultimate ends and our ultimate ends are what we progress toward when we satisfy our needs*. We can insure they work together by **assuming** that we are motivated to satisfy our needs. Theories that look to our internal programming to explain what motivates us satisfy both of these **conditions**.”

was changed to:

“We can correct this problem by replacing Austrian economics’ subjectivist theory of consumption with an evolutionary one. **We can do so by basing our theory of consumption on theories that look to our internal programming to explain what motivates us.**⁴

⁴ **T**he explanations that we use to think about how best to satisfy our needs and those that we use to identify our needs must both fit together and work together. We can insure that these two types of explanations fit together by defining our needs and ultimate ends tautologically: *our needs are those things we need to progress toward our ultimate ends and our ultimate ends are what we progress toward when we satisfy our needs*. We can insure they work together by **requiring** that we are motivated to satisfy our needs. Theories that look to our internal programming to explain what motivates us satisfy both of these **requirements**.”

Chapter 2, Refining Ultimate Ends, new seventh paragraph

Deleted “**currently**” in the fourth sentence.

Deleted “**Over time**” in the last sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**eliminating**” to “**culling**” in the last sentence.

Chapter 2, Refining Ultimate Ends, new eighth paragraph

Changed “**eliminate** teleonomic theories **by developing rules for eliminating theories** that fail to help us identify what we need to **achieve**” to “**cull** teleonomic theories that fail to help us identify what we need to **pursue**” in the first sentence.

Changed “oxygen, water, **and nutrition**” to “oxygen **and** water” in the third sentence (two occurrences).

Changed “**eliminate**” to “**cull**” in the sixth sentence.

Changed “**Hence, we ought to cull any theory that attributes human motivation to a single level of abstraction**” to “**We ought to cull all simplistic explanations of human behavior**” in the eighth sentence.

Changed “**prescriptive**” to “**teleonomic**” in the ninth sentence (three occurrences).

Chapter 2, Refining Ultimate Ends, new ninth paragraph

Changed “**eliminate**” to “**cull**” in the first sentence.

Deleted “**by developing rules for eliminating those**” in the first sentence.

Changed “**This**” to “**Doing so wisely**” in the second sentence.

Deleted “**particular**” in the sixth sentence.

Deleted “**in order**” in the seventh sentence.

Changed “a particular need **at a particular moment in time**” to “a need” in the eighth sentence.

Deleted “**particular**” in the last sentence (two occurrences).

Chapter 2, Refining Ultimate Ends, new tenth paragraph

Deleted “**theories, rules, customs, etc.**” in the second sentence.

Changed “**typically**” to “**usually**” in the ninth sentence.

Chapter 2, Refining Ultimate Ends, last two paragraphs

Changed “**eliminate**” to “**cull**” in all (two occurrences).

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**eliminating**” to “**culling**” in all (one occurrence).

Chapter 2, Moral Science, second paragraph

Deleted “**in turn**” in the second sentence.

Added the following sentences:

“These inventions include ever more sophisticated (1) tools for enhancing our senses (telescopes, microscopes, cloud chambers, particle accelerators); (2) tools for enhancing our common sense (formal logic, algebra, analytical geometry, calculus, statistics, computer simulation); and (3) testing methods and procedures.”

Chapter 2, Moral Science, fourth paragraph

Deleted “**relatively**” in the first sentence.

Changed “**due to**” to “**caused by**” in all (two occurrences).

Chapter 2, Moral Science, sixth paragraph, second sentence

Deleted “(e.g., **intellectual tools that explain how to live ever more wisely**).”

Chapter 2, Moral Science, last paragraph, last sentence

“The **study of the** ever-evolving process of discovering, testing, and applying knowledge useful in living good lives is a scientific research program of, by, and for all intelligent life.”

was changed to:

“ The ever-evolving process of discovering, testing, and applying knowledge useful in living good lives is a scientific research program of, by, and for all intelligent life. **The study of this research program is part of this research program.**”

Chapter 3, Introduction, first two sentences

“Managerial excellence is **the wise use of resources in pursuing our ultimate ends. We increase excellence by** choosing **better** subordinate ends and **better** means to **achieve** our chosen subordinate ends.”

were changed to:

“Managerial excellence is **is a matter of** choosing subordinate ends and means to our chosen subordinate ends **wisely.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3, Wealth, first sentence

“To think clearly about our ultimate ends and how best to achieve them, we need a concept of wealth that concerns what we need to progress toward our ultimate ends. Managerial wealth is goods and the resources to produce goods, where goods are *things that we humans need to progress toward our ultimate ends*. In sharp contrast, marginalist wealth is goods and the resources to produce goods, where goods are *economic goods that we consumers want*.”

were changed to:

“Wealth is goods and the resources to produce goods. Marginalist goods are *scarce resources that we want*. In sharp contrast, managerial goods are *those things that we need to progress toward our ultimate ends*.”

Chapter 3, Pleasure and Pain, first paragraph

Changed “However” to “Regrettably” in the third sentence.

Chapter 3, Pleasure and Pain, third paragraph

“In Western ethics, Aristotle best defines pleasure and Spinoza best defines joy. Aristotle defined pleasure as *the thing that perfects or completes activity*. Pleasure comes from being absorbed in activity. To give us pleasure, an activity must not be so easy as to be boring, nor so difficult as to be overwhelming. Work that does not challenge us is boring and work that challenges us too much is overwhelming. Between these two extremes there is a level that enables us to become absorbed in work. Complete pleasure, ecstasy, is a matter of completely losing ourselves in activity. Pain-in-acting is anything that interferes with losing ourselves in activity.”

was changed to

“In Western ethics, Aristotle best defines pleasure and Spinoza best defines joy. Aristotle defined pleasure as losing ourselves in activity. To give us pleasure, an activity must not be too easy or too difficult. An activity that does not challenge us is boring and work that challenges us too much is overwhelming. Between these two extremes there is a level that enables us to lose ourselves in activity. Pain-in-acting is anything that interferes with losing ourselves in activity.”

Chapter 3, Pleasure and Pain, fourth paragraph

Changed “impedes” to “hinders” in the last sentence.

Chapter 3, Pleasure and Pain, fifth paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We can learn to **become absorbed** in any activity **and so we can learn to find pleasure in any activity.**”

was changed to:

“We can learn to lose ourselves in any activity.”

Chapter 3, *Pleasure and Pain*, sixth paragraph

Changed “**becoming absorbed**” to “**losing ourselves**” in all (three occurrences).

Chapter 3, *Vicious Circles*, second paragraph

Changed “**become absorbed**” to “**lose ourselves**” in the first sentence.

Chapter 3, *Practical Wisdom*, first paragraph

Changed “**Achieving happiness**” to “**Living a good life**” in the second sentence.

Deleted “**, which we need to prescribe general ends**” in the third sentence.

Changed “**determine specific**” to “**choose subordinate**” in the fourth sentence.

Changed “**a moderate amount of good fortune**” to “**a bit of good luck**” in the last sentence.

Chapter 3, *Practical Wisdom*, second paragraph

Changed “**Finally**” to “**Fourth**” in the fifth sentence.

Chapter 3, *Practical Wisdom*, third paragraph

“**In choosing a wise course of action, we must choose an effective end and the most efficient means to it.** There are three basic means of choosing **ends and means** wisely: (1) deliberation, (2) decision rules, and (3) discipline. Deliberation involves choosing the appropriate model for the given situation, drawing a conclusion from that model, and judging the validity of the conclusion. Using decision rules involves selecting the appropriate rule and applying it wisely. Strong appetites and emotions can frustrate deliberation and decision rules by overwhelming our perception, intuition, and reason. In contrast, discipline, which is the conscious formation and use of habits, is relatively immune to appetites and emotions. People acting by habit can act wisely even when strong appetites or emotions interfere with their faculties. e.g., soldiers perform drills to instill discipline so that they can act wisely in battle. Acting wisely is often a matter of knowing which of these three means to use.”

was changed to

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“There are three basic means of choosing wisely: deliberation, decision rules, and discipline. Each has its advantages and disadvantages. Deliberation is thorough but costly. Applying decision rules is less thorough but also less costly. Discipline is the least thorough and least costly. It is also the least susceptible to strong appetites and emotions, which can overwhelm our perception, intuition, and reason. Acting wisely is often a matter of knowing which of these three means to use.”

Chapter 3, *Two means of pursuing happiness.*, first three paragraphs

“Aristotle and Spinoza provide us with different means of pursuing happiness. Aristotle asks us to look for moral virtue in others. **Spinoza asks us to look into ourselves.**

“**Aristotle** believed that moral virtue **concerns** the habit of wanting the right things, which we develop by acting as if we want the right things. **He determined moral virtue by examining the characteristics of the wise. He defined these characteristics in terms of emotions or actions. With one exception, he associated each of these characteristics with one virtue and two vices. The virtue is having the proper amount of the characteristic. The vices are having either too little or too much. The emotion of confidence yields the virtue of courage and the vices of cowardice and recklessness. The act of sharing yields the virtue of generosity and the vices of stinginess and extravagance. The exception is to this “golden mean” rule is curiosity: Aristotle believed that we can never learn too much.**

“**Spinoza** believed that **all emotions concern movements toward or away from perfection. We achieve true freedom and happiness by addressing** the causes of our emotions rationally. **In terms of our needs model, we develop moral virtue by learning to understand our needs and the best means of satisfying them. We achieve true freedom and happiness by satisfying our needs rationally.”**

were changed to:

“Aristotle and Spinoza provide us with different means of pursuing happiness. Aristotle asks us to look for moral virtue in the wise. **He** believed that moral virtue **is** the habit of wanting the right things, which we develop by acting as if we want the right things. **In contrast, Spinoza asks us to look into ourselves. He** believed that **moral virtue is the ability to address** the causes of our emotions rationally, **which** we develop by learning to understand our needs and the best means of satisfying them.”

Chapter 3, *Two means of pursuing happiness.*, last paragraph

Changed “but **rather** when” to “but when” in the first sentence.

Chapter 3, *Alternatives to Pursuing Happiness*, first paragraph, second sentence

Deleted “(per se).”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3, *Human Capital, Work, and Leisure*, first paragraph, first sentence

Changed “increases” to “raises.”

Chapter 3, Trade, first paragraph

Changed “any” to “the” in the first sentence.

Changed “establishing” to “setting up” in the last sentence.

Chapter 3, Trust, first paragraph

“Knowledge of a means of trade is a necessary but not a sufficient condition for trade. Trading partners **must also** trust one another to fulfill their roles in the trading relationship. *Trust is the belief that a person or thing will perform as expected.*”

were changed to:

“Trade **requires that** trading partners trust one another to fulfill their roles in the trading relationship. **Trust is the belief that a person or thing will perform as expected.**”

Chapter 3, Trust, third paragraph

“Trust **plays a particularly important role** in information age economies. Knowledge is **relatively** difficult to protect from theft: (1) many forms of knowledge can be easily duplicated, which makes them easy to steal; (2) stealing knowledge does not prevent its owner from using it, which makes the theft of knowledge easier to **conceal**; and (3) the legal recourse for stolen knowledge tends to be more expensive than it is for scarce resources, where evidence of theft is more clear-cut and the legal precedents tend to be better established. **The more expensive knowledge is to protect from theft, the less of it will be created.** Trust lowers the cost of protecting knowledge from theft.”

was changed to:

“In information age economies, trust is a strategic asset. Knowledge is difficult to protect from theft: (1) many forms of knowledge can be easily duplicated, which makes them easy to steal; (2) stealing knowledge does not prevent its owner from using it, which makes the theft of knowledge easier to **hide**; and (3) the legal recourse for stolen knowledge tends to be more expensive than it is for scarce resources, where evidence of theft is more clear-cut and the legal precedents tend to be better established. Trust lowers the cost of protecting knowledge from theft, **which promotes creating knowledge.**”

Chapter 3, *Three Common Misbeliefs*, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Several common beliefs hinder our ability to **increase** excellence in trade. The most important of these is the belief that we cannot **improve the means of trade**. This belief tends to blind us to the potential of **improving the means of trade**. Failing to see this potential **in turn** tends to blind us to other means of **increasing** managerial excellence. For example, failing to see the benefits of **increasing the efficiency of** trade caused many American manufacturers to perceive the Toyota Production System as a collection of techniques for **minimizing** WIP inventory. By adopting these techniques they **thought** they could catch up to their Japanese competitors. They soon discovered that by the time they adopted current Japanese techniques, the Japanese had developed new ones. The Toyota system is a more than a collection of techniques for **minimizing** WIP inventories. It is a strategy for learning by doing.”

was changed to:

“Several common beliefs hinder our ability to **promote** excellence in trade. The most important of these is the belief that we cannot **promote excellence in trade**. This belief tends to blind us to the potential of **promoting excellence in trade**. Failing to see this potential tends to blind us to other means of **promoting** managerial excellence. For example, failing to see the benefits of **promoting excellence in** trade caused many American manufacturers to perceive the Toyota Production System as a collection of techniques for **cutting** WIP inventory. By adopting these techniques they **believed that** they could catch up to their Japanese competitors. They soon discovered that by the time they adopted current Japanese techniques, the Japanese had developed new ones. The Toyota system is a more than a collection of techniques for **cutting** WIP inventories. It is a strategy for learning by doing.”

Chapter 3, *Three Common Misbeliefs*, second paragraph

Changed “**increasing**” to “**promoting**” in the first sentence.

Chapter 3, *Three Common Misbeliefs*, third paragraph

“A third common belief that hinders **increasing** excellence in trade is the belief that **increasing competition decreases cooperation. Competition is the process of determining which competitor is best**. When excellence **includes** cooperation, **increasing** competition tends to **increase** cooperation. Consider the game of basketball. Playing basketball well requires **cooperation in the form of** teamwork. Players compete by cooperating well. **The level of play**, including **the level of** teamwork, tends to rise with closeness of the score.”

was changed to:

“A third common belief that hinders **promoting** excellence in trade is the belief that **competition opposes cooperation**. When excellence **calls for** cooperation, **promoting** competition tends to **promote** cooperation. Consider the game of basketball. Playing

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

basketball well requires teamwork. Players compete by cooperating well. Excellence of play, including excellence in teamwork, tends to rise with closeness of the score.”

Chapter 3, *Three Common Misbeliefs*, last paragraph

Changed “increase” to “promote” in the first sentence.

Deleted “both” in the last sentence.

Changes in Version 2004.11.19

[ClearEdits® review of Chapter 4.]

Preface, fourth paragraph, last sentence

Changed “Only a” to “A.”

Acknowledgments, first paragraph

Reordered acknowledgments temporally. Adjusted opening sentences in tributes to Likens and Douglass.

Chapter 1, Overview, first sentence

Changed “Managerial Excellence” to “Managerial Concepts.”

Chapter 3, title

Changed “Managerial Excellence” to “Managerial Concepts.”

Chapter 4, Increasing Managerial Excellence, title

Changed title to “Progress.”

Chapter 4, Progress, first paragraph, first sentence

“Increasing managerial excellence is a matter of converting new information into new applications of knowledge.”

was changed to:

“Progress is movement toward the ultimate normative end of a good life for all. In information age economies, the primary means of progress involves increasing

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

managerial excellence, which is a matter of converting new information into new applications of knowledge that is useful in progressing toward our ultimate ends.”

Chapter 4, Progress, first paragraph

Changed “**marginal increase in**” to “**new**” in the new fourth sentence.

Changed “**implement better means**” to “**apply new useful knowledge**” in the last sentence.

Chapter 4, Progress, second paragraph, second sentence

Deleted “**very.**”

Chapter 4, Progress, second paragraph, last two sentences

“A small raw material **price increase** might cause firms to react as marginalist theory predicts. **On the other hand**, it might either have no immediate effect or trigger a firm to adopt a new process that changes the industry.”

were changed to:

“ A small **rise in the price of a** raw material might cause firms to react as marginalist theory predicts; it might have no immediate effect; or **it might** trigger a firm to adopt a new process that changes the industry.”

Chapter 4, Progress, third paragraph

Changed “**increase in managerial excellence**” to “**new application of useful knowledge**” in the first sentence.

Changed “**week**” to “**month**” in the last sentence.

Chapter 4, Progress, fourth paragraph

“**Increasing managerial excellence** has both deflationary and inflationary effects. In itself, **a better means either decreases the demand for goods and services or increases the amount or quality of goods and services available for sale, and so is deflationary. However, implementing it requires reallocating resources, a process that uses scarce resources without increasing output, and so is inflationary. Because the cost of reallocating resources tends to overwhelm the benefit of the new means in the short run, increasing managerial excellence tends to create a “bow wave” of inflation. The greater the cost of reallocating resources, the greater this bow wave is likely to be.**”

was changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Applying new useful knowledge is inflationary in that it takes non-knowledge scarce resources from other uses. Once applied, the new knowledge is deflationary in that it frees non-knowledge scarce resources for other uses. Metaphorically, progress from increasing managerial excellence creates a “bow wave” of inflation.”

Chapter 4, Progress, fifth paragraph

“Economies are subject to waves of increases in managerial excellence. One reason for this is new products often require new production methods, which in turn require other new products, e.g., each new generation of integrated circuits requires more precise machine tools, cleaner manufacturing areas, and better design tools. Another reason is a major invention can trigger waves of increases in excellence, e.g., the invention of the transistor spawned countless inventions, innovations, and improvements.”

was deleted.

Chapter 4, Economic Turbulence, title

Changed title to “Turbulence.”

Chapter 4, Turbulence, first paragraph, second through fourth sentences

“The turbulent flow of one resource tends to create turbulent flow of related resources. The turbulent flow of labor causes unemployment, plus the turbulent flow of money and other resources. The turbulent flow of money or goods causes surges of inflation or deflation, plus the turbulent flow of labor and other resources.”

was changed to:

“Turbulence in the flow of one resource tends to create turbulence in the flow of related resources. Turbulence in the flow of money and goods tends to cause turbulence in the flow of labor. Turbulence in the flow of labor tends to cause turbulence in the flow of money and goods.”

Chapter 4, Turbulence, second paragraph

Changed “form and magnitude” to “amount and form” in the second sentence.

Deleted “the nature of” in the second sentence.

Deleted “existing” in the third sentence.

Changed “a minimum of” to “little” in the third sentence.

Changed “However,” to “But” in the fourth sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted the last two sentences: “Similarly, if firms with published product prices foolishly raise their prices due to the mistaken belief that a temporary rise in input prices is permanent, inflation is likely to be more severe.”

Chapter 4, Turbulence, third paragraph

“Economic turbulence wastes time and other resources. Capturing the benefit of turbulence requires knowledge of how to do so.”

was changed to:

“Economic turbulence wastes time and other resources, which creates an opportunity to those who know how to lower it.”

Changed “necessary” to “needed” in the new second sentence.

Changed “reducing” to “lowering” in the last sentence.

Chapter 4, Economic Fluidity, title

Changed title to “Fluidity.”

Chapter 4, Fluidity, first paragraph

Changed “Implementing better means” to “Progress from applying useful knowledge” in the first sentence.

Changed “scarce resources” to “resources” in the first sentence.

Changed “increase excellence” to “move us forward” in the first sentence.

Chapter 4, Fluidity, second paragraph

Changed “general” to “important” in the second sentence.

Changed “implement” to “carry out” in the last sentence.

Chapter 4, Fluidity, third paragraph

Changed “within” to “in” in the first sentence.

Chapter 4, Fluidity, fourth paragraph

Changed “much to cut employment” to “many jobs to cut” in the first sentence.

Chapter 4, Fluidity, fifth paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted “, which determine what types of decisions the organization must make” in the first sentence.

Deleted: “ To do their jobs well, those carrying out the selected alternative must understand what they are supposed to do. It also helps if they approve of the solution.”

Changed “implementing” to “carrying out” in the third sentence.

