**Studies in the
Bábí and Bahá’í Religions**

Volume Twelve

**Evolution and Bahá’í Belief**

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Anthony A. Lee, General Editor

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*From Iran East and West*, Volume Two, edited by Juan R. Cole and Moojan Momen (1984).

*In Iran*, Volume Three, edited by Peter Smith (1986).

*Music, Devotions and Mashriqu’l-Adhkár*, Volume Four, by R. Jackson Armstrong-Ingram (1987).

*Studies in Honor of the Late H. M Balyuzi*, Volume Five, edited by Moojan Momen (1989).

*Community Histories*, Volume Six, edited by Richard Hollinger (1992).

*Symbol and Secret: Qur’an Commentary in Bahá’u’lláh’s Kitáb-i Íqán*, Volume Seven, by Christopher Buck (1995).

*Revisioning the Sacred: New Perspectives on a Bahá’í Theology*, Volume Eight, edited by Jack McLean (1997).

*Modernity and the Millennium: The Genesis of the Baha’i Faith in the Nineteenth-Century Middle East*, distributed as Volume Nine, by Juan R. I. Cole, Columbia University Press (1999).

*Paradise and Paradigm: Key Symbols in Persian Christianity and the Bahá’í Faith*, distributed as Volume Ten, by Christopher Buck, State University of New York Press (1999).

*Religion in Iran: From Zoroaster to Baha’u’llah*, distributed as Volume Eleven, by Alessandro Bausani, Bibliotheca Persica Press (2000).

*Evolution and Bahá’í Belief ‘Abdu’l-Bahá’s Response to Nineteenth-Century Darwinism*, Volume Twelve, edited by Keven Brown (2001).

*Reason and Revelation*, Volume Thirteen, edited by Seena Fazel and John Danesh (2001).

*Bahá’ís in the West*, Volume Fourteen, edited by Peter Smith (2002).

[Photograph]

‘Abdu’l-Bahá

*“In the world of existence, man has traversed successive*

*degrees until he has attained the human kingdom.”*

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**Evolution and Bahá’í Belief:**

**‘Abdu’l-Bahá’s Response to**

**Nineteenth-Century Darwinism**

by

Keven Brown

and

Eberhard von Kitzing

Edited by Keven Brown



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The authors wish to dedicate this volume to

their beloved children

Minea and Anja Brown

and

Arianne, Nora, Mona, Fabian,

Cannel, and Constanze von Kitzing

May each carry forward an ever advancing civilization by cultivat-

ing the special gifts and talents with which they have been endowed

by their Creator and by sharing these with the world. May they also

live to witness a cherished desire of their fathers: science and reli­

gion both honored as the two wings of one bird, both working

together to obtain a more balanced understanding of reality.

Religion assures us that life’s purpose is not arbitrary, that it is

designed by a loving Creator in the best way possible. It instills hope

and optimism that our efforts will be crowned by success, that our

destiny is glorious. Faithful adherence to the scientific method, on

the other hand, enables us to separate fancy from fact, to discover

new technologies for the betterment of all, and to come ever closer

to understanding the workings of our universe.

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[Photograph]

Charles R. Darwin (1809–1882)

Immediately after his *Origin of Species* was published

(1859), thoughtful people began to ponder its implications

for the status of human beings and the biblical concept of

creation.

Foreword

It is now over 140 years since Darwin published his famous book

*The Origin of Species*, but the intense controversy surrounding his

theory of evolution has not died down, especially in America. The

classical worldview that predominated up until the middle of the

nineteenth century understood all species as having been created by

God in essentially their present forms all at one time. Modification

of populations was allowed in recognition of the fact that organisms

do adapt to changing environmental conditions, but any change

beyond the strict bounds of a species’ essential characteristics was

not considered possible. This is also the view accepted by many

contemporary Christian denominations, a view that a 1993 Gallup

poll found to be supported by 47% of Americans.1

This view, however, stands in stark contrast to the position put

forward by Darwin, and now accepted by the scientific community,

which holds that no act of supernatural creation is necessary to

explain the origin of the diverse biological populations that inhabit

our planet. Instead, the mechanical processes of random variation

and natural selection of the fittest are sufficient to account for all the

divergent organisms that exist on earth today. In contrast to the clas-

sical view, which believes that all kinds were specially created for a

preexisting purpose, many modern writers propose that no preexist-

ing plan or purpose is necessary for the origin of man or any other

species.2

Darwin’s theory had profound repercussions, not only for every

scientific discipline (including history and social science), but also

for religion. By denying special creation, Darwin’s theory threat-

ened to undermine one of the most cherished doctrines of religion.

If the diversity of species didn’t need a creator, the role of God was

diminished. If speciation is arbitrary and occurs through a blind, nat-

ural process, then the laws that govern human beings could also be

arbitrary and constructed on a merely pragmatic basis, not in accord

with an intelligible order created by God. Social Darwinism, which

viewed society and the economy as an arena in which the fittest

nation should rise to the top at the expense of other nations, was one

consequence of this view. Materialism, which denied the existence

of an incorporeal soul and a spiritual world, also gained fresh con-

verts on account of Darwin’s theory.

It is not surprising, therefore, that during the twentieth century

religion and science have continued to find themselves at odds with

each other, not only in people’s minds but in the courts. In 1925, a

young biology teacher named John Scopes was put on trial and fined

$100 for defying a Tennessee state law prohibiting the teaching of

“any theory which denies the story of the Divine creation of man as

taught in the Bible” in public schools. Although the Tennessee

appellate court overturned the verdict two years later, such laws

were not declared unconstitutional until 1968.

In the late 1970s, Arkansas and Louisiana passed laws requiring

that whenever evolution is taught in public schools “creation sci-

ence” must also be taught. A number of other states introduced sim-

ilar “creation science” bills in their state legislatures before the

United States Supreme Court rejected such laws in 1987.3 The lat-

est effort to promote “creation science” in public schools occurred

in 1999, when the Kansas Board of Education voted to remove evo-

lution theory from the state’s science curriculum, while not formally

banning its instruction or insisting on equal time for “creation science.”

At the beginning of the twentieth century, the controversy

between the materialistic interpretation of Darwin’s theory and bib-

lical special creation was even more intense in the public mind.

Fundamentalists saw it as a confrontation between “theism versus

atheism, morality versus immorality, angel-man versus monkey-

man,” while scientists and others saw it as a contest between “reason

versus superstition, enlightenment versus obscurantism, scientific

skepticism versus blind commitment to religious dogma.”4

It was in this divisive atmosphere that ‘Abdu’l-Bahá, during his

visits to Europe and America between 1911 and 1913, presented the

Bahá’í principle that true religion and sound science are comple-

mentary and can never oppose one another. ‘Abdu’l-Bahá repeated

this principle again and again in his talks to Western audiences. For

example, in Paris on November 12, 1911, he said:

If a religious statement is found which categorically contradicts reason and

science, then that statement is mere fancy …. Therefore make all of your

beliefs congruent so that science and religion are in harmony, for religion is

one wing of man and science is the other. Man can fly with two wings but

not with one. All religious beliefs that are contrary to reason and science are

not part of the reality of religion. Rather, such blind beliefs and absolute

convictions are the cause of hatred and enmity between the children of men.

But if religion is made congruent with science, the truth will appear.

Therefore, let your aim be this: to make science in accord with religion and

religion in accord with science.5

In a talk given at a Unitarian Church on June 9, 1912, he affirmed:

Science must recognize the truth of religion, and religion must recog-

nize the truth of science. A perfect relationship must be obtained

between them, for this is the root of truth …. Therefore, we must

abandon superstitions and investigate reality, and that which we see

corresponding to reality, we should accept. That to which science does

not assent and reason does not accept is not reality; rather it is blind

imitation. We must cast these misguided beliefs far away from us and

hold fast to reality. Any religion that is in harmony with science and

reason is worthy of acceptance.6

It was from this perspective of the complementarity of religion

and science, and the need to maintain harmony between them, that

‘Abdu’l-Bahá addressed the question of evolution. Although

‘Abdu’l-Bahá accepted evolution, as he understood the meaning of

this word, as a fact, he did not accept Darwin’s theory as it was

taught by the scientists of his time. Instead, ‘Abdu’l-Bahá presented

an understanding of evolution harmonious with the religious idea of

creation and the philosophical concept of essences. The details of

his manner of reconciling evolution and creation are discussed in the

articles that follow.

It is important to determine here what ‘Abdu’l-Bahá means by the

term “science” (*‘ilm*), since it is obvious ‘Abdu’l-Bahá is referring

to something that does not necessarily accord with any particular

scientific theory or, even with the scientific consensus of an age. Let

us consider the following statement:

You have asked how we can harmonize scientific theories with the

ideas of religion. Know that this material world is the mirror of the

Kingdom, and each of these worlds is in complete correspondence

with the other. The correct theories of this world which are the result

of sound scientific thinking are in agreement with the divine verses

without the slightest divergence between them, for the truth of all

things is laid away in the treasuries of the Kingdom. When that truth

is manifested in the material :world, the archetypes and realities of

beings ‘attain realization. If a scientific theory does not correspond

with the divine verses, it is certain that it is the essence of error.7

In other words, the Bahá’í principle of the harmony of science and

religion is based on the assumption that the world of the Kingdom

(i.e., the atemporal, placeless dimension) contains all the realities

and potentialities upon which the material world is founded. Since

divine revelation is also based upon the same source, its true mean-

ing cannot be in conflict with any categorical facts of the external

world. In the same letter quoted above, ‘Abdu’l-Bahá goes on to

explain how for over a thousand years learned consensus followed

the Ptolemaic system in which the earth was viewed as the fixed

center of the universe around which the sun moved, while two verses

of the Qur’an, according to ‘Abdu’l-Bahá’s interpretation, indicated

the fixity of the sun relative to the planets and the movement of the

earth around it.

This does not mean, however, that particular religious ideas and

doctrines are inherently superior to particular scientific theories, and

vice versa, because ‘Abdu’l-Bahá also explains that the criteria by

which humans judge the veracity of a proposition (i.e., sense per-

ception, reason, scriptural authority, and inspiration) are all liable to

error due to human subjectivity. Consequently, he concludes that the

most reliable standard of judgement is all four in combination:

But a statement presented to the mind accompanied by proofs which

the senses can perceive to be correct, which the faculty-of reason can

accept, which is in accord with traditional authority and sanctioned by

the promptings of the heart, can be adjudged and relied upon as per-

fectly correct, for it has been proved and tested by all the standards of

judgment and found to be complete.8

In other place, he adds that the standard of the “inmost heart”

(*mízán al-fu’ád*) through the aid of the Holy Spirit is capable of

apprehending the truth of things.9 In summary, the Bahá’í principle

of the harmony of science and religion not only implies the, essential

unity of the material and spiritual dimensions of existence, but

means that human beings must rely upon both science (empirical

data interpreted through reason and inspiration) and religion (scrip-

ture interpreted through reason and inspiration) to obtain a truer pic-

ture of reality.

Originally this volume was planned to include three articles, one

by a historian, one by a physical scientist, and one by a practicing

evolutionary biologist. Unfortunately, the third article being pre-

pared by Dr Ronald Somerby, the biologist, was not ready in time

and he has urged us to publish without him. As such, the views pre-

sented here do not represent the full richness of different back-

grounds that this subject deserves. Somerby’s article proposed to

cover such questions as the meaning of complementarity, the princi-

ple of “unity in diversity” in modern evolutionary theories, and the

need for a new paradigm shift that transcends both classical meta-

physics and the modern mechanization of nature. We urge him to

complete his article soon.

Eberhard von Kitzing’s article, “The Origin of Complex Order in

Biology,” focuses on ‘Abdu’l-Bahá’s concept of the *originality of*

*species*, places it within the context of the nineteenth-century con-

flict between the views of classical biology and Darwin’s theory of

evolution, and compares ‘Abdu’l-Bahá’s views with concepts in

modern biology and cosmology. Kitzing explains that his essay is

based on the assumption that ‘Abdu’l-Bahá’s statements on the sub-

ject of evolution are not intended to be explanations of biological

fact. In other words, ‘Abdu’l-Bahá was not a biologist; rather he

approached the subject from the standpoint of religious knowledge.

As such, his arguments reflect his interest in the philosophical and

spiritual consequences of Darwinism as it relates to questions of

religion, such as the purpose of life. He was especially concerned

with the theory’s potential, as represented by “certain European

philosophers,” to undermine the essential principles of religion.

If all of ‘Abdu’l-Bahá’s statements on evolution are to be under-

stood literally as referring to biological fact, then these statements

need to be supported by evidence from applied biology just like any

other hypothesis, if they are to be taken seriously. Kitzing proposes

that the *parallel evolution model*, which results from interpreting

‘Abdu’l-Bahá’s statements literally and as doctrine, not argument,

“produces more problems than it solves.” He presents a series of

five questions that he believes need to be successfully answered for

parallel evolution to be accepted as a serious theory by scientists.

Kitzing also gives a non-literal interpretation of ‘Abdu’l-Bahá’s

statements on evolution that he finds more in harmony with current

scientific thought. For should the literal meaning of ‘Abdu’l-Bahá’s

statements become categorically proven to contradict biological

facts, Bahá’ís will have to answer this question posed by historian

Susan Maneck: “Should Bahá’ís feel compelled to accept that earli-

er theory [of parallel evolution] because of ‘Abdu’l-Bahá’s use of it,

or is it sufficient to simply accept the point of it all, that our Reality

is ultimately related to our intended end, not our origins, and allow

science to figure out the rest of it?”10

My own article, “‘Abdu’l-Bahá’s Response to Darwinism,”

explores in detail the philosophical and historical context within

which ‘Abdu’l-Bahá spoke and from which he and his audience

drew the understanding which informed their discourse. I start with

the conflict between the essentialists and Darwinists during the lat-

ter half of the nineteenth century in Europe and America, and then

move to the parallel controversy that took place over Darwinism in

the Near East. Since ‘Abdu’l-Bahá indicated in one of his talks that

his views on evolution are generally congruent with the system of

thought of the “philosophers of the East,” by which he means Plato

and Aristotle, and the philosophers of Iran, I devote a lengthy chap-

ter to examining the ideas of these philosophers as they relate to the

concepts of “species,” “essence,” and “becoming.”

With the views of the “philosophers of the East” presented as nec-

essary background, my last chapter is devoted to a careful analysis

of ‘Abdu’l-Bahá’s teachings on evolution based on the context pre-

sented in the first three chapters. The original Arabic or Persian

writings and talks of ‘Abdu’l-Bahá are relied upon throughout, and

revised translations are provided where necessary.

My approach is to assume that ‘Abdu’l-Bahá intended his words

on this subject to be taken at face value, and that he was responding

to Laura Clifford Barney’s questions on “the modification of

species” and “the theory of the evolution of beings” with unam-

biguous and non-symbolic language.

Both authors agree, however, that ‘Abdu’l-Bahá’s response to

Darwinism was more philosophical in nature than scientific and that

his main objective was to establish by *rational arguments* the exis-

tence a divinely ordained purpose for life, the special place of

humanity in creation, the need of final causes (i.e., teleology), and

the existence of timeless natural laws in the universe.

Numerous religious leaders and scientists during the twentieth

century have found science and religion to be not the least bit con-

tradictory. Each, working in the sphere that it knows best, gives us a

fuller and truer picture of reality than either could by itself. Neither

should dominate the other, but each should recognize the comple-

mentary and mutually beneficial role of the other in human society.

