

COMPLEXITY SCIENCE  
*and* WORLD AFFAIRS



WALTER C. CLEMENS JR.

*Foreword by Stuart A. Kauffman*

## Praise for *Complexity Science and World Affairs*

“Complexity can be overwhelming and complexity science can be daunting, and, yet, in Walter Clemens’s skilled hands both become accessible, understandable, and useful tools for both scholars and practitioners. Once again, Clemens has shown that sophisticated academic theorizing only benefits from clarity, elegance, and wit. The book is ideal for graduate and undergraduate students as a supplementary text in international relations or comparative politics.”

— Alexander Motyl, Rutgers University–Newark

“Clemens offers a fresh, even startling, paradigm and process for analyzing the seemingly unpredictable relations within and among human societies. With impressive clarity he proposes that ‘the capacity to cope with complexity’ has become a key determinant of success in our intricately interrelated world. Careful study of this capacity in specific contexts can lead to revealing analyses in comparative politics and international relations. A provocative and stimulating treatise!”

— S. Frederick Starr, Johns Hopkins University

“Walt Clemens’s provocative new book can be appreciated at several levels: as an analytical framework in international relations—complexity science—that offers a compelling alternative to realism and neoliberalism; as an incisive critique of the ‘fitness’ of the supposedly most developed societies to deal with our complex world; and as a humanistic value-set that provides better standards for assessing governments than do GDP, trade levels, or military spending. Clemens skillfully integrates theory and practice to explore US ‘hyperpower,’ the two Koreas, China, and other states from new angles, and with consistent objectivity. IR specialists should find this book exciting, while IR and international studies students will be challenged by the new paradigm it presents.”

— Mel Gurtov, Portland State University

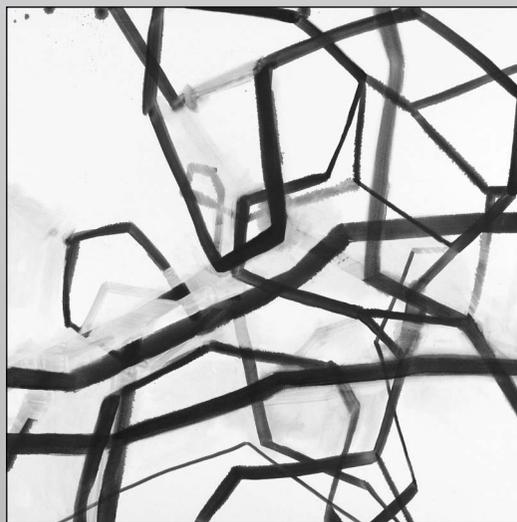
“Clemens proposes a powerful new way of looking at international relations and politics, and offers a productive method for assessing the fitness of societies in the early twenty-first century.”

— Guntis Šmidchens, University of Washington, Seattle

“You don’t have to be a political scientist to wonder why some states succeed and others do not, why some societies flourish while others suffer stagnation and conflict. Employing the relatively new tool of complexity science, Walter Clemens evaluates the ‘fitness’ of states and societies, i.e. their ability to cope with complex challenges and opportunities. He does so in a way that is erudite—how many studies quote Walt Whitman and Karl Marx in the same chapter?—yet clear and accessible. Clemens challenges both existing political science paradigms and policy perspectives. This is a stimulating, rich volume that can be read and re-read with profit and appreciation for its breadth and depth and most of all for its insistence that we see the world, and the states in it, in all their complexity.”

— Ronald H. Linden, University of Pittsburgh

COMPLEXITY SCIENCE  
*and* WORLD AFFAIRS



SUNY SERIES, JAMES N. ROSENAU SERIES IN GLOBAL POLITICS

---

David C. Earnest, editor

COMPLEXITY SCIENCE  
*and* WORLD AFFAIRS



WALTER C. CLEMENS JR.

FOREWORD BY STUART A. KAUFFMAN

**SUNY**  
PRESS

Cover art, *BlueMol 10–13*, by Daniel Kohn.

Cover and interior art by Daniel Kohn is from the series *DataSets*, and is used by permission.

Published by  
State University of New York Press, Albany

© 2013 Walter C. Clemens Jr.