Deleted: “To do their jobs well, those carrying out the selected alternative must understand what they are supposed to do. It also helps if they approve of the solution.”

Changed “increases” to “raises” in the new fourth sentence.

Changed “increase” to “raise” in the new fourth sentence.

Deleted “However,” in the last sentence.

Chapter 4, Fluidity, sixth paragraph

Changed “reduce” to “lower” in the first sentence.

Chapter 4, Fluidity, seventh paragraph

Changed “reduce” to “lower” in the first sentence.

Chapter 4, Fluidity, last paragraph

“In freely evolving economies, individuals and managers experiment with new decision-making methods. In the long run, the best methods are emulated and the worst are discarded. Hence, freely evolving economies tend to become more fluid over time.”

was deleted.

Chapter 4, Avalanche Catastrophes, second paragraph

Changed “minor” to “small” in the first sentence.

Deleted “particular” in the fourth sentence.

Changed “this critical” to “the critical” in the fourth sentence.

Changed “greater slopes” to “slopes greater than the critical value” in the fourth sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted the last sentence: “The former, *subcritical* sand piles tend to grow upward until their slopes reach the critical slope and the latter, *supercritical* ones tend to widen until their slopes return to the critical value.”

Chapter 4, Avalanche Catastrophes, third paragraph

Changed “**increases**” to “**steepens**” in the first sentence.

Changed “**increase stability**” to “**lessen the severity of avalanches**” in the second sentence.

Changed “**because it takes longer for the sand pile to grow upward to the steeper critical slope**” to “**an illusion**” in the fourth sentence.

Changed “This appears to indicate that fluidity has little effect on the number or size of catastrophes.” to “**an illusion**” in the fourth sentence.

Changed “**greater slopes**” to “**slopes greater than the critical value**” in the fourth sentence.

Chapter 4, Avalanche Catastrophes, fourth paragraph

Changed “**Whether or not**” to “**Regardless of whether**” in the first sentence.

Chapter 4, A Crude Look at the Whole, first paragraph

“Imagine an economy filled with free and wise people pursuing happiness. **Given that people pursuing happiness seek to find and implement better means** whenever they have the resources to do so, **the level of turbulence will tend toward a critical value.** **When turbulence exceeds the critical value,** people will be forced to spend more resources, particularly time, responding to turbulence. **This will leave fewer resources for finding and implementing better means. The resulting decrease in new means will eventually decrease turbulence. On the other hand, when turbulence falls below the critical value, people will have more resources for finding and implementing better means. The resulting increase in new means will eventually increase turbulence. In both cases,** the level of turbulence tends to **return to the** critical value. Except for the occasional major avalanche catastrophe, the economy will produce **what appears to be (but isn't) an exploitable** trade-off between transient inflation and unemployment.”

was changed to:

“Imagine an economy filled with free and wise people pursuing happiness. **People will seek to apply new useful knowledge** whenever they have the resources to do so. **Their new applications of useful knowledge will raise the level of turbulence. As the level of turbulence rises,** people will spend more time and other resources responding to turbulence, **which will leave them less time and other resources for applying new**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

useful knowledge. Given this dynamic process, the level of turbulence will tend toward a critical value. Except for the occasional major avalanche catastrophe, the economy will produce an illusory trade-off between transient inflation and unemployment. It will also become ever more fluid and so progress ever more rapidly.”

Chapter 4, A Crude Look at the Whole, second paragraph

Changed “increasing managerial excellence” to “progress from increasing managerial excellence” in the first sentence.

Changed “attempt” to “try ” in the second sentence.

Changed “attempts” to “tries” in the second sentence.

Chapter 4, Conclusion, first paragraph

Changed “During the last half of the twentieth century many intellectuals” to “Many late industrial age intellectuals have” in the first sentence.

Changed “in order to” to “to” in the first sentence.

Changed “eliminate” to “rid us of” in the first sentence.

Changed “consequence” to “result” in the third sentence.

Changed “unwise as well as unjust” to “both unwise and unjust” in the last sentence.

Changes in Version 2004.11.20

[ClearEdits® review of Chapter 5 and 6.]

Chapter 3, Production, last sentence

Deleted “(See Appendix A.)”

Chapter 5, footnote 4, first six sentences

“Many today advocate the creation of a world government. This means of improving the quality of decision-making is problematic. In theory, government is a substitute for practical wisdom. In practice, special interest groups will cynically accept just ends while effectively denying the means of accomplishing them. The classic example is the so-called three-fifths clause in the United States Constitution, which counted

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

slaves as three-fifths of a person for the purpose of representation in the House of Representatives. This clause guaranteed that the slave states could prevent the federal government from progressing toward the just end proclaimed in the Preamble.”

was changed to:

“Many today advocate creating a world government. This means of improving the quality of decision-making is problematic. In theory, government is a substitute for practical wisdom. In practice, special interest groups will cynically accept just normative ends while denying adequate means of progressing toward them. The classic example is the three-fifths clause in the United States Constitution, which guaranteed that the slave states could prevent progress toward the just ends proclaimed in the Preamble.”

Chapter 5, *Consider the Justice of Interventions*, first paragraph, end

Added the sentence:

“In contrast, “wise” policy makers consider not only the cost of enforcing laws but also the costs of learning.”

Chapter 5, *Consider the Justice of Interventions*, second paragraph

“From the managerial perspective outlined in this work, justice requires that we continuously learn how better to pursue happiness. Further, the cost of enforcing laws is much more problematic. Assume behavior “A” is useful in pursuing happiness and that if we perform “A,” we will eventually learn that “A” is useful. A government can prescribe “A” or let us learn that “A” is helpful. In theory, if the total cost of prescribing “A” is greater than the total cost of not prescribing “A,” then prescribing “A” is unjust. Further assume that behavior B is harmful and that if we perform “B,” we will eventually learn that “B” is harmful. A government can proscribe “B” or let us learn that “B” is harmful. In theory, if the total cost of proscribing “B” is greater than the total cost of not proscribing “B,” then proscribing “B” is unjust. What matters is the justice of interventions, not behaviors.”

was changed to:

“Policy makers face a choice between prescribing a behavior that helps us pursue happiness or letting us learn that the behavior helps us pursue happiness. If the cost of prescribing the behavior is greater than the cost of not prescribing the behavior, then prescribing then prescribing the behavior is unjust. Conversely, policy makers face a choice between proscribing a behavior that hinders our pursuit of happiness or letting us learn that the behavior hinders our pursuit of happiness. If the cost of proscribing the behavior is greater than the cost of not proscribing the behavior, then proscribing then proscribing the behavior is unjust. *What matters is the justice of interventions, not behaviors.*”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 5, *Consider the Justice of Interventions*, third paragraph

Changed “**Determining the justice of** government intervention” to “**Judging** government interventions” in the first sentence.

Chapter 5, *Consider the Justice of Interventions*, fourth and fifth paragraphs

“Two arguments for erring on the side of not intervening are worth mentioning. First, to be effective, governments must **have the trust of the governed**. When governments intervene **unjustly or ineffectively**, they undermine **trust in their justice and effectiveness**. **Limiting governments to just and effective interventions tends to increase the trust of the governed, which in turn increases the effectiveness of interventions. As the people of the United States learned during Prohibition, trying to enforce an unenforceable law undermines respect for the law.**

“Second, unjust interventions tend to benefit a few people greatly and to harm many people only a little. As public choice economist Mancur Olson observed, this makes them nearly impossible to rescind.³ **Residents of the United States are still paying higher prices for many types of food due to Depression era emergency marketing programs. Given that** unjust government interventions are nearly impossible to rescind, prudence demands that policy makers err on the side of not intervening.”

were changed to:

“Two arguments for erring on the side of not intervening are worth mentioning. First, to be effective, governments **must be trusted to act wisely**. When governments intervene foolishly, they undermine their effectiveness. Second, unjust interventions tend to benefit a few people greatly and to harm many people only a little. As public choice economist Mancur Olson observed, this makes them nearly impossible to rescind.³ **Because** unjust government interventions are nearly impossible to rescind, prudence demands that policy makers err on the side of not intervening.”

Chapter 5, *Manage the Money Supply Passively*, second paragraph

Changed “**conceals**” to “**obscures**” in the third sentence.

Deleted “**both**” in the third sentence.

Chapter 5, *Manage the Money Supply Passively*, third paragraph

“Burying problems postpones, not eliminates, turbulence. Only improving the quality of decision-making eliminates turbulence.”

was deleted.

Chapter 5, *Provide Moral Vision*, second paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “increase” to “quicken” in the third sentence.

Changed “ following the virtuous path of accumulating wealth and accelerating change” to “pursuing happiness” in the third sentence.

Chapter 5, Free Association, first paragraph

Changed “While” to “Although” in the last sentence.

Deleted “, which would require the tendency toward lucidity to overwhelm less noble tendencies” in the last sentence.

Chapter 5, Free Association, second paragraph

Changed “the rise of market economies, and the industrial revolution” to “industrialization, and market economies” in the first sentence.

Chapter 5, Free Association, third paragraph

Changed “eliminate” to “lower” in the third sentence.

Chapter 5, Free Association, fourth paragraph

Deleted “, e.g., religious and fraternal organizations” in the third sentence.

Deleted “in the form of lower premiums” in the fourth sentence.

Chapter 5, Just Taxation, first paragraph

Deleted “the process of” in the first sentence.

Chapter 5, Just Taxation, second paragraph

Changed “the creation of” to “creating” in all (two occurrences).

Deleted “the consumption of” in the fourth sentence.

Changed “minimize” to “lower” in the fifth sentence.

Chapter 5, Just Taxation, fourth paragraph

Changed “eliminating” to “ending” in the first sentence.

Changed “straightforward” to “clear” in the first sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “Depending on the elasticity of demand for the products that the corporation sells, the” to “The” in the second sentence.

Changed “either on its customers or its owners” to “customers and owners” in the second sentence.

Chapter 5, Just Taxation, fifth paragraph

Changed “eliminating” to “ending” in the first sentence.

Chapter 5, Just Taxation, sixth paragraph

Changed “Unfortunately” to “Regrettably” in the third sentence.

Changed “in order to” to “to” in the fourth sentence.

Chapter 5, Just Taxation, last paragraph

“A just system ensures both minimum standards of individual welfare and ever wiser means of raising the general level of welfare. Governments best ensure the former and markets the latter. For example, a just system might combine a government run safety net program paid for by progressive income taxes with a tax exempt universal welfare savings account program. The latter would allow tax free expenditures for qualified retirement, medical, unemployment, and educational expenses. It would also allow unlimited giving to qualified charitable organizations. Upon the death of the last exempt beneficiary, all funds not willed to qualified charitable organizations would be taxed at rate at least as progressive as that of the income tax system. Ideally, the government safety net program would shrink to insignificance. However, it would never be eliminated. Like a militia, it would remain available for emergencies.”

was changed to:

“A just system ensures minimum standards of individual welfare and ever wiser means of raising the general welfare. Governments best ensure minimum standards of individual welfare and markets best ensure ever wiser means of raising the general welfare. A just system might combine a government run safety net program paid for by progressive income taxes with a tax exempt universal welfare savings account program. The universal welfare savings account would allow tax free spending for qualified retirement, medical, unemployment, and educational expenses. It would also allow unlimited giving to qualified charitable organizations. After the last owner of the account dies, all funds not willed to qualified charitable organizations would be taxed at rate at least as progressive as that of the income tax system. Ideally, the government safety net program would shrink to insignificance but would never be dissolved. Like a militia, it would remain available for emergencies.”

Chapter 5, International Cooperation

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**Nevertheless**” to “**Even so**” in the second sentence.

Chapter 5, Conclusion

Changed “**increasing**” to “**promoting**” in the second sentence.

Changed “**the kind of** government that encourages” to “**governments** that encourage” in the second sentence.

Chapter 6, second paragraph

Changed “**attempt**” to “**try**” in the third sentence.

Changed “**achieve**” to “**pursue**” in the third sentence.

Deleted “**with a minimum amount of wasteful turbulence**” in the third sentence.

Changed “ rather than the actions of **individuals**” to “**of government** rather than the actions of **the governed**” in the fourth sentence.

Changed “**requires**” to “**calls for**” in the last sentence.

Chapter 6, third paragraph

Deleted “**currently**” in the first sentence.

Deleted “**both**” in the last sentence.

Changes in Version 2004.11.22

[ClearEdits® review of Appendices.]

Acknowledgments, fourth paragraph

Added “**at Pomona**” to the first sentence.

Chapter 2, Refining Everyday Thinking, first paragraph

Deleted “**toward our ultimate ends**” in the second sentence.

Deleted “**of ultimate ends**” in the second sentence.

Changed “**something about**” to “**the nature of**” in the last sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, *Theories are subjective.*

Changed “**All theories**” to “**Theories**” in the first sentence.

Deleted the second sentence: “**We can conceive of the world in many ways.**”

Changed “**Thus, all**” to “**Hence,**” in the last sentence.

Chapter 2, Refining Ultimate Ends, seventh paragraph

Changed “**can**” to “**owe it to ourselves to**” in the first sentence.

Chapter 2, Refining Ultimate Ends, seventh paragraph

Changed “**can also**” to “**also owe it to ourselves to**” in the first sentence.

Chapter 2, Refining Ultimate Ends, eleventh paragraph

Added “**Similarly, whenever we are tempted to use ‘social science’ we ought to substitute ‘tribal science’ in order to remind ourselves and others that we refer to a science that usually falls short of the normative end of reverence for life.**” at the end of the last sentence.

Chapter 3, *Practical Wisdom*, first paragraph

Changed “**bit of good luck**” to “**moderate amount of good fortune**” in the last sentence.

Chapter 3, Human Capital, Work, and Leisure, second paragraph

Changed “**most efficient**” to “**best**” in the fourth sentence.

Chapter 4, A Crude Look at the Whole, second paragraph

Changed “progress” to “progress **from increasing excellence**” in the last sentence.

Chapter 4, Conclusion, first paragraph

Changed “**progress**” to “**progress from increasing excellence**” in the last sentence.

Chapter 5, *Consider the Justice of Interventions*, fourth paragraph

Changed “**As public choice economist Mancur Olson observed, this**” to “**This**” in the fifth sentence.

Chapter 5, Fluid Relationships, third paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Inserted paragraph break after the third sentence.

Chapter 6, second paragraph

Deleted “**design decision strategies to**” in the third sentence.

Changed “**calls for**” back to “**requires**” in the last sentence.

Afterword, seventh paragraph

Changed “progress” to “progress **from increasing excellence**” in the second sentence.

Changed “progress” to “progress **from increasing excellence**” in the fourth sentence.

Afterword, last paragraph

Changed “progress” to “progress **from increasing excellence**” in the fifth sentence.

Appendix A, Introduction, second paragraph

Changed “**necessarily**” to “**always**” in the third sentence.

Appendix A, Ever Leaner Production, second paragraph

Changed “Fortunately **for Toyota, it**” to “**It**” in the second sentence.

Deleted “**, due to the inexhaustibility of knowledge,**” in the last sentence.

Appendix A, Ever Leaner Production, third paragraph

Deleted “**relatively**” in the first sentence.

Appendix A, *Traditional Manufacturing Systems*, second paragraph

Changed “**a single**” to “**one**” in the second sentence.

Appendix A, *Traditional Manufacturing Systems*, last paragraph

Deleted “**very**” in the first sentence.

Changed “**in order to**” to “**to**” in the last sentence.

Appendix A, *Folding in Production Operations*, second paragraph

Deleted “**total**” in the first sentence.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Appendix A, *Folding in Production Operations*, third paragraph

Changed “**However,**” to “**But**” in the fourth sentence.

Appendix A, *Folding in Production Operations*, last paragraph

Deleted “**relative**” in the second sentence.

Appendix A, *Smoothing Flows*, second paragraph

Changed “**minimizing**” to “**lowering**” in the fourth sentence.

Appendix A, *Smoothing Flows*, third paragraph

Changed “**by themselves**” to “**alone**” in the second sentence.

Changed “**kind of**” to “**type of**” in the second sentence.

Deleted “**useful knowledge in the form of**” in the fifth sentence.

Changed “**eliminates**” to “**ends**” in the last sentence.

Appendix A, *Smoothing Flows*, last paragraph

Changed “**stop at the end of**” to “**end at**” in the first sentence.

Changed “**varying**” to “**variations in**” in the last sentence.

Appendix A, *Manufacturing Techniques*, first paragraph

Deleted first two sentences: “**Toyota manufacturing techniques evolve over time. However, the underlying principles remain constant.**”

Appendix A, *Organization, Procedures, and Tools*, first paragraph

Changed “**,**” to “**;**” in the first sentence (two occurrences).

Deleted “**Generally,**” in the second sentence.

Appendix A, *Organization, Procedures, and Tools*, fifth paragraph

Deleted “**both**” in the first sentence.

Appendix A, *Organization, Procedures, and Tools*, sixth paragraph

Changed “**, e.g.,**” to “**. For example,**” in the third sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Appendix A, *Organization, Procedures, and Tools*, ninth paragraph

Changed “, e.g.,” to “. For example,” in the third sentence.

Appendix A, *Organization, Procedures, and Tools*, tenth paragraph

Changed “the use of” to “using” in the first sentence.

Changed “objective is eliminating” to “goal is ending” in the second sentence.

Appendix A, *Organization, Procedures, and Tools*, last paragraph

Changed “facilitate” to “promote” in the first sentence.

Changed “a single” to “one” in the first sentence.

Appendix A, *Production Links*, first paragraph

Deleted “a number of” in the first sentence.

Changed “reduce” to “cut” in the last sentence.

Appendix A, *Production Links*, third paragraph

Changed “begins” to “starts” in the first sentence.

Changed “locates” to “finds” in the fifth sentence.

Changed “completes” to “finishes” in the sixth sentence.

Appendix A, *Production Links*, fourth paragraph

Changed “begin” to “start” in the first sentence.

Changed “attempts” to “tries” in the third sentence.

Changed “predict the exact nature of” to “find” in the fourth sentence.

Deleted “both” in all (four occurrences).

Appendix A, *Knowledge Induction*, first paragraph

Changed “determining” to “finding” in the first sentence.

Changed “sufficiently complex” to “complex enough” in the third sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Appendix A, *Knowledge Induction*, second paragraph

Changed “**reducing**” to “**cutting**” in the second sentence.

Changed “**attempts**” to “**tries**” in the seventh sentence.

Appendix A, *Knowledge Induction*, third paragraph

Changed “**attempts**” to “**tries**” in the last sentence.

Appendix A, *Knowledge Induction*, fourth paragraph

Changed “**Finally**, the team can” to “**The team can also**” in the first sentence.

Appendix A, *Knowledge Induction*, fifth paragraph

Changed “**e.g.**” to “**for example**” in the first sentence.

Appendix A, *Knowledge Induction*, sixth paragraph

Changed “**The nature of these problems is**” to “**These problems are**” in the second sentence.

Deleted the fifth sentence “**The latter is a matter of not accepting a problem until uncovering five layers of causation.**”

Appendix A, *Visibility*, first paragraph

Deleted “**straightforward work flow,**” in the second sentence.

Changed “**Typically, each**” to “**Each**” in the fifth sentence.

Changed “**may indicate**” to “**shows**” in the seventh sentence.

Changed “**one may warn**” to “**light warns**” in the seventh sentence.

Changed “**one may signal**” to “**light signals**” in the seventh sentence.

Changed “**assistance**” to “**help**” in the seventh sentence.

Changed “**or a single red one indicates**” to “**signals**” in the eighth sentence.

Changed “**, while**” to “**and**” in the eighth sentence.

Changed “**indicates**” to “**shows**” in the eighth sentence.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Appendix A, *Human Conditions*, first paragraph

Deleted the last sentence: “**Improving working conditions reduces stress, which allows workers to accomplish more.**”

Appendix A, *Cooperation*, first paragraph

Changed “**a higher level of**” to “**greater**” in the first sentence.