As ‘Abdu’l-Bahá desired: “Science must recognize the truth of reli-

gion, and religion must recognize the truth of science. A perfect

relationship must be obtained between them, for this is the root of

truth.”11

The Catholic Church is to be praised for its recent efforts to har-

monize the teachings of the Bible with the facts of science and the

fruits of reason. As the Vatican II Council expressed it: “Research

performed in a truly scientific manner can never be in contrast with

faith because both profane and religious realities have their origin in

the same God.”12 The Catholic Church therefore deems evolution

and Christianity to be compatible. It holds that “God created the

matter and laws of the universe” and that “evolution is the manner

in which these laws have unfolded.”13 In another move on the side

of science and reason, Pope John Paul II recently declared that

“rather than a place, hell indicates the state of those who freely and

definitively separate themselves from God.” He added that hell is

“not a punishment imposed externally by God” but the natural con-

sequence of the unrepentant sinner’s choice to live apart from

God.14

The Bahá’í principle of the harmony between science and religion

is connected to another Bahá’í principle which holds that “religious

truth is not absolute but relative.”15 This means that religious state-

ments should be understood from the perspective of the historical

and cultural context within which they were revealed and in the light

of the purpose for which they were revealed. It is with respect to the

purpose of religious statements that universality applies, whereas

the literal words and images of sacred writings are very time and

culture bounded. The changing understanding of the concept of hell

is illustrative of this point. According to a Catholic scholar: “to peo-

ple living in early Christian centuries, infernal images of hell no

doubt conveyed quite effectively the horrific consequences of reject-

ing God. One thing people feared most then was the burning and pil-

laging of their towns. If you had described hell to them in terms of

relationships and psychological experiences like loneliness, they

wouldn’t have known what you were talking about.”16

Such time- and culture-bound concepts and statements are also

found in the writings of Bahá’u’lláh and ‘Abdu’l-Bahá. For exam-

ple, when Bahá’u’lláh refers to “the fourth heaven” of classical

astronomy in the Kitáb-i Íqán, Shoghi Effendi explains that this

book “was revealed for the guidance of that sect [the Shí‘ah],”

where “this term was used in conformity with the concepts of its fol-

lowers.”17 In the same manner, such terms as “essence,” “species,”

“evolution,” and “creation” have specific meanings to ‘Abdu’l-Bahá

relative to the cultural and philosophical background with which his

audience was familiar. One should not automatically assume that

such terms, or ‘Abdu’l-Bahá’s usage of them, are limited by that

background. But their meaning should be properly understood

through a careful study of their original context, and then they

should be interpreted and applied in terms that make sense today.

This is in keeping with the dynamic character of the Bahá’í Faith,

which Shoghi Effendi says, has the capacity “even as a living organ-

ism, to expand and adapt itself to the needs and requirements of an

ever-changing society” and “has been so fashioned” as “to keep it in

the forefront of all progressive movements.”18

How should the Bahá’í community interact with scientists and

discuss scientific theories? With a combination of frankness and

humility, in the spirit of a fellow-seeker searching for the truth about

reality, questioning assumptions that preclude the existence of meta-

physical causes, but willing to discard preconceptions and always

being open to new perspectives. Why is this important? Because, as

‘Abdu’l-Bahá states: “religion is one wing of man and science is the

other. Man can fly with two wings but not with one.”19 Furthermore,

‘Abdu’l-Bahá explains that “if religion is contrary to science and

reason, it is not possible for it to instill confidence in the heart ….

Therefore, religious teachings must be congruent with reason and

science so that the heart may be assured and mankind find true hap-

piness.”

The articles presented in this volume have as one of their aims, in

addition to exploring the philosophical and historical background of

the evolution question in Europe and the Near East at the end of the

nineteenth century, presenting interpretations of ‘Abdu’l-Bahá’s

statements on evolution (from the side of religion) that may be more

congruent with reason and with scientific facts. The full answer of

how evolution and creation have worked together to bring the uni-

verse into existence is very complex, and many more questions need

to be explored and answered. It is our hope that this volume will

help stir our fellow Bahá’ís and interested scientists to work harder

to raise the science and religion dialogue to new heights of agree-

ment and understanding.

 Keven Brown

 March 2001

Notes

1. Cited by Chet Raymo, *Skeptics and True Believers* (New York: Warner, 1998)

 p. 122.

2. Richard Dawkins, “God’s Utility Function,” *Scientific American*, vol. 273, no.

 5, (1995) pp. 80–85.

3. Ashley Montagu, *Science and Creationism* (New York: Oxford University

 Press, 1984) pp. 4–5; Stephen Jay Gould, “Dorothy, It’s Really Oz,” *U.S. News*

 *and World Report* (August 23, 1999) p. 59.

4. Raymo, *Skeptics and True Believers*, p. 121.

5. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 1 (Talks of ‘Abdu’l-Bahá) (Hofheim-Langenhain:

 Bahá’í-Verlag, 1984) pp. 155, 157–158; corresponds to *Paris Talks*, 11th

 Edition, pp. 141–146. The original, free English translation contains much mate-

 rial that is not in the Persian.

6. Ibid., vol. 2, pp. 136–137; *Promulgation of Universal Peace*, (Wilmette: Bahá’í

 Publishing Trust, 1982) pp. 175–176, revised translation.

7. ‘Abdu’l-Bahá, *Makátíb-i ‘Abdu’l-Bahá*, vol. 3 (Collected Letters) (Cairo 1921)

 pp. 172–173.

8. ‘Abdu’l-Bahá, *Promulgation*, p. 255.

9. ‘Abdu’l-Bahá, *Min Makátíb-i ‘Abdu’l-Bahá*, vol. 1 (From the Collected Letters)

 (Rio de Janeiro: Editora Baha’i Brasil, 1982) p. 85.

10. Susan Maneck on Baha’i Studies List, August 1, 2000.

11. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 2, p. 136.

12. Quoted in Robert Root-Bernstein, “On Defining a Scientific Theory,” in

 *Science and Creationism*, p. 82.

13. Ibid., p. 83.

14. Quoted in “Hell Hath No Fury,” *U.S. News and World Report* (January 31,

 2000) pp. 45, 48.

15. Shoghi Effendi, *World Order of Bahá’u’lláh* (Wilmette: Bahá’í Publishing

 Trust, 1974) p. 58.

16. Rev. Thomas Reese, quoted in “Hell Hath No Fury,” *U.S. News and World*

 *Report* (January 31, 2000) p. 49.

17. Quoted in a letter written on behalf of the Universal House of Justice, 3

 November 1987.

18. Shoghi Effendi, *The World Order of Bahá’u’lláh*, pp. 22–23.

19. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 1, p. 158.

20. Ibid., vol. 2, p. 227; *Promulgation of Universal Peace*, pp. 298–299, revised

 translation.

**Studies in the**

**Bábí and Bahá’í Religions**

Volume Twelve

**Evolution and Bahá’í Belief**

Part One

**‘Abdu’l-Bahá’s response**

**to Darwinism:**

**Its historical and philosophical context**

by

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*The translations and revised translations of ‘Abdu’l-Bahá’s writings and talks*

*contained in this essay are provisional and have not been authorized by*

*the Universal House of Justice.*

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[Image]

An evolutionary tree

An illustration from Ernst Haeckel’s Evolution of Man (1879)

showing the evolution of life from “Amoebae” and “Monera”

to “MAN.” The drawing conceals the highly imprecise and

speculative nature of the relationships shown.

Preface

Many Westerners first became acquainted with ‘Abdu’l-Bahá

(1844–1921) during his missionary journeys to Europe and America

between 1911 and 1913, undertaken for the purpose of spreading the

teachings of his father, Bahá’u’lláh, founder of the Bahá’í Faith.

During his busy schedule of meeting his American followers, visit-

ing dignitaries, speaking at churches, social organizations, and uni-

versities, and associating with people from all walks of life,

‘Abdu’l-Bahá emphasized his father’s progressive social principles,

which included such teachings as the equality of men and women,

the oneness of the human race, the establishment of a world federal

government, the adoption of a universal auxiliary language, and the

harmony of science and religion.

‘Abdu’l-Bahá’s views on the theory of evolution, as it was under-

stood at the beginning of the twentieth century, fall within the con-

text of the last principle. In one talk of ‘Abdu’l-Bahá at the Open

Forum in San Francisco, dated 10 October 1912, he speaks particu-

larly about the theory of evolution and contrasts the modern Western

idea of the transmutation of species with the idea of evolution with-

in a species of the “philosophers of the East” (*falásiftyyih sharq*),

with whom he associates his own views (see Section 3). Among

these philosophers, he includes “Aristotle and Plato, and the

philosophers of Iran.”1 ‘Abdu’l-Bahá had previously discoursed on

this subject to Laura Clifford Barney, an American who visited him

in ‘Akká between 1904 and 1906. She records at least five talks of

‘Abdu’l-Bahá specifically addressing the questions of evolution and

the diversification of species. In several of his letters, ‘Abdu’l-Bahá

also writes on this subject.

In order to accurately analyze ‘Abdu’l-Bahá’s ideas and compare

them to the understanding educated Westerners had of Darwin’s the-

ory at the time, it will be necessary to use the original texts of

‘Abdu’l-Bahá and ensure their accurate translation into English. It

will also be necessary to study in depth the views of the “philoso-

phers of the East” and the responses of Darwin’s contemporaries to

his theory. The tasks to be accomplished in this article, therefore, are

four-fold: (1) to present revised translations of ‘Abdu’l-Bahá’s writ-

ings and talks on the subject of evolution where necessary;2 (2) to

explain the relevant theories of certain Greek and Islamic philoso-

phers on the ideas of “species,” “essence,” and “becoming”; (3) to

describe the contemporary response to Darwinisin during the last

half of the nineteenth century and the beginning of the twentieth

century in Europe and, more especially, in the Arab world; and (4)

to analyze ‘Abdu’l-Bahá’s doctrine in the light of this historical con-

text and philosophical background.

After having accomplished these tasks, I believe it will be demon-

strated that ‘Abdu’l-Bahá is a teleologist (or essentialist), who main-

tains the original creation of “species” by God outside of time, and

that he was a proponent of evolution in a sense that is harmonious

with the doctrine of creation. As the essay will attempt to make clear

(especially in Sections 2 and 3), ‘Abdu’l-Bahá is not an Aristotelian

essentialist but a Platonic one. In other words, ‘Abdu’l-Bahá’s

essences (*máhiyát*) and species (*naw‘iyát*) are equivalent to Platonic

Forms, not to Aristotelian substances and the logical essences

derived from them.

Section 1

# The Historical Context

## Europe3

Darwin’s *The Origin of Species by Means of Natural Selection* (pub-

lished in 1859) disturbed the scientific community, for it struck at

the foundations of a long-established worldview in which religion

and science worked side by side without interfering in any funda-

mental way in the domain of the other. That God had created all

species according to a divine plan and linked them together in the

great Chain of Being was taught by religion and almost universally

accepted; it was the role of scientists to discover the material details

of that plan and reveal the wisdom of the Creator. English naturalist

John Ray’s work *The Wisdom of God Manifested in the Works of the*

*Creation* (1691) is typical of the thinking of the time. The pre-

Darwinian worldview was well summed up by Newton, who said:

“A God without dominion, providence, and final causes, is nothing

else but Fate and Nature …. All the diversity of natural things

which we find, suited to different times and places, could arise from

nothing but the ideas and will of a Being necessarily existing.”4

### 1.1. Teleological Thinking vs. Population Thinking

The assumption of the design and creation of the natural world by a

supreme being are fundamental to teleological thinking, which had

been dominant since the days of Plato and Aristotle, and which is

still favored by the general American population.5 In this view, each

species was created by design and for a purpose in the great plan of

life. In other words, it is not by chance that humanity is at the apex

of the animal kingdom. According to the Judeo-Christian tradition,

every species of plant and animal was independently created prior to

the creation of Adam. Called “special creation,” this view holds that

an essential discontinuity separates species from each other. As the

French biologist, Georges Cuvier (1769–1832), wrote to a friend:

“We imagine that a species is the total descendence of the first cou-

ple created by God.”6 The British physiologist, William Carpenter

(1813–1885), summed up the prevailing belief at the time Darwin

published *The Origin of Species*:

Now it seems to be a received article of faith, both amongst scientific

naturalists and with the general public, that all these reputed species

have a real existence in nature; that each originated in a distinct act of

creation; and that, once established, each type has continued to trans-

mit its distinctive characters, without any essential change, from one

generation to another, so long as the race has been permitted to exist.

This idea of the permanence of species … is commonly regarded at

the present time [1860] as one of those doctrines which no man altogether

in his right senses will set himself up seriously to oppose.7

At the present time, this view of the special creation of species is

still widely believed, especially among fundamentalist Christians

for whom it is an essential doctrine. One of the leading contempo-

rary proponents of special creation is Dr Duane Gish of the Institute

for Creation Research. He explains:

By creation we mean the bringing into being of the basic kinds of

plants and animals by the process of sudden, or fiat, creation described

in the first two chapters of Genesis …. We do not know how God cre-

ated, what processes He used, for God used processes which are not

now operating anywhere in the natural universe. This is why we ‘refer

to divine creation as special creation ….

During the creation week God created all of the basic animal and

plant kinds, and since then no new kinds have come into being, for the

Bible speaks of a finished creation (Gen. 2:2) ….

The concept of special creation does not exclude the origin of

varieties and species from an original created kind. It is believed that

each kind was created with sufficient genetic potential, or gene pool,

to give rise to all, of the varieties within that kind that have existed in

the past and those that are yet in existence today.8

The problem with explaining the origin of species by special cre-

ation, argued the early critics, is that it does not explain how species

have actually appeared, survived, and vanished in the real world. No

one had witnessed an act of special creation taking place, and it was

evident by this time from the fossil record that innumerable differ-

ent species had appeared and then become extinct in the long course

of geologic time. Did this mean that the Creator continued to create

new species independently as older species vanished? Charles Lyell,

author of *Principles of Geology*, thought so; he proposed that God

uniformly replaced extinct species by new special creations after

each extinction.9 But if this was true, then an act of special creation

should at some time be observable.

Darwin’s theory excited the scientific community because his

proposed natural mechanism for the origin of species was feasible

and explained many observable facts of nature that had not been sat-

isfactorily explained by earlier theories. In short, it brought the

explanation of species forms into the realm of science and out of the

realm of theology. Darwin was saying that most ancient extinct

species did not really vanish but were earlier evolutionary stages of

the species on earth today.10 His field observations of structurally

similar but reproductively isolated populations in close geographic

proximity suggested to him that biological species are not specially

created by divine intervention, nor are they fixed realities of nature.

Instead, he proposed that the diversity of species is due solely to the

natural selection of the random individual variations of organisms

which best suit them to adapt to a changing environment. All the

species existing today have resulted, he said, from the gradual trans-

formation of one or several first primitive forms into which God

breathed the spirit of life. Although Darwin allowed creation for the

first primitive form, the new theory contradicted the fundamental

premise of special creation: the real existence of distinct species in

nature and their essential discontinuity from each other.

Darwin’s view is called *population thinking* by modern biologists

because it considers only the individual members of populations as

real, not the “species,” which is a mental construct used for classifi-

cation. Darwin explained: “I look at the term species as one arbitrarily

given, for the sake of convenience, to a set of individuals closely

resembling each other.”11 Since every individual has variations or

unique characteristics, Darwin proposed that if some members of a

homogeneous population become geographically separated from the

parent population, they can become—through the gradual evolution

of those unique variations—a new reproductively isolated population,

or a new “species.” Darwin felt he had found sure evidence of this

with many similar but reproductively isolated species on the

Galapagos Islands.

Mayr explains: “The concept of a static type is replaced by that of

a highly variable population. New variations are produced continu-

ously, some of them superior and some of them inferior to the exist-

ing average.”12 Superior variations that help the population adapt to

changes in the environment or compete better with similar popula-

tions tend to be preserved in the gene pool—this is natural selection.13

The random variations, according to Darwin, occur accidentally, but

their “selection” is neither accidental nor predetermined. Beneficial

variations are simply preserved because they better meet the survival

needs’ of an organism. Given time and geographic isolation, this is

how Darwin conceived of new species gradually deriving from parent

species. By implication, Darwin postulated that all organisms, includ-

ing man, have descended from common ancestors by a continuous

process of branching. Each animal, plant, or micro-organism is but a

link in a chain of ever-changing, never-repeated forms, and these

forms are determined solely by the environment.

The significance of this change of view to Western thought has

been eloquently expressed by Thomas Kuhn:

All the well-known pre-Darwinian evolutionary theories those of

Lamarck, Chambers, Spencer, and the German Naturphilosophen—

had taken evolution to be a goal-directed process. The “idea” of man

and of the contemporary flora and fauna was thought to have been

present from the first creation of life, perhaps in the mind of God. That

idea or plan had provided the direction and the guiding force to the

entire evolutionary process. Each new stage of evolutionary develop-

ment was a more perfect realization of a plan that had been present

from the start. For many men the abolition of that teleological kind of

evolution was the most significant and least palatable of Darwin’s sug-

gestions. *The Origin of Species* recognized no goal set either by God

or nature. Instead, natural selection, operating in the given environ-

ment and with the actual organisms presently at hand, was responsible

for the gradual but steady emergence of more elaborate, further artic-

ulated, and vastly more specialized organisms. Even such marvelously

adapted organs as the eye and hand of man—organs whose design had

previously provided powerful arguments for the existence of a

supreme artificer and an advance plan—were products of a process

that moved steadily from primitive beginnings but toward no goal. The

belief that natural selection, resulting from mere competition between

organisms for survival, could have produced man together with the

higher animals and plants was the most difficult and disturbing aspect

of Darwin’s theory.14

Darwin never pretended to explain how life arose to begin with.