All rights reserved

Printed in the United States of America

No part of this book may be used or reproduced in any manner whatsoever without written permission. No part of this book may be stored in a retrieval system or transmitted in any form or by any means including electronic, electrostatic, magnetic tape, mechanical, photocopying, recording, or otherwise without the prior permission in writing of the publisher.

For information, contact  
State University of New York Press, Albany, NY  
[www.sunypress.edu](http://www.sunypress.edu)

Production and book design, Laurie Searl  
Marketing, Anne M. Valentine

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

Clemens, Walter C.  
Complexity science and world affairs / Walter C. Clemens, Jr.  
pages cm

Includes bibliographical references.

ISBN 978-1-4384-4901-2 (hardcover : alk. paper)

1. World politics—21st century. 2. Evaluation—Methodology. 3. Complexity (Philosophy) I. Title.

D863.C54 2013  
909.83'1—dc23

2013002395

10 9 8 7 6 5 4 3 2 1

FOR

Anna, Ali, Lee Lo, Ho Tai,

Lani, Rose, Olivia, Julian, Jeff, Todd, Ben, Julia

Liz and Stu



# CONTENTS

List of Figures and Tables ix

Foreword xi

*Stuart A. Kauffman*

To the Reader xvii

Acknowledgments xxi

- 1 Why a Science of Complexity? 1
- 2 Basic Concepts of Complexity Science 23
- 3 A Crucial Test Case: Why the Baltic Is Not the Balkans 39
- 4 Culture and the Capacity to Cope with Complexity 55
- 5 Complexity Science as a Tool to Understand the New Eurasia 71
- 6 How Complexity Concepts Explain Past and Present Fitness 107

7	Hyperpower Challenged: Prospects for Americans	121
8	What Future for the American Dream?	147
9	Why Is South Korea Not North Korea?	165
10	Toward a New Paradigm for Global Studies	179
11	Challenges to Complexity Science	201
	Afterword: Science and Art in this Book: Exploring the Genome Together	211
	<i>Daniel Kohn</i>	
	Notes	213
	References	227
	Index	245

## FIGURES *and* TABLES

### FIGURES

Figure 1.1	Exploitation, Mutual Gain, and Fitness: Likely Linkages	4
Figure 2.1	Soft and Hard Power Resources: USA, Russia, and China in 2012	32
Figure 2.2	HDI and Honesty Scores for Leading Countries by Cultural and Political Heritage in 2010	37
Figure 5.1	HDI Scores for All Communist and Post-Communist States, 1970-2010	73
Figure 5.2	HDI, BTI, and CPI Scores for Communist and Post-Communist States in 2010	92
Figure 6.1	Bible in the Vernacular vs. HDI, BTI, and CPI Scores for Historically Christian, Post-Communist States	117
Figure 7.1	HDI Trends: Scores for Leading States, 1980-2010	130
Figure 9.1	South Korea compared with North Korea, BTI 2012	167
Figure 9.2	“In the beginning was the Word . . .”—in <i>Hangŭl</i>	175

### TABLES

Table 2.1	Alternative Scenarios Posited by Complexity Science	34
Table 3.1	Comparative Democracy, Independent Media, and Human Development 2009	43
Table 3.2	Progress in Closing the First 30 Chapters of the <i>Acquis Communautaire</i>	45

Table 3.3	Peace and War in Lithuania and Croatia	47
Table 3.4	Economic and Social Development in Estonia Compared with Bosnia	48
Table 5.1	Freedom House Democracy Ratings for “Nations in Transit” in 2012	84
Table 5.2	Transformation Rankings (BTI) of Communist and Post-Communist Countries, 2003-2012, by Cultural Heritage	89
Table 5.3	HDI, Transformation, Democracy, Honesty, and Economic Freedom, 2011-2012	93
Table 5.4	Purchasing Power Per Inhabitant, Post-Communist States Members and Candidate Members of the EU	97
Table 5.5	Suicide Rates per 100,000 Before and After Communist Collapse	101
Table 6.1	Percentage of Individuals in Communist or Post-Communist Countries Using the Internet in 2011 (global n = 92)	115
Table 7.1	Parameters of Power, 1776-2000	122
Table 7.2	Parameters of Power, 2008 and 2012	131
Table 10.1	Percentage of Individuals in Islamic Heritage Countries Using the Internet in 2011	197