Changed “**Finally,**” to “**Fourth**” in the last sentence.

Appendix A, *Cooperation*, last paragraph

Changed “**The process of moving**” to “**Moving**” in the third sentence.

Changed “**typically begins**” to “**starts**” in the third sentence.

Deleted “**and design specifications**” in the third sentence.

Deleted “**, which in turn can lead to developing new specifications**” in the fourth sentence.

Deleted “**very**” in the last sentence.

Appendix A, *Good People*, first paragraph

Changed “**begin**” to “**start**” in the first sentence.

Changed “**establish**” to “**set up**” in the third bullet point.

Deleted “**(e.g., Total Quality Control programs)**” in the last bullet point.

Appendix A, *A Learning Attitude*, bullet points

Deleted “**very**” in the last bullet point.

Appendix A, *Summary*, bullet points

Deleted “**in order**” in the third sentence.

Appendix A, *A Learning Attitude*, bullet points

Deleted “**very**” in the last bullet point.

Appendix B, *Introduction*, first paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**eliminating**” to “**culling**” in the first sentence.

Appendix B, Introduction, second paragraph

Changed “**functioning**” to “**working**” in all (three occurrences).

Appendix B, Introduction, third paragraph

Deleted “**fundamental**” in all (four occurrences).

Appendix B, Ultimate Normative Ends of Life, first paragraph

“Humanists look to human nature to explain human ends. They claim that the **statement, “the ultimate normative end of human life is living a good life,” has meaning. To have meaning, a statement must tell us something more than is contained in the statement alone. In this case, the statement has meaning because it** focuses our attention on what we need to live a good life.”

was changed to:

“Humanists look to human nature to explain human ends. They claim that the ultimate normative end of human life is living a good life. **This simple** statement focuses our attention on what we need to live a good life.”

Appendix B, Ultimate Normative Ends of Life, third paragraph

Changed “**all human beings share certain needs and that these can be separated into two major types**” to “**human needs fall into two groups**” in the first sentence.

Changed “**is the set of**” to “**contains**” in the second sentence.

Appendix B, Ultimate Normative Ends of Life, fourth paragraph

Changed “**type is the set of**” to “**group contains**” in the first sentence.

Changed “**fortunate and virtuous few**” to “**people**” in the third sentence.

Deleted “**of his subjects**” in the fourth sentence.

Changed “**culture**” to “**civilization**” in the fourth sentence.

Deleted “**very**” in the last sentence.

Appendix B, Ultimate Normative Ends of Life, tenth paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted “, **shared beliefs and common means of satisfying our needs**” in the first sentence.

Deleted “**naturally**” in the second sentence.

Appendix B, Ultimate Normative Ends of Life, thirteenth paragraph

Changed “**append**” to “**add**” in the third sentence.

Changed “**Inevitably**” to “**Without exception**” in the fourth sentence.

Appendix B, Ultimate Normative Ends of Life, fifteenth paragraph

Changed “**However**” to “**But**” in the second sentence.

Appendix B, Ultimate Normative Ends of Life, last paragraph

Changed “**However, it is**” to “**It is also**” in the third sentence.

Changed “**necessary**” to “**needed**” in the third sentence.

Deleted the fifth sentence: “**We can easily correct Schweitzer’s mistake by eliminating this assumption.**”

Changed “**corrected explanation**” to “**philosophically correct assumption**” in the last sentence.

Appendix B, Practical Benefits of Magical Mysticism, first paragraph

Deleted “**the development of**” in the all (two occurrences).

Deleted “**both**” in the first sentence.

Changed “period **and** ethical mysticism making a revival in the Renaissance and becoming” to “periods; ethical mysticism making a revival in the Renaissance; and **ethical mysticism** becoming” in the last sentence.

Appendix B, Practical Benefits of Magical Mysticism, fifth paragraph

Changed “**experience of mystical oneness by means of detachment**” to “**magical mystical experience**” in the first sentence.

Deleted “**integrated, coherent, and**” in the first sentence.

Changed “, **e.g., Archimedes’s interrupted bath**” to “. **The classic example is Archimedes’s sudden discovery of the principle of displacement**” in the first sentence.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Appendix B, Practical Benefits of Magical Mysticism, last paragraph

Changed “increased” to “greater” in the fifth sentence.

Changed “Thus, a” to “A” in the sixth sentence.

Appendix B, Sacrifice versus Prudence, title

Changed “versus” to “and.”

Appendix B, Sacrifice and Prudence, first paragraph

Changed “necessary to achieve” to “needed to reach” in the first sentence.

Appendix B, Sacrifice and Prudence, second paragraph

Changed “acheiving” to “pursuing” in the first sentence.

Changed “However, there are very real” to “But there are” in the third sentence.

Appendix B, Sacrifice and Prudence, third paragraph

Changed “acheiving” to “pursuing” in the first sentence.

Changed “in order to” to “to” in the first sentence.

Changed “achieve” to “reach” in all (three occurrences).

Deleted “(e.g., purgatory)” in the third sentence.

Deleted “as well as through the temporal end of mystical union” in the third sentence.

Appendix B, Sacrifice and Prudence, sixth paragraph

Changed “in support of” to “promoted by” in the first sentence.

Appendix B, Sacrifice and Prudence, last paragraph

Deleted “very real” in the first sentence.

Appendix B, Divine Law, second paragraph

Changed “eliminate” to “lower” in the first sentence.

Appendix B, Divine Law, third paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**minimizes**” to “**lessens**” in the first sentence.

Appendix C, first paragraph

Appended “, **which promotes lucidity.**”

Deleted the second sentence: “**As a result of this experience, people gain self-knowledge.**”

Changed “**from their neighbors begin to seek**” to “**start to pursue**” in the new second sentence.

Appendix C, second paragraph, first sentence

“The immediate effect of releasing this product would be a **decrease** in the demand for some **activities** and an **increase** in the demand for others.”

was changed to:

“The immediate effect of releasing this product would be a **drop** in the demand for some **goods** and a **rise** in the demand for others.”

Appendix C, third paragraph

Deleted “**inherently**” in the first paragraph.

Appendix C, fourth paragraph

Deleted “**rather than outputs**” in the third sentence.

Appendix C, fifth paragraph, first sentence

“Focusing on the strategic issue of how we ought to live requires viewing consumer goods as well as services as means to happiness.”

was changed to:

“From a strategic perspective, all consumer goods and services are means to happiness.”

Appendix C, fifth paragraph, second sentence

Changed “**Hence, the**” to “**The.**”

Appendix C, last paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“An accounting truism holds that **policies that seek to maximize what is measured** encourage production of what is measured at the expense of what is not measured.”

was changed to:

“An accounting truism holds that **accounting systems** encourage **the** production of what is measured at the expense of what is not measured.”

Appendix C, last paragraph

Changed “**Ultimately**” to “**In the end**” in the new second sentence.

Changes in Version 2004.11.30

Preface, third paragraph

Changed “**ever better** strategies” to “strategies” in the last sentence.

Acknowledgments, fourth paragraph

Deleted “, **who likely would have directed me to Milton Friedman’s *The Methodology of Positive Economics***” in the second to last sentence.

Acknowledgments, second paragraph

Deleted “**and theology**” in the second sentence.

Acknowledgments, fifth paragraph

Deleted “**the late**” in the first sentence.

Acknowledgments, seventh paragraph

Inserted the following paragraphs:

“The seventh is my entrepreneur father, John Huntington Harris, who succeeded better than most at balancing pragmatism and idealism. He owed his pragmatism to his paternal grandfather, a successful Grinnell, Iowa businessman whose father and grandfather had been Yankee sea captains. He owed his idealism to his mother, who drummed her Reverend John Lothrop inspired ideals into her Grinnell High School history students, including Harry Hopkins, and into her three sons. The most impressed was her middle son, Lathrop, who became a favorite graduate student of University of Chicago political scientist Quincy Wright. Soon after starting his thesis on the coming war (1936?), Lathrop fell into a deep depression and developed a severe

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

case of tuberculosis, which confined him to an asylum until his death (1941). In his eulogy to Lathrop, Grinnell College philosophy professor John Stoops read from Lathrop's treasured typewritten copy of Stephen Vincent Benét's post apocalyptic short story, *The Place of the Gods (By the Waters of Babylon)*: "Truth is a hard deer to hunt. If you eat too much of the truth at once, you may die of the truth. ... Nevertheless, we make a beginning..." His older brother's death by intellectual pursuit taught my father not to take intellectual models too seriously. This lesson was reinforced by his experiences as an Army Air Force officer attached to the Statistical Control and Management Control groups during the Second World War. His common sense approach to problems often conflicted with those of more intellectual "Whiz Kids."

"My father heartily supported my decision to write a book about the role of culture in information age companies: an important part of my job as head of human resources and information systems for our family owned manufacturing firm had been to maintain our small town Iowa corporate culture as we rapidly expanded across the country. Despite his great ability to quickly get to the root of most matters, he could not comprehend my work. He attributed this to my style, particularly to my use of such unfamiliar terms as 'recursionist economics.' The real problem was more a matter of substance than of style. Like his high school and college classmate, George Leland Bach, and his uncle, Wilfred McNeil, my father believed in the primacy of decision rules. He was looking for moral values expressed as decision rules, not for a moral vision expressed as a strategy for learning. He could not grasp that in rapidly changing circumstances what matters most is moral vision, not moral values."

Chapter 2, *Theories produce predictions and explanations.*, last paragraph

Changed "learn" to "do" in the fourth sentence.

Chapter 3, Wealth

Changed "scarce resources" to "things" in the second sentence.

Deleted "those" in the third sentence.

Chapter 6, second paragraph

Deleted "marginalist" in the second sentence.

Chapter 6, third paragraph

Deleted "try to" in the first sentence.

Changes in Version 2004.12.07

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, fourth and fifth paragraphs

“This radical approach to normative economics will be resisted by scholars who believe that it takes a theory to beat a theory. They **owe it to themselves** to consider the nature of decision-making. The foremost task of decision-making is to define our ultimate ends. The intellectual tool that we use to define our ultimate ends ought to address all uncertainty. **No theory can** address the uncertainty of **its** basic assumptions. **A strategy** for learning can address all uncertainty.”

“These scholars also owe it to themselves to consider what happened in the market for production management tools. **Users decided that Toyota’s learning-by-doing production strategy was better than production theories that focused on allocating scarce resources efficiently.** Toyota’s strategy for learning beat the theories for allocating.”

were changed to:

“This radical approach to normative economics will be resisted by scholars who believe that it takes a theory to beat a theory. They **ought** to consider the nature of decision-making: The foremost task of decision-making is to define our ultimate ends. The intellectual tool that we use to define our ultimate ends ought to address all uncertainty. **Unlike theories, which cannot** address the uncertainty of basic assumptions, **strategies** for learning can address all uncertainty. These scholars also **ought** to consider what happened in the market for production management tools: Toyota’s strategy for learning beat the theories for allocating.”

Chapter 1, Mainstream Economics' Blind Spot, third paragraph

Changed “**useful** network” to “network” in the second sentence.

Chapter 2, *Theories produce predictions and explanations.*, second paragraph

Changed “seek” to “**today** seek” in the last sentence.

Chapter 2, second footnote (printed version only)

“True believers in scientific analysis want to restrict science to theories that fit their reductionist research program, which is based on the ideal of understanding everything about a system. To reject empirically testable theories simply because they don’t fit a particular research program is unscientific. Science involves rejecting theories by disproving hypotheses, not by whether they fit a particular research program.”

was restored after having been accidentally replaced by HTML link.

Chapter 2, sixth footnote (printed version only)

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Maslow, Abraham H., *Motivation and Personality*, (New York: Harper & Row, 1987), 15-31.”

was restored after having been accidentally replaced by HTML link.

Chapter 2, eleventh footnote

Changed “errors **in our theories tends to pull**” to “**theoretical errors leads**” in the last sentence.

Chapter 4, Progress, first paragraph

Deleted “**that is useful in progressing toward our ultimate ends**” in the second sentence.

Chapter 4, Fluidity, fifth paragraph

Changed “**decrease**” to “**lower**” in the last sentence.

Appendix A, second footnote (printed version only)

“Ohno, Taiichi, *Toyota Production System*, (Cambridge, Mass.: Productivity Press, 1988), 25-27. Note that American supermarkets inspired Ohno to design a “pull” system.”

was restored after having been accidentally replaced by HTML link.

Changes in Version 2004.12.10

Contents, title (Printed version only.)

Changed “**Table of Contents**” to “Contents.”

Preface, third paragraph

“Over the last quarter century I’ve learned that **my wish for an overarching theory of moral philosophy** was misguided.”

was changed to:

“Over the last quarter century I’ve learned that **this wish was foolish.**”

and appended to the second paragraph.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Rather than strategic theories, we ought to seek *strategies for learning*.”

was appended to the fourth paragraph and changed to:

“Rather than strategic theories, we ought to seek *strategies for learning*.”

Acknowledgments, ninth paragraph, second sentence

Changed “*Soon after starting* his thesis *on* the coming war (1936?)” to “*While working on* his thesis *about* the coming war (1936).”

Acknowledgments, ninth paragraph, second sentence

Changed “*my work*” to “*what I had written about ethics and economics*.”

Chapter 1, Mainstream Economics' Blind Spot, seventh paragraph, second sentence

Changed “to setup” to “to set up” in the last sentence.

Chapter 1, Mainstream Economics' Blind Spot, last paragraph

Changed “workers setup” to “workers set up” in the sixth sentence.

Chapter 2, Moral Science, second paragraph, second sentence

Changed “(our sensations of)” to “our sensations of.”

Chapter 2, Moral Science, fifth paragraph, first sentence

Changed “cultural evolution” to “*normative model* / cultural evolution.”

Changed “cultural evolution” to “*normative model* / cultural evolution.”

Chapter 4, Conclusion, first paragraph, first sentence

“*Many late industrial age intellectuals have preached* that (1) wealth is consumer goods and the capacity to produce consumer goods; (2) the *wealthy* are willing to give up some wealth producing liberty to purchase economic security and (3) socialism would rid us of *what Joseph Schumpeter called* capitalism’s “gales of creative destruction.””

was changed to:

“*Renegade Austrian economist Joseph Schumpeter believed* that (1) wealth is consumer goods and the capacity to produce consumer goods; (2) the *wealthy* are

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

willing to give up some liberty to purchase economic security and (3) socialism would rid us of capitalism's "gales of creative destruction."⁴

Chapter 5, *Consider the Justice of Interventions*, first paragraph, last sentence

Changed "the cost of enforcing laws but also the costs of learning" to "these costs and benefits but also the costs and benefits of learning."

Chapter 5, *Consider the Justice of Interventions*, second paragraph

"Policy makers face a choice between prescribing a behavior that helps us pursue happiness or letting us learn that the behavior helps us pursue happiness. If the cost of prescribing the behavior is greater than the cost of not prescribing the behavior, then prescribing then prescribing the behavior is unjust. Conversely, policy makers face a choice between proscribing a behavior that hinders our pursuit of happiness or letting us learn that the behavior hinders our pursuit of happiness. If the cost of proscribing the behavior is greater than the cost of not proscribing the behavior, then proscribing then proscribing the behavior is unjust. *What matters is the justice of interventions, not behaviors.*"

was appended to first paragraph and changed to:

"They choose between prescribing a behavior that helps us pursue happiness and letting us learn that the behavior helps us pursue happiness. Similarly, they choose between proscribing a behavior that hinders our pursuit of happiness and letting us learn that the behavior hinders our pursuit of happiness. *What matters is the justice of interventions, not behaviors.*"

Chapter 6, second paragraph, first sentence

Added "put forth in this work."

Chapter 6, last paragraph, first sentence

Changed "moral vision put forth in this work" to "managerial strategy."

Appendix B, Divine Law, second paragraph, last sentence

"In Mathew 7:16, Jesus tells us to judge them by their usefulness: "By their fruits you shall know them."⁵

was changed to:

"In Mathew 7:15-20, Jesus tells us to judge them by their usefulness:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Beware of false prophets, who come to you in sheep's clothing but inwardly are ravenous wolves. You will know them by their fruits. Are grapes gathered from thorns or figs from thistles? So, every sound tree bears good fruit, but the bad tree bears evil fruit. A sound tree cannot bear evil fruit, nor can a bad tree bear good fruit. Every tree that does not bear good fruit is cut down and thrown into the fire. Thus you will know them by their fruits.”¹¹”

“¹¹ The Bible. Revised Standard Edition.”

Changes in Version 2004.12.13

Acknowledgments, eighth paragraph

Changed “groups” to “Groups” in the second to last sentence.

Chapter 2, Moral Science, *Theories are refinements of everyday thinking.*, fourth paragraph

Changed “philosophical theories” to “theories” in the second sentence.

Changed “these theories” to “narratives” in the third sentence.

Changed second Venn diagram accordingly.

Appendix B, first footnote

“Materialists find support for their position in analytical science, science that reduces the world to elemental parts and basic principles. The greatest mystery here is what lies behind and beneath quantum level phenomena. Dualists find support for their position in synthetic science, science that focuses on how structures and phenomena emerge from the interactions of elemental parts and basic principles. Here, the greatest mystery is what lies behind and beyond normal consciousness. Beneath and beyond both great mysteries is an even greater one: does what lies beyond our normal consciousness connect us to what lies beneath quantum level phenomena?”

was changed to:

“Materialists find support for their position in analytical science, science that reduces the world to elemental parts and basic principles. The foremost mystery for analytical science is what lies beneath quantum level phenomena. Dualists find support for their position in synthetic science, science that focuses on how structures and phenomena emerge from the interactions of elemental parts and basic principles. The foremost mystery for synthetic science is what lies behind normal consciousness. Greater than

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

either of these mysteries is the mystery of how what lies beneath quantum level phenomena relates to what lies beyond normal consciousness.”

Changes in Version 2004.12.15

Appendix B, Ultimate Normative Ends of Life, title

Changed “**Ultimate Normative Ends of Life**” to “**Human Needs**.”

Appendix B, Human Needs

Added the subtitle “The Role of Beliefs in Satisfying Needs” after the fourth paragraph.

Added the subtitle “Schweitzer’s Universal Spiritual Need” after the tenth paragraph.

Appendix B, Human Needs, third paragraph, third sentence

“We feel these “becoming needs” when we are becoming fully human.”

was deleted.

Appendix B, Human Needs, fourth paragraph, second sentence

“We feel these “being needs” only after we have become fully human.”

was deleted.

Appendix B, Human Needs, fourth paragraph, last sentence

Changed “: the” to “. The”

Changed “**these mysterious** needs” to “**their spiritual** needs.”

Added the sentence: “In other words, they could have very different spiritual beliefs.”

Appendix B, *The Role of Beliefs in Satisfying Needs*, last paragraph

“Because we learn from others’ experiences as well as our own, we develop cultures. And because our needs form a hierarchy, we can view cultures as aiming to satisfy what members believe to be their highest need.”

was deleted.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Appendix B, Practical Benefits of Magical Mysticism

Merged first and second paragraphs.

Changed “**events**” to “**historical trends**” in the fourth sentence.

Appendix B, Practical Benefits of Magical Mysticism, new third paragraph

Changed “In **other words,**” to “In **religious terms,**” in the fifth sentence.

Changes in Version 2004.12.17

Acknowledgments, eighth paragraph

Changed “**Yankee** sea captains” to “**merchant** sea captains **from Barnstable, Massachusetts**” in the second sentence.

Chapter 2, second footnote

“True believers in scientific analysis want to restrict science to theories that fit their reductionist research program, which **is** based on the ideal of understanding everything about a system. To reject empirically testable theories simply because they don’t fit a **particular** research program is unscientific. Science involves rejecting theories by disproving hypotheses, not by whether they fit a **particular** research program.”

was changed to:

“True believers in scientific analysis want to restrict science to theories that fit their reductionist research programs, which **are** based on the ideal of understanding everything about a system. To reject empirically testable theories simply because they don’t fit a **reductionist** research program is unscientific. Science involves rejecting theories by disproving hypotheses, not by whether they fit a **reductionist** research program.”

