

THE SCIENCE
OF EVOLUTION
AND
THE MYTH
OF CREATIONISM

KNOWING WHAT'S REAL
AND WHY IT MATTERS

ARDEA SKYBREAK



Insight Press
Chicago

Contents

INTRODUCTION	1
CHAPTER 1	
AN OVERVIEW	7
So What Is Evolution Anyway?	10
What All Evolving Systems Have in Common	11
Millions and Billions of Years	13
What the Fossils Tell Us	18
So What Did Darwin Figure Out?	23
What Darwin Learned about Selection from Farmers	25
Has Darwin's Theory of Natural Selection Really Been Tested and Proven to Be True?	28
<i>SUPPLEMENTAL INSERTS FOR CHAPTER 1:</i>	
The Earliest Emergence of Life	8
Not Everyone Wants You to Learn about Evolution.	11
Creation Myths	14
Dating Techniques	17
Change Was in the Air	22
Genetic Drift and Founder Effects	30
The Continued Existence of Life on this Planet Is Not a Given	32
CHAPTER 2	
THE EVIDENCE OF EVOLUTION IN ACTION IS ALL AROUND US	39
Evolution in Action Today	40
Rapid Evolutionary Change Observed in a Population of Moths	40
Where Would We Be Without Fruit Flies?	42
One Species Splitting into Two on Opposite Sides of the Grand Canyon	46
A Few Words on Creationists	52
<i>SUPPLEMENTAL INSERTS FOR CHAPTER 2:</i>	
The Moth Flap	44
Evolution in Action — The Distribution of Sickle Cell Genes in Human Populations	48
An Interesting Example of Evolution in Action in the Treatment of HIV Infections	51
CHAPTER 3	
REVIEWING A FEW KEY POINTS ABOUT ADAPTATION	57
CHAPTER 4	
HOW EVOLUTION PRODUCES WHOLE NEW SPECIES	65
How Do We Know Something Really Happened If We Weren't There to See It?	68

Speciation and the Diversification of Life Are Rooted in the Same Basic Phenomena, Including Natural Selection	70
Living Things Can't Help But Evolve	71
How Do Entirely New Species Come into Being?	74
<i>SUPPLEMENTAL INSERTS FOR CHAPTER 4:</i>	
Were We Bound to Evolve?—The Role of Random and Non-Random Factors in Evolution.	68
Evolution of Pesticide Resistance in a Population of Insects	72
CHAPTER 5	
MORE ON REPRODUCTIVE ISOLATION, SPECIATION AND THE EMERGENCE OF EVOLUTIONARY NOVELTIES	83
Mechanisms of Reproductive Isolation.	83
Especially <i>Small</i> Reproductively Isolated Populations Can Exhibit More Evolutionary “Novelties” and Rapid Evolutionary Change.	84
Some Reasons Speciation Might <i>Not</i> Occur	85
What Evolutionary Biologists Argue About and What This Does and Doesn't Mean.	86
A Few Words about the So-called “Gaps” in the Fossil Record	87
Not All Evolutionary Lines Evolve at the Same Rate.	89
There Are No Guarantees in Evolution	90
The Effects of Mass Extinctions.	91
Speciation Before Our Eyes?	94
CHAPTER 6	
EVOLUTION IS A PROVEN FACT – THE EVIDENCE IS CONCRETE AND COMES FROM MANY DIFFERENT DIRECTIONS	99
The Past Leaves its Marks on the Present	99
Direct Evidence of Evolution from Both the Fossil Record and the Molecular Record	100
Indirect Evidence of Evolution	
• Embryo development	103
• Vestigial (“remnant” or “left over”) features	104
• Homologous features	105
• Convergence	106
• “Sub-optimal design”: nature’s quirks and imperfections.	108
• Geographic distribution of species around the world	110
• The fact that the features of living organisms fit into a system of “nested” hierarchical classification	111
<i>SUPPLEMENTAL INSERT FOR CHAPTER 6:</i>	
A Conscious “Intelligent Designer” Wouldn't Design Life The Way It Is.	112
CHAPTER 7	
THE EVOLUTION OF HUMAN BEINGS.	117
WHERE DID WE COME FROM?	117
Human Beings Evolved Out of Pre-existing Non-human Species.	120
Some Basic Facts of Human Evolution.	125
And Then There Are the Fossils – Lots and Lots of Fossils!.	127