He proposed that God had breathed life into one or several first

primitive forms. Then he thought God had stepped back from His

work and allowed the mechanism of natural selection, which

Darwin had just discovered, to take over and “select” the random

variations best suited for survival in an ever-changing environment.

The forms of the species resulting over the vast course of time were

determined strictly by natural forces, not by conscious design.

“There is a grandeur in this view of life,” explained Darwin, “with

its several powers, having been originally breathed by the Creator

into a few forms or into one; and … from so simple a beginning

endless forms most beautiful and most wonderful have been, and

are, being evolved.”15 Although his theory dealt a blow to teleolo-

gy, as traditionally understood, he allowed that God had established

the general laws of nature but not the details. In his words:

There seems to me too much misery in the world. I cannot persuade

myself that a beneficent and omnipotent God would have designedly

created the Ichneumonidae with the express intention of their feeding

within the living bodies of Caterpillars, or that a cat should play with

a mouse. Not believing this, I see no necessity in the belief that the eye

was expressly designed …. On the other hand, I cannot anyhow be

contented to view this wonderful universe, and especially the nature of

man, and to conclude that everything is the result of brute force. I am

inclined to look at everything as resulting from designed laws, with the

details, whether good or bad, left to the working out of what we may

call chance.16

### 1.2 Evidences Favoring Darwinism

Just as Newton had deduced an invisible force called gravity to

explain the movements of the heavenly bodies (now more accurately

explained by Einstein’s general theory of relativity), Darwin deduced

his theory from a wide range of observable evidence, which gave his

theory scientific credibility. That scientists were not able to find a par-

ticular set of “essential characteristics” universally distinguishing one

biological species from another was an apparent victory for the

Darwinists. Geometrical figures and atomic elements are universally

and clearly defined, but the situation with organic species, when these

are defined by reproductive isolation, is more problematic. For exam-

ple, except for inability to interbreed, two or more species of finches

may look and act nearly identical to each other. By what then are their

essences (i.e., their essential characteristics) distinguished?17

Still, Darwin’s critics saw no reason for one species to evolve into

another; this would be, they thought, like lead evolving into gold.18

To them, the kinds of biological organisms required by nature

should be just as fixed as the kinds of elements in physics.

Other evidences used by Darwin and his followers to support evo-

lution include the following: (1) The existence of vestiges or rudi-

mentary organs no longer used suggests that the species has evolved

from a form in which those organs were necessary. (2) The similarity

of reproductively isolated species in geographic proximity suggests

that they have branched from each other recently. This is especially

evident in the case of the animals in Australia, which bear a family

resemblance. (3) The taxonomic hierarchy and morphological simi-

larity of organisms is evidence of descent from a common ancestry

(the tree model of evolution).19 (4) The stages of embryological

development (ontogeny) appear to recapitulate the stages of evolu-

tion (phylogeny). For example, if biological species had been spe-

cially created, asked Darwin, why shouldn’t their ontogeny take

them by the most direct path to the adult stage, so that the wing of a

bat or the fin of a porpoise would be “sketched out with all their

parts in proper proportion, as soon as any part became visible [in the

embryo]”?20 But instead we find detours, such as the embryos of

land-living vertebrates going through a gill-arch stage. (5) Darwin’s

strongest evidence, he felt, was in the ability of breeders and domes-

ticators to alter the shape and constitution of wild species. Given

time and a larger gene pool, nature should be able to alter a species

into a completely different species. Based on such evidences,

Darwin asserted against the essentialists: “On the ordinary view of

each species having been independently created …. I do not see that

any explanation can be given.”21

### 1.3 Essentialist Objections to Darwinism

1.3.1 *The Role of Natural Selection and Chance*. What biologists

who favored the special creation of species by a transcendent, ruling

mind (such as Lyell, Herschel, Cuvier, Owen, Agassiz, and von

Baer) found most objectionable in Darwin’s theory was, as

Frederick Hutton put it, “its reliance on *natural* causes and *chance*

in affecting the changes.” We should be more inclined,” he contin-

ued, “to refer the modifications which species of animals or plants

have undergone to the direct will of God.”22 Most essentialists

accepted that random variations did occur in nature, but these vari-

ations, they claimed, could never stray from the limits set by the

“species essence.”

Darwin’s critics held that every species has an immutable essence,

or law, or idea present in the mind of God which determines the

essential attributes of its biological counterpart, such as the impor-

tant organs, basic body structure, and behaviors necessary to fulfill

a niche in an environmental system. These remain constant through

time and make each species what it is. Accidental properties, like

color, amount of body hair, and size, in contrast, may vary from indi-

vidual to individual depending on the environment. Natural selec-

tion, from this perspective, merely serves to ensure that accidental

characteristics that stray too far from the norm are eliminated, while

the essential form is preserved through time. This was the general

position of classical biology, which is designated today as *typologi*-

*cal thinking*, because of the assumed close correlation between fixed

essences (types) and static biological populations.

Classical biology also held that these essences and their biologi-

cal counterparts formed an unchanging, continuous Chain of Being.

The Creator “did not make kinds separate without making some-

thing intermediate between them,” so that a “wonderful linkage of

beings” exists, wherein “the highest species of one genus coincides

with the lowest of the next higher genus, in order that the universe

may be one, perfect, and continuous.”23 The static understanding of

the Chain of Being, however, began to change after Leibniz (1644–

1716) added the concept of dynamic becoming to it (see Section

1.4).

One of Darwin’s arguments was that natural selection could, over

time, transmute the so-called essential form, just as domesticators

modified animals and plants by artificial selection. But Agassiz

countered:

It is not true that a slight variation, among successive offspring of the

same stock, goes on increasing until the difference amounts to a spe-

cific distinction. On the contrary, it is a matter of fact that extreme

variations finally degenerate or become sterile ….24 Our domesticated

animals, with all their breeds and varieties, have never been traced

back to anything but their own species, nor have artificial varieties, so

far as we know, failed to revert to the wild stock when left to them-

selves.25

Darwin remained adamant, however, that it is precisely the acci-

dental properties, the chance individual variations, that, if benefi-

cial, in time could become typical of a group, and hence the basis of

a new species. He stressed: “Unless such [profitable variations]

occur, natural selection can do nothing.”26

Herschel in his *Physical Geography of the Globe* objected strongly

to this line of thinking:

We can no more accept the principle of arbitrary and casual variation

of natural selection as a sufficient condition, per se, of the past and

present organic world than we can receive the Laputan method of

composing books [by randomly striking the keys of a typewriter] as a

sufficient account of Shakespeare and the Principia …. Equally in

either case, an intelligence, guided by a purpose, must be continually

in action to bias the directions of the steps of change to regulate their

amount to limit their divergence and to continue them in a definite

course. We do not believe that Mr. Darwin means to deny the necessity

of such intelligent direction. But it does not, so far as we can see, enter

into the formula of this law; and without it we are unable to conceive

how far the law can have led to the results.27

1.3.2. *The Lack of Intermediate Forms*. The slow and gradual

change of an older species into a new species was another compo-

nent of Darwinism that nineteenth-century essentialists found diffi-

cult to accept. On the whole, the essentialists agreed that Darwin’s

theory was based on assumptions. If what Darwin proposed was

true, then there should be a wealth of transitional fossil forms in the

geological strata, which would prove that one class of animals had

gradually evolved from another. For example, there should be many

intermediates between fishes and amphibians, between reptiles and

mammals, and so forth. Many of the essentialists were paleontolo-

gists, and what they found in the fossil record was exactly the oppo-

site of what Darwin required. Instead, they said, species appear sud-

denly in the fossil record, persist relatively unchanged for most of

their existence, and then abruptly disappear from the fossil record.

As the British paleontologist, Richard Owen (1804–1892), observed:

When we see the intervals that divide most species from their nearest

congeners, in the recent and especially the fossil series, we either doubt

the fact of progressive conversion, or, as Mr. Darwin remarks … one’s

“imagination must fill up very wide blanks.” … The last

ichthyosaurus, by which the genus disappears in the chalk, is hardly

distinguishable from the- first ichthyosaurus …. The oldest ptero-

dactyle is as thorough and complete a one as the latest.28

The same objection was put forth by the American paleontologist,

Louis Agassiz (1807–1873):

[Darwin’s] doctrines, in fact, contradict what the animal forms buried

in the rocky strata of our earth tell us of their own introduction and

succession upon the surface of the globe …. Let us look now at the

earliest vertebrates, as known and recorded in geological surveys.

They should, of course, if there is any truth in the transmutation theo-

ry, correspond with the lowest in rank or standing. What then are the

earliest known vertebrates? They are the selachians (sharks and their

allies) and ganoids (garpikes and the like), the highest of all living

fishes, structurally speaking …. The Silurian deposits follow imme-

diately upon those in which life first appeared, and should therefore

contain not the highest fishes, but the fishes next in order to the

myzonts [“fishes structurally inferior to all others”] …. The presence

of the selachians at the dawn of life upon earth is in direct contradic-

tion to the idea of a gradual progressive development.29

Cuvier had similarly objected against Lamarck’s evolutionary

theory: “If the species have changed by degrees, we should find

some traces of these gradual modifications; between paleotherium

and today’s species we should find some intermediary forms: This

has not yet happened.”30 He also called attention “to the fact that the

mummified animals from the Egyptian tombs which were many

thousands of years old were quite indistinguishable from the living

representatives of these species.”31

Though Darwin recognized the lack of evidence in the geological

strata for intermediate forms, he attributed such lack of evidence to

“the extreme imperfection of the geological record.”32 Today evo-

lution biologists claim to have discovered a number of preserved

transitional species in the fossil record. One of the most famous is

*Archaeopteryx*, considered to be an intermediate between reptiles

and birds. Contemporary evolutionists Stephen Jay Gould and Niles

Eldredge do not argue against transitional lineages between kinds,

but they do contest Darwinian gradualism between them. Their the-

ory of punctuated equilibrium, says Gould, accounts for “two out-

standing facts of the fossil record geologically ‘sudden’ origin of

new species and failure to change thereafter (stasis).”33

Another paleontologist, Francois Jules Pictet (1809–1872), pointed

out another problem with the gradual development of intermediate

forms:

Admit, for instance, that they [birds] sprang from a common progeni-

tor with mammals and reptiles. The wing then must have been formed

by successive alterations in the anterior limb of the prototype. But I do

not see how natural selection could act for the conservation of future

birds, since this modified member, this future wing, being neither a

real arm nor a real wing, could not possibly be of any physiological

value.34

He also noticed that the explosion of diverse, complex life forms

appearing in the earliest part of the fossil record, with nothing more

complicated than bacteria beforehand, contradicted Darwin’s idea of

life starting from only one or a few primitive types.35

### 1.4 Essentialist Alternatives

For some essentialists, such as T. H. Huxley and William Bateson,

the only way evolution was viable was by the sudden origin of new

species by saltation, i.e. evolutionary jumps in which earlier species

are used as building blocks for new species via an extensive muta-

tion.36 In this way, distinct species essences are preserved and act as

the laws defining the field of favorable mutations. This idea was

also noticed by the physical scientist, Fleeming Jenkin. In 1867, he

wrote in *The North British Review*:

If … the advantage given by the sport [a radical mutation] is retained

by all descendants … then these descendants will shortly supplant the

old species entirely, after the manner required by Darwin. But this theory

of the origin of species is surely not the Darwinian theory [of gradual

change]; it simply amounts to the hypothesis that, from time to time,

an animal is born differing appreciably from its progenitors, and possess-

ing the power of transmitting the difference to its descendants. What

is this but stating that, from time to time, a new species is created? It

does not, indeed, imply that the new specimen suddenly appears in full

vigour, made out of nothing.37

Jenkin also argued that just as there is a set number of chemical

elements and possible combinations of these, the forms of species

and possible variations are also limited, though seemingly infinite.

He explained that

organized beings may be regarded as combinations, either of the ele-

mentary substances used to compose them, or of the parts recurring in

many beings, … [so it is not] surprising that newly discovered species

and varieties should almost invariably occupy an intermediate position

between some already known, since the number of varieties of one

species, or the number of possible species, can only be indefinitely

increased by admitting varieties or species possessing indefinitely

small differences one from another.38

Another possibility, which was foreshadowed by Leibniz, is that

evolution is really change within the same species, in other words,

the temporal unfoldment of the preexisting potentialities of the orig-

inal kinds created by God. Leibniz stated:

Although many substances [species] have already attained a great per-

fection, yet on account of the infinite divisibility of the continuous,

there always remain in the, abyss of things slumbering parts which

have yet to be awakened, to, grow in size and worth, and in a word, to

advance to a more perfect state …. There is a perpetual and a most

free progress of the whole universe in fulfillment of the universal

beauty and perfection of the works of God, so that it is always advanc-

ing towards a greater development.39

According to Mayr, although Leibniz’s idea “helped to prepare the

ground for evolutionary thinking,” it was not a genuine theory of

evolution, in a strict Darwinian sense, since it did not allow for the

transmutation of one species into another. Transformation within a

species and the development of varieties out of original kinds does

not count as “evolution” to Mayr. He argues that Leibniz’s view,

which maintains fixed underlying essences but allows for the grad-

ual transformation of physical forms toward greater perfection,

should be called, as Lovejoy coined it, “the temporalizing of the

Chain of Being.”40 In other words, the Chain of Being became con-

strued by Leibniz and his followers “as a process in which all forms

are gradually realized in the order of time.”41

Although the British naturalist, Thomas Wollaston (1821–1878),

chose special creation over evolution, he allowed a greater range of

plasticity within the species limit to help account for Darwin’s

observations: “Whilst ‘individual variation’ in each species is liter-

ally endless, it is at the same time strictly prescribed within its proper

morphotic limits (as regulated by its specific range), even though we

may be totally unable to define their bounds.”42 Because of this, “if

a formerly acknowledged species can be shown to be descended

from another formerly acknowledged species, then these two forms

were not actually species but varieties [even if they can no longer

interbreed].”43

This again is a form of “evolution” within an original species or

kind, and can be termed “parallel evolution” since the original kinds

develop in parallel or independently from each other. (The modern

concept of “microevolution,” which recognizes the undisputable

fact that living things change as they adapt to their environment, is

amenable to both the supporters of special creation and of parallel

evolution.) These two essentialist alternatives will be examined

again when we come to the writings of ‘Abdu’l-Bahá on this sub-

ject.

As early as 1690, the English philosopher John Locke had given

an answer as to why a particular set of “essential characteristics”

universally distinguishing one biological species from another

would never be found. This, as mentioned in Section 1.2, was one of

the main objections Darwinists held against the essentialist claim

that each natural species has an essence which determines it. Locke

granted the existence of “real essences” that are known by God, but

he distinguished these from the purely “nominal essences” con-

ceived by human beings. Because of the essential limitation of

human knowledge and its inability to encompass every detail of an

entity, he proposed that the precise boundaries of real essences can-

not be known. Thus, he says, “our distinguishing substances into

species by names is not at all founded on their real essences; nor can

we pretend to range and determine them exactly into species,

according to essential internal differences.”44 In other words, real

essences, just like real laws of nature, can never be completely

defined and will always be the subject of further inquiry. What

humans deal with are nominal and provisional representations of

these real things.

Morphologists also answered this same objection by proposing

that there is no one-to-one correspondence between the species

essence and what Darwinists define ,as a biological species. In other

words, mutual interbreeding does not define a single species in the

metaphysical sense. Instead, an ideal type determining a common

form and common function in, a certain environmental niche under-

lie the evident variability of things.45

Under the naturalists’ definition of “real species” as “all forms

related by blood descent to a common ancestor,” Darwin would

have to say, had he believed in species as other than nominal con-

structs, that there is only one or several species and countless vari-

eties. This is because Darwin allowed special creation to one or sev-

eral first primitive organisms, from which everything else has sub-

sequently derived by slow and gradual variation. But, as already

mentioned, Darwin’s theory represents a radical change in thinking,

because he proposed that God had no preconceived plan for how the

first organism(s) should evolve. This was left to the mechanism of

chance variations followed by their necessary selection by the envi-

ronment.

Since Mayr says most biologists did not agree on the significance

of natural selection as the main agent of evolution until the “evolu-

tionary synthesis” of the 1930s and 40s, we can assume that during

‘Abdu’l-Bahá’s visits to Europe and American between 1911 and

1913, the debates between the essentialists and the Darwinists were

far from settled.46 The implications of the two alternatives (species

as fixed realities of nature determining biological populations versus

biological populations as productions of natural selection and

species as mere theoretical constructs) would not have been lost to

his educated audience. We may now turn to the reception of

Darwinism in the Arab world.