Chapter 2, *Theories are refinements of everyday thinking.*, sixth paragraph

Changed “**. But**” to “**, but**” in the third and fourth sentences.

Chapter 2, Refining Ultimate Ends, fourth paragraph

Changed “deductive **method**” to “deductive **approach**” in the first sentence.

Chapter 4, A Crude Look at the Whole, fourth paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “become” to “**tend to** become” in the last sentence.

Chapter 6, second paragraph, last sentence

“It also reminds us that wise decision-making requires moral vision.”

was deleted.

Chapter 6, last paragraph

Changed “**shows**” to “**for learning also tells**” in the first sentence.

Afterword, eighth paragraph

Changed “**live** wisely” to “**choose** wisely” in the last sentence.

Appendix B, first footnote

“Materialists find support for their position in analytical science, science that reduces the world to elemental parts and basic principles. The foremost mystery for analytical science is what lies beneath quantum level phenomena. Dualists find support for their position in synthetic science, science that focuses on how structures and phenomena emerge from the interactions of elemental parts and basic principles. The foremost mystery for synthetic science is what lies behind normal consciousness. Greater than either of these mysteries is the mystery of how what lies beneath quantum level phenomena relates to what lies beyond normal consciousness.”

was deleted.

Changes in Version 2004.12.21

Chapter Heading References

Added a chapter heading reference page for Word / Adobe version.

Acknowledgments, third paragraph, first sentence

Added the sentence:

“The immediate economic problem was stagflation, which did not fit neatly into the Hicks model.”

Acknowledgments, fourth paragraph, last two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“I was too shy and too upset to raise this issue with Gordon. This issue quietly dogged me through business school and on through my business career.”

were deleted.

Acknowledgments, eighth paragraph

Changed “war” to “**world** war” in the fifth sentence.

Acknowledgments, ninth paragraph

“He could not grasp that in **rapidly changing circumstances** what matters most is moral vision, not moral values.”

was changed to:

“He could not grasp that in **information age economies** what matters most is moral vision, not moral values. **The faster we progress, the greater our need to envision progress accurately.**”

Chapter 2, *Theories are refinements of everyday thinking.*, fourth paragraph, last sentence

“This set includes Darwin’s theory of evolution **and** Wegener’s theory of plate tectonics.”

was changed to:

“This set includes Darwin’s theory of evolution, Wegener’s theory of plate tectonics, **and the M-theory of physics.**”

Chapter 2, second footnote

“True believers in scientific analysis want to restrict science to theories that fit their reductionist research programs, which are based on the ideal of understanding everything about a system. To reject empirically testable theories simply because they don’t fit a reductionist research program is unscientific. Science involves rejecting theories by disproving hypotheses, not by whether they fit a reductionist research program.”

was deleted.

Chapter 2, Refining Ultimate Ends, eighth paragraph

Changed “**simplistic explanations of human behavior**” to “**teleonomic theories that focus on a single level of abstraction**” in the sixth sentence.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 2, Moral Science, last paragraph, last sentence

“The study of this research program is part of this research program.”

was reduced to a footnote.

Appendix C, title quote

““Science is organized knowledge. Wisdom is organized life.” — *Immanuel Kant*”

was changed to

““Even the free-market economists... have failed, as yet, to come to terms with the new role and inexhaustibility of knowledge.” — *Alvin and Heidi Toffler*.”

“¹ Toffler, Alvin and Heidi. “Catch the (Political) Wave.” *Wall Street Journal*. 16 October 1994: A16.”

The footnote is only in the HTML version.

Preface, second paragraph

Changed “**Over the last quarter century** I’ve learned” to “I **have since** learned” in the last sentence.

Acknowledgments, second paragraph, last sentence

Changed “**do so**” to “**become a better human being.**”

Acknowledgments, third paragraph

Changed “Keynesians **of the Hicks ISLM persuasion**” to “**Neo-Keynesians**” in the first sentence.

Changed “Hicks model” to “Hicks **ISLM** model” in the second sentence.

Changed “Keynesians” to “**Neo-Keynesians**” in the third sentence.

Acknowledgments, ninth paragraph

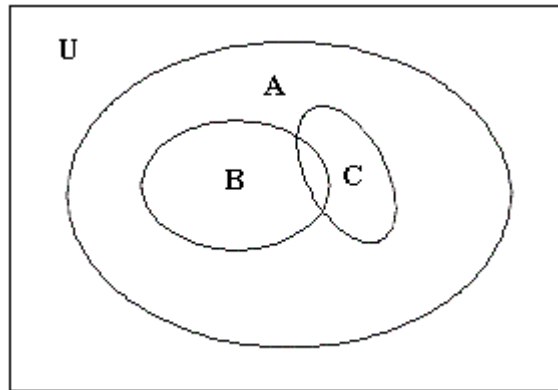
Changed “envision progress **accurately**” to “envision progress” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, second through fifth paragraphs

Wealth in the Information Age

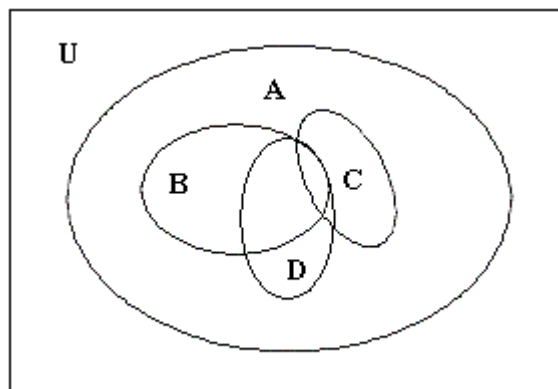
Changes from October 7, 1998 through May 2, 2005

“We can analyze everyday thinking by classifying worldly knowledge into sets based on the processes that we use to refine it. The most basic process, the process that separates knowing from not knowing something about the world, is making an intuitive connection between our experiences and what we believe we know about the world. This intuitive process defines the universal set of knowledge about the world (U). A good example of worldly knowledge that falls into this set and into no other set is that of an eyewitness who can identify but not describe a suspect’s face.



“We refine worldly knowledge (U) by rejecting all worldly knowledge that we cannot express in words or symbols. What remains are worldly narratives (A). We refine worldly narratives (A) by rejecting those that fail to meet standards for logic and elegance. What remains are philosophical theories (B). We also refine worldly narratives (A) by rejecting those that fail to meet empirical standards. What remains are scientific theories (C).

“Most scientists today believe that science involves testing theories that produce predictions. This conception of science falls short of Einstein’s ideal of refined everyday thinking in that it doesn’t test theories that aim at helping us find problems to solve. We can remedy this by testing narratives against empirical standards for finding problems to solve. What remains are scientific theories that explain (D). This set includes Darwin’s theory of evolution, Wegener’s theory of plate tectonics, and the M-theory of physics.



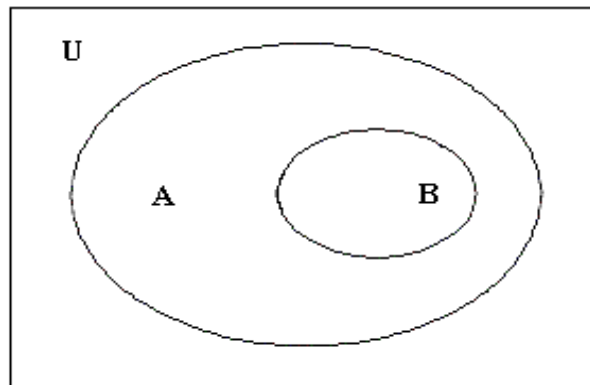
Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Ideally, a single theory predicts and explains everything about a system ($C \cap D$): theories that explain are simply theories that predict “written backwards.” We test theories that explain by how well they predict. Practically, we test theories by how well they perform their role in decision-making. We test theories that predict (C) by how well they help us predict. We test theories that explain (D) by how well they help us find problems to solve.”

were changed to:

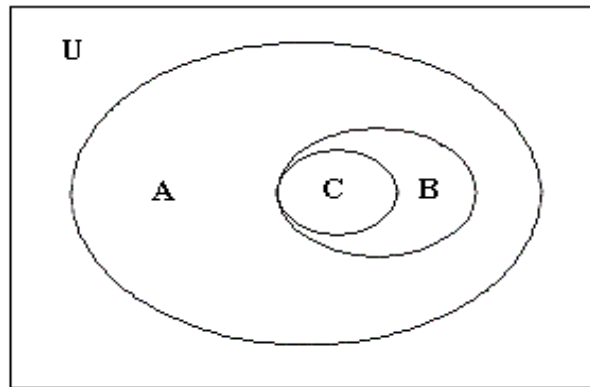
“We can analyze everyday thinking by classifying worldly knowledge into sets based on the processes that we use to refine it. The most basic process, the process that separates knowing from not knowing something about the world, is making an intuitive connection between our experiences and what we believe we know about the world. This intuitive process defines the universal set of knowledge about the world (U). A good example of worldly knowledge that falls into this set and into no other set is that of an eyewitness who can identify but not describe a suspect’s face. We refine worldly knowledge (U) by rejecting all worldly knowledge that we cannot express in words or symbols. What remains are worldly narratives (A). We refine worldly narratives (A) by rejecting those that fail to meet standards for logic and elegance. What remains are philosophical theories (B):



“Idealists believe that science ought to concern the discovery of the truth. A true theory is one that predicts and explains everything about a system. We refine philosophical theories (B) by rejecting those that fail to meet empirical standards for predicting. What remains are scientific theories (C):

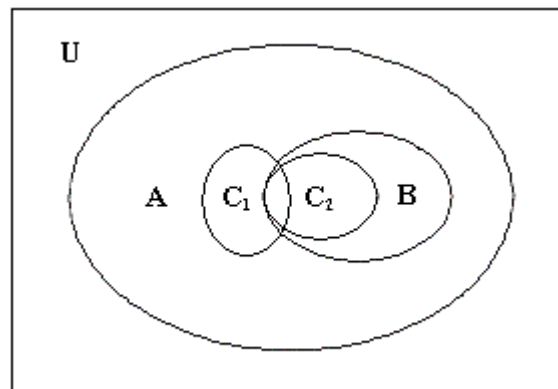
Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005



“This idealistic definition of science tends to limit testing to systems simple enough to be well understood.

“In contrast, pragmatists believe that science ought to concern the never-ending process of discovering useful truth. We test theories by how well they perform their role in everyday thinking. From the managerial perspective put forth in this work, we test theories by how well they perform their role in decision-making. We test theories that predict by how well they help us predict. We test theories that explain by how well they help us find problems to solve. Here, we refine narratives (A) by rejecting those that fail to meet our empirical standards for predicting. What remains are scientific theories that predict (C₁). We refine philosophical theories (B) by rejecting those that fail to meet our empirical standards for helping us find problems to solve. What remains are scientific theories that explain (C₂). This set includes Darwin’s theory of evolution, Wegener’s theory of plate tectonics, and the M-theory of physics:”



Chapter 2, *Theories are refinements of everyday thinking.*, sixth paragraph, first sentence

Changed “**decision-oriented** metamethodology” to “**pragmatic** metamethodology².”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“² In the pursuit of useful truth, the functional distinction between theories that predict and those that explain is more basic than the methodological distinction between theories that are scientific and those that are not scientific. In philosophical terms, the functional distinction between theories that predict and those that explain is a metamethodological distinction.”

Afterword, first paragraph

Changed “I’ve” to “I have” in the second sentence.

Changed “a good life for all” to “reverence for life” in the third sentence.

Deleted the last sentence: “With philosophers, especially philosophers of science, it is how decision-oriented pragmatism reconciles idealism and pragmatism.”

Afterword, second paragraph

Changed “I’ve” to “I have” in the first sentence.

Merged paragraph with the first paragraph.

Changes in Version 2004.12.27

Chapter 2, Theories are refinements of everyday thinking., fourth paragraph

Changed “by how well” to “by testing how well” in all sentences (four occurrences).

Chapter 2, Refining Our Ultimate Ends, first paragraph

Changed “refining our ultimate ends” to “refining our pursuit of our ultimate ends” in the second sentence.

Appendix B, sixth footnote

Changed “Bhagavad Gita” to “Bhagavad-Gita.”

This changes was also made in the Chapter Heading References section of the print (Word / Adobe) version.

Appendix B, Sacrifice and Prudence, last paragraph

Changed “to link or relink to something greater than ourselves” to “for mystical oneness” in the first sentence.

Changes in Version 2004.12.30

Preface, first paragraph, first sentence

“*Wealth in the Information Age, The **Economics** of Practical Wisdom* is the book that I wish I had read twenty-six years ago in George Leland Bach’s **normative economics** course, *Business, Government, and the Changing Environment.*”

was changed to:

“**Living well is a matter of deciding wisely. The scientific theories that we use to help us decide wisely naturally fall into two categories. Positive theories describe things as they are. Normative theories prescribe how things ought to be. Wise decision-makers use positive theories to *evaluate* alternatives. They use normative theories to *formulate* alternatives. Positive science is organized knowledge. Normative science is organized life.**

“*Wealth in the Information Age, The **Science** of Practical Wisdom* is the book that I wish I had read twenty-six years ago in George Leland Bach’s course, *Business, Government, and the Changing Environment.*”

Chapter 1, The Strategy, first paragraph, last sentence

“From the managerial perspective, the universal problem we face is one of how we intelligent beings choose to progress toward our ultimate ends. ”

was appended to the second paragraph. In effect, the paragraph break was moved forward one sentence.

Chapter 2, Moral Science, fifth paragraph

Changed “**a brilliant, but partial**” to “**an insightful**” in the first sentence.

Chapter 5, International Cooperation, footnote

Re-added the sentence:

“It took the bloodiest war in United States history to erase that stain from the Constitution.”

Changes in Version 2004.12.31

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Title

Changed “The **Economics** of Practical Wisdom” to “The **Science** of Practical Wisdom.”

Preface, first paragraph, first sentence

“*Wealth in the Information Age, The **Economics** of Practical Wisdom* is the book that I wish I had read twenty-six years ago **in** George Leland Bach’s **normative economics** course, *Business, Government, and the Changing Environment.*”

was changed to:

“*Wealth in the Information Age, The **Science** of Practical Wisdom* is the book that I wish I had read twenty-six years ago **for** George Leland Bach’s course, *Business, Government, and the Changing Environment.*”

Preface, third paragraph

Changed “**approach to normative economics**” to “**idea**” in the first sentence.

Changed “They ought to consider the nature of decision-making: The foremost task of decision-making is to define our ultimate ends.” to “They ought to consider the foremost task of decision-making, which is defining our ultimate ends.” in the third sentence.

Changed “**:**” to “**.**” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, end

Added the paragraph:

“Some idealists will dismiss this pragmatic definition of science for not being positive, for not describing the world as it is. They ought to consider the nature of scientific research programs. Scientific research programs are positive in their ends, normative in their means, and potentially religious in their effect on researchers. The ever-evolving process of discovering, testing, and applying useful knowledge is a scientific research program of, by, and for all intelligent life.”

Chapter 2, Refining Ultimate Ends, fourth paragraph.

Changed “**consume**” back to “**live**” in the last sentence.

Chapter 2, Moral Science, title

Changed “**Moral** Science” to “**Economic** Science.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 2, Economic Science, fifth paragraph

Changed “an insightful” to “a pragmatic” in the first sentence.

Chapter 2, Economic Science, last two paragraphs

“A more complete solution is to define economic science as the study of the ever-evolving process of discovering, testing, and applying knowledge useful in living good lives. Until all of us act wisely, managing this study well requires distinguishing between intellectual tools for helping us follow our teleonomic programming and intellectual tools for helping us to predict how others will follow their teleonomic programming. It’s just good common sense.

“Many scientists and philosophers of science will dismiss this definition of economic science for not being positive, for not describing the world as it is. They ought to consider the nature of scientific research programs. Scientific research programs are positive in their ends, normative in their means, and potentially religious in their effect on researchers. The ever-evolving process of discovering, testing, and applying knowledge useful in living good lives is a scientific research program of, by, and for all intelligent life.”

“ The study of this research program is part of this research program.”

were changed to:

“A more complete pragmatic solution is to define economic science as the study of the ever-evolving process of discovering, testing, and applying knowledge useful in living good lives. Until all of us act wisely, we ought to distinguish between intellectual tools for helping us follow our teleonomic programming and intellectual tools for helping us predict how others will follow their teleonomic programming. It’s just good common sense.”

Chapter 4, Avalanche Catastrophes, fourth paragraph

Deleted “falling on a plane” in the last sentence.

Appendix B, Practical Benefits of Magical Mysticism, fifth paragraph

Changed “the three stooges throw away a priceless vase because they” to “a stooge throws away a priceless vase because he” in the fourth sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface for Academics

Added the Preface for Academics:

“This year marks the one hundredth anniversary of the year that Albert Einstein addressed the two most important anomalies in early twentieth century physics. His particle theory of light addressed the problem that black-bodies did not radiate energy in the way the prevailing wave theory of light predicted they would. His special theory of relativity addressed the problem that the speed of light was the same in the direction of the earth’s rotation as it was in all other directions.

“Early twenty-first century economists face two similar anomalies. The first is that acting wisely differs from acting efficiently. The second is that the economic research program is not consistent with other scientific research programs.

“Einstein provides a model for addressing these two anomalies. In his special theory of relativity he replaced the Newtonian foundation of invariant time and space with the foundation of invariant light speed. It is painfully obvious that we need to replace modern economics’ foundation of *practically* invariant consumer wants with something more stable. The obvious choice is human nature, which is many orders of magnitude more stable than consumer wants. We owe it to ourselves to expand modern economics’ scientific research program to include all human knowledge. We urgently need the resulting universal research program to discover and disclose the foolish use of theories.

“From this practical perspective, discovering more about human nature is part of the economic problem that we must solve. A major hurdle in discovering more about ourselves is the complex (“reflexive”) relationship between the models that we use to guide our actions and reality. We owe it to ourselves to distinguish between the theories that we use to predict what will happen and the theories that we use to explain how to act wisely. In the pursuit of useful knowledge, this distinction is more basic than the distinction between theories that are scientific and those that are not scientific.

“The essence of the science of practical wisdom is that we owe it to ourselves to test theories by how we use them in decision-making. We ought to test the theories that we use to predict by how well they help us to predict. We ought to test the theories that we use to explain by how well they help us to find problems to solve.”

Acknowledgments, ninth paragraph, third and fourth sentences

“He attributed this to my style, particularly to my use of such unfamiliar terms as ‘recursionist economics.’ **The real problem was more a matter of substance than of style.**”

were changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“He attributed this to my style, particularly to my use of such unfamiliar terms as ‘paradigm’ and ‘recursionist economics.’ A year and a half after his death I recognized that my style was too intellectual. I also recognized that there was a more substantial problem.”

Acknowledgments, ninth paragraph, last sentence

Changed “The faster we progress” to “The greater our potential for progress is.”

Chapter 1, title

Changed “Strategy” to “Learning.”

Chapter 1, Modern Economics' Blind Spot

Changed “creating useful knowledge” to “learning.”

Chapter 2, eleventh footnote, end

Added the sentences:

“The further away we are from these attractors, the greater the potential for avalanche catastrophes.”

Chapter 4, Avalanche Catastrophes, last two paragraphs

“Regardless of whether market economies are weakly chaotic, decreasing fluidity stores economic stress, which worsens the danger of avalanche catastrophes. Ball bearings never produce avalanches.