## FOREWORD



Walt Clemens is a much admired friend whom I have known since a summer when we both served as counselors in a camp for diabetic children in the Sequoia National Park. I was fifteen, midway through high school, and he twenty-two, a fledgling grad student. Working with these diabetic children planted the seeds for my own future in medical and biological sciences. Before the camp breakfast Walt studied Russian grammar, and later, after these brave kids got their insulin shots, he taught them American Indian lore and dancing. When the camp season ended, Walt and I climbed Mount Whitney and fished in the Klamath River. Years later, he climbed the Matterhorn in the Alps and Mount Pacharmo in Nepal. I wish I had been with him. He tells me that he has studied world affairs because, like mountains, they stand before us—challenging, interesting to explore, sometimes beautiful, potentially useful, and often dangerous. Why grapple with the peaks and valleys of our often messy planet? To understand where humanity has come from and where it can go. To live, prosper, and procreate in realms where, as naturalist John Muir noted, “[w]hen you touch anything, you find it is hitched to everything else in the universe.”

The summits of knowledge about human behavior are still distant and enshrouded with mist. The ascent routes are steep and poorly mapped. We would-be climbers and our instruments are clumsy. Our knowledge and tools for learning have improved but remain feeble next to tasks of understanding and perhaps nudging the world to some better place.

Clemens has written an outstanding book—the culmination of a half-century’s experience in and analysis of world affairs. Having wrestled with the nostrums of power politics and legal-moralism, he has opted to search for a more comprehensive approach to analyzing world affairs. To this end, he has turned to complexity science in the hope of articulating a new paradigm for the study of comparative government and cross-border relations. Having reached the summit of Mount Whitney and other mountains, he seeks to scale the Everests of global studies with the eyes of a scholar and adventurer utilizing new ideas and tools.

Clemens has performed masterfully in applying the basic concepts of complexity science to confronting and climbing the precarious and often clouded Himalayas of world affairs. But this approach to knowledge still faces severe limits. Complexity science has taken shape for no more than three decades. Still inchoate, it has not yielded any accepted theory. As Clemens writes in his final chapter, complexity science is more like the first efforts at flight by the Wright brothers than by Icarus. The science is primitive but has the potential to become a powerful tool for reaching new heights. Using the existing tools, Clemens provides a strong start. He uses complexity science to generate new insights into the problems and opportunities facing post-communist societies, the much vaunted American dream, and transnational issues ranging from environmental cooperation to metastasizing networks of terror. He has produced a lively book, interesting and deep, bound to interest not only political and other social scientists but all thoughtful persons concerned with understanding and perhaps improving the human condition. He has sketched and outlined a paradigm for social science with fewer limitations than alternative approaches such as structural realism, rational choice, constructivism, or current utopianisms.

Still, complexity science and some forms of social science are constrained by the mechanistic worldview inherited from Sir Isaac Newton and the Enlightenment. In this foreword, I would like to suggest a post-Newtonian and post-Darwinian framework that could enhance the paradigm and insights offered by Clemens. I do so as one not trained in cross-border or comparative politics but as a biologist looking for patterns in all forms of life.

Biology cannot be reduced to chemistry and physics. When students of human relationships seek to mimic physics, they go astray. The realities and potentialities of world affairs cannot be pre-stated. The world is not an optimization or decision problem with a given cost and payoff landscape. Clemens is wise to avoid formal methods not suited to a highly uncertain and variable terrain. International relations refuse to abide within the mooring lines of universal gravitation and integral calculus.

*Political life cannot be reduced to the pre-stated payoff matrices of game theory. The values of each actor are hard if not impossible to discern and quantify. Even more*

*important, the adjacent possible space for strategic planning cannot be known or defined in advance. Little or nothing is entailed. Nothing flows ineluctably from anything.*

Newton bequeathed to us the view that everything in the universe is entailed by underlying laws of motion and integration. If so, nothing is new or unexpected. There can be no Black Swans. Carrying this view to its logical extreme, Pierre-Simon Laplace in the early nineteenth century imagined a giant computer in the sky. He suggested that if this machine, sometimes called the “Laplacian demon,” knew the positions and momenta of all the particles in the universe, it could deduce the entire becoming of the universe. Why? Because everything is entailed. Here began what physics Nobelist Stephen Weinberg called “The Dream of a Final Theory”—a theory so profound it could be written in a compact equation on his T-shirt. Isaac Asimov’s *Foundation Trilogy* has Hari Seldon embracing a similar dream for psychosocial history. If this dream corresponded to reality, world affairs could be reduced to a set of decision problems, no more complex than sending a spaceship to Saturn on the basis of Newton’s laws.