A Brief Summary	131
WHAT IT ACTUALLY MEANS TO “BECOME HUMAN”	132
We Are the New Kid on the Block.....	132
The Emergence, and Consolidation, of New Species	134
Key Junctures in the Evolution of Human Beings	135
THE CLEAR, AND GROWING, EVIDENCE OF EVOLUTION	
FROM APES TO HUMAN BEINGS	139
Why Is Our Hominid Species the Only One Still Standing?	145
What Makes Us So Special, If Only to Ourselves?	146
THE TWO BIGGEST LEAPS IN HOMINID EVOLUTION	148
A Series of Transitions from More Ape-like to More Human Features	150
Were the Earliest Hominids “Just Apes”? The Significance of the	
Evolution of Bipedalism on the Road to Becoming Human	152
So, Are We Just an Accident?	155
SUMMARY AND OVERVIEW.....	156
A Possible Environmental Connection	160
One Species – All Over the World –	
A Species Radically Transforming the World	164
<i>SUPPLEMENTAL INSERTS FOR CHAPTER 7:</i>	
Humans and Dinosaurs?! Another Creationist Absurdity.....	124
Chimp and Human DNA: How Close Are We?.....	127
Was Toumai One of Our Ancestors?	129
Meave Leakey’s Take on Her Latest Fossil Find.....	141
Was <i>Homo erectus</i> the First Human Species to Leave Africa?.....	143
We All Came from Africa	164
What Does the Science of Evolution Tell Us about	
Human “Races”?.....	166
“Social Darwinism” Is Not Based on Science	
and Has Nothing to Do with Darwinism	171
Are Humans Still Evolving?.....	172
CHAPTER 8	
ANTI-EVOLUTION CREATIONISM:	
AN ASSAULT ON ALL OF SCIENCE, IN THE NAME OF GOD.....	179
WITHOUT THE SCIENCE OF EVOLUTION THERE WOULD BE	
NO SCIENCE—IT’S JUST THAT FUNDAMENTAL	181
Evolution Science and the SARS Virus	182
Evolution Science, Organ Transplants and the “Spare Parts” of the Future..	184
What Everyone Should Know about the Creationists	185
SNAKE OIL SALESMEN AND CHARLATANS AT COURT.....	189
They Want You!.....	194
“BUT HOW CAN WE EVER BE SURE ANYTHING IS TRUE?”:	
SUCH PHILOSOPHICAL RELATIVISM OFFERS CREATIONISTS	
EASY PICKINGS	212
The “Theory of Evolution” – What a Scientific Theory Is	214
RECOGNIZE, DEMAND AND FIGHT FOR SCIENTIFIC TRUTH	219
A GUIDE TO THE CREATIONIST ZOO	222

The Young Earth Creationists (YECs)	223
The Old Earth Creationists (OECs)	226
The Progressive Creationists (PCs) and Evolutionary Creationists (ECs)	227
Theistic Evolutionists (TEs)	227
The Intelligent Design Creationists (IDCs)	229
REFUTING THE OLD-SCHOOL “SCIENTIFIC CREATIONISTS”	230
The Second Law of Thermodynamics	234
Another Typical Example of Creationist Methods:	
God in the Gaps?	235
Another Example of Step-Wise Evolution: The Evolution of Elephants	238
Mutants Are Not Monsters	238
The Age of the Earth (and of the Universe) –	
A Big Problem for the Creationists	240
“Maybe God Just Made It <i>Look</i> Old, and Maybe God Also Just	
Made It <i>Look</i> Like Life Has Evolved”	244
Would an All-Knowing God Make Sloppy Designs?	244
CREATIONISM’S NEW WRAPPER WON’T FOOL US:	
INTELLIGENT DESIGN THEORY IS STILL JUST RELIGION –	
IT’S STILL NOT SCIENCE – AND IT’S STILL WRONG!	245
Dembski’s “Design Filter” Idea	251
Behe and the Idea of “Irreducible Complexity” as “Evidence” of	
“Intelligent Design”	252
The Entirely Natural Evolution of Complex Multi-Part	
Biochemical Processes	269
A QUESTION OF METHODS, A QUESTION OF STRUGGLE	274
How can we get at the actual truth of things?	276
More on what is wrong, methodologically, with Intelligent Design	
Creationism and the idea of “irreducible complexity” as evidence	
of divine design	281
CREATIONISM AND THE MORALITY POLICE	287
AUTHOR’S POSTSCRIPT	292
<i>SUPPLEMENTAL INSERTS FOR CHAPTER 8:</i>	
In the Very Beginning and Looking to the Future	190
The Cambrian Explosion, Punctuated Equilibrium	
and the “God of the Gaps” Argument	195
Misrepresenting Working Scientists—A Favorite Creationist Tactic	200
Rare Variants of the Almost Entirely Universal Genetic Code Are	
Evidence of Evolution, Not Design	203
Look Who’s In Bed With Whom!	209
“Project Steve”: Evolutionists Use Humor to Make a Serious Point	213
Reality and Distortions of Reality—Objective Truth and	
Subjective Influences	216
Some Things You Can Do to Learn More about	
Creationist Lies and Distortions	222
Evolution is <i>Not</i> “Just a Chance Process”	253
Do Lottery Winners Win By Design?	258

Appendix A	
GLOSSARY	301
Appendix B	
SELECTED BIBLIOGRAPHY	316
Appendix C	
GEOLOGICAL TIMELINE	319
Appendix D	
DEFEND SCIENCE STATEMENT	320
INDEX	325
ABOUT THE AUTHOR	337