“Those who would give up essential liberty to purchase a little temporary safety put themselves and others at greater risk. As Benjamin Franklin wrote to the governor of Pennsylvania in 1755, they deserve neither liberty nor safety.”

were changed to:

“Regardless of whether market economies are weakly chaotic, decreasing fluidity stores economic stress, which worsens the danger of avalanche catastrophes. Those who would give up essential liberty to purchase a little temporary safety put themselves and others at greater risk. As Benjamin Franklin wrote, they deserve neither liberty nor safety.”

Chapter 5, Just Taxation, second paragraph

Changed “creating useful knowledge” to “useful knowledge” in the third sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**creating** useful knowledge” to “knowledge” in the fourth sentence.

Changes in Version 2005.01.20

Preface for Academics, second and third paragraphs

“Early twenty-first century economists face **two similar** anomalies. **The first** is that acting wisely differs from acting efficiently. **The second** is that the economic research program is not consistent with other scientific research programs.

“Einstein provides a model for addressing these two anomalies. In his special theory of relativity he replaced the Newtonian foundation of invariant time and space with the foundation of invariant light speed. We can replace modern economics’ foundation of **practically** invariant consumer wants with **something more stable**. **The obvious choice is human nature, which is many orders of magnitude more stable than consumer wants**. **We owe it to ourselves to** expand modern economics’ scientific research program to include all human knowledge. We urgently need the resulting universal research program to discover and disclose the foolish use of theories.”

were changed to:

“Early twenty-first century economists **also** face **important** anomalies. **One** is that acting **efficiently** differs from acting **wisely**. **Another** is that the economic research program is not consistent with other scientific research programs. Einstein provides a model for addressing these two anomalies. In his special theory of relativity he replaced the Newtonian foundation of invariant time and space with the foundation of invariant light speed. We can replace modern economics’ foundation of **practically** invariant consumer wants with **a foundation of practically** invariant human nature. **Making this change requires that we** expand modern economics’ scientific research program to include all human knowledge. We urgently need the resulting universal research program to discover and disclose the foolish use of theories.”

Preface for Academics, new third paragraph, second and third sentences

“A major hurdle in discovering more about ourselves is the complex (“reflexive”) relationship between the **models** that we use to guide our actions and reality. **We owe it to ourselves to** distinguish between the positive theories that we use to predict what will happen and the normative theories that we use to explain how to act wisely.”

were changed to:

“A major hurdle in discovering more about ourselves is the complex (“reflexive”) relationship between the **normative theories** that we use to guide our actions and reality. **Clearing this hurdle requires that we** distinguish between the **positive** theories

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

that we use to predict what will happen and the **normative** theories that we use to explain how to act wisely.”

Acknowledgments, ninth paragraph, second to last sentence

Changed “**could** not grasp” to “**did** not grasp.”

Chapter 2, Economic Science, title

Changed title to “**Expanding** Economic Science.”

Chapter 3, *Three Common Misbeliefs*, title

Changed title to “**Several** *Common Misbeliefs*.”

Chapter 3, *Several Common Misbeliefs*, first paragraph

Changed “promote” to “improve” in all (2 occurrences).

Changed “promoting” to “improving” in all (3 occurrences).

Changes in Version 2005.01.24

Acknowledgments

Added tribute to Milton Friedman:

“The fourth was Milton Friedman. Soon

“Einstein provides a model for addressing these two anomalies. In his special theory of relativity he replaced the Newtonian foundation of invariant time and space with the foundation of invariant light speed. We can replace modern economics’ foundation of **practically** invariant consumer wants with **something more stable. The obvious choice is human nature, which is many orders of magnitude more stable than consumer wants. We owe it to ourselves to** expand modern economics’ scientific research program to include all human knowledge. We urgently need the resulting universal research program to discover and disclose the foolish use of theories.”

Changes in Version 2005.01.31

Preface for Academics, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“This year marks the one hundredth anniversary of the year that Albert Einstein addressed the two most important anomalies in early twentieth century physics. His particle theory of light addressed the problem that black-bodies did not radiate energy in the way the prevailing wave theory of light predicted they would. His special theory of relativity addressed the problem that the speed of light was the same in the direction of the earth’s rotation as it was in all other directions.”

was deleted.

Preface for Academics, new first paragraph

Changed “**Early twenty-first century** economists” to “**E**conomists” in the first sentence.

Changed “**also** face important anomalies” to “face important **theoretical** anomalies” in the first sentence.

Changed “Einstein” to “**Albert** Einstein” in the fourth sentence.

Changed “**he**” to “**Einstein**” in the fifth sentence.

Changed “**Making this change**” to “**This**” in the seventh sentence.

Preface for Academics, new second paragraph

“From this practical perspective, **discovering more about human nature is part of** the economic problem that we must solve.”

was changed to

“From this practical perspective, the economic problem that we must solve **includes discovering more about human nature.**”

Changes in Version 2005.02.07

Title page

Changed “S. M. Harris” back to “Scott Maynard Harris.” The original change is to prevent confusion with economist (Robert) Scott Harris. The change back is to prevent confusion with atheist Sam Harris.

Appendix B, Sacrifice and Prudence, last paragraph, end

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Added the sentence: “Secular humanists ought to heed Einstein’s warning, “Science without religion is lame.””

Appendix B, Divine Law, end

Added the paragraph: “Religious fundamentalists ought to heed Einstein’s warning, “Religion without science is blind.””

Changes in Version 2005.02.12

Acknowledgments, fourth paragraph

Added the paragraph:

“The fourth is Taiichi Ohno. In the summer of 1984 I was head of information systems and human resources, essentially the chief knowledge officer at Star Forms, Inc., our family owned business forms manufacturing company. Star Forms was then thirteen years into what was to be a fourteen year run of 33% annual sales growth and 34% annual return on equity. We learned faster than our competitors. A lecture by Taiichi Ohno, which was the highlight of a tour of Japanese factories, convinced me that by Toyota standards we were not organized to learn.”

Renumbered subsequent paragraphs.

Acknowledgments, new tenth paragraph

Changed “**our family owned manufacturing firm**” to “**Star Forms**” in the first sentence.

Chapter 5, Just Taxation, fifth paragraph

“If we were **as lucid as angels**, if we were **to choose wisely all of the time**, no government would be necessary.”

was changed to

“If we were **perfectly wise**, if we were **as lucid as angels**, no government would be necessary.”

Chapter 5, Just Taxation, seventh paragraph

“If we were **as lucid as angels**, we would share our wealth wisely. There would be no need for governments to force us to do so. Regrettably, we are not **as lucid as angels**. This does not mean that we ought to demand that governments expend non-knowledge

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

resources to force us to share our wealth. Non-knowledge government resources are poor substitutes for the inexhaustible knowledge resource of practical wisdom. We ought to demand that governments encourage us to become ever **more lucid.**”

was changed to

“If we were **perfectly wise**, we would share our wealth wisely. There would be no need for governments to force us to do so. Regrettably, we are not **perfectly wise**. This does not mean that we ought to demand that governments expend non-knowledge resources to force us to share our wealth. Non-knowledge government resources are poor substitutes for the inexhaustible knowledge resource of practical wisdom. We ought to demand that governments encourage us to become ever **wiser.**”

Appendix B, title

Changed “**Eliminating**” to “**Culling.**”

Appendix B, Conclusion, last sentence

Deleted “**as an organizing principle.**”

Changes in Version 2005.02.18

(Responses to DFB criticisms)

Preface, second paragraph, fifth sentence

Added “**by blinding me to more useful truths.**”

Preface, third paragraph, last two sentences

“**These** scholars also ought to consider what happened in the market for production management tools. Toyota’s strategy for learning beat the theories for allocating.”

were converted to a new paragraph and changed to:

“Scholars **who believe that it takes a theory to beat a theory** also ought to consider what happened in the market for production management tools. Toyota’s strategy for learning **wisely** beat the theories for allocating **efficiently.**”

Preface for Academics, second paragraph, first sentence

Changed ““**reflexive**”” to “**reflexive / recursive.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface for Academics, last paragraph, first sentence

Changed “owe it to ourselves” to “owe it to ourselves (ought).”

Acknowledgments, fifth paragraph

Changed “at Star Forms, **Inc.**” to “, at Star Forms” in the second sentence.

Changed “Star **Forms**” to “Star” in the third sentence.

Acknowledgments, fifth paragraph, fourth sentence

“We **learned** faster than our competitors.”

was changed to:

“We **achieved this remarkable record by acting and learning** faster than our competitors.”

Chapter 1, Marginalist Economics’ Blind Spot, third paragraph, third sentence

“This is as true of conceptual frameworks as it is for railroad networks.”

was deleted.

Chapter 1, Marginalist Economics’ Blind Spot, fourth paragraph, second sentence

“Mainstream economists define “wealth” to mean **consumer** goods and the resources for producing **consumer goods, where consumer goods are those goods and services that we buy to satisfy our wants.**”

were converted to a new paragraph and changed to:

“Mainstream economists define “wealth” to mean **the goods and services that we consumers buy to satisfy our wants** and the resources for producing these **consumer goods and services.**”

Chapter 1, Marginalist Economics’ Blind Spot, fifth paragraph, last sentence

“We can see **this** in the marginalist economic order quantity (EOQ) model, **which is at the heart of Material Requirements Planning (MRP) systems, the most advanced Western production systems of the nineteen seventies and eighties.**”

was moved to the next paragraph and changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We can see **how this definition of excellence in means tends to blind us by studying** the marginalist economic order quantity (EOQ) model.”

Chapter 1, Marginalist Economics’ Blind Spot, eighth paragraph, fifth sentence

“The inexhaustibility of knowledge makes **finding out the value of what we expect to learn** problematic.”

was changed to:

“The inexhaustibility of knowledge makes **this evaluation** problematic.”

Chapter 1, Marginalist Economics’ Blind Spot, last paragraph, second sentence

Deleted “**By learning through experience,**” in the second sentence.

Chapter 1, Managerial Excellence, first paragraph, second sentence

Added “**the term**” to the first sentence.

Chapter 1, Managerial Excellence, second paragraph

Inserted the paragraph:

“Choosing the right problem to solve is a matter of dividing up the problem of how best to pursue our ultimate ends into smaller, more tractable problems. In the production example above, the ultimate end of production scheduling is producing wisely. Given the global problem of how best to produce wisely, the subordinate problem of how best to set up is more effective than the more limited subordinate problem of how to best to set up for our current knowledge of how to set up. In managerial terms, it is a more *effective* problem to solve.”

Changed “**intelligent beings**” to “**, the members of the community of beings capable of using the knowledge that we create,**” in the first sentence.

Chapter 1, The Strategy, first paragraph

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” calls for making profound changes **to** how we think about the universal problem we face, the problem that defines our ultimate ends. The inexhaustibility of knowledge makes it impossible to separate what happens today from what happens one thousand years from now. **We must** consider not only the living but also future generations. Further, the low cost of copying many types of useful knowledge makes it impossible to separate what happens in our society from what happens in other societies. **We must** consider not only members of our society

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

but also all other members of the community capable of using the knowledge that it creates.”

was changed to:

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” calls for making profound changes in how we think about the universal problem we face, the problem that defines our ultimate ends. The inexhaustibility of knowledge, **the fact that using knowledge does not use it up**, makes it impossible to separate what happens today from what happens one thousand years from now. **In determining what is wise, we owe it to ourselves to consider not only the living but also future generations.**

Further, the low cost of copying many types of useful knowledge makes it impossible to separate what happens in our society from what happens in other societies. **In determining what is wise, we ought to consider not only members of our society but also all other members of the community capable of using the knowledge that it creates.”**

Chapter 1, The Strategy, new third through fifth paragraphs

“From the managerial perspective, the universal problem we face is one of how we, the members of the community of beings capable of using the knowledge that we create, choose **to** progress toward our ultimate ends. This universal problem is an open-ended one. **Mathematicians face a similar problem when they seek to evaluate the transcendental number pi. Rather than seeking ever better rational approximations of pi:**

$$\begin{aligned} &3, \\ &22/7, \\ &355/113, \\ &\dots \end{aligned}$$

they seek ever better means of calculating pi:

$$\begin{aligned} \pi &= 4(1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \dots), \\ \pi &= 2 \cdot \sqrt{3}(1 - 1/3 \cdot 3 + 1/5 \cdot 3^2 - 1/7 \cdot 3^3 + 1/9 \cdot 3^4 - 1/11 \cdot 3^5 + \dots), \\ &\dots \end{aligned}$$

where better means are those that converge more quickly.

“Mathematicians progress toward pi by applying a process (formula) recursively. Similarly, we progress toward our ultimate ends by applying a process (decision-making) recursively.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“**Decision-making** starts with finding a problem to solve and ends with learning from the experience. We do not decide perfectly. Our imperfect decision-making wastes resources. But, **given a learning attitude**, we learn from our mistakes. Given a learning attitude, waste is a regrettable by-product of learning through experience.”

were changed to:

“From the managerial perspective, the universal problem we face is one of how we, the members of the community of beings capable of using the knowledge that we create, **ought** to progress toward our ultimate ends.⁵ We progress toward our ultimate ends by means of decision-making, where decision-making is defined as the process that starts with finding a problem to solve and ends with learning from the experience.

“We do not decide perfectly. Our imperfect decision-making wastes resources. But, **given the proper attitude and an understanding of the value of learning**, we learn from our mistakes. Given a learning attitude, waste is a regrettable by-product of learning through experience.”

“**Mathematicians face a similar (open-ended) problem when they seek to evaluate the transcendental number pi. Rather than seeking ever better rational approximations of pi: 3, 22/7, 355/113, ..., they seek ever better recursive processes for calculating pi: $\pi = 4(1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \dots)$; $\pi = 2 \cdot \sqrt{3}(1 - 1/3 \cdot 3 + 1/5 \cdot 3^2 - 1/7 \cdot 3^3 + 1/9 \cdot 3^4 - 1/11 \cdot 3^5 + \dots)$; ..., where better recursive processes are those that converge more quickly.**”

Chapter 2, *Theories produce predictions and explanations.*, last paragraph

Changed “**owe to ourselves** (ought)” to “ought” in the second to last sentence.

Chapter 2, Refining Ultimate Ends, fifth paragraph, last sentence

“We can do so by basing our theory of consumption on theories that look to **our internal programming** to explain what motivates us.”

was changed to:

“We can do so by basing our theory of consumption on theories that look to **human nature** — our internal programming — to explain what motivates us. **Modern biologists call theories that look to internal programming to explain motivation “teleonomic theories.”**”

Chapter 2, Refining Ultimate Ends, sixth paragraph

Changed “**these “teleonomic theories”**” to “**teleonomic theories**” in the first sentence.

Chapter 2, Refining Ultimate Ends, seventh paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Deleted “Pragmatists focus on means. Idealists define ultimate ends. Pragmatic idealists refine ultimate ends:”

Changed “tighten” to “then tighten” in the last sentence.

Chapter 2, Refining Ultimate Ends, eighth paragraph

“We owe it to ourselves to cull teleonomic theories that fail to help us identify what we need to pursue our ultimate ends. For example, psychologist Abraham Maslow provides us with a means of identifying our physical and mental needs.⁶ Our physical needs for oxygen and water arise from our molecular processes’ need for oxygen and water. In contrast, our mental needs for love and self-respect arise from our minds, not from the molecular processes of our brain cells. Until we understand the complex relationships between our bodies and what we commonly refer to as our minds and our spirits, focusing on one level of abstraction will tend to blind us to needs that emerge on other levels of abstraction. We ought to cull all teleonomic theories that focus on a single level of abstraction. We ought to cull teleonomic theories based solely on sociobiology, which focus on our bodies; teleonomic theories based solely on postmodernism, which focus on our minds; and teleonomic theories based solely on our need to relink with the infinite Being, which focus on our spirits. The wise focus not on their bodies, on their minds, or on their spirits, but rather on their bodies, minds, and spirits.

“⁶Maslow, Abraham H., *Motivation and Personality*, (New York: Harper & Row, 1987), 15-31.”

was changed to:

“We owe it to ourselves to cull teleonomic theories that fail to help us identify what we need to pursue our ultimate ends. First, we ought to cull all teleonomic theories that focus on a single level of abstraction. Until we understand the complex relationships between our bodies and what we commonly refer to as our minds and our spirits, focusing on one level of abstraction will tend to blind us to needs that emerge on other levels of abstraction. Only fools focus on their bodies, minds, or spirits. The wise focus on their bodies, minds, and spirits. Hence, we ought to cull teleonomic theories based solely on sociobiology, which focus on our bodies; teleonomic theories based solely on postmodernism, which focus on our minds; and teleonomic theories based solely on our need to relink with the infinite Being, which focus on our spirits.”

Chapter 2, Refining Ultimate Ends, ninth paragraph

Changed “owe to ourselves” to “ought” in the first sentence.

Chapter 2, Refining Ultimate Ends, end

Added the paragraph:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Pragmatists focus on means. Idealists define ultimate ends. Pragmatic idealists refine ultimate ends.”

Chapter 3, Introduction, first sentence

Deleted “subordinate ends and means to our chosen subordinate.”

Chapter 3, Wealth

“Wealth is goods and the resources to produce goods. Marginalist goods are things that we *want*. In sharp contrast, managerial goods are things that we *need* to progress toward our ultimate ends.”

was changed to:

“Marginalists and managers alike define wealth as goods and the resources to produce goods. However, they differ in how they define goods. Marginalists define goods as those consumer goods and services that we *want*. This definition of goods does *not* include practical wisdom. Managers define goods as those things that we *need* to progress toward our ultimate ends. This definition of goods does include practical wisdom.”

Chapter 3, Consumption, first paragraph

“From the marginalist perspective, winning a fortune in the lottery will automatically lead to a good life, and so it is unequivocally good. From the managerial view, it can be bad if the winner is foolish, as would be the case if the winner were an alcoholic who would use the money to pursue his or her self-destructive habit. Understanding this difference requires a deeper understanding of pleasure and pain.”

was changed to:

“The marginalist definition of goods *does not* include practical wisdom. From the marginalist perspective, winning a fortune in the lottery will automatically lead to a good life, and so it is unequivocally good. In contrast, the managerial definition of goods *does include* practical wisdom. From the managerial view, winning a fortune in the lottery can be bad if the winner is foolish, as would be the case if the winner were an alcoholic who would use the money to pursue his or her self-destructive habit. Understanding this difference requires a deeper understanding of pleasure and pain.”

Chapter 3, *Virtuous Circles*, second paragraph

Changed “ability” to “potential” in all (3 occurrences).

Chapter 3, Practical Wisdom, first paragraph, first sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“The ultimate **normative** end of life is happiness, a life well lived.”

was changed to:

“**Aristotle tells us that** the ultimate end of life is happiness, a life well lived.”

Chapter 3, *Two Means of Pursuing Happiness*, second paragraph

Changed “acting **in the world**” to “**interacting with others**” in the third sentence.

Chapter 3, *Alternatives to Pursuing Happiness*, third paragraph, first sentence

“**The** distinction between pursuing happiness, pursuing pleasure, and pursuing nothing is **more than an artifact of Western civilization.**”

was changed to:

“**This** distinction between pursuing happiness, pursuing pleasure, and pursuing nothing is **universally useful. We find clear reflections of it in successful Eastern cultures.**”

Chapter 3, *Alternatives to Pursuing Happiness*, last paragraph

Merged into third paragraph.

Chapter 3, *Trade*, second paragraph

Changed “**establishing**” to “**setting up new**” in the fourth sentence.

Changed “**unwinding**” to “**ending**” in all (2 occurrences).

Chapter 3, *Trust*, last paragraph, last sentence

“Trust lowers the cost of protecting knowledge from theft, which promotes creating knowledge.”

was changed to:

“Trust promotes knowledge by lowering the cost of protecting knowledge from theft.”

Chapter 3, *Several Common Misbeliefs*, title

Changed “**Several**” back to “**Three.**”

Chapter 3, *Several Common Misbeliefs*, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**Several**” back to “**Three**” in the first sentence.

Added “**(efficiency and effectiveness)**” in the first sentence.