## The Arab world47

Under the impact of Western ideas, the late nineteenth-century in the

Arab world was a period of intellectual ferment and increasing inter-

est in secular learning and social change. One of the most important

vehicles for the dissemination of Western scientific ideas into the

Arab world was the magazine *al-Muqtaṭaf* founded by Yaqub

Sarruf and Faris Nimr in Beirut in 1876. It moved to Egypt in 1885.

The editors of *al-Muqtaṭaf* were open-minded Christian Arabs who

were generally favorable to Darwin’s theory. The discussion on

Darwinism in *al-Muqtaṭaf* was frequently countered by the journal

*al-Mashriq*, founded in 1898 by an Arab Catholic, Father Louis

Cheikho.48 Darwin’s theory was introduced and discussed in *al*-

*Muqtaṭaf* in its first volume in an article by Rizqullah al-Barbári.49

### 1.5 Rizqullah al-Barbárí’s Description of Darwinism

Barbárí commences with the biblical view that the first man was cre-

ated at once by God’s power, not by evolution. Contrary to the bib-

lical view, he says that certain ancient philosophers believed in the

spontaneous generation of all organisms. “They assumed that the

earth was full of the ‘seeds’ or ‘germs’ of all organic species, which

then evolved of their own accord with the appearance of suitable

conditions.”50 Some modern scientists have returned to this view,

Barbárí continues, which teaches that creatures arise “from inert

matter by their own power when conditions are right … emerging

by natural causes ‘without needing an intelligent creator. To be sure,

many natural scientists oppose this … and say that every living

thing is due to fixed natural laws.”51

Darwin, he says, is not to be counted among the materialists,

because he accepts a Creator as the cause of existence. Both groups

agree, though, that “all the differences among animals and plants

occur solely from natural causes without the interference of a con-

scious power in their production.”52 At the end of his article,

Barbári refutes this theory for four reasons: (1) Matter or the origi-

nal germ cannot by itself differentiate into all that exists today; an

intellectual power is needed. (2) Although Darwin did not deny the

existence of God, his theory leads to the refutation of all the proofs

for God’s existence. (3) This theory requires that everything now

existing was generated from a single germ in the space of 500 mil-

lion years by a natural action; but no proof for this exists. (4) This

theory is against sound intelligence.53

As Ziadat notes, “Arab interest in Darwinism centered on its

philosophical, social, and political implications, rather than on its

status as a biological theory.”54 In other words, the educated public

was more interested in knowing how this theory affected their reli-

gious and political views than in understanding how well it stood up

to empirical evidence. This explains Barbárí’s cursory review of

Darwinism and his focus on its philosophical and theological mean-

ing. In the Arab world, Darwin’s *The Origin of Species* was not

known firsthand until 1918 with the translation of the first five chap-

ters by Ismail Mazhar. Before that, Darwin’s theory was known

through translations of works by some of his commentators, like

Herbert Spencer, Ernst Haeckel, and Ludwig Büchner, and through

articles in journals like *al-Muqtaṭaf.*

The real debate over Darwinism began in 1882 when an American

professor, Edwin Lewis, gave a speech appearing to favor

Darwinism to the graduating class at the Syrian Protestant College

in Beirut. As a result, several professors who sided with Lewis were

forced to resign. The debate continued in the pages of *al-Muqtaṭaf*

between Louis, supported by *al-Muqtaṭaf*’s editor, Yaqub Sarruf,

and an Egyptian, Yusuf al-Ḥá’ik, on one side, and James Denis, an

American theologian, and other dissenters, on the other side.55

### 1.6 Yaqub Sarruf’s article supporting Darwin

Darwin’s position, explains Sarruf, is that everything on earth,

whether extinct or living, has derived gradually from something

else, so biological species, in this case, could not be independently

created. This chain of descent goes back to one or several roots for

all plants and animals. Sarruf reminds us that Aristotle also spoke of

the “great Chain of Being” and saw nature as one interconnected

whole linked together from the lowest plant to the highest animal

with very little difference between neighboring links, but it was a

fixed and eternal whole that did not evolve.56 Arabic speaking

philosophers, states Sarruf, adopted Aristotle’s concept of a fixed

Chain of Being, but they added to it the ideas of creation and

“progress toward perfection” (*taraqqí ila’l-kamál*), “not in the sense

that man was an ox and became a donkey, then a horse, an ape, and

finally man,” but in the sense that independently created species

progress within themselves. For example, according to medieval

natural science, gold is a metal that gradually reaches perfection by

first passing through less perfect stages. So first it is lead, tin, cop-

per, and silver, before becoming gold, but all the while it has

remained within the same species.57 In other words, these metals

were not recognized as separate elements in essence. Sarruf says this

view is called “independent creation” (*al-khalq al-mustaqill*),

wherein species have remained independent from each other since

the beginning of their creation.58 The position of Sarruf’s “Arabic

speaking philosophers,” by which he probably means those after

Mullá Ṣadrá (see Section 3.9), is obviously very similar to that of

Leibniz (see Section 1.4).

In the remainder of the article, Sarruf discusses some of the prob-

lems with the independent creation of biological populations. First,

he says, as more and more species became classified scientists

began to recognize that they could no longer find unique attributes

distinguishing one species from another. For example, butterflies

were found to consist of many different species with no apparent

fixed distinction between them.59 “Furthermore,” continues Sarruf,

“when scientists examined the composition of plants and animals,

they found that all plants and animals belonging to one taxon or one

class are formed according to a common pattern, so that vertebrates,

for example, all have bones according to one pattern, no matter how

different the species …. Thus the bones in the hand of a man, the

foot of a horse, the wings of a bird, and the fins of a fish are all

homologous.”60 This similarity of structure indicates common

descent.

Another evidence against independent creation, explains Sarruf,

was the discovery of trace organs, or vestiges, no longer being used

by a species. For example, the whale has teeth which never break

through its gums and the boa constrictor has vestiges of legs hidden

under its skin, each of which indicate its descent from other verte-

brates which had use for these organs.61

Scientists also used to believe, he says, that just as mature animals

differ in their forms, their embryos similarly differ. But then it was

proven by close examination that the embryos of different species

are virtually indistinguishable, a sign of their common origin. If the

species were independently created, why don’t their embryos dif-

fer?62

With the discovery of fossils buried in the strata of rock, scientists

found that the living animals of one region resembled the extinct

animals of the same region, although their species were apparently

different; thus the marsupials of Australia resemble the extinct mar-

supials of the same continent, and these species are not found else-

where. The same geographical isolation and species resemblance

was found with the armadillo and its extinct predecessors, which are

found only in South America. “Therefore,” asks Sarruf, “if the

species of animals had been created independently, why do the ani-

mals living now in one country resemble those that lived there for-

merly and are now extinct?”63 He proposes that Darwin’s answer is

more satisfying: “some species descended from others, so those liv-

ing today are naturally similar to their now extinct ancestors.”64

The fossil remains in the great depths of sedimentary rock also

provided evidence favoring Darwin’s theory, claims Sarruf. “It was

found that the animals of the earth since the beginning of its exis-

tence until today had succeeded one another gradually …. The most

ancient layers of rock contained nothing but sea shells and the bones

of fishes very different from those living today …. The next layer

contained traces of animals having legs.”65 Sarruf concludes that the

more recent geological strata contain the fossils of mammals and

primates, and that those animals more recent in time resemble each

other more closely than those more distantly separated. “The links

connecting these species to each other,” he explains, “are not seen

because it is said that one species has changed into another species

gradually by the change of its individual members.”66 Although he

adds that the discovery in America of the fossilized remains of an

animal with the body of a bird and the jawbone and teeth of a rep-

tile provides a link between the reptile and the bird.

As for the reason organs change and variations appear, Sarruf

holds that this is due to an organism’s need to adapt to the environ-

ment to survive. For example, the giraffe’s long neck developed

from its need to feed on the leaves of high branches. “God did not

create its front legs longer than its hind legs or its neck very long, as

is widely believed, but it was compelled to eat the leaves of trees; its

preference for this over moving to a more verdant region changed its

body from its original form.”67 The snake, he says, also lost its legs

because of its need to adapt to a changing environment.

Darwin’s great law of natural selection, by which beneficial vari-

ations are preserved, depends on two things, says Sarruf. The first is

that all creatures multiply in large numbers in a short time, but only

the fittest survive to reproduce and carry on subsistence. Were it not

for this the earth would soon become overpopulated and resources

would become depleted. The second is that offspring inherit the

characteristics of their parents, so if a parent has a characteristic that

increases its life span or ability to reproduce, it is sure that some of

its offspring will inherit this quality. They, in turn, will pass it on to

their descendants. In this way, over a long period of time, the species

changes.68 Darwin’s most famous evidence for this, continues

Sarruf, is in how far human breeding of domesticated plants and ani-

mals has altered them from their wild relatives. Nature does the

same thing, only much more slowly.69

As for species that do not change over time, Sarruf says this is

because they are well-suited to their environments, and this situation

may continue indefinitely.70 As for how today’s species reached

their present state from one origin, “it is not,” clarifies Sarruf, “that

the flea became a frog, the frog became an eagle, the eagle became

an ox, and the ox became an elephant, but their first ancestor was the

same. The flea was produced from one branch [of the evolutionary

tree] and the elephant from another over a long period of time.”71 So

it is not correct to say that man has descended from the ape, because

these are contemporary species, but both descended from a common

primate ancestor.72

Sarruf ends his defense of Darwinism by acknowledging that cer-

tain of its proofs are weak, as Darwin also admitted. But he says,

despite this, “it contains established truths, has greatly benefited sci-

entists, and opened a number of doors to hidden mysteries.”73 His

depiction of Darwinism is surprisingly accurate and very similar to

Mayr’s construction, which I have summarized in Sections 1.1–2.

### 1.7 James Denis’ refutation of Darwinism

Referring to Sarruf’s article and Edwin Lewis’s address, the theolo-

gian James Denis complains that Darwin completely separated reli-

gious truth from the conclusions of science and denied God’s role in

creating plants and animals as they appear today. He accuses Darwin

of being an unbeliever and rejecting the truth of the Bible. The

whole of Denis’s refutation consists in summoning authorities to

back him up. The Apostle Paul, for example, refuted Darwin, when

he wrote: “For by Him were all things created that are in heaven and

that are in earth, visible and invisible” (Colossians 1:16). Denis next

turns to certain scientists of his time: A German naturalist states that

“none of the human fossils found so far prove that man was at one

time inferior to his present state.”74 The French philosopher Pouchet

asserts: “Species are not theoretical concepts created by human

intellects, but they are created by the all-powerful Hand of God in

numerous stages. They cannot change into other species, but they

change independently … and are limited by certain timeless

laws.”75 The American geologist Professor Dana claims: “The dis-

tance between man and the ape is enormous. The area of the brain

in the lowest humans is 68 square inches and in the highest apes

only 34 …. No links between man and the apes have been found in

the geological strata.”76 In short, many brilliant scientists, including

Agassiz, Dawson, Beal, Pasteur, and Owen, have objected to

Darwin’s theory. Denis ends by arguing that Darwin’s theory should

not be confused with a religious theory of “evolution by a divine

power” (*al-irtiqá‘ bi-qúwat iláhíyah*), because evolution may be a

law by which the Creator operates, so long as self-creation and the

transmutation of species are not included.77

### 1.8 Edwin Lewis Responds to James Denis

In his response to Denis, Lewis focuses on his belief that science and

religion are in essential harmony. Denis had accused Darwin of

being an unbeliever. Lewis explains that Darwin only meant that

one’s relationship with God is a personal matter, which does not

conflict with a scientist’s duty to investigate reality impartially.

Whatever we think of Darwin’s theory, he was a model example of

using the scientific method to further our knowledge of reality. “We

should not make a rigid judgment against the value of this theory,

since it hasn’t been sufficiently test yet.”78 Lewis continues: “It is

clear that the scientific method correctly applied does not make men

turn away from their religion,” and Darwin had testified to God’s

greatness and acknowledged Him as the Creator of the laws of

nature. “By studying nature, we learn about the way God established

it, but through revelation we learn who and what God is.”79 Lewis

concludes that whoever follows a revealed religion should rejoice in

God and in the progress of science, for whatever appears in one con-

trary to the other will vanish in the course of time and the reality will

be made manifest.80

### 1.9 Yusuf al-Ḥá’ik responds to one of Lewis’ critics

A scholar had written a letter to *al-Muqtaṭaf* objecting to Lewis’

speech to the graduating class at the Protestant College. The scholar

wrote: “He [Lewis] referred to Darwin as a model scientist, showed

esteem for his ideas, and did not attempt to refute them, nor did he

mention that many of the greatest scientists of our time consider

them to be absurd and devoid of proof.”81 Ḥá’ik counters this criti-

cism in a reasonable manner:

We know that many of the scientists are unbelievers, but this does not

mean their works, discoveries, and inventions should not be accorded

great respect …. True religion does not contradict science … for

what is science except an explanation of the laws by which God

caused the universe to operate. Scientists who believe in God and

those who don’t both agree in investigating realities, but they differ in

that the former recognize God as the originator of the laws and the lat-

ter do not. There is no objection, therefore, if a believer refers to the

theory of a learned nonbeliever in a scientific meeting …. If it is not

correct, science itself will disprove it; if it is correct, man will not be

lowered from his high station.82

### 1.10 Shiblí Shumayyil and Ludwig Büchner

In 1884, Shiblí Shumayyil, a Lebanese Catholic, published his trans-

lation of Ludwig Büchner’s commentary *Sechs Vorlesungen über die*

*Darwinsche Theorie*83 in his book *Falsafat al-Nushú’ wa’l-Irtiqá’*

(The Theory of Evolution), raising a vehement intellectual response

among Muslims and Christians alike. The reason for this response

was that Shumayyil, via Büchner, understood Darwin’s theory as a

call to materialism. Büchner wrote, in defense of materialism:

“Perhaps the greatest philosophical achievement of Darwin’s theory

is its removal, by categorical proofs, of the belief in final causes

from the sphere of the natural sciences and from science in general.

… His theory has explained to us the correct causes [of speciation],

and its proofs are derived not only from philosophy but from nature

and living specimens as well.”84

The materialist does not accept as explanations for natural phe-

nomena what the senses or scientific instruments cannot detect.

Thus Shumayyil states: “Man … and whatever is in him derives

from nature. This is the truth, and there is no reason for doubting it

today …. Nothing in his composition indicates a connection to the

world of spirit or to a hidden reality …. He is like the animal phys-

iologically and like the mineral chemically. He is distinguished from

them only in quantity, not quality, and in form not essence.”85

Büchner held that matter never disappears but is simply trans-

formed from one form or state into another according to the law of

change, which applies not only to living organisms, as Darwin

demonstrated, but to energy and the atomic elements as well. All

result from the continuous transformations of matter.86 Matter and

its motion, therefore, are the ultimate, self-evident basis of all that

exists.87 Shumayyil says that Darwin proved the transmutations of

biological populations with scientific certainty and disproved the

fixity of species through special creation, showing instead that they

are produced necessarily by the laws of nature and never cease to be

generated and destroyed as one succeeds another.88

One of Shumayyil’s followers, Salama Musa, wrote *Muqdimat al*-

*Superman* (The Advent of Superman) and *Naẓariyat al-Taṭawwur*

*wa Aṣl al-Insán* (The Theory of Evolution and the Origin of Man).

He was very interested in eugenics and wished his countrymen to

discontinue allowing physically or mentally handicapped persons to

marry. Instead of natural selection, which he felt was no longer fea-

sible in the case of human beings, he wanted to use artificial selec-

tion to produce children with optimum physical and mental charac-

teristics.89

### 1.11 Refutations of materialism

The editors of *al-Muqtaṭaf*, unlike Shumayyil, denounced material-

ism. Faris Nimr in an address titled *Fasád Falsafat al-Máddiyín*

(The Falsity of Materialistic Philosophy), published in *al-Muqtaṭaf*

in 1883,90 rejected the opinion of the materialists that the actions of

the soul are no more than the effects of matter, and likewise that

feelings, intelligence, and human will are merely the actions of the

brain.91 He upheld instead that the mind is independent of the brain,

which is only the instrument of the former.92 Sarruf, in his own

commentary against materialism at a later date, called World War I

the end result of materialistic philosophy unguided by morality or

belief in the divine force that created, organizes, and controls the

world.93

Another critic of the materialists’ use of “struggle for survival” to

justify the war was Jurji Zaydan, the editor of *al-Hilál*. Influenced

by Henry Drummond’s philosophy in *The Ascent of Man*, that “love,

cooperation, and friendship are also laws of nature, and are necessary

for evolution in all living organisms,” he emphasized that the more

a society exhibits cooperation and self-sacrifice, the more evolved it

is.94

A letter of ‘Abdu’l-Bahá (which will be discussed in Section 4)

makes the very same points. Although not favoring religion, Ismail

Mazhar also opposed materialism because it did not answer the

question of the origin of life. He admitted that the forces acting to

produce speciation were still unknown and he interpreted the law of

struggle for survival to mean “struggle against an adverse environ-

ment,” whereas “mutual aid governed living organisms.”95

### 1.12 Arabic speaking essentialists

Among the Arab Christians, Father Louis Cheikho took a strong

stand against Darwinism and opposed the moderates at *al-Muqtaṭaf*.