For better or worse, reality confounds this dream. Many innovations create new adjacent possibles from which can emerge still more possible strategy spaces. A screwdriver, for example, can tighten or release a screw, open a can of paint, wedge open a door, or stab an assailant. It can also spear a fish and so could be rented to fishermen for a share of the catch. It could launch a fish harvesting and sales business. Lacking a screwdriver or other similar, implement, however, a camper might be unable to pry open her last can of tuna.

The number of uses for a screwdriver is not infinite but *indefinite*. More, while the integers are naturally ordered, there is no natural ordering among the uses of a screwdriver. The uses listed here are merely different uses that follow nothing more than a nominal scale. But if the uses of a screwdriver are indefinite in number and un-orderable, we can never be sure that we have listed them all. No effective procedure or algorithm can list all the uses of a screwdriver or—equally important—reveal new uses, as yet unimagined.

The impact of technology on economics and society is equally unforeseeable. No one in the 1930s or 1940s could have envisioned how sophisticated computing machines would shape society. No one foresaw or intended the becoming of the mainframe computer and its evolution into a personal computer used for word processing, file sharing, and accessing the World Wide Web. These unfolding developments generated new sets of adjacent possibles whose impacts have included Google, Facebook, and the Arab Spring. The enabling possibilities that lie ahead outstrip our imagination as well as our knowledge.

Let us shift to life sciences. What if some bacterium takes shape in a new environment? What if some molecular screwdriver finds a use that enhances the

fitness of the bacterium? A heritable variation and natural selection may then pull out a new use by selecting at the level of the bacterium. The function of the molecular screwdriver cannot be pre-stated. Once in operation, it changes the very space of possibilities for the future evolution of the biosphere. The new use of the screwdriver, now a reality, creates a new adjacent possible set of opportunities for evolution. This process iterates indefinitely.

If in evolution a niche is thought of as a boundary condition, we cannot pre-state that niche in a noncircular manner. The evolving bacterium, in order to reproduce in its world, achieves a closure in some set of “tasks” or uses of things and processes that pass, in part, through the environment. But there is no noncircular statement of what that task closure is, until selection reveals—*after the fact*—what has worked for the organism in its environment. In short, we cannot pre-state the boundary conditions afforded by the niche.

Because we cannot pre-state the ever-changing phase space of biosphere evolution, we cannot write laws of motion for the evolving biosphere and cannot pre-state the boundary conditions afforded by the “actual” niche, then we have no equations of motion to integrate. Lacking foreknowledge of the boundary conditions, we cannot integrate the laws of motion we do not have.

*My conclusion is that the Newtonian paradigm that has reigned for some three hundred and fifty years does not apply to evolution of the biosphere and human relations. No pre-statable laws entail the becoming of the biosphere. Still less do they exist and operate in economic, legal, social, or cultural systems. Enablement—not entailing causal laws—explains the evolution of world affairs.*

Social scientists have no reason to suffer physics envy. No one can anticipate the adjacent possibles into which human systems may “become.” Moreover, we can form no probability statements on such matters without knowing the sample space. Neither a frequency nor a Baysean sense of probability can apply.

As in biological niches, man-made laws provide enabling constraints that create an adjacent, partially un-pre-statable possible space of actions. If authorities seek to protect the Amazonian forest by conservation laws and satellite monitoring of the canopy, lumber harvesters may get around the law and monitors by cutting trees shorter than the canopy. Man-made rules create an adjacent possible but partially un-pre-statable strategy space of possible actions. Then we cannot know what we enable by our laws, regulations, and policies. Then, what is wise governance? What is wise foreign policy?

Life is a constant becoming of new opportunities—here called *enabling constraint adjacent possibilities*—that enable, but do not cause, innovations in our personal, artistic, scientific, economic, cultural, and political lives. Such typically un-pre-statable innovations, in turn, generate yet new adjacent possible enabling constraint opportunities that people may or may not exploit.