Added “**first and**” in the second sentence.

Chapter 3, *Several Common Misbeliefs*, second paragraph

Changed “**A** second” to “**The** second” in the first sentence.

Added the sentence:

“For example, a mahogany desk made from wood from a certified source may be more valuable to us than an otherwise identical desk made from wood of unknown origin.”

Chapter 3, *Several Common Misbeliefs*, third paragraph

Changed “**A** third” to “**The** third” in the first sentence.

Chapter 3, *Production*, first sentence

Changed “**P**roduction” to “**As the rapid tool setting example in the first chapter showed, p**roduction.”

Chapter 3, *Profit*, first sentence

Inserted the sentence:

“Profit is the return on practical wisdom.”

Chapter 4, *Introduction*

Changed “economic turbulence” to “**the** economic turbulence **it creates.**”

Chapter 4, *Progress*, first paragraph, first sentence

“**P**rogress is movement toward the ultimate normative end of a good life for all.”

was changed to:

“**If we accept Schweitzer's ultimate normative end of reverence for life (Appendix B), then** progress is movement toward the ultimate normative end of a good life for all.”

Chapter 4, *Progress*, second paragraph, last sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“A small rise in the price of a raw material might cause firms to react as marginalist theory predicts; it might have no immediate effect; or it might trigger a firm to adopt a new process that changes the industry.”

was changed to:

“A small rise in the price of a raw material might cause firms to react as marginalist theory predicts. **Alternatively**, it might have no immediate effect or it might trigger a firm to adopt a new process that changes the industry.”

Chapter 4, Progress, third paragraph

Changed “**interfere**” to “**interact**” in the second sentence.

Chapter 4, Progress, last paragraph, last sentence

“Metaphorically, progress from increasing managerial excellence creates a “**bow wave**” of inflation.”

was changed to:

“Metaphorically, **a surge of** progress from increasing managerial excellence creates a **temporary** wave of inflation.”

Chapter 4, Turbulence, third paragraph, second sentence

“**When** capturing this benefit requires trading with those hurt by turbulence, **it also requires the trust needed to make such trades.**”

was changed to:

“**Capturing** this benefit **may** require trading with those hurt by turbulence.”

Chapter 4, Fluidity, fourth paragraph

Changed “raise” to “raises” in the fourth sentence.

Deleted “significantly” in the last sentence.

Chapter 4, Fluidity, last paragraph

Changed “more fluid **over time**” to “**ever** more fluid” in the last sentence.

Chapter 4, Conclusion, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Renegade Austrian economist Joseph Schumpeter believed that (1) wealth is consumer goods and the capacity to produce consumer goods; (2) the *wealthy* are willing to give up some liberty to purchase economic security and (3) socialism would rid us of capitalism’s “gales of creative destruction.”⁴ These **widely-held** beliefs are not the most useful for progressing toward the ultimate end of reverence for life. More useful are the beliefs that (1) **wealth is what we need to progress toward the ultimate end of reverence for life**; (2) the *wise* are willing to accept economic turbulence as a regrettable result of progress; and (3) socialism postpones turbulence by retarding progress from increasing excellence, which is **both** unwise and unjust.”

was changed to:

“**This chapter rebuts the widely held beliefs that:** (1) the *wealthy* are willing to give up some liberty to purchase economic security and (2) socialism would rid us of capitalism’s “gales of creative destruction.”⁴ These **two** beliefs are not the most useful for progressing toward the ultimate end of reverence for life. More useful are the beliefs that (1) the *wise* are willing to accept economic turbulence as a regrettable result of progress and (2) socialism postpones turbulence by retarding progress from increasing excellence, which is unwise and unjust.”

Chapter 5, Introduction, first paragraph, first sentence

“Policy makers **decide** who makes what decisions under what incentives.”

was changed to:

“Policy making **is a matter** of who makes what decisions under what incentives.”

Chapter 5, *Consider the Justice of Interventions*, third paragraph

Added the sentence:

“The classic example is the attempt to prohibit the sale of alcohol in the United States during the nineteen twenties.”

Changed “prudence” to “practical wisdom” in the last sentence.

Chapter 5, *Control the Monetary Supply Passively*, first paragraph

Changed “price” to “**the** price” in the first sentence.

Deleted “**allow monetary authorities**” in the third sentence.

Chapter 5, Free Association, third paragraph

Changed “**urban, industrial, and market-oriented**” to “industrial” in the first sentence.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 5, Free Association, fourth paragraph, last two sentences

“This supposed **break** for employees effectively takes away their right to buy insurance from whomever they please. **It also involves employers, and through authoritarian progressive legislation, the government, in the personal lives of employees.**”

was changed to:

“This supposed **gain** for employees **is** effectively **a loss in that it** takes away their right to buy insurance from whomever they please.”

Chapter 5, Conclusion

Added the sentence:

“The best government is the one that results in the greatest improvement in the quality of decision-making.”

Chapter 6, first paragraph

“In information age economies, the potential interactions between ethics (how we ought to live) and mainstream economics (how we use scarce resources to satisfy our wants) are too important to ignore. We need a strategy for learning how to live ever more wisely.”

was changed to:

“At the dawn of the industrial age, Adam Smith’s example of a pin factory showed the wisdom of pursuing the virtuous circle of the division of labor and the expansion of market size. Today, Toyota’s strategy for learning shows the wisdom of pursuing the virtuous circle of good people and good products: Good people produce good products. Good products, *including good intellectual tools*, produce good people. We ought to learn more about what makes people good. We ought to learn more about what enlightened self-interest truly is.”

Chapter 6, second paragraph, first sentence

“**The managerial** strategy for learning how to live ever more wisely **put forth in this work** differs markedly from current economic theories.”

was changed to:

“*Wealth in the Information Age* **promotes a** strategy for learning how to live ever more wisely. **This strategy for learning** differs markedly from current economic theories.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 6, third paragraph

Changed “The managerial strategy for learning” to “This strategy” in the first sentence.

Changes in Version 2005.02.21

Preface, second paragraph, fifth sentence

Deleted “leading me astray by.”

Preface, third paragraph

Changed “They” to “These scholars” in the third sentence.

Preface, fourth paragraph

Changed “Scholars who believe that it takes a theory to beat a theory” to “These scholars” in the first sentence.

Acknowledgments, fourth paragraph

Added the paragraph:

“The fourth is Harold Leavitt, my first year faculty advisor at the Stanford Graduate School of Business. Hal told his core course organizational behavior students that the least understood, most often ignored, and often most difficult part of decision-making is finding the best problem to solve. As Einstein observed, perfection of means and confusion of ends seem to characterize our age.”

Renumbered subsequent paragraphs.

Acknowledgments, new sixth paragraph

Changed “essentially” to “what today would be called” in the second sentence.

Acknowledgments, new ninth paragraph, end

Added the sentence:

“I am especially grateful for his explanation of his cognitive style (*Hayek on Hayek*, 134-5), which often inspired me to continue rolling this stone up the mountain.”

Changes in Version 2005.02.26

Preface for Academics, first paragraph

Changed “**human nature**” to “**teleonomic programming**” in the sixth sentence.

Changed “**human knowledge**” to “**knowledge useful in fulfilling our teleonomic programming**” in the seventh sentence.

Changed “**the resulting**” to “**this**” in the last sentence.

Changed “**theories**” to “**intellectual tools**” in the last sentence.

Preface for Academics, second paragraph, first two sentences

“**From this practical perspective**, the economic problem that we **must** solve includes **discovering** more about **human nature**. A major hurdle in **discovering** more about ourselves is the complex (reflexive / recursive) relationship between our sensations of reality and the normative theories that we use to guide our actions **and reality**.”

were changed to:

“**Ideally**, the economic problem that we **owe it to ourselves (ought)** to solve includes **learning** more about ourselves. A major hurdle in **learning** more about ourselves is the complex (reflexive / recursive) relationship between **our sensations of reality and** the normative theories (**models**) that we use to guide our actions.”

Preface for Academics, third paragraph

“**The essence of the science of practical wisdom is that we owe it to ourselves (ought)** to test theories by how we use them in decision-making. We ought to test the theories that we use to predict by how well they help us to predict. We ought to test the theories that we use to explain by how well they help us to find problems to solve.”

was changed to:

“**Practically, we ought** to test theories by how we use them in decision-making. We ought to test the theories that we use to predict **what will happen** by how well they help us to predict **what will happen**. We ought to test the theories that we use to explain **how to act wisely** by how well they help us to find problems to solve.”

Acknowledgments, tenth paragraph, end

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Moved paragraph to after new eleventh paragraph. Renumbered acknowledgments accordingly.

Chapter 2, Refining everyday thinking, first paragraph

Added: “**that define our ultimate ends**” at the end of the third sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, third paragraph

“Idealists believe that science ought to concern the discovery of the truth. **A true** theory is one that predicts and explains everything about a system. We refine philosophical theories (B) by rejecting those that fail to meet empirical standards for predicting. What remains are scientific theories (C):”

were changed to:

“Idealists believe that science ought to concern the discovery of the truth. **Discovering the truth, which some describe as God’s view of the Universe, helps us satisfy our need for mystical oneness, our need to become part of something greater than ourselves. (See Schweitzer’s Universal Spiritual Need in Appendix B.)** Idealists also **believe that a good scientific** theory is a theory that predicts and explains everything about a system. Accordingly, they refine philosophical theories (B) by rejecting those that fail to meet empirical standards for predicting. What remains are scientific theories (C):”

Chapter 2, *Theories are refinements of everyday thinking.*, fifth paragraph

Changed “useful **truth**” to “useful **knowledge**” in the first sentence.

Chapter 4, Progress, first paragraph, first two sentences

“**If we accept Schweitzer’s ultimate normative end of reverence for life (Appendix B), then progress is movement toward the ultimate normative end of a good life for all.**”

were changed to:

“**Progress is movement toward our ultimate normative ends.**”

Chapter 4, Avalanche Catastrophes, last paragraph

Changed “weakly chaotic” to “weakly **or strongly** chaotic” in the first sentence.

Afterword, third paragraph, seventh sentence

“**The new regulations** would make flying commuter airlines more expensive, **which** would cause some people to switch from flying to driving.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

was changed to:

“**Regulating commuter airlines like major airlines** would make flying commuter airlines more expensive. **This in turn** would cause some people to switch from flying to driving.”

Afterword, third paragraph, last sentence

“**Would more regulation result in more highway deaths than it saved by preventing airline crashes?**”

was changed to:

“**Right wingers asked whether regulating commuter airlines like major airlines would result in more highway deaths than it saved preventing airline crashes.**”

Changes in Version 2005.03.05

Preface, second paragraph

The first two sentences:

“I was already familiar with Bach’s decision rules. I had learned the first from my parents; the second from Wilfred McNeil, comptroller of the United States Department of Defense under its first six Secretaries; and the third from Harry Carroll, professor of classical Western history, art, languages, and philosophy.”

were deleted.. The the next two sentences were appended to the first paragraph. The last sentence was appended to the third paragraph.

Preface, last two paragraphs

“Rather than strategic theories, we ought to seek strategies for learning. This radical idea will be resisted by scholars who believe that it takes a theory to beat a theory. **These scholars ought to consider** the foremost task of decision-making, **which** is defining our ultimate ends. The intellectual tool that we use to define our ultimate ends ought to address all uncertainty. Unlike theories, which cannot address the uncertainty of basic assumptions, strategies for learning can address all uncertainty.

“**These scholars also ought to consider what happened in the market for production management tools.** Toyota’s strategy for learning wisely beat the theories for allocating efficiently.”

were changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Rather than strategic theories, we ought to seek strategies for learning. This radical idea will be resisted by scholars who believe that it takes a theory to beat a theory. **More useful than the belief that it takes a theory to beat a theory is the belief that it takes an intellectual tool to beat an intellectual tool. There are both theoretical and practical reasons for this. In theory,** the foremost task of decision-making is defining our ultimate ends. The intellectual tool that we use to define our ultimate ends ought to address all uncertainty. Unlike theories, which cannot address the uncertainty of basic assumptions, strategies for learning can address all uncertainty. **In practice,** Toyota’s strategy for learning wisely beat the theories for allocating efficiently.”

Preface for Academics, second and third paragraphs

“**Ideally, the economic problem that** we owe it to ourselves (ought) to **solve includes** learning more about ourselves. A major hurdle in learning more about ourselves is the complex (reflexive / recursive) relationship between our sensations of reality and the normative **theories (models)** that we use to guide our actions. Clearing this hurdle requires that we distinguish between the positive **theories** that we use to predict what will happen and the normative **theories** that we use to explain how to act wisely. In the pursuit of useful knowledge, this distinction is more basic than the distinction between theories that are scientific and those that are not scientific.

“**Practically,** we ought to test theories by how we use them in decision-making. We ought to test the theories that we use to predict **what will happen** by how well they help us to predict **what will happen**. We ought to test the theories that we use to explain **how to act wisely** by how well they help us to find problems to solve.”

were changed to:

“**In theory,** we owe it to ourselves (ought) to **follow the scientific research program that arises from our teleonomic programming. Following this program requires that we** learn more about ourselves. A major hurdle in learning more about ourselves is the complex (reflexive / recursive) relationship between our sensations of reality and the normative models that we use to guide our actions. Clearing this hurdle requires that we distinguish between the positive **models** that we use to predict what will happen and the normative **models** that we use to explain how to act wisely. In the pursuit of useful knowledge, this distinction is more basic than the distinction between theories that are scientific and those that are not scientific.

“**In practice,** we ought to test **economic** theories by how we use them in decision-making. We ought to test the theories that we use to predict by how well they help us to predict. We ought to test the theories that we use to explain by how well they help us to find problems to solve.”

Acknowledgment, tenth paragraph

Deleted “**and his uncle, Wilfred McNeil,**” in the seventh sentence.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Chapter 2, *Theories are refinements of everyday thinking.*, last sentence

“The ever-evolving process of discovering and testing useful knowledge is a scientific research program of, by, and for all intelligent life.”

was deleted.

Afterword, last paragraph, end

Added the paragraph:

“I believe that all human activity both is and ought to be part of the scientific research program of, by, and for all intelligent life.”

Changes in Version 2005.03.12

Preface, first paragraph, third sentence

Changed “**revealing** his beliefs” to “**disclosing** his **core beliefs.**”

Preface, second paragraph

“I have since learned that this wish was foolish. Rather than strategic theories, we ought to seek strategies for learning. **This radical idea will be resisted by scholars who believe that it takes a theory to beat a theory. More useful than the belief that it takes a theory to beat a theory is the belief that it takes an intellectual tool to beat an intellectual tool. There are both theoretical and practical reasons for this. In theory, the foremost task of decision-making is defining our ultimate ends. In practice, Toyota’s strategy for learning wisely beat all theories for allocating efficiently.**”

was changed to:

“I have since learned that this wish was foolish. Rather than strategic theories, we ought to seek strategies for learning. **The foremost task of decision-making is defining our ultimate ends. Unlike theories, which cannot address the uncertainty of basic assumptions, strategies for learning can address all uncertainty.**”

“**The idea that a strategy ought to replace a theory conflicts with the maxim that it takes a theory to beat a theory. More useful than this scholastic maxim is the pragmatic maxim that it takes an intellectual tool to beat an intellectual tool.** Toyota’s strategy for learning wisely beat all theories for allocating efficiently.”

Preface for Academics, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**the economic** research program” to “**their scientific** research program.”

Preface for Academics, second paragraph, second sentence

“Following this program **requires that we** learn more about ourselves.”

was changed to:

“Following this program **involves learning** more about ourselves.”

Acknowledgments, fifth paragraph, second sentence

Changed “**his core course organizational behavior students**” to “**me.**”

Changed “**, most often ignored, and often most difficult**” to “**and** most often ignored.”

Acknowledgments, ninth paragraph

Changed “**Reverend John Lothrop inspired**” to “**Congregationalist**” in the third sentence.

Changed “approach to problems often conflicted with **those**” to “approach to **decision-making** often conflicted with the **model centric approach**” in the last sentence.

Acknowledgments, tenth paragraph, first sentence

Changed “**as head of human resources and information systems for**” to “**at.**”

Acknowledgments, eleventh paragraph, last sentence

Changed “**cognitive style**” to “**intellectual make-up.**”

Chapter 2, *Theories are refinements of everyday thinking.*, fourth paragraph, second and third sentences

“**We** test theories by testing how well they perform their role in **everyday thinking.** **From the managerial perspective put forth in this work, we test theories by testing how well they perform their role in** decision-making.”

was changed to:

“**In the pursuit of useful knowledge, we ought to** test theories by testing how well they perform their role in decision-making.”

Chapter 2, *Theories are refinements of everyday thinking.*, second footnote

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**In the pursuit of useful truth, the**” to “**The**” in the first sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, fourth paragraph

Changed “test” to “**ought to test**” in the new third and fourth sentences.

Changed “refine” to “**ought to refine**” in the new fifth and seventh sentences.

Changed “**the** M-theory” to “**Witten’s** M-theory” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, fifth paragraph

Changed “**metamethodology**” to “**approach**” in the first sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, last paragraph

“Some idealists will dismiss this pragmatic definition of science for not being positive, for not describing the world as it is. They ought to consider the nature of scientific research programs. Scientific research programs are positive in their ends, normative in their means, and potentially religious in their effect on researchers.”

was deleted.

Chapter 2, *Refining Ultimate Ends*, eighth paragraph, last three sentences

“**Only fools focus on their bodies, minds, or spirits. The wise focus on their bodies, minds, and spirits.** Hence, we ought to cull teleonomic theories based solely on sociobiology, which focus on our bodies; teleonomic theories based solely on postmodernism, which focus on our minds; and teleonomic theories based solely on our need to relink with the infinite Being, which focus on our spirits.”

were changed to:

“Hence, we ought to cull teleonomic theories based solely on sociobiology, which focus on our bodies; teleonomic theories based solely on postmodernism, which focus on our minds; and teleonomic theories based solely on our need to relink with the infinite Being, which focus on our spirits. **Only fools focus on their bodies, minds, or spirits. The wise focus on their bodies, minds, and spirits.**”

Appendix B, title

Changed “**Culling Unethical Theories**” to “**Reverence for Life.**”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, second paragraph, third sentence

“The foremost task of decision-making is defining our ultimate ends.”

was deleted.

Preface for Academics, second paragraph, second sentence

Changed “involves learning” to “requires that we learn.”

Preface for Academics, third paragraph, first sentence

Changed “economic theories” to “theories.”

Acknowledgments, third paragraph, first sentence

Changed “human being” to “person.”

Chapter 2, *Theories are refinements of everyday thinking.*, third paragraph, fourth sentence

Inserted a paragraph break.

Chapter 5, Just Taxation, fourth through sixth paragraphs

“The case for ending personal income taxes is more problematic. It is also more enlightening in that it gets to the heart of the reason that we have governments.

“If we were perfectly wise, if we were as lucid as angels, no government would be necessary. *Government is a substitute for practical wisdom.*

“If we were perfectly wise, we would share our wealth wisely. There would be no need for governments to force us to do so. Regrettably, we are not perfectly wise. This does not mean that we ought to demand that governments expend non-knowledge resources to force us to share our wealth. Non-knowledge government resources are poor substitutes for the inexhaustible knowledge resource of practical wisdom. We ought to demand that governments encourage us to become ever wiser.”

were changed to:

“The case for ending personal income taxes is more problematic. If we were perfectly wise, we would share our wealth wisely. There would be no need for governments to force us to do so. Regrettably, we are not perfectly wise. This does not mean that we ought to demand that governments force us to act wisely. It does mean that we ought to demand that governments encourage us to act ever more wisely.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 5, Just Taxation, last paragraph, third sentence

Inserted a paragraph break.