In regard to species, he held that each was a special creation, simi-

lar to a “small seed which contains in it the roots, branches, and

flowers of a tree,” such that “wheat seeds do not produce beans and

the seeds of beans do not yield wheat. Therefore, animals could not

produce humans or man evolve from animals.”96 Another Christian,

Rufail Hawawini, writing in 1906 in the Arabic paper *al-Kalimah*

published in New York, said that “all species were created separately

and that man, no matter how diverse, came from one root, Adam.”97

1.12.1 *Jamál al-Dín al-Afghání*. Among Muslims, Jamál al-Dín al-

Afgháni was a firm opponent of Darwin’s theory. He wrote *al-Radd*

*‘ala’l-Dahriyín* (The Refutation of the Materialists) in 1881 in

Persian; it was later translated into Arabic by his follower,

Muḥammad Abduh, and published in Egypt. Although he was not

well-informed about Darwin, whom he classified among the materi-

alists, his views were typical of many of his fellow Muslims. He

commences by reminding his readers that one of the first material-

ists was Democritus, who believed that the “whole universe is com-

posed of small hard particles that are naturally mobile, and that they

appear in their present form by chance.”98

Referring to Darwin and his supporters, he explains that they

“decided that the germs of all species, especially animals, are iden-

tical, that there is no difference between them, and that the species

also have no essential distinctions. Therefore, they said, those germs

transferred from one species to another and changed from one form

to another through the demands of time and place, according to

necessity and moved by external forces.”99 Mistakenly, he relates

that Darwin has man descending from the ape and the orangutan. In

short, he is especially critical that the diversity of species and the

perfection of organs could occur by chance without the benefit of

intelligent direction. He says:

If one asked him [Darwin]: What guided those defective, unintelligent

germs to the production of perfect and sound external and internal

members and, limbs, whose perfection and soundness the wisest men

are unable to fathom, and whose benefits the masters of physiology are

unable to enumerate; and how could blind necessity be the wise guide

of the germs toward all these perfections of form and reason—natu-

rally he could never raise his head from the sea of perplexity.100

Against the idea of some materialists that the simple elements

form themselves into complex and stable forms, he asks:

How did these separate, scattered particles become aware of each

other’s aims and by what instrument of explanation did they explain

their affairs? In what parliament and senate did they confer in order to

form these elegant and wonderful beings? And how did these separate

particles know that if they were in a sparrow’s egg they must there take

on the form of a grain-eating bird, and that its beak and maw should

be so formed as to make its life possible?101

1.12.2 *Ḥussein al-Jisr*. Ḥussein al-Jisr, a Shi‘ite jurist from Lebanon,

won a prize from his patron, Sulṭán ‘Abdu’l-Ḥamíd, for his book *Al-*

*Risála al-Ḥamídáya Haqíqa al Díyána al-Islámiya wa Haqqiya al-*

*Sharí‘a al Muḥammadíya* (The Praiseworthy Epistle on the Truth of

Islam and Islamic Canon Law) published in Beirut in 1887. In one

part of the book, he argues against Darwin’s theory and supports

“the theory of creation and the independence of species” (*madhhab*

*al-khalq wa istiqlál al-anwá‘*). He is reasonable enough, however, to

state that should the evolution “hypotheses become established by

categorical proofs which haven’t a chance of contradiction or refu-

tation, Muslims should accept them” and interpret the Holy Book so

that the two views are compatible.102 But he is clear that Muslims

would continue to hold God as the real First Cause of the universe,

who had chosen to create the world via natural laws and secondary

causes. Whether God created the species independently and all at

once in the beginning or gradually by means of evolution, deriving

some from others, Jisr maintains that “either of these two beliefs …

would suffice Muslims to prove the existence of God and to ascribe

to Him the attributes which these signs indicate.”103

Jisr argues, however, that the proofs for the theory of evolution

are weak and against the obvious meaning of the Qur’án and the

Bible, which indicate that God created species independently, not

derivatively (cf. Genesis 1:10–31). He adds that although the Holy

Texts are clear on independent creation, they are not clear on

whether species were created all at once or gradually.104

As for the proofs used to support Darwin’s theory, Jisr relates and

then refutes three of them, saying that none are categorical evidence

for evolution. The first proof is that the existence of trace members

or vestiges, which now have no use, indicate that the species has

changed. If each species was independently created, why are these

useless vestiges present? They must have been of use to an earlier

species which has since evolved so that they are no longer necessary,

and only their traces remain; or they indicate that the species is cur-

rently changing into something else where they will be of use.105 In

response, Jisr asks: “What prevents these vestiges from having a

use? They may have a wisdom which is hidden to you, just as the

uses of many things existing in plants and animals are hidden from

you.”106

The second proof is that the oldest layers of sedimentary rock

contain fossils of the most primitive plants and animals, and the lay-

ers higher up contain more evolved species. If the theory of inde-

pendent creation is true, both the most primitive and the most

advanced species should be found in each of the geological strata,

but this is not the case. Consequently, the origin of the higher

species must be the ancient primitive species, which changed in

form and evolved until they appeared as they do today.107 Jisr coun-

ters that God may have created the most primitive plants and ani-

mals first in accordance with the earth’s primitive state. Then when

the earth’s environment began to change, He created independently

a new group of more advanced species suitable to the new condi-

tions, not deriving them from the more primitive species. The old

species became extinct due to natural disasters or from competition

with the new species. This process of new independent creation and

extinction continued, proposes Jisr, until the present species

appeared and accounts for the fossils of ancient extinct species

found in the strata of rocks.108 This was also the position of the

British geologist Charles Lyle mentioned above.

The third proof constitutes the four laws by which the transmuta-

tion of species and the extinction of the primitive by evolution take

place. The first is the law of inheritance, which states that the off-

spring will inherit the characteristics of the parents. The second is

the law of variation, which means, inheritance notwithstanding, the

offspring will differ in some characteristics from the parents. The

third is the law of struggle to survive, in other words, species com-

pete with each other to acquire the means of subsistence, and some

are destroyed by others or by natural disasters. The fourth is the law

of natural selection, which means the strongest and most fit will

endure, while the weakest and least fit will perish.109 Jisr accepts

two of the laws without hesitation, because they do not contradict

creation. He says: “As for the law of inheritance, this is an evident

thing which Muslims do not deny …. Similarly, we do not object to

the struggle to survive. As a result of this law, some species survive

while others perish and return to God.”110 But he interprets the law

of variation in a different way. Similar to other essentialists, he says

the variations that occur in individuals are accidental and not essen-

tial, so that they cannot become the means of transforming one

species into another.111 Even if the variations of individuals within

a species continue for millions of years, this could not change the

species, which is fixed. The law of natural selection, explains Jisr,

is a natural consequence of the other three, so it is also compatible

with the existence of species by creation.112 With his refutation fin-

ished, Jisr concludes that the theory of creation is superior to that of

evolution.

1.12.3 *Abu al-Majd al-Iṣfahání*. The last Muslim thinker to be con-

sidered here, also a contemporary of ‘Abdu’l-Bahá, is Abu al-Majd

Muḥammad Riḍá al-Iṣfahání, a Shi‘ite theologian from Iraq. He was

acquainted with the views of Darwin’s critics and supporters and

wrote a two volume work called *Naqd Falsafah Darwin* (Critique of

Darwin’s Philosophy), which appeared in 1914. Of all the critiques

of Darwinism yet presented, his is the most knowledgeable and pen-

etrating. He accepted evolution in a special sense, as long as God

remained the Creator of all things by design (*qaṣd*) and choice

(*ikhtiyár*). In his introduction he warns his fellow believers to not

thoughtlessly reject Darwinism, and he castigates the materialists

for denying God:

As for how things were created, although all these species were creat-

ed independently and came into existence from the seal of nonexis-

tence without changing from what they were at the beginning of their

creation, there is no clear text in the Book or the Sunna which is in

opposition to this theory. Whether the primordial ancestor of the camel

was a camel or not, or the most distant ancestor of the elephant was an

elephant or not, the evidence of their creation in each case is manifest

and testifies to the existence of a wise Creator. Therefore the rejoicing

of the materialists over this theory and making it the basis of their

heresy is most strange.113

By the materialists, Iṣfahání means specifically Ludwig Büchner

and his Lebanese follower, Shiblí Shumayyil, who were promoting

a concept that Iṣfahání considered extremely dangerous to the posi-

tive teachings of religion. He is eager to disassociate Darwin’s name

from the materialists, and he affirms that Darwin was a believer in

God by quoting his words in *The Origin of Species*: “‘The origin of

all these genera is five or six [ancestors] into which the Creator

breathed the spirit of life.’ But,” laments Iṣfahání, “the ignorant

among his supporters eclipsed this star and brought the utmost dis-

honor upon him and his theory.”114 Another reason Iṣfahání

admired Darwin was because he admitted the hypothetical nature of

his ideas, and Iṣfahání quotes him again, this time from *The Descent*

*of Man*: “Many of the ideas I have proposed are very hypothetical

and I do not doubt that some will be disproved by categorical

proofs.”115

Iṣfahání believed that scientific theories can only be established

by categorical proofs, and that no categorical proofs can contradict

the essential truth of religion. The believers, he is quick to point out,

do not deny the natural laws by which the Creator causes things to

occur.116

Despite his praise for Darwin, Iṣfahání has some serious criti-

cisms of Darwin’s theory. He starts with Darwin’s affirmation that

man is able to change just like other animals and is subject to the law

of inheritance, which allows the transmission of new characteristics

to the offspring.117 He observes: “The utmost that is proved by the

capacity to change is the possibility of transformation, but the acqui-

sition of the human form by this means does not refute its occur-

rence by another cause, like creation.”118

A second proof of Darwin for the descent of man from the animal

is based on the similar construction of their bodies, so that the pat-

tern of human bones, muscles, nerves, blood vessels, cells, and brain

are like that of an ape, bat, seal, and so on, indicating that man is

physiologically closely related to the animal and that they share

common descent. Iṣfahání states that Muslim thinkers have long

noted the physiological similarity between men and certain animals,

especially the ape, but they have not deduced from this their descent

from a common ancestor. That the organs are analogous does not

mean they are also homologous, i.e., they may be similar by design

but not necessarily because of a common physical ancestor. He

includes an especially interesting statement attributed to the Imám

Ja‘far al-Ṣádiq, according to *al-Mufaḍḍil*, from the *Kitáb al-Tawḥíd*:

Ponder upon the creation of the ape and its resemblance to man in

most of its members, i.e. its head, face, and shoulders. Its intestines are

also like the intestines of man. It is endowed with a mind and nature

by which it understands its master and imitates many of the things it

sees man doing, so much so that it is the nearest among created things

to man. Its characteristics … serve as an example to man with respect

to himself that he should know he is from the clay of beasts and their

origin …. Were it not for the excellence which makes man superior to

the beasts in thought, intellect, and speech, he would be like some of

the beasts. Although the ape has different features in the nose-mouth

structure, hanging tail, and hair enveloping its body, this would not

prevent the ape from catching up to man, were it given thought, intel-

lect, and speech like those of man.119

Notwithstanding physiological similarity, Iṣfahání argues that “mere

resemblance between two things does not require their transmuta-

tion from a third thing, or the change of one into another” because

these species are different in essence.120

Darwin’s third proof is that the embryo of man in the beginning is

almost no different from the embryos of other vertebrates. Then

gradually, differences appear, indicating that the legs of lizards, the

limbs of mammals, the wings of birds, and the arms and legs of man

have all evolved from one original form. Iṣfahání rejects this idea

that ontogeny recapitulates phylogeny, firstly, because of the revela-

tion of Haeckel’s forgeries of the stages of embryonic forms; but

also for the following reasons: (1) the comparison is limited to

species that reproduce sexually; (2) some animals jump from one

stage to another but omit the stages in between; (3) some animals

may advance, then decline, then advance again. As an example of

the second, Iṣfahání says: “You find two animals of one species ….

whose embryos grow in different ways. Frogs usually pass through

the stage of having gills, but in America there is a species of frog

that doesn’t pass through this stage.”121

Darwin’s fourth proof is that the existence of vestiges, or trace

organs, in man and the higher animals, such as breasts in the human

male, the wisdom teeth, etc. indicate common descent. They have

become vestiges due to lack of use.122 Iṣfahání counters that the sci-

ence of physiology, which studies the functions of organs, did not at

first know the functions of many of the organs. For example, heart

valves used to be considered trace organs until their use in the cir-

culation of the blood was discovered. The small number of remain-

ing vestiges may also have functions of which we are still

unaware.123 Iṣfahání also undermines the proof in another respect:

If we agree there is no actual use for these organs now, how do we

know they were functional to man in the past. Perhaps they will be

functional in the future. According to evolution, the organs do not

come into existence all at once, but they are completed gradually ….

They began to appear in one of the ancient epochs and did not cease

to become more perfected over millions of years until they reached

maturity and were ready to perform their functions. It is evident that in

those past eras, these presently active members would have been con-

sidered an excess.124

As an example, Iṣfahání says the breasts of a girl at first are not

functional, but they grow gradually until maturity, when their func-

tion is realized for nursing children. He holds that such changes to

species through evolution do not negate the immutability of the

species forms of things. He concludes: “The utmost they have

proven is that these organs were in man formerly, and he had need

of them, but is now independent of them. This does not prove that

he was an animal, even according to their principles …. Rather, the

hand of divine wisdom produced them [changes in organs] as they

were needed.”125

Iṣfahání also discusses the discovery of fossil remains like

Neanderthal and Java man, which were being put forward as inter-

mediate links to prove the descent of man from the animal. He says

of Java man: “Its skull being intermediate in size between apes and

man does not prove that its owner was intermediate between them.

Some men have brains smaller than some animals, and some ani-

mals have larger brains.”126 In regard to the discovery of

Neanderthal man, he similarly concludes: “All that these discover-

ies succeed in proving is the existence of a kind of primate … nearer

to man than the presently evolved apes. The descent of man from it

is not proved.”127

The depth of Iṣfahání’s understanding of Darwinism is evident in

his criticism of some contemporary scientists who were trying to

find a link between man and present-day apes. Iṣfahání asserts they

have misunderstood an important aspect of Darwin’s theory, which

is that no present forms derive from other present forms; rather

Darwin holds that each species is the end of a long series of trans-

formations from a common unknown ancestor.128

Similar to Jisr’s response to the four laws of evolution above,

Iṣfahání has no trouble accepting them from the standpoint of reli-

gion, except for the law of variation. Darwin based this law on the

premise that no two individuals are alike. Everything has some new

variations, and these variations are the cause of new species by con-

tinuous deviation from the parent population.129 Iṣfahání responds:

“These philosophers insist that this [i.e. random variation] is the

cause of all beings … but it is necessary for them to prove that these

variations are not limited by a law or that there is not a law behind

the species which derives some of them from others.”130 Later in his

book, he perceptively notes that the main problem with Darwin’s

“theory are the laws of differentiation, which still aren’t known, and

are preserved for the twentieth century to discover.”131

At this point, Iṣfahání has arrived at the heart of the controversy

between the essentialists and the Darwinists, and he is commend-

ably candid about the problems both sides face on the issue of spe-

ciation: “What they say [i.e., in favor of Darwinism] could be true if

there is no distinction between accidental and essential attributes, or

if they are able to prove that variations apply to essential things.”132

He next quotes Büchner’s response to the essentialists:

The opponents of Darwin … claim changes apply to accidents only,

like color, skin, and stature, and say such changes do not apply to the

essence (*jawhar*), but Darwin explained the error of their claim and

established that the tendency to change does extend to the essence. He

said that the distinction between the species and the variants is diffi-

cult to ascertain and scientists maintain many differences over this

issue; they do not have an accepted definition for it [species].133

Iṣfahání answers Büchner in a manner reminiscent of John Locke

and Thomas Wollaston (see 1.4 above): “We say that establishing

[the limits of] the species is a question belonging to the Exalted

Wisdom, and it cannot be attained by way of the natural sci-

ences.”134 In other words, Iṣfahání believes that the laws determin-

ing independent species are known only to God and cannot be ascer-

tained by physical classification.