Rational planning has its limits. We must live forward not knowing what will or can happen. The issues that drive world affairs are not pre-statable, optimization problems. We cannot anticipate the novel variables that will become relevant. Clemens agrees with Jean-Paul Sartre on the sources of existential anxiety. Given that we want to live fully, but in a cosmos of

unknowns, each must do what he or she regards as meaningful. Beginning in graduate school at Columbia University (interspersed with research at Moscow State University and the Hoover Institution), Clemens chose to study U.S.-Soviet arms control issues in the hope of preserving and then improving the human condition. Later, lecturing under State Department auspices, he was explaining for an audience in Indonesia why only two countries could be regarded as “superpowers.” As he rattled off statistics about Soviet and U.S. military and economic power, an earthquake shook the room. Chastened, Walter acknowledged the existence of still greater forces.

Clemens in recent years has looked beyond arms control to search for patterns that govern life in many domains of world affairs. Focusing on issues of societal fitness, he showed in *The Baltic Transformed* (2001) how peoples in Estonia, Latvia, and Lithuania escaped the Scylla of top-down communist rigidity and the Charybdis of anarchy to optimize their political and economic liberation. In the present book he expands his horizon to understand why the Balkans did not follow the Baltic example; why some post-communist societies such as Slovenia and the Czech Republic became more fit in the 1990s and early 2000s while most others stagnated; why the United States dominated the twentieth century but staggered like a blinded giant early in the twenty-first; why South Korea is so unlike the North; and how complexity science illuminates the adjacent possibles generated by technological change in fourteen cases of transnational relations. While eschewing any simple formulas, Clemens combines quantitative measures by the United Nations Human Development Programme, Freedom House, the Bertelsmann Foundation, and Transparency International with his own qualitative research to arrive at balanced evaluations of societal fitness across Eurasia, the United States, and worldwide. Both his quantitative and qualitative assessments point to what Clemens sees as the mother lode of fitness: culture. He notes the interactions between folk mythology and behavior in the Baltic and Balkan lands. For Americans and all peoples, Clemens notes the contributions to “consilience” (E. O. Wilson’s term) that radiate from the writings of Herman Melville and Ralph Waldo Emerson.

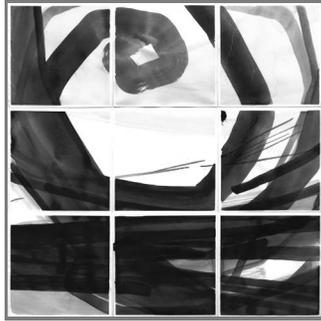
This book does not offer the last word on complexity science and world affairs. Like the first flights by the Wright brothers, however, Clemens shows brilliantly how theory can illuminate and benefit praxis. His book provides a model—perhaps a paradigm—that researchers in many fields can follow as they depart from simplistic reductionisms, aware and wary of the adjacent possibles that may emerge as humans co-evolve with each other and their ever-changing environment.

STUART A. KAUFFMAN

*Stuart A. Kauffman is Professor Emeritus, University of Pennsylvania; Distinguished Visiting Professor, University of Vermont; Affiliate Professor, The Institute for Systems Biology; and former MacArthur Fellow.*



## TO THE READER



This book is about societal fitness—defined by complexity scientists as the ability to cope with complex challenges. The capacity to cope with complexity, this book argues, hinges heavily on culture—the values and way of life of each society. These values, in turn, arise from the heritage of a broad civilization such as Western Christianity or Islam. To be sure, many other factors shape fitness—including the role of individuals both inside and outside of government. But some cultures give rise to outstanding individuals while others suppress them. Some cultures help people to take advantage of their resources, while others waste and abort them.

Can fitness be measured? The best single measure is probably the United Nations Human Development Index (HDI). The index seeks to evaluate how well each society enhances the range of choice for its members. To do so, it measures health, education, and income in each UN member state.

Since the HDI omits other variables relevant to fitness, this book supplements the UN index by rankings of democratization, honesty, and knowledge-based economics by Freedom House, the Bertelsmann Foundation, Transparency International, and the Harvard-MIT Index of Economic Complexity. All these rankings try to show the absolute and the relative fitness of each actor, for example, changes in life expectancy within each country and how they compare with movements up or down in other states.

A drive to excel—as individuals and as communities—is essential to fitness in the twenty-first century, but so is the ability to create shared values by cooperation. This quality is very different from the brute strength endorsed by