Appendix B, Sacrifice and Prudence, last paragraph

“Secular humanists tend to ignore our need for mystical oneness. The danger of ignoring this potentially overwhelming need is the flourishing of such deeply flawed means of satisfying it as Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism. Rather than distinguishing between secular and religious humanism, we ought to distinguish between materialist and dualist religious humanism. Secular humanists ought to heed Einstein’s warning, “Science without religion is lame.””

was changed to:

“**Secular Humanism**

Secular humanists tend to ignore our need for mystical oneness. The danger of ignoring this potentially overwhelming need is the flourishing of such deeply flawed means of satisfying it as Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism. Rather than distinguishing between secular and religious humanism, we ought to distinguish between materialist and dualist religious humanism.

“Secular humanists ought to heed Einstein’s warning, “Science without religion is lame.””

Appendix B, Divine Law, title

Changed “**Divine Law**” to “**Religious Fundamentalism.**”

Changes in Version 2005.03.31

Preface for Academics, second paragraph, third sentence

“A major hurdle in learning more about ourselves is the complex (reflexive / recursive) relationship between **our sensations of reality and** the normative models that we use to guide our actions.”

was changed to:

“A major hurdle in learning more about ourselves is the complex (reflexive / recursive) relationship between the normative models that we use to guide our actions **and reality.**”

Acknowledgments, second paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “**several**” to “**nine**” in the first sentence.

Acknowledgments, sixth paragraph

Changed “Star” to “Star **Forms**” in the second sentence.

Deleted “, **which was the highlight of a tour of Japanese factories,**” in the last sentence.

Acknowledgments, eighth paragraph

Changed “199**6**” to “199**8**” in the last sentence.

Chapter 2, Refining Everyday Thinking, title

Changed title to “**The Nature of Theories.**”

Chapter 2, The Nature of Theories, first paragraph

“**The Toyota strategy for learning how to produce ever more wisely involves refining production operations by removing work-in-process inventory. (See Appendix A.) Similarly, the managerial strategy for learning how to progress ever more wisely involves refining our pursuit of our ultimate ends by removing theories that define our ultimate ends. Understanding this strategy calls for understanding the nature of theories.**”

was changed to:

“**The first chapter proposed a strategy for learning how to progress toward our ultimate ends ever more wisely. Pursuing this strategy requires that we understand the nature of theories.**”

Chapter 2, Refining Ultimate Ends, title

Changed title to “Refining **Everyday Thinking.**”

Chapter 2, Refining Everyday Thinking, last paragraph

“Pragmatists focus on means. Idealists define ultimate ends. Pragmatic idealists refine ultimate ends.”

was reduced to a footnote at the end of the seventh paragraph.

Chapter 2, Expanding Economic Science, end

Added the paragraph:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“All human activity both is and ought to be part of the scientific research program of, by, and for all intelligent life.”

Chapter 3, Trade, first paragraph

Changed “**Having a reputation of**” to “**A reputation for**” in the first sentence.

Chapter 3, *Three Common Misbeliefs*, first paragraph

Deleted “(efficiency and effectiveness)” in the first sentence.

Changed “WIP inventory” to “**work-in-process (WIP)** inventory” in the fifth sentence.

Afterword, last paragraph, last sentence

“I believe that all human activity both is and ought to be part of the scientific research program of, by, and for all intelligent life.”

was deleted.

Appendix A, Introduction

“Just-In-Time (JIT) Manufacturing/Lean Manufacturing/Toyota Production System has become something of a joke among economists. Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to introduce the virtuous circle of the division of labor and the expansion of market size. Like Smith’s pin factory, the Toyota system straddles two economic epochs. Where Smith’s pin factory combined pre-industrial age technology with industrial age batch manufacturing organization and management, JIT/Lean Manufacturing/Toyota Production System combines industrial age batch manufacturing technology with something post-industrial. **The joke is that economists cannot agree on the system’s name, much less what makes it special.**”

“What makes the Toyota system exemplary in its information age organization and management, **which focuses** on continual improvement (*kaizen*) in production, trade, and consumption. **It is the epitome of an information age, learning-by-doing strategy.** From this perspective, more production of saleable product is not always more productive. Less “production” can be more productive.”

was changed to:

“Just-In-Time (JIT) Manufacturing/Lean Manufacturing/Toyota Production System has become something of a joke among economists. Many believe that it represents the early information age equivalent of Adam Smith’s early industrial age pin factory, which Smith used to introduce the virtuous circle of the division of labor and the

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

expansion of market size. **The joke is that economists cannot agree on the system's name, much less what makes it special.**

“ Like Smith's pin factory, the Toyota system straddles two economic epochs. Where Smith's pin factory combined pre-industrial age technology with industrial age batch manufacturing organization and management, JIT/Lean Manufacturing/Toyota Production System combines industrial age batch manufacturing technology with information age organization and management. **Toyota managers** focus on continual improvement (*kaizen*) in production, trade, and consumption. From this **learning-by-doing** perspective, more production of saleable product is not always more productive. Less “production” can be more productive.”

Appendix A, Ever Leaner Production, second paragraph

Changed “work-in-process inventory” to “work-in-process **(WIP)** inventory” in the first sentence.

Appendix A, Traditional Manufacturing Systems, sixth paragraph

Changed “work in process” to “work-in-process” in the fourth sentence.

Appendix A, Smoothing Flows, first paragraph

Changed “**WIP** flows” to “**Work-in-process** flows” in the second sentence.

Appendix A, Smoothing Flows, last paragraph

Deleted “**(WIP)**” in the third sentence.

Appendix B

Demoted sections: *Practical Benefits of Magical Wisdom*, *Secular Humanism*, and *Religious Fundamentalism*.

Appendix B, Practical Benefits of Magical Mysticism, fourth paragraph

Changed “religious conversions” to “religious conversions **triggered by divine action**” in the second sentence.

Appendix B, Sacrifice and Prudence

Changed title to “**Balanced Excellence**.”

Added subsection title, “**Sacrifice**,” after the third paragraph.

Appendix B, Sacrifice, first paragraph, last four sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Even here successful religions teach us to balance the extreme Dionysian with the Apollonian. Too small a willingness to risk ourselves for the sake of others is deemed to be cowardly. Too great a willingness to risk ourselves for others is deemed to be foolhardy or self-destructive. Only the proper balance is deemed to be heroic. The wise temper sacrifice with practical wisdom.”

were deleted.

Appendix B, *Sacrifice*, last paragraph

Changed “**prudent**” to “**wise**” in the first sentence.

Changed “**prudence and romance over enlightenment**” to “**practical wisdom**” in the last sentence.

Appendix B, *Sacrifice*, end

Added the paragraph:

“In contrast, the wise temper sacrifice with practical wisdom. Too small a willingness to risk ourselves for the sake of others is cowardly. Too great a willingness to risk ourselves for others is foolhardy or self-destructive. Only the wise amount is truly heroic.”

Appendix C, first paragraph

Changed “**, which**” to “**that**” in the first sentence.

Changes in Version 2005.04.08

Preface, first paragraph

Changed “**beliefs**” to “**values**” in the third sentence.

Chapter 1, Mainstream Economics’ Blind Spot, eighth paragraph

Changed “**fellow workers**” to “**others**” in the seventh sentence.

Chapter 1, Managerial Excellence, last paragraph

Changed “learning **by doing**” to “learning **through experience**” in the first sentence.

Chapter 1, The Strategy, third paragraph, end

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Added the footnote:

“Formal decision-making consists of (1) finding a problem to solve, (2) formulating alternatives, (3) choosing an alternative, (4) carrying out the chosen alternative, and (5) learning from the experience. Not all decision-making situations deserve formal decision-making. Less costly forms of decision-making include decision rules (heuristics / rules of thumb) and discipline (habits). The decision to use these less costly forms often deserves formal decision-making.”

Chapter 1, The Strategy, fourth paragraph

Changed “the proper attitude and” to “an attitude based on” in the second sentence.

Chapter 2, Refining Everyday Thinking, first two paragraphs

“The managerial strategy for learning how to progress toward our ultimate ends ever more wisely aims at improving the quality of decision-making. Formal decision-making consists of (1) finding a problem to solve, (2) formulating alternatives, (3) choosing an alternative, (4) carrying out the chosen alternative, and (5) learning from the experience. To perform the first two tasks well, decision-makers need theories that explain based on what the wise would do.

“The Austrian school of evolutionary economics comes close to producing such theories. Austrian economists seek to explain human action.³ They argue that societies in which individuals are free to manage their own lives create the most consumer satisfaction and that such societies need high ethical standards if they are to remain free. To those who believe that freedom and responsibility encourage ethical behavior, Austrian economics holds the moral high ground. To others, it is merely an apology for current beliefs and behaviors.”

was changed to:

“The managerial strategy for learning how to progress toward our ultimate ends ever more wisely calls for theories that explain based on what we would do if we were wiser. The Austrian school of evolutionary economics, which seeks to explain human action,³ comes close to producing such theories. Austrian economists recognize that people free to manage their lives will tend to become ever wiser. Regrettably, they do not recognize that the combination of freedom and moral vision is better than freedom alone.”

Chapter 3, Three Common Misbeliefs, first paragraph

Changed “learning by doing” to “learning” in the last sentence.

Chapter 3, Three Common Misbeliefs, third paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “closeness” to “**the** closeness” in the last sentence.

Chapter 3, *Three Common Misbeliefs*, last paragraph

Changed “**former** Soviet Union” to “Soviet Union” in the second sentence.

Chapter 4, Introduction, first paragraph

Changed “**normative** view” to “**complex adaptive systems** view” in the first sentence.

Chapter 4, Turbulence, last paragraph (double spaced Adobe version only)

“In freely evolving economies, individuals and managers experiment with new decision-making methods. In the long run, the best methods are emulated and the worst are discarded. Hence, freely evolving economies tend to become ever more fluid.”

was moved to the end of the Fluidity section. This mistake occurred when transferring paragraphs from the online version to the double spaced Adobe version over a year ago.

Chapter 5, Introduction, first paragraph

Changed “just taxation, **and international cooperation**” to “**and** just taxation” in the last sentence.

Chapter 5, *Consider the Justice of Interventions*, second paragraph, last sentence

“They know that the government that governs best governs least.”

was deleted.

Chapter 5, *Consider the Justice of Interventions*, third paragraph, sixth sentence

Footnote in Adobe versions mistakenly referenced online HTML page. It should have referenced the following:

“³ Olson, Mancur, *The Rise and Decline of Nations*, (New Haven: Yale University Press, 1982).”

Chapter 5, International Cooperation, entire section

“International Cooperation

Nation states are not leviathans with human characteristics living in a global village. Nevertheless, the basic principles underlying international affairs are the same as those underlying domestic affairs. Government officials ought to consider the justice of

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

intervening in the affairs of other states rather than the justice of the actions of other states. They ought to consider the advantages of living under the rule of international law rather than the rule of nation states. Most importantly, they ought to consider international cooperation to be a means of improving the quality of decision-making rather than an end in itself.⁴

⁴ Many today advocate creating a world government. This means of improving the quality of decision-making is problematic. In theory, government is a substitute for practical wisdom. In practice, special interest groups will cynically accept just normative ends while denying adequate means of progressing toward them. The classic example is the three-fifths clause in the United States Constitution, which guaranteed that the slave states could prevent progress toward the just ends proclaimed in the Preamble. It took the bloodiest war in United States history to erase that stain from the Constitution.”

was deleted.

Appendix A, *Three Common Misbeliefs*, first paragraph

Deleted “riveting,” from the second sentence.

Changes in Version 2005.04.11

Chapter 1, *Managerial Excellence*, second paragraph

Changed “more effective” to “better” in the third sentence.

Chapter 1, *Managerial Excellence*, last paragraph

Changed “better” to “more effective” in the last sentence.

Chapter 2, *Refining Everyday Thinking*, first six paragraphs

“The managerial strategy for learning how to progress toward our ultimate ends ever more wisely calls for theories that explain based on what we would do if we were wiser. The Austrian school of evolutionary economics, which seeks to explain human action,³ comes close to producing such theories. Austrian economists recognize that people free to manage their lives will tend to become ever wiser. Regrettably, they do not recognize that the combination of freedom and moral vision is better than freedom alone.

“To progress most readily, we need an explicitly moral theory of evolutionary economics — one that removes the artificial barrier separating excellence in what Austrian economists deem to be consumption, from excellence in what they deem to

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

be production and trade. Whether it is the ability to read, write, calculate, operate a motor vehicle, use a computer, learn quickly, communicate clearly, think logically, or behave contently, useful knowledge does not recognize the boundaries that separate “consumption” from “production” and “trade.”

“Applying the Austrian school’s deductive approach to the question of how we turn consumer goods into progress toward our ultimate ends appears to call for making controversial metaphysical assumptions about our nature. The most important of these unverifiable assumptions concerns whether an immaterial part of us survives the death of our bodies. The founder of Austrian economics, Carl Menger, chose to avoid this and other metaphysical problems by defining ‘wealth’ as consumer goods and the resources to produce consumer goods. Supporters of this subjectivist concept of wealth believe it to be value-neutral. It actually supports the current state of the world by tending to blind us to the possibility of learning to live more wisely.

“We can correct this problem by replacing Austrian economics’ subjectivist theory of consumption with an evolutionary one. We can do so by basing our theory of consumption on theories that look to human nature — our internal programming — to explain what motivates us. Modern biologists call theories that look to internal programming to explain motivation “teleonomic theories.”⁴

“Modern biology supports using teleonomic theories as the foundation for explaining cultural evolution. It tells us that our beliefs and behaviors are evolving at a pace many orders of magnitude faster than the genetic level programming that underlies our higher level internal programming. For all practical purposes, we can assume that our fully realized internal programming is fixed.⁵

“Rather than basing evolutionary explanations on what we want, which ignores the possibility of solving problems by learning to live more wisely, we can base them on the set of all teleonomic theories. We can then tighten these loose explanations by culling members of this set.⁶

⁵ Although we can improve the process by which our genetic programming develops into our higher level programming, we cannot improve our higher level internal programming beyond the bounds set by our genetic programming. Therefore, we can safely assume that our fully realized internal programming is fixed. This may not always be the case. The next economic era is most likely to be defined by our ability to change our genetic programming. A major challenge of the information age must be to accumulate the wisdom we will need to meet the challenges of the coming era.”

were changed to:

“The managerial strategy for learning how to progress toward our ultimate ends ever more wisely calls for theories that explain based on what we would do if we were wiser. The Austrian school of evolutionary economics, which seeks to explain human action,³ comes close to producing such theories. Austrian economists recognize that

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

people free to manage their lives will tend to become ever wiser. Regrettably, they do not recognize that the combination of freedom and moral vision is better than freedom alone. We need an explicitly moral theory of evolutionary economics — one that removes the artificial barrier separating excellence in what Austrian economists deem to be consumption, from excellence in what they deem to be production and trade. Whether it is the ability to read, write, calculate, operate a motor vehicle, use a computer, learn quickly, communicate clearly, think logically, or behave continently, useful knowledge does not recognize the boundaries that separate “consumption” from “production” and “trade.”

“To progress toward our ultimate ends most readily, we need to consider the issue of how we turn consumer goods into progress toward our ultimate ends. Addressing this issue using theories requires that we make controversial assumptions about our ultimate ends. The most important of these concerns whether an immaterial part of us survives the death of our bodies. The founder of Austrian economics, Carl Menger, chose to avoid these controversial assumptions by defining ‘wealth’ as consumer goods and the resources to produce consumer goods. Supporters of this subjectivist concept of wealth believe it to be value-neutral. It actually supports the current state of the world by tending to blind us to the possibility of learning to live more wisely.

“Rather than addressing the issue of how we turn consumer goods into progress toward our ultimate ends using Carl Menger’s subjectivist concept of wealth we can address it using a humanist concept of wealth. We can replace Menger’s subjectivist theory of consumption with the set of theories of consumption that look to human nature — our internal programming — to explain what motivates us.⁴ In biological terms, we can base our theories of consumption on the set of all “teleonomic theories.”⁵ We can then tighten these loose theories by culling members of this set.⁶

⁵ Teleonomic theories are theories that look to our internal programming to explain motivation. Modern biology supports using teleonomic theories as the foundation for explaining cultural evolution. It tells us that our beliefs and behaviors are evolving at a pace many orders of magnitude faster than the genetic level programming that underlies our higher level internal programming. For all practical purposes, we can assume that our fully realized internal programming is fixed.

“Although we can improve the process by which our genetic programming develops into our higher level programming, we cannot improve our higher level internal programming beyond the bounds set by our genetic programming. Therefore, we can safely assume that our fully realized internal programming is fixed. This may not always be the case. The next economic era is most likely to be defined by our ability to change our genetic programming. A major challenge of the information age must be to accumulate the wisdom we will need to meet the challenges of the coming era.”

Chapter 4, Introduction, first paragraph

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “view of macroeconomics” to “(CAS) macroeconomic model” in the first sentence.

Chapter 5, Overview, first two paragraphs

“At the dawn of the industrial age, Adam Smith’s example of a pin factory showed the wisdom of pursuing the virtuous circle of the division of labor and the expansion of market size. Today, Toyota’s strategy for learning shows the wisdom of pursuing the virtuous circle of good people and good products: Good people produce good products. Good products, *including good intellectual tools*, produce good people. We ought to learn more about what makes people good. We ought to learn more about what enlightened self-interest truly is.

“*Wealth in the Information Age* promotes a strategy for learning how to live ever more wisely. This strategy for learning differs markedly from **current** economic theories. Where **current** microeconomic theories help us evaluate alternatives, the managerial strategy helps us formulate them. And where **current** macroeconomic theories **try to help** government **officials** pursue **their ends**, the managerial strategy helps policy makers **help all of** us pursue happiness. It tells us that policy makers should judge interventions of government rather than the actions of the governed and that they should err on the side of not intervening justly rather than intervening unjustly.”

were changed to:

“**Mainstream economics focuses on the tactical problem of allocating efficiently. Intellectual tools derived from mainstream economics, including mainstream economics’ concepts of wealth and excellence in means, are tactical. We should never use these tactical tools strategically.**

“*Wealth in the Information Age* promotes a strategy for learning how to live ever more wisely. This strategy for learning differs markedly from **mainstream** economic theories. Where **mainstream** microeconomic theories help us evaluate alternatives, the managerial strategy helps us formulate them. And where **mainstream** macroeconomic theories **encourage** government **policy makers to lower economic turbulence**, the managerial strategy **encourages policy makers to create an environment that allows** us pursue happiness **ever more readily**. It tells us that policy makers should judge interventions of government rather than the actions of the governed and that they should err on the side of not intervening justly rather than intervening unjustly.”

Chapter 5, Overview, third paragraph

Changed “strategy” to “strategy **for learning**” in the first sentence.

Changes in Version 2005.04.15

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Preface, third paragraph, last sentence

Italicized “Toyota’s strategy for learning wisely beat all theories for allocating efficiently.”

Chapter 1, title quotation

Added “*The Paradigmatic Individuals*” to the attribution.

Chapter 1, The Strategy, first three paragraphs

“Changing our concept of excellence in means from marginalist “efficiency” to managerial “efficiency and effectiveness” calls for making profound changes in how we think about the universal problem we face, the problem that defines our ultimate ends. The inexhaustibility of knowledge, the fact that using knowledge does not use it up, makes it impossible to separate what happens today from what happens one thousand years from now. In determining what is wise, we owe it to ourselves to consider not only the living but also future generations.

“Further, the low cost of copying many types of useful knowledge makes it impossible to separate what happens in our society from what happens in other societies. In determining what is wise, we ought to consider not only members of our society but also all other members of the community capable of using the knowledge that it creates.