The next part of Iṣfahání’s criticism turns upon the supposition of

the Darwinists that random variation and natural selection are suffi-

cient to explain the countless variety of living beings. These laws do

not explain, he argues, “the causes by which things exist” nor the

causes of their order and perfection. “They only explain the causes

of their survival and the reason they are not destroyed after their

existence.”135 Like Pictet (see Section 1.3), he objects to the idea

that natural selection by itself should select organs that as yet have

no benefit, and which may even be detrimental to the organism’s

immediate survival, because “nature according to them [Darwin and

his supporters] is blind; if this is so how can it single out the aug-

mentations which have no benefit except after a long period of

time?”136

Iṣfahání, having undermined Büchner’s interpretation of

Darwinism, explains that “what is meant by the philosophy of cre-

ation is the theory of the independence of species (*istiqlál al-anwá‘*)

and their non-evolution from each other. If we have defended this

philosophy, it is a purely scientific defense, not religious.”137

Although upholding independent creation, Iṣfahání combines it with

a special understanding of evolution. A definition of evolution

(*al-irtiqá‘*) which he finds acceptable is the following: “It is the

movement of living bodies toward perfection.”138 “The universe,”

he says, “has a wise director who brings all things into existence as

they are needed and annihilates them when they serve no purpose.

He does so gradually, both bringing into existence and destroying,

according to the requirements of the divine system.”139

In other words, he believes that species are more or less evolved

in relation to themselves but not in relation to each other, because

each creature is perfect in its place and its organs suit its environ-

mental niche. So he argues against Spencer, who defined evolution

as a decrease in homologous organs and increase of diverse organs:

In short, if one organ fulfills a number of functions without deficiency

and fulfills all the animal’s needs, then there is no need for other

organs to divide up its functions; nay, those organs would be an excess

and could be harmful …. The existence and state of these things is not

evolution and their lack is not considered a decline. For example, you

may consider the mole primitive because its eyes are undeveloped, but

it does not need its sight.140

As for how evolution and creation work together, Iṣfahání con-

cludes with the following conception:

What can we say against the Divine Power if He created the horse after

numerous transformations due to His knowledge that it cannot at once

become the form of a horse, but according to the most perfect system,

must first wear other more primitive forms? Or what can we object if

different exigencies due to different times, new changes it the envi-

ronment, and changes in the means of subsistence, required the forms

of the ancestors of the horse to change, so that their shape in each stage

was conformable with what suited the circumstances and conditions of

the environment. How absurd to consider the destruction of the pillars

of teleology the fruit of this philosophy!141

\* \* \*

In summation, Muslim thinkers, in general, rejected Darwin’s theory

insofar as it called for speciation by random variation and natural

selection alone and failed to allow for the role of God’s wisdom in

the creation of species. This is because they belonged to the same

teleological worldview supported by a large number of Darwin’s

contemporaries in Europe (see Section 1.1). Very few Arab

thinkers, whether Christian or Muslim, accepted materialism. Most

rejected it as a dangerous and unworkable doctrine. The editors of

*al-Muqtaṭaf*, Sarruf and Nimr, can be considered deists like Darwin

who believed that God had set the laws of nature into motion but did

not preplan the boundaries of species.

From the writings and talks of ‘Abdu’l-Bahá on the subject of

evolution, which will be examined in Sections 2 and 4, it is evident

that ‘Abdu’l-Bahá was familiar with the contemporary debate on

this theory in the Arab world and knew, generally, the views of

Darwin’s supporters and detractors. It is also possible that ‘Abdu’l-

Bahá subscribed to the journal *al-Muqtaṭaf*, and that he had an

opportunity to familiarize himself with the issues.142 In his table

talks, published as *Some Answered Questions*, given to Laura

Clifford Barney in ‘Akká’, Palestine, between the years 1904–1906,

‘Abdu’l-Bahá does not mention by name any of Darwin’s support-

ers. He calls those who uphold speciation by transmutation “certain

European philosophers,” and designates those who believe in the

divine creation of species “theologians” (*iláhíyún*). He reserves the

term “materialists” (*máddíyún*) for those who allow for no ultimate

reality beyond matter.

[Photograph]

‘Abdu’l-Bahá

“Man was always a distinct species, a man, not an animal.”

Section 2
The originality of species

Among the key concepts that ‘Abdu’l-Bahá proposes in his talks on

evolution is the concept of the “originality of species” (*aṣálat-i*

*naw‘*), which is pivotal to understanding his response to Darwinism.

By “originality” here is probably meant the state of being “the

source or cause from which something arises” or “not secondary or

derivative.” The expression *aṣálat-i naw‘* (originality of species) is

used by ‘Abdu’l-Bahá in *Some Answered Questions*,143 twice in

Chapter 47, twice in Chapter 49, and once in Chapter 50 in the vari-

ant form aṣlíyah. In each case, it is used as an alternative to the

Western theory of the “transmutability of species” (*taghyír-i naw‘*)

proposed by “certain European philosophers” (i.e., Darwin,

Spencer, Büchner, etc.). The position of the latter theory is that all

species, including man, are successive modifications of earlier

species through the natural selection of random variations in the

struggle to survive. ‘Abdu’l-Bahá, standing within the teleological

tradition, counters this theory by asserting that species are not

derived from each other; rather each has its own originality, or pri-

mary reality (*asálat*), and independence (*istiqlál*).

While affirming that evolution (*taraqqí*) of the biological form

has occurred, he qualifies this by saying that “progress and devel-

opment take place within the species itself,” not “from the genus to

the species.”144 Various Arabic words have been used by Arabic

speakers to translate “evolution,” such as *taraqqí*, above, and its

variant *irtiqá‘*, both of which mean to ascend, progress, and

advance. The word *nushú’*, meaning to grow and develop, is also

used, and the theory of evolution has been specifically termed *madhhab*

*al-nushú’ wa’l-taraqqí*. These words, however, do not capture the sig-

nificance of Darwin’s particular use of the term “evolution,” which

implies the transmutation of one species into another without any

underlying goal. It is clear that when ‘Abdu’l-Bahá uses “evolution”

favorably, it is not in the particular Darwinian sense of the word, but

in the general sense of progress leading to greater complexity and

perfection over time. Confusion may arise for the reader of ‘Abdu’l-

Bahá’s writings because he uses the same term to refer both to

Darwin’s theory, and to his own idea of evolution within the bound-

aries of species. Because of this, it is important to remember that

when ‘Abdu’l-Bahá uses the term “evolution” (*taraqqí*) favorably,

he means it in the general sense of the term.

Some may maintain that what ‘Abdu’l-Bahá is supporting is not

evolution at all but rather the temporalization and continuous

becoming of the great Chain of Being, a concept posited by some of

the philosophers already discussed. This is true if one defines “evo-

lution” in the Darwinian sense, but it is clear that “evolution” has

many other connotations, all of which are widely accepted in the

English language and all of which would be acceptable to ‘Abdu’l-

Bahá. For example, *Merriam Webster’s Collegiate Dictionary* (10th

edition) defines “evolution” as (1) “a process of change in a certain

direction: unfolding”; (2) a process of continuous change from a

lower, simpler, or worse to a higher, more complex, or better state”;

(3) “a process of gradual and relatively peaceful social, political, and

economic advance”; (4) “the historical development of a biological

group (as a race or species): phylogeny”; (5) “a theory that the var-

ious types of animals and plants have their origin in other preexist-

ing types and that the distinguishing differences are due to modifi-

cations in successive generations”; (6) “a process in which the

whole universe is a progression of interrelated phenomena.” Since

only definition number five is the Darwinian definition, it is fully

justified to say that ‘Abdu’l-Bahá supported evolution in the gener-

al meaning of this word.

The doctrine of the originality of species and the idea that species

only progress within themselves but do not transform gradually into

other species are consistently maintained by ‘Abdu’l-Bahá in both

his talks and his letters. For example:

Question.—What do you say with regard to the theory held by some

European philosophers on the evolution of beings? Answer ….

Briefly, this question will be decided by determining whether species

(naw‘) are original or not. For instance, has the species (*naw‘íyah*) of

man been established from the beginning, or was it afterward derived

from the animal?145

Now assuming that the traces of organs which have disappeared actu-

ally existed, this is not a proof of the lack of independence and non-

originality of the species (*naw‘*). At most it proves that the form,

appearance, and organs of man have progressed. But man has always

been a distinct species (*naw‘*), man, not animal. So, if the embryo of

man in the womb of the mother passes from one form to another so

that the second form in no way resembles the first, is this a proof that

the species (*naw ‘íyah*) has changed? that it was at first an animal, and

that its organs evolved until it became a man? No, indeed! How puerile

and unfounded is this idea and this thought! For the originality of the

human species (*naw‘*), and the independence of the essence (*máhíyah*)

of man, is clear and evident.146

In regard to “creation,” say to the historian that in the same way that

“divinity” and “lordship” have no beginning, “creativity” and “provision,”

and the other original divine perfections, also have no beginning and no

end. In other words, creation has existed from the beginning that has no

beginning and will last until the end that has no end. The species

(*naw‘íyah*) and essences of all things are permanent (*báqí*) and established

(*bar qarár*). Only within the limits of each species (*naw‘íyah*) do progress

and decline occur.147

In these quotations, as well as in other passages on this subject,

‘Abdu’l-Bahá frequently uses the term naw‘íyat (specificity or

species-ness), which is the abstract noun form of naw ‘ (species).

Since translating *naw‘íyát* as “specificity” or “species-ness” is awk-

ward in English, and also confusing, both *naw‘* and *naw‘íyat* have

been translated in this article by the single English term “species.”

What is critical now is to determine what ‘Abdu’l-Bahá intended by

the term “species” (*naw‘* and *naw‘íyah*).

It is the opinion of the author that ‘Abdu’l-Bahá had a particular

meaning in mind for “species” different from what most modern

readers understand by this term. Today, “species” primarily indi-

cates the theoretical classification of a biological form as determined

by its ability to reproduce sexually with similar organisms. This

view was probably also held by many of ‘Abdu’l-Bahá’s European

and American listeners in 1912, under the influence of Darwinism.

Although ‘Abdu’l-Bahá often does use the term species in a biolog-

ical sense,148 it is evident that he understood “species” primarily in

a Platonic sense. This is supported by the fact that he uses “essence”

(*máhíyah*) correlatively with “species” above. Among the philoso-

phers of Iran the term *máhíyah* has two precise philosophical mean-

ings. Professor Izutsu explains:

Máhíyah in Islamic philosophy is used in two different senses: (1)

máhíyah “in the particular sense” (bi-al-ma‘ná al-khaṣṣ), which refers

to what is given in answer to the question about anything “what is it?”,

the expression, *má huwa* or *má hiya* “what is it?” being the source of

the word *máhíyah* in this sense; and (2) *máhíyah* “in the general sense”

(*bi-al-ma‘ná al-‘ámm*) referring to that by which a thing is what it is,

i.e. the very “reality” (*ḥaqíqah*) of the thing.149

The word *máhíyah* in the particular sense is best translated by the

term “quiddity,” which refers to “what something is” without requir-

ing its actual existence. In other words, it is strictly a concept in the

mind, such as when we think of “man” in general apart from any

concrete instances of man. Man, in this sense, is called a “univer-

sal,” which in philosophy means the logical classification of indi-

vidual beings under a certain general type. Thus, individual human

beings are classified under the “species” humanity, which has been

conceptually abstracted from those same individuals, and so forth

for other species. “Species,” “quiddities,” and “universals” in this

sense refer to mental constructs derived from actual biological par-

ticulars. This is exactly the way modern science uses the concept of

“species” and it was also Aristotle’s understanding. But ‘Abdu’l-

Bahá is not using the terms *máhíyah* and *naw‘íyah* in this sense.

It is the second meaning of *máhíyah*, “that by which a thing is

what it is,” which corresponds to ‘Abdu’l-Bahá’s meaning. This is

the Platonic understanding, in which the terms *máhíyah* (essence)

and *naw‘íyah* (species) refer to a divine reality existing in a realm

outside of space and time, not to a human concept (see Sections 3.1

and 3.2 for more on the differences between Plato’s and Aristotle’s

views). The Greek *eidé*, translated into English as Platonic “Form”

or “Idea,” was the same word used for “species” among the Greek

philosophers. In Sufi terminology such reality is also called a “fixed

archetype” (*al-‘ayn al-thábitah*), in other words, the universal idea

of something posited in God’s knowledge prior to its actual mani-

festation as concrete existents in time. This usage of the term *‘ayn*

was commonly accepted among Islamic philosophers and mystics

by the time of Mullá Ṣadrá, who identified *‘ayn* (pl. *a‘yán*) with the

Platonic Ideas.150 William Chittick points out, however, that in Ibn

‘Arabí’s writings *‘ayn* should not be translated as “archetype,” but

rather as “entity,” because Ibn ‘Arabi did not regard it as a model for

many individual things in the Platonic sense.151 Though the arche-

types of things are commonly said to be fixed (*thábitah*), this term

would probably be better translated in the technical sense of the

posited. In other words, they are posited in God’s knowledge, not

necessarily fixed in God’s knowledge. Among Islamic philosophers,

*máhíyah* is also closely related in meaning to *dhát* (quintessence)

and *ḥaqíqah* (reality).

Given this context, where “species” is the correlative of “essence”

in a Platonic sense (Izutzu’s second definition above), it is seen that

‘Abdu’l-Bahá’s concept of “species” (*naw‘* or *naw‘íyah*) is not

equivalent to the modern scientific definition. Therefore, in order to

avoid the ambiguity that the term “species” standing alone con-

veys, the expression “species essence” will often be used in this

essay to signal the Platonic meaning (as opposed to the modern or

Aristotelian meaning) of ‘Abdu’l-Bahá’s concept of species.

Although some readers trained in modern sciences will find this

expression awkward, it is not altogether contrived, since Shaykh

Aḥmad also uses it (see Section 3.10).

Such species essences are necessary, according to Mullá Ṣadrá,

for two reasons: First, there must be one director for each biological

species which regulates, determines, and preserves its members;

otherwise those species will not be continuous but discontinuous, so

that a non-horse could eventually evolve from a horse, and a non-

human from a human, etc.152 Second, God must know things as

universals before He knows them as particulars in order to have a

plan (*‘ináyah*) for the cosmos; otherwise the universe would not be

a system but a haphazard flow of events.153

As an archetype, the species essence is in a special sense a uni-

versal, but in an entirely different way than the logical universal. In

God’s knowledge, archetypes are causative of actual existents, not

derivative from them (as are logical universals). Because it is one in

relation to the many that it causes, it is in this sense only a univer-

sal. Temporal or biological existents are accidents dependent on

their species essences. ‘Abdu’l-Bahá also follows this way of think-

ing. For example:

This general [external] existence is one of the accidents inhering in the

realities of beings, while the essences (*máhíyát*) of beings are the sub-

stance (*jawhar*) …. Certainly, that which is the substance is superior

to that which is the accident, for the substance is the origin, and the

accident is the consequence; the substance is dependent on itself,

while the accident is dependent on something else; that is to say, it

needs a substance in which it subsists.154

The word *jawhar*, usually used to translate Aristotelian “substance,”

is another Arabic philosophical term which is sometimes used in a

sense nearly equivalent to *máhíyah*.

Inasmuch as the essences or potentialities of all possible creatures

exist timelessly “with” God, ‘Abdu’l-Bahá proposes that “the species

and essences of all things are permanent and established.”155 In short,

when ‘Abdu’l-Bahá refers to a “species” he means the species reality,

not its accident or reflection in matter at some particular time point in

its changing reflection. Although the biological definition of a species

as “able to have fertile offspring” is a good working definition, at root

it is the characteristics of the definer of the species, the actual species

essence, that determine the species (cf. John Locke’s idea of a “real

essence” in Section 1.4).

The debate, then, between ‘Abdu’l-Bahá and “certain European

philosophers” who have proposed the theory of the transmutation of

species is more philosophical than scientific in nature. The question

is: Does the present form of a biological population depend solely on

material factors (such as natural selection and random mutations), or

does it depend also on timeless laws designed by a transcendent

Creator? This is not a scientific question, according to scientists,

because its answer, one way or the other, cannot be falsified by obser-

vation and experimentation.156 To be scientific, a hypothesis must be

subject to a process of empirical verification which may falsify it. A

philosophical argument, on the other hand, may have as its object

things which cannot be proven or disproven by science (such as the

existence of God, purpose, and timeless laws of nature) but which can

be established by reason and rational proofs.

The difference between how ‘Abdu’l-Bahá and his Western audi-

ence understood the implications of the term “species” would account

for the ambiguity that is apparent in discussions of the writings and

talks of ‘Abdu’l-Bahá on this subject. ‘Abdu’l-Bahá concurred with

the views of “the philosophers of the East,” in other words, the

philosophers of Islam and the Greek philosophical tradition from

which they borrowed. In one of his talks, as already mentioned, he

associates his views on the originality of species with these Eastern

philosophers. It is this tradition that will now be examined in hopes

of coming to a clearer understanding of ‘Abdu’l-Bahá’s position.

Chimpanzee illustrated

in a drawing from *The Animal Kingdom* (1817). By this

time, both chimps and orangutans were well known in

Europe. The gorilla had not yet been described. Still, the

discovery of apes so similar to human beings gave rise to

questions about the relationship of humanity to other

members of the animal kingdom.

Section 3
Species, Essence, and Becoming:
The Views of the “Philosophers of the East”

## 3.1 Aristotle

The two variant understandings of what a species is go back to the

dispute between Plato and Aristotle on the nature of form. Is a

species: (a) determined solely by the biological form and, therefore,

a mental construct? or (b) determined by an immaterial, archetypal

form which is beyond the direct grasp of the human mind and is,

therefore, a reality of nature? For Aristotle (384–322 b.c.e.), the only

form of things is the form immanent in the matter of-actual existents,

the form of particular individuals: this tree, this man, this horse, etc.

He called these “primary substances.” Mayr says that historians of

science have recently recognized in Aristotle’s immanent form the

equivalent of the genetic program of modern biology by which the

next generation assumes the form of its parents.157

According to Aristotle, primary substances are the fundamental

realities of the world to which accidents, such as quantity, quality,

relation, place, position, time, state, activity, and passivity can be

predicated. “All the other things,” he explained, “are either said of

the primary substances as subjects or in them as subjects …. If the

primary substances did not exist it would be impossible for any of

the other things to exist.”158 Although individual entities undergo

change in respect to coming-into-being and going-out-of-existence,

alteration of quality, growth or diminution, and change of place

(motion), the essences of these primary substances are fixed and

unchanging. In other words, it is not the substance itself, as subject,

that is changing but only its accidental qualities. Change is the

exchange of one accidental quality for another, and is therefore an

accidental feature of reality. This type of philosophy, based on

unchanging primary substances, is therefore called substance meta-

physics—as opposed to process metaphysics, which places change

itself into the category of substances.

The very first things predicated of primary substances, before any

other qualification, are species and genera, which Aristotle termed

“secondary substances.” Secondary substances do not subsist inde-

pendently, but because of things predicated they most reveal the

primary substance, they have been honored by the designation “sec-

ondary substance.” They are not, however, true substances, because

they have only a mental reality. Aristotle says:

Of the secondary substances the species is more a substance than the

genus, since it is nearer to the primary substance. For if one is to say

of the primary substance what it is, it will be more informative and apt

to give the species than the genus. For example, it would be more

informative to say of the individual man that he is a man than that he

is an animal.159

As regards the primary substances, it is indisputably true that each of

them signifies a certain “this”; for the thing revealed is individually

and numerically one. But as regards the secondary substances,

although it appears from the form of the name (when one speaks of

man or animal) that a secondary substance likewise signifies a certain

“this,” this is not really true; rather, it signifies a certain qualification,

for the subject is not, as the primary substance is, one, but man and

animal are said of many things.160

The species form, Aristotle stated, is coincidentally identical in all

members of a species but not numerically one. Only primary sub-

stances, i.e. actual individuals, are one. The logical universal

abstracted by the mind from concrete individuals (which are the pri-

mary realities), such as “man” abstracted by observing human indi-

viduals, corresponds to the real specific form immanent in them. But

it does not exist apart from individual concrete beings in any man-

ner whatsoever, except as a derivative mental construct.161

In such a cosmos, where the individual entities themselves are the

ultimate realities, Aristotle did not see the need for Forms, or Ideas,

separated from the physical world, as taught by Plato, to act as causes

to the biological forms of species taken as a whole. For Aristotle

another member of the same species is sufficient to provide the form

(concealed in the seed or sperm) unchanged to the next generation

of the species. “So it is evident that there is no need at all of setting

up a Form as a pattern … but that which begets [i.e., a man, a horse,

etc.] is sufficient to produce and to be the cause of the form in mat-

ter.”162 In other words, the species form is passed on by the biolog-

ical begetter, which is Aristotle’s “efficient cause,” and this efficient

cause must precede that which it generates and be fully developed

itself.163

A beginning for this process, or a source of its existence, is not

envisioned by Aristotle. In Aristotle’s system, God (or the First

Mover) is the “final cause” of things, not actively, but passively as

an object of desire, for God’s only act is to eternally contemplate

himself. In other words, as the supreme and most perfect being in

the universe, He indirectly moves other beings to emulate Him and

thus obtain their own inherent perfection.164 God does not bestow

existence on anything, nor is He concerned with the other beings in

the universe, since He confines His activity to contemplating him-

self as the only object worthy of His thought. Unlike Plato, for

whom species are planned by a ruling, ordering Mind (*Phaedo* 97c)

and are materially created in time, for Aristotle biological species

are causes-to-themselves, always have been as they are, and repeat

themselves endlessly in a universe co-eternal with God. There is no

possibility of an act of divine creation in the biblical or quranic

sense in Aristotle’s system, nor for any form of evolution. However,

his conception of species as mental constructs and not realities of

nature, and his emphasis on the individual, is almost identical to the

position held by modern population biologists.

## 3.2 Plato

Plato (428–348 b.c.e.), on the other hand, taught the existence of a

Creator existing independently of the physical universe, who fash-

ioned the cosmos out of pre-existing materials, which were in a state

of chaos, by means of eternal, primary patterns, which, Plato called

Forms, or Ideas.165 These are not the conceptual universals origi-

nated and comprehended by the human mind taught by Aristotle, but

eternal, objective, incorporeal realities, such as “Beauty itself,”

“Justice itself,” “Man himself,” etc. Plato arranged these realities

(not beings) into a hierarchy of more universal and less universal

Ideas, and said it is only possible to know them in this world by the

process of dialectic.

The Ideas, which in modern terms are equivalent to laws of

nature, correspond to reality itself. To know them is to know the

truth about the best order of things, the pursuit of which Plato called

the purpose of human existence. For example, Socrates, Plato’s prin-

cipal speaker in the dialogues, would ask: “What is it that makes a

beautiful thing beautiful or a just act just?” If what makes something

beautiful or just is only relative to the thing itself, as the Sophists

claimed, then how is an objective criterion for these attributes in the

real world possible? Socrates’ answer was that beauty and justice

are not relative; rather they subsist in themselves, apart from their

particular, temporal expressions, as part of an intelligible natural

order of things. It is by the degree of their reflection of “Justice

itself” that the acts of particular human beings can be called just.

The best society, therefore, will be that in which the acts of its cit-

izens mirror the principle of justice laid down in the natural order.

But none of these acts are Justice itself, only imperfect approximations

of it. Similarly, what makes a flower or a work of art both beautiful is

their common participation in an ideal standard of beauty in the world of

Forms. What determines the forms of natural species is also not relative

or haphazard to Plato, since objective criteria for all species and all nat-

ural functions required for the harmonious functioning of the whole cos-

mos exist in the domain of separate Ideas.

Since the Forms cannot be known directly, one can only approach

them through their particular likenesses in sensory experience. This

requires one to use inductive reasoning and to engage in dialectic, an

objective process of questioning and answering, until one finds an

answer coherent with observable facts. Plato explained that insofar

as such an answer is based on fluctuating particulars, it is called

opinion; but insofar as it accurately reflects the Idea-Forms, it is true

knowledge.166

Some Forms are inclusive of others, and the supreme, all-encom-

passing Form Plato called the Form of the Good, which provides

both existence and reality to all the other Forms.167 This is a crucial

point, because it implies that the system of Forms is determined by

the Good. In other words, the Forms are related to each other in the

way they are because this relation is good and results in the best pos-

sible universe. The Creator, who is a being with a “mind,” is not the

same as the Form of the Good, which is a reality. Plato says: “Mind

in producing order sets everything in order and arranges each indi-

vidual thing in the way that is best for it.”168 So the Idea of the Good

contains in itself all the kinds of goodness necessary to make a cos-

mos out of the inherent disorderliness of the preexisting matter.169

Proclus, one of Plato’s commentators, explains that the hierarchy

of causative Ideas ranges from the most general to the most specific.

He says:

By the most general I mean those that are participated in by all beings,

so that nothing at all exists without a share in them—for example,

Being, Identity, and Otherness, for these extend to all things …. By

the most specific I mean those Ideas that are participated in by indi-

viduals, such as Man, Dog, and others of the sort. Their “makings”

have as their immediate result the generation of individual unities—

Man [the making] of individual men, Dog of particular dogs, and

Horse and each of the rest in like manner. I call intermediate those

ideas that have wider application than these, but are not active in

things. Justice, for example, belongs to souls; but how could it be an

attribute of bodies …. Justice in itself, apart from all other ideas, illu-

minates only the beings that are capable of receiving it, and that is not

all things in general.170

Two of Aristotle’s criticisms of Plato’s Forms, which include the

species essences of biological beings, were that Plato did not explic-

itly locate them anywhere, nor, according to Aristotle, adequately

explain how they could be a cause of material forms while they are

separate.171 To Aristotle, a form must be in a material thing to cause

something, so how then can the same form be both in one particular

thing and in many other things at the same time? Plato’s answer, of

course, was that the Form is separate and acts as the model for the

many material forms which bear its likeness. In other words, the

material (or biological) form and the archetypal form are two differ-

ent things. Aristotle, it appears, did not accept Plato’s explanation

that the connection between the separate Form and the material form

is the creative action of the Creator, who is the ultimate mover of the

forms in matter (cf. *Timaeus* 28a, 53b, etc.). In other words, the

Creator fashions the material forms as a whole by taking the eternal

Ideas as His patterns, and in this sense the many “participate” in the

one of which they are a likeness.172 (The theory of Natural Law is

founded upon this system of Plato.)

According to Plato, the separate Forms “always are and never

become,” whereas the material forms are “always becoming but

never are.”173 The first are “intelligible and unchanging models”

(the causes of that-which-changes), the others “visible and changing

copies of their.”174 Here we have the beginning of the idea that

physical beings, progress toward a goal, which was such an impor-

tant concept to the essentialists who opposed Darwin (see Sections

1.4 and 1.6). In other words, physical beings are always in a state of

motion and naturally inclined to fulfill the potentiality determined

by their immaterial causes. Plato also proposed a third reality, akin

to Aristotle’s matter, as necessary for changing things to come into

actual existence. He called this “the receptacle” and “the nurse of all

becoming and change.” It is a formless, receptive medium in which

images of the models are enabled to appear and disappear as contin-

ually recurrent, similar qualities (cf. *Timaeus* 49a–5 1b).175

In sum, both Plato and Aristotle made valuable contributions to

the question of the nature of form, but from radically different per-

spectives. Aristotle, recognizing no transcendent cause for the *exis*-

*tence* of things, saw the universe as self-existent and self-ordering,

and from the perspective of biology, he determined that an earlier

member of one species is sufficient to pass on the specific form, for-

ever unchanged, from one generation to the next. Plato proposed, on

the other hand, that a temporal individual is insufficient to account

for the existence of the specific form of the whole species, and he

recognized the need of a separate organizing and existentializing

cause to act as its ultimate origin. Although the terminology is dif-

ferent, it is amazing that here at the very beginning of Western phi-

losophy the basic outlines of the debate between the essentialists and

Darwinists of the nineteenth century are already evident.

## 3.3 The Middle Platonists and the Church Fathers

As time and distance separated Aristotle and Plato from latter

thinkers, a movement grew, especially among Neoplatonists, to har-

monize the ideas of the two greatest philosophers of the ancient

world. Many forgot or overlooked that there were critical differ-

ences between the two.

As for where the Forms are located and what their relationship is

to the Creator, Plato was ambiguous on this point. In one passage,

he does admit that they are created by God (*Republic* x, 597b-e),

though elsewhere he says they are uncreated (*Timaeus* 52a). It was

left up to latter thinkers to make the connection between God and

the Ideas clear. The Middle Platonist, Albinus (c. 2nd century c.e.),

said: “The Idea, in relation to God, is his act of thinking,” and

Wolfson explains, that “by saying that there are Ideas he means that

God acts by certain rules and plans and that the order observed in

nature is not the result of mere chance.”176 Philo of Alexandria

(born c. 15 b.c.e.) and the Fathers of the Church placed Plato’s Ideas

in God’s Word, or Logos, by which He created the world at the

beginning of creation. Thus, the Word of God functioned as a kind

of intelligible blueprint, synonymous with Plato’s domain of tran-

scendent Forms, by which God voluntarily fashioned the form of the

world.

Plotinus (205–270 c.e.) posited a trinity of three universal causes

each separate in substance: ‘The One, who is beyond being; the

Intellect, which is both mind and being; and the Soul, which is the

intermediary between the Intellect and changing beings. Plotinus

placed Plato’s Ideas in the subordinate Intellect, not the One. The

doctrine of the Church, on the other hand, held that the three persons

of the trinity are one in essence and being, implying that since the

Platonic Ideas are the living and eternal thought of the Creator, they

are uncreated.

Augustine (354–430 c.e.) developed an idea, which he borrowed

from the Stoics, which places him close to the thinking of Darwin’s

essentialist opponents on how the Chain of Being might unfold in

the procession of time.177 The early Stoics viewed God as the

Active Principle containing “the active forms of all the things that

are to be,” which are like seeds, “through the activity of which indi-

vidual things come into being as the world develops.”178 Augustine

termed these seeds “seminal reasons” (*rationes seminales*). He has

God create these seminal reasons at the beginning of the world in the

humid element, and they unfold in time and manifest themselves as

environmental conditions become suitable for their development.

They are not purely passive, but tend to self-development. As

Copleston explains Augustine:

All plants, fishes, birds, animals, and man himself, He created invisi-

bly, latently, potentially in the germ, in their *rationes seminales*. In this

way God created in the beginning all the vegetation of the earth before

it was actually growing on the earth, and even man himself … For

example, God created in the beginning the *rationes seminales* of

wheat, which, according to God’s plan and activity, unfolded itself at

the appointed time as actual wheat, which then contained seed in an

ordinary sense …. Each species, then, with all its future developments

and particular members, was created at the beginning in the appropri-

ate seminal reason.179

Similar to but not the same as the seminal reasons are the divine

ideas or Platonic Forms, which for Augustine play an essential role

in God’s creative act. By them God knows things as universals prior

to their creation in time. In the *De Ideis*, he explains that the divine

ideas are “certain archetypal forms or stable and unchangeable rea-

sons of things, which were not themselves formed but are contained

in the divine mind eternally and are always the same. They neither

arise nor pass away, but whatever arises and passes away is formed

according to them.”180

## 3.4 William of Ockham

The view of the Church Fathers was upheld by almost all Christian

philosophers in one form or another until the time of Latin

Scholasticism, when the nature of universals became an issue.

Against the doctrine of Realism, which taught the independent exis-

tence of universals as unitary realities outside the human mind, the

opposing doctrine of nominalism, primarily associated with William

of Ockham (1299–1350 c.e.), was a return to Aristotle’s emphasis on

the individual form immanent in material things and the mere con-

ceptual existence of species. The term “nominalism” implies that

what we call a universal is a name only with no reality outside the

human mind, so that what exists in actuality are only singular, sep-

arated individuals. It is significant that Mayr singles out scholastic

nominalism as the precursor of modern population thinking.181

Ockham’s way marks the beginning of modern empiricism.

## 3.5 Alfarabi

Alfarabi (c. 870–950 c.e.) was the first of the well-known Islamic

philosophers who attempted to harmonize the views of Plato and

Aristotle. Most Islamic philosophers considered themselves loyal to

Aristotle in one sense or another, but they were really Neoplatonists,

influenced by that unique blend of Platonism and Aristotelianism

formulated by the successors of Plotinus. Many Islamic philoso-

phers were led astray in regard to Aristotle’s genuine position

because of the early misidentification of Plotinus’s *Enneads* with

Aristotle. They did not know Plotinus by name, but knew his work

as *The Theology of Aristotle*.182

Since Alfarabi’s ideas on species are the same as Avicenna’s

below, I will just mention here his theory of “becoming” as repre-

sentative of the Arabic-speaking philosophers in general. At the

basis of all material things is prime matter, which they share in com-

mon. Prime matter receives in succession alternating and contrary

forms, which Alfarabi says emanate directly from the Active

Intellect, an intellect intermediate between God and creation. The

first things to arise from this interaction are the elements, which in

turn combine into more complex bodies, such as vapors and solids.