“From the managerial perspective, the universal problem we face is one of how we, the members of the community of beings capable of using the knowledge that we create, ought to progress toward our ultimate ends.⁵ We progress toward our ultimate ends by means of decision-making.⁶

⁵ Mathematicians face a similar (open-ended) problem when they seek to evaluate the transcendental number pi. Rather than seeking ever better rational approximations of pi: 3, 22/7, 355/113, ..., they seek ever better recursive processes for calculating pi: $\pi = 4(1 - 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + \dots)$; $\pi = 2 \cdot \sqrt{3}(1 - 1/3 \cdot 3 + 1/5 \cdot 3^2 - 1/7 \cdot 3^3 + 1/9 \cdot 3^4 - 1/11 \cdot 3^5 + \dots)$; ..., where better recursive processes are those that converge more quickly.

⁶ Formal decision-making consists of (1) finding a problem to solve, (2) formulating alternatives, (3) choosing an alternative, (4) carrying out the chosen alternative, and (5) learning from the experience. Not all decision-making situations deserve formal decision-making. Less costly forms of decision-making include decision rules (heuristics / rules of thumb) and discipline (habits). The decision to use these less costly forms often deserves formal decision-making.”

were changed to:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We progress toward our ultimate ends by means of decision-making.”⁵

“Formal decision-making consists of (1) finding a problem to solve, (2) formulating alternatives, (3) choosing an alternative, (4) carrying out the chosen alternative, and (5) learning from the experience. Not all decision-making situations deserve formal decision-making. Less costly forms of decision-making include decision rules (heuristics / rules of thumb) and discipline (habits). The decision to use these less costly forms often deserves formal decision-making.”

Chapter 2, Refining Everyday Thinking, paragraph, last two sentences

“We need an explicitly moral theory of evolutionary economics — one that removes the artificial barrier separating excellence in what Austrian economists deem to be consumption, from excellence in what they deem to be production and trade. Whether it is the ability to read, write, calculate, operate a motor vehicle, use a computer, learn quickly, communicate clearly, think logically, or behave continently, useful knowledge does not recognize the boundaries that separate “consumption” from “production” and “trade.””

were changed to:

“We need an explicitly moral theory of evolutionary economics.”

Chapter 2, Expanding Economic Science, second paragraph

Inserted the following paragraph:

“The inexhaustibility of knowledge, the fact that using knowledge does not use it up, makes it impossible to separate what happens today from what happens a thousand years from now. In determining what is wise, we ought to consider not only the living but also future generations. Further, the low cost of copying many types of useful knowledge makes it impossible to separate what happens in our society from what happens in other societies. In determining what is wise, we ought to consider not only members of our society but also all other members of the community capable of using the knowledge that it creates. All human activity both is and ought to be part of the scientific research program of, by, and for all intelligent life.”

Chapter 5, Overview, third paragraph

Changed “God's view” to “a God's eye view” in the first sentence.

Appendix B, Religious Fundamentalism, third paragraph

Removed parentheses around “(with preference given to other intelligent life)” in the last sentence.

Changes in Version 2005.04.16

Chapter 1, The Strategy, new third paragraph

Changed “the rule of law” to “**trust in our predictions about what the courts will do, hence** the rule of law” in the fifth sentence.

Chapter 2, Refining Everyday Thinking, second paragraph

Changed “of these” to “of these **issues**” in the third sentence.

Chapter 2, Refining Everyday Thinking, fourth paragraph

Changed “to pursue” to “**in order** to pursue” in the first sentence.

Numbered clauses in the fourth sentence.

Changed “bodies, minds, *or* spirits” to “bodies, **on their** minds, *or* **on their** spirits” in the fifth sentence.

Chapter 4, Introduction, first paragraph

Added the sentences:

“Progress is movement toward our ultimate normative ends. Assuming that we share the ultimate normative end of reverence for life, progress is movement toward a good life for all. In information age economies, the primary means of progress is increasing managerial excellence.”

Chapter 4, Progress, title

Changed title to “**Increasing Excellence.**”

Chapter 4, Increasing Excellence, first paragraph, first two sentences

“**Progress is movement toward our ultimate normative ends. In information age economies, the primary means of progress involves increasing managerial excellence, which** is a matter of converting new information into new applications of knowledge.”

were changed to:

“**Increasing excellence** is a matter of converting new information into new applications of knowledge.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 4, Fluidity, first paragraph

Changed “**applying useful knowledge**” to “**increasing excellence**” in the first sentence.

Changes in Version 2005.04.18

Preface for Academics, title

Changed “**Academics**” to “**Scientists.**”

Preface for Scientists, first paragraph

Inserted the paragraph:

“Consider a complex adaptive system consisting of potentially cooperative intelligent agents who are uncertain of their needs and the best means of satisfying their needs. The traditional scientific approach to studying this system is for scientists to develop and verify theories about agents’ needs and agents’ means of satisfying their needs. The alternative put forth in this work is for scientists to develop and verify strategies for agents to learn more about their needs and the best means of satisfying them. In short, it is for scientists to help intelligent agents become ever better scientists.”

Preface for Scientists, new second paragraph

“**Economists** face important theoretical anomalies. One is that acting efficiently differs from acting wisely. Another is that **their** scientific research program is not consistent with other scientific research programs. **Albert Einstein provides a model for addressing these two anomalies. In his special theory of relativity Einstein replaced the Newtonian foundation of invariant time and space with the foundation of invariant light speed.** We can **replace modern** economics’ foundation of practically invariant consumer wants with a foundation of practically invariant teleonomic programming. This requires that we expand mainstream economics’ scientific research program to include all knowledge useful in fulfilling economic agents’ teleonomic programming. We urgently need this universal research program to discover and disclose the foolish use of intellectual tools.”

was changed to:

“**As human beings we** face important theoretical anomalies **in mainstream (Anglo-American Neoclassical) economics.** One is that acting efficiently differs from acting wisely. Another is that **mainstream economics’** research program is not consistent with other scientific research programs. We can **address these two anomalies by replacing mainstream** economics’ foundation of practically invariant consumer wants with a foundation of practically invariant teleonomic programming. This **radical solution**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

requires that we expand mainstream economics' scientific research program to include all knowledge useful in fulfilling our teleonomic programming. We urgently need this universal research program to discover and disclose the foolish use of intellectual tools.”

Acknowledgments, fifth paragraph

Changed “Einstein” to “**Albert** Einstein” in the last sentence.

Chapter 2, *Theories are refinements of everyday thinking.*, third and fourth paragraphs

“Idealists believe that science ought to concern the discovery of the truth. **Discovering the truth, which some describe as a God’s eye view of the Universe, helps us satisfy our need for mystical oneness, our need to become part of something greater than ourselves. (See Schweitzer’s Universal Spiritual Need in Appendix B.)**

“**Idealists also believe that a** good scientific theory is a theory that predicts and explains everything about a system. Accordingly, they refine philosophical theories (B) by rejecting those that fail to meet empirical standards for predicting. What remains are scientific theories (C):”

were changed to:

“**We further refine knowledge by scientific research, which is a matter of developing and testing hypotheses. Idealists and pragmatists differ in their approach to this research.**

“Idealists believe that science ought to concern the discovery of the **whole truth about a part of the Universe. A** good scientific theory is one that predicts and explains everything about a system. Accordingly, **idealists** refine philosophical theories (B) by rejecting those that fail to meet empirical standards for predicting. What remains are scientific theories (C):”

Chapter 2, *Expanding Economic Science*, fifth paragraph

Changed “their self-fulfilling nature” to “**the combination of** their self-fulfilling nature and “**lock-in.**”” in the fourth sentence.

Chapter 4, *Introduction*, first paragraph

Changed “, **which**” to “**that**” in the last sentence.

Chapter 4, *Fluidity*, first paragraph

Changed “**Progress from** increasing” to “**I**ncreasing” in the first sentence.

Wealth in the Information Age
Changes from October 7, 1998 through May 2, 2005

Appendix B, *Schweitzer's Universal Spiritual Need*, first paragraph

Changed “truth” to “truth (“a God’s eye view of the Universe”)” in the last sentence.

Changes in Version 2005.04.21

Preface for Scientists, first paragraph

Inserted the paragraph:

“Tradition holds that science is positive and wisdom is normative. From this perspective, ‘the science of practical wisdom’ is an oxymoron. Given the ever increasing importance of practical wisdom, it is time for a new perspective.”

Chapter 2, *Theories are refinements of everyday thinking.*, third paragraph

Changed “this” to “scientific” in the last sentence.

Chapter 2, sixth footnote

Changed “focus on means” to “refine everyday thinking” in the first sentence.

Chapter 2, Refining Everyday Thinking, seventh paragraph

Changed “that usually falls short” to “that often falls short” in all (2 occurrences).

Chapter 2, eleventh footnote, last sentence

“The further away we are from these attractors, the greater the potential for avalanche catastrophes.”

was deleted.

Chapter 3, Harmful Pleasure and Joy, first paragraph

Changed “allow” to “encourage” in the last sentence.

Chapter 4, Increasing Excellence, third paragraph

“Each new application of useful knowledge causes a ripple of change to flow through an economy. These ripples interact with one another in unpredictable ways. For example, the simultaneous rise in the price of steel and fall in the price of plastic is

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

likely to cause a more rapid substitution of plastic for steel than if the price of steel rises a month after the price of plastic falls.”

was changed to:

“**Applying new useful knowledge also** causes a ripple of change to flow through an economy. These ripples interact with one another in unpredictable ways. For example, the simultaneous rise in the price of steel and fall in the price of plastic is likely to cause a more rapid substitution of plastic for steel than if the price of steel rises a month after the price of plastic falls.”

and moved to the end of the section.

Chapter 4, Fluidity

Changed “**Fluidity**” to “**Adaptiveness**” in the title.

Changed “**Fluid**” to “**Adaptive**” in the second sentence of the first paragraph.

Changed “**fluidity**” to “**adaptiveness**” in the third sentence of the first paragraph.

Changed “**fluidity**” to “**adaptiveness**” in the last sentence of the first paragraph.

Changed “**fluidity**” to “**adaptiveness**” in the last sentence of the last paragraph.

Chapter 4, Avalanche Catastrophes

Changed “fluidity” to “fluidity (**adaptiveness**)” in the first sentence of the third paragraph.

Changed “**fluidity**” to “**adaptiveness**” in the first sentence of the last paragraph.

Chapter 4, A Crude Look at the Whole

Changed “**fluid**” to “**adaptive**” in the last sentence of the first paragraph.

Chapter 5, Introduction, first paragraph

Changed “**free association**” to “**adaptive relationships**” in the last sentence.

Chapter 5, Free Association

Changed “**Free Association**” to “**Adaptive Relationships**” in the title.

Changed “**fluid**” to “**adaptive**” in the last sentence of the third paragraph.

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Changed “fluid” to “adaptive” in the second sentence of the first paragraph.

Appendix A, *Good People*, first paragraph

Changed “adaptable” to “adaptive” in the first sentence.

Changes in Version 2005.04.23

Chapter 3, *Harmful Pleasure and Joy*

“Pleasure and joy are harmful to us when they lead us away from following the virtuous circle of pleasure and joy. They mislead us by masking the pain of foolish activities. They also mislead us by masking the pain of unsatisfied needs that we are able to satisfy wisely. In short, they encourage us to construct fools’ paradises.”

was deleted.

Chapter 3, *Practical Wisdom*, third paragraph

Inserted the paragraph:

“We need practical wisdom because pleasure and joy are not perfect indicators of what is truly good for us. Pleasure and joy can mask the pain of unsatisfied foolish activities and the pain of unsatisfied needs that we are able to satisfy wisely. They often lead us to construct fools’ paradises.”

Chapter 3, *Trust*, second paragraph

Changed “forms of knowledge” to “strategic assets” in the first sentence.

Changed “It” to “Deceit” in the last sentence.

Moved paragraph to the end of the subsection.

Chapter 3, *Trust*, new second paragraph, first two sentences

“In information age economies, trust is a strategic asset. Knowledge is especially difficult to protect from theft.”

were changed to:

“Trust is especially important in information age economies. This is because knowledge assets are more difficult to protect from theft than non-knowledge assets.”

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

Chapter 3, *Trust*, new second paragraph

Changed “knowledge” to “**the substitution of knowledge for non-knowledge resources**” in the last sentence.

Chapter 4, Conclusion, first paragraph

Changed “**the ultimate end of reverence for life**” to “**our ultimate ends**” in the second sentence.

Chapter 5, Introduction,

Changed “**adaptive relationships**” to “**free trade**” in the last sentence.

Chapter 5, Adaptive Relationships, title

Changed “**Adaptive Relationships**” to “**Free Trade.**”

Chapter 5, Free Trade, third paragraph, last sentence

“Part of the solution to this difficult problem must be to lower barriers to **adaptive relationships**, those things that make forming, changing, or dissolving relationships difficult or expensive.”

was changed to:

“Part of the solution to this difficult problem must be to lower barriers **to trade**. **Barriers to trade are** those things that make forming, changing, or dissolving **trading** relationships difficult or expensive.”

Chapter 5, Free Trade, fourth paragraph, first two sentences

“A good example of **such** a barrier **in the United States** is the tax-free status of employee insurance benefits. This supposed **gain for employees is effectively a loss in that it** takes away **their** right to buy insurance from whomever they please.”

was changed to:

“A good example of a barrier **to trade** is the tax-free status of employee insurance benefits **in the United States**. This supposed **benefit** effectively takes away **employees’** right to buy insurance from whomever they please.”

Chapter 5, Free Trade, fifth paragraph

The first two sentences:

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“We are used to thinking about the moral hazards of having insurance — people choosing to act foolishly because they are protected by insurance. We also ought to consider the potential moral encouragements of buying insurance.”

and the last sentence:

“Those organizations with a mandate to do good works would pass spiritual benefits on to their insurance clients.”

were deleted.

This paragraph was merged with the fourth paragraph.

Chapter 5, Free Trade, last paragraph

“Nothing is more useful to a human than another human guided by lucidity. Adaptive relationships allow lucidity to flourish.”

was changed to:

“Free trade promotes competition. Given a moral vision, competition promotes cooperation and lucidity. Nothing is more useful to a human than another human guided by lucidity.”

and appended to the third paragraph.

Changes in Version 2005.04.25

Chapter 2, Refining Everyday Thinking, six paragraph, third sentence

“Under these conditions we would want intelligent beings to pursue Albert Schweitzer’s normative end of reverence for life:”

was changed to:

“Under these conditions we would want intelligent beings to satisfy their needs ever more efficiently as this lessens killing and suffering. We would also want intelligent beings to devote themselves to helping other life survive and thrive with preference given to other intelligent life. In Albert Schweitzer’s words:”

Chapter 2, Refining Everyday Thinking, seventh paragraph

“From this perspective, whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to a

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

concept of justice that **often** falls short of the normative end of reverence for life. Similarly, whenever we are tempted to use ‘social science’ we ought to substitute ‘tribal science’ in order to remind ourselves and others that we refer to a science that **often** falls short of the normative end of reverence for life.”

was changed to:

“From this **strategic** perspective, whenever we are tempted to use ‘social justice’ we ought to substitute ‘tribal justice’ in order to remind ourselves and others that we refer to a **tactical** concept of justice that **always** falls short of the normative end of reverence for life. Similarly, whenever we are tempted to use ‘social science’ we ought to substitute ‘tribal science’ in order to remind ourselves and others that we refer to a **tactical concept of** science that **always** falls short of the normative end of reverence for life.”

Chapter 2, Refining Everyday Thinking, last paragraph

Changed “rather than” to “rather than **on**” in the last sentence.

Chapter 5, Just Taxation, fifth paragraph, last two sentences

“**This does not mean that we ought** to demand that governments force us to act wisely. **It does mean that we ought** to demand that governments encourage us to act ever more wisely.”

were changed to:

“**We lack the wisdom** to demand that governments force us to act wisely. **The most we can hope for is the wisdom** to demand that governments encourage us to act ever more wisely.”

Appendix B, *Secular Humanism*

“Secular humanists **tend to ignore** our need for mystical oneness. **The danger of ignoring this potentially overwhelming need is** the flourishing of **such** deeply flawed means of satisfying it **as** Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism. **Rather than distinguishing between secular and religious humanism, we ought to distinguish between materialist and dualist religious humanism.**

“Secular humanists ought to heed Einstein’s warning, “Science without religion is lame.”

was changed to:

“Secular humanists **often use science to dismiss** our spiritual need for mystical oneness. **In doing so, they confuse the metaphysical assumptions of scientific theories**

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

with reality. Denying our need for mystical oneness encourages the flourishing of deeply flawed means of satisfying it. These include Marxist-Leninism, Nazism, Fascism, Maoism, and Baathism. Secular humanists ought to heed Einstein's warning, "Science without religion is lame.

¹⁰ Rather than distinguishing between secular and religious humanism, we ought to distinguish between materialist and dualist humanism."

Appendix B, *Religious Fundamentalism*, second paragraph

Changed "lower our" to "rid us of" in the third sentence.

Changed "judge" to "judge (verify)" in the third sentence.

Appendix B, *Religious Fundamentalism*, third paragraph

"Moral philosopher John Rawls provides a means of judging theories about how we ought to live. Rawls asks us to imagine what theories we would choose if we were ignorant of the circumstances of our birth.¹¹ For this imagined original position of ignorance to produce a complete theory of justice, we must consider what rules we would want to guide intelligent life if we were completely ignorant of the circumstances of our birth, which includes ignorance of what species we will be and into what era we will be born. Under these conditions we would want intelligent beings to satisfy their needs ever more efficiently as this lessens killing and suffering. We would also want intelligent beings to devote themselves to helping other life survive and thrive with preference given to other intelligent life.

¹¹ Rawls, John, *A Theory of Justice*, (Cambridge, MA: The Belknap Press of Harvard University, 1971)."

was deleted.

Changes in Version 2005.05.02

Preface, third paragraph, last sentence

"Toyota's strategy for learning wisely beat all theories for allocating efficiently."

was changed to:

"Strategies for learning wisely can beat theories for allocating efficiently: Toyota's batch production strategy beat all batch production theories."

Preface for Scientists, second paragraph, first two sentences

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“Consider a complex adaptive system consisting of potentially cooperative intelligent agents who are uncertain of **their needs and the best means of satisfying their needs**. The traditional scientific approach to studying this system is for scientists to develop and verify theories about agents’ **needs** and agents’ means of satisfying their **needs**.”

were changed to:

“Consider a complex adaptive system consisting of potentially cooperative intelligent agents who are uncertain of **what to do**. The traditional scientific approach to studying this system is for scientists to develop and verify theories about agents’ **wants** and agents’ means of satisfying their **wants**.”

Preface for Scientists, third paragraph

Changed “mainstream (Anglo-American Neoclassical) economics” to “**economic science**” in the first sentence.

Changed “**mainstream** economics” to “economic **science**’s” in the second sentence.

Changed “**mainstream** economics” to “economic **science**’s” in the third sentence.

Changed “**mainstream** economics’ **scientific**” to “economics” in the fourth sentence.

Chapter 2, Expanded Economic Science, third paragraph

Added “**thermometers**” to the third sentence.

Chapter 4, Introduction, second sentence

“Assuming that we share the ultimate normative end of reverence for life, progress is movement toward a good life for all.”

was deleted.

Chapter 4, A Crude Look at the Whole, first paragraph, sixth sentence

Inserted the sentence:

“In CAS terms, progress occurs at the boundary of order and chaos.”

Afterword, fifth paragraph

Changed “**progress toward** a good life **for all**” to “a good life” in the first sentence.

Afterword, last paragraph, third sentence

Wealth in the Information Age

Changes from October 7, 1998 through May 2, 2005

“When talking to those on the left, I claim to be a “classical liberal progressive” in that I favor classical liberal means and ever more “**progressive**” subordinate ends.”

was changed to:

“When talking to those on the left, I claim to be a “classical liberal progressive” in that I favor classical liberal means and ever more **inclusive** subordinate ends **for individuals.**”

Appendix B, *Religious Fundamentalism*, second paragraph

Changed “**judge (verify)**” to “verify” in the third sentence.