In these elements and first simple bodies “arise forces by which they

move spontaneously toward the things for which they exist … and

forces by which they act and are acted upon.”183 Alfarabi continues:

From these the existence of all the other bodies follows by necessity.

First the elements mix with one another, and out of that many contrary

bodies arise. Then these contrary bodies mix either exclusively with

one another, or with one another and with the elements, so that there

will be a second mixture after the first, and out of that, again, many

bodies with contrary forms arise. In each of these, again, arise forces

by which they act and are acted upon …. These mixtures go on being

performed, one mixture following the previous one, but so that the fol-

lowing mixture is always more complex than the previous one, until

bodies arise which cannot mix with one another …. The minerals arise

as the result of a mixture which is nearer to the elements and is less

complex, and their distance from the elements is less in rank. The

plants arise as the result of a more complex mixture than theirs, and

they are a further stage removed from the elements. The animals

which lack speech and thought arise as a result of a mixture which is

more complex than that of the plants. Man alone arises as the result of

the last mixture.184

Alfarabi’s theory of how material things come into being is not a

precursor of Darwin’s theory of evolution, because the species

which appear as a result of the various mixtures of the elements are

predetermined by the Active Intellect, and there is no mention of

any modification of form after a mixture is completed. There is also

no indication here of how long this process of “becoming” takes.

Another element that is missing from this description is the idea of

“progress toward perfection,” which Sarruf noted was a concept that

the Arabic speaking philosophers added to Aristotle’s great Chain of

Being (see Section 1.6).

## 3.6 Avicenna

In his definitions of *naw‘* and *máhiyah*, Avicenna (980–1037 c.e.)

uses these terms in the customary manner of the Aristotelian logi-

cians. He says: “As for the species (*naw‘*), it is the essential univer-

sal which is said of many beings in answer to the question: ‘What is

it?’” or “The species is described as that which is said of many

beings multiple in number in answer to the question: ‘What is it?’,

like ‘human’ said of Zayd and ‘Umar.”185 In regard to *máhiyah*, he

defines it in the sense of quiddity: “Whoever asks ‘what is it?’ only

asks what is the quiddity (*máhiyah*) … which is realized in the sum

of its essential constituents … that enter into the quiddity in the

intellect.”186 Avicenna reserves the term *‘ayn* for concrete, particu-

lar existents, equivalent to Aristotle’s use of the term “primary sub-

stance” (see Section 2.1).187 As mentioned in Section 2, the Sufis

and *Ḥikmat* philosophers of Iran later adopted this term and used it

in the special sense of an immaterial causative essence.188

Avicenna maintained unchanged Aristotle’s division of being into

substance and accident. He also misunderstood the nature of Plato’s

Forms and made the typical Aristotelian critique: in other words, he

understood Plato to say that Forms exist both separately and, at the

same time, in the many particulars of which they are the form. He

logically rejects this view, saying: “It is impossible for the universal

animal to be a particular real animal, for it would then have to be

both walker and flyer, as well as not walker or flyer, and be both

biped and quadruped. It becomes evident, then, that the idea of uni-

versality, for the very reason that it is a universal, is not an actual

existent except in thought.”189

But with his conception of God as not merely the agent of motion

but also the giver of existence, Avicenna did come to a position sim-

ilar to what Augustine found to be implicit in Plato: God’s thoughts

are the causes of the existence of all things.

The Necessary Existent [God] is … a knower of Its own essence. Its

essence is the existentiator of things according to the order in which

they exist …. All things are known to It, then, due to Its own essence.

It does not become a knower of things because It is caused by them,

but on the contrary, Its knowledge is the cause for the existence of all

things. Similar to such knowledge is the (scientific) knowledge of the

builder with regard to the form of the house he has conceived. His con-

ception of the form of the house is the cause of this form in the exter-

nal reality.190

Though Avicenna has God creating things by His knowledge,

God does not create anything directly in Avicenna’s system, except

one thing, which is the first and only thing to emanate from God.

This is based on a philosophical principle accepted by most Islamic

philosophers that only one thing can emanate from what is itself

one. But this first emanation, commonly called the First Intellect,

has multiplicity introduced into it; it is hence a unity-multiplicity, a

one-many. Avicenna says: “This intellect is not … the True God, the

First. For although in one respect this first intellect is one, it is mul-

tiple inasmuch as it consists of the forms of numerous universals. It

is thus one, not essentially, but accidentally, acquiring its oneness

from Him who is essentially one, the one God.”191

Avicenna did not stop, however, with the universals in the First

Intellect as the formal causes of things. He went on in good

Neoplatonic fashion to add nine additional separate intellects, each

one emanating from the one above it, and each one also emanating

a soul and a heavenly sphere corresponding to its level in the celes-

tial hierarchy. The lowest of these intellects, called the Active

Intellect, emanated not only the matter of the sublunar world but all

of its forms.192

## 3.7 Averroes

Among the Islamic philosophers, Averroes (1126–1198 c.e.) was the

most faithful student of Aristotle. He made it his life’s work to

attempt to return to the true teachings of Aristotle, from which ear-

lier philosophers had strayed. He was surprisingly successful. In the

words of Gilson: “Aristotle had taught (*De Anima* i.1) that the

notion of animal is … posterior to the individuals from which it is

formed by the intellect. Averroes had concluded that the definitions

of “genera” and “species” are not definitions of real things outside

the soul, but of individuals, and that it is the intellect that produces

universality in them.”193

Although Averroes accepted the hierarchy of eternal incorporeal

intelligences corresponding to the celestial spheres, he rejected the

emanation scheme of Alfarabi and Avicenna and returned to

Aristotle’s position that the intelligences owe the existence of their

matters to themselves, while God is their formal cause only indi-

rectly as the supreme object of desire in the universe.194 He also

held the Aristotelian position that physical forms are due only to

physical factors, not to the influence of incorporeal realities as held

by Plato. His final view is summed up by Davidson: “At all events,

Averroes’ *Long Commentary on the Metaphysics* [of Aristotle]

unambiguously excludes the Active Intellect or any other incorpo-

real agent from the process whereby natural forms emerge; no incor-

poreal being serves as … the emanating source of animate forms ….

In inanimate nature—according to Averroes’ final view of things—

mechanical physical forces bring forms already existing potentially

in matter to a state of actuality.”195

Averroes’ ideas had little influence on other Islamic philosophers,

many of whom did not know of his work, but they did have a last-

ing influence in Europe in the movement known as Latin Averroism,

which in turn influenced the thinking of William of Ockham and

other Latin scholastics (see Section 3.4).

## 3.8 Suhrawardí

With the post-Avicennan philosopher, Suhrawardí (1154–1191 c.e.),

a more genuinely Platonic view of Plato’s theory of Forms is seen

by Islamic philosophers for the first time. Avicenna, as mentioned

above, did not have a place for Platonic Forms (as he conceived

them) in his system, though he did have God’s knowledge, general-

ly speaking, as the cause of the existence of things. Suhrawardí,

however, revived a fully Platonic position. He criticized Avicenna

for holding that only ten intellects can account for the multiplicity of

species in the world while also holding to the principle that a simple

cause can only emanate a simple effect.

Suhrawardí’s solution, in brief, was to allow each lower intellect

in the main vertical order to receive effects both directly and medi-

ately from the intellects above it, so that a horizontal order of intel-

lects could also come into being by these accidental relationships.

The number of intellects in the horizontal order is finite, though as

numerous as the number of species in the world and the number of

stars in the heavens.196 In Suhrawardí’s system, all intellects are

self-conscious, self-subsistent, abstract lights, and the horizontal

order corresponds to Plato’s realm of transcendent Forms. Each

Platonic Form is the lord of a terrestrial species (*rabb al-naw‘*) or

lord of an image (*rabb al-ṣanam*), from which each member of a

biological species ultimately derives the image of its species. The

Platonic Forms, to Suhrawardí, are not realities, but self-conscious

beings; they are celestial angels. He calls them “celestial lords of

species images” that correspond to biological species. He argues:

“The species in our world do not occur simply by chance; otherwise

a non-human could appear from man, and non-wheat from

wheat.”197

In several places Suhrawardí corrects the common Aristotelian

misunderstanding of Platonic Forms (i.e., understanding them as

“universals” meant in logic) and explains how they can be unitary in

themselves while common to the many and not in the many:

They [Platonists] did not deny that predicates are mental and that uni-

versals are in the mind [as in logic]; but when they said, “There is a

universal man in the world of intellect,” they meant there is a domi-

nating [immaterial] light containing different interacting rays and

whose shadow among [physical] magnitudes is the form of man. It is

a universal, not in the sense that it is a predicate, but in the sense that

it has the same relation of emanation to these individuals.198

Do not imagine that these great men [e.g., Plato, Socrates, Hermes],

mighty and possessed of insight, held that humanity has an intelligible

that is its universal form and that is existent, one and the same, in

many. How could they allow something to be unconnected to matter

yet in matter? … It is not that they considered the human archetype,

for example, to be given existence as a copy of that which is below it

[referring to the Aristotelian view on logical universals]. No men held

more firmly that the higher does not occur because of the lower.199

In Suhrawardí’s view, then, Platonic Forms are the immaterial

roots of the biological members of species. Unlike the Church

Fathers, though, Suhrawardí has the Forms function independently

of their ultimate Source; in other words, they are not the contents of

God’s mind. God, therefore, does not create the world through His

providence, but instead it necessarily overflows from God and can-

not be other than it is.200 It will be recalled that in Plato’s system,

the Ideas are “realities,” not “beings,” and that one Form, although

it is unitary, can be associated with many subordinate Forms.

## 3.9 Mullá Ṣadrá

The seventeenth-century Persian philosopher Mullá Ṣadrá (c. 1571–

1640) was responsible for making an important innovation in the

traditional substance-based philosophy of Aristotle and Plato that

had been the mainstay of the philosophers of the East up until this

time. Both Plato and Aristotle had taught that the world subsists by

means of fixed and unchanging realities to which ever-changing,

impermanent qualities, called accidents, become predicated. While

for Plato the fixed realities are Forms or laws beyond this physical

reality, for Aristotle they are the immanent forms (or substances) of

individual material entities (see sections 3.1 and 3.2). This view of

a harmonious cosmos kept in order by static essences dominated

Western philosophy until the time of Darwin and underlay the think-

ing of Darwin’s essentialist opponents. Ṣadrá maintained the idea of

a harmonious cosmos based on static essences in God’s mind, but he

made the novel move of adding motion, or becoming, to the category

of substance.

Traditional philosophy had categorized motion as an accident

occurring in accidents, i.e., in place, quantity, quality, etc., while the

substance or substratum of the moving body (its locus of being)

remained unchanged. This view implies that motion as a process is

subjective, not real. Ṣadrá argued, as Rahman explains, that “move-

ment cannot be established on the basis of a stable entity. Such an

entity can have a stable essence, but not a stable being which must

consist simply of change and mutation. *There is, therefore, beneath*

*the change of accidents, a more fundamental change, a change-in-*

*substance*.”201 This underlying, dynamic substance, according to

Mullá Ṣadrá, is existence itself and identical to God’s self-manifes-

tation, and it “has a natural impulsion toward taking ever new

forms.”202 A “thing” for Ṣadrá is a particular “structure of events”

or an “event system” arising from the continuous movement of exis-

tence and given temporal coherence and unity by the Platonic

Forms, or stable essences, in God’s mind. The substance of exis-

tence is called “ambiguous” (*tashkík*) by Ṣadrá because it remains

the same while unfolding itself in ever different forms, like clay that

can be molded into infinite forms yet retains its identity. The move-

ment of existence in Ṣadrá’s system is both evolutionary and teleo-

logical, because, driven by God’s love for the beauty of His own

Essence, existence moves unidirectionally and irreversibly toward

states of greater perfection as it strives to realize the divine intelligi-

ble order and reveal the mysteries of the divine being.

Like Augustine and unlike Suhrawardí, Ṣadrá identified the con-

tents of God’s mind with the transcendent Ideas of Plato, and so with

the species essences of things. He removed entirely the hierarchy of

separate intellects of Alfarabi, Avicenna, and Suhrawardí, and,

unlike Suhrawardi, he recognized the Platonic Forms as realities, not

separate self-conscious beings. God’s providence, or purposive plan

(*‘ináyah*), is responsible for the order of the universe.203 Rahman

explains, though, that according to Ṣadrá: “God and His knowledge

… are not two things in any sense except in our conception of Him.

Rather, God, by merely being what He is, gives rise to an ideal sys-

tem of existence—which we may call His mind or the contents of

His mind—and the contents of His mind, merely by being what they

are, generate the universe.”204

Despite his differences with Suhrawardí, Mullá Ṣadrá agrees with

the former in regard to the causative function of the Platonic Forms.

He says:

If you would ponder upon the appearance of species in this world of

ours, you will find that they do not occur by mere chance; otherwise

those species would not remain preserved and it would be possible for

a non-human to be derived from a human, a non-horse from a horse, a

non-date palm from a date palm, and a non-wheat grain from a wheat

grain. This is not the case; rather, these species are continuous and per-

manent without alteration or change …. The truth is as the ancients

have stated: It is necessary for each species among the physical species

to have a luminous, incorporeal substance subsisting in itself, which

regulates, determines, and preserves it. It is a universal to that species,

but they did not intend by this that universal whose conception

requires participation [in particulars, i.e., a logical universal].205

Mullá Ṣadrá argues here precisely as Darwin’s essentialist oppo-

nents argued two centuries later. Biological species do not occur by

pure chance; otherwise the kind of non-teleological transmutation of

species that Darwin proposed would occur. Ṣadrá and his predeces-

sors held that species are fixed realities of nature on account of the

divinely ordained laws which determine and preserve them. Ṣadrá

also understood that the Aristotelians, like latter population thinkers,

gave the Platonic Forms, or laws of nature, a mere nominal exis-

tence. He states:

As for the error of the Aristotelians, it is in making the divine Forms

mere accidents, deficient in existence, and making what is connected

to them and subordinate to them in existence [i.e. physical forms]

more subsistent, substantial, and real than them …. But if this error is

laid to rest by making them real entities (*mawjúdát ‘ayníyah*), not con-

ceptual entities, then in this sense, they become like the Forms of

Plato. As for the error of the Platonists [i.e., Suhrawardí and his fol-

lowers], it is in making God’s knowledge of things [which consists of

these divine Forms] separate from His Essence.206

According to Ṣadrá, if existence itself is in constant flux, then the

only thing that can give order to the universe are the permanent

essences in God’s mind. Although these essences are conceptual in

relation to God, they are real in relation to things. Ṣadrá followed

the Sufis, and Plato in the *Timaeus*, in saying that what we call a sta-

ble material form is really a constantly recurring and moving image

of a fixed archetype from which we, in turn, abstract a stable con-

cept, such as man, tree, dog, and the like.207 Physical species and

environments emerge (*takawwun*) in the world process, which is the

systematic, unidirectional flow of existence, as soon as matter

attains the capacity to receive them. This is progress, movement,

and development, but not “evolution” in the Darwinian sense.

## 3.10 Shaykh Aḥmad Aḥsá’í

Shaykh Aḥmad Aḥsá’i (1753–1825 c.e.) is considered by Bahá’ís to

be one of the forerunners of the Báb, whom Bahá’ís believe to be the

forerunner of their own prophet, Bahá’u’lláh. Shaykh Aḥmad wrote

two voluminous commentaries on two important works of Mullá

Ṣadrá called the *Sharḥ al-Mashá‘ir* and the *Sharḥ al-Ḥikmat al-*

*‘Arshiyyah*. Due to these, and other works like the *al-Fawá’id al-*

*Ḥikmiyyah*, he is a very important transitional thinker between the

earlier “philosophers of the East” and ‘Abdu’l-Bahá. For the pur-

poses of this article, a, fully systematic study of Shaykh Aḥmad’s

thought was not possible, and reference is only made to his com-

mentary on the *Mashá‘ir*.

Shaykh Aḥmad’s works contain many original philosophical

ideas which distinguish him from his predecessors.208 Among the

most important is his development of a true process metaphysics

whereby he makes process or action (*fi‘l*), not substance, the ulti-

mate foundation of contingent existence. He also rejects the empha-

sis of earlier philosophers on the primacy of either existence or

essence, and asserts instead the unbreakable polarity of essence and

existence.

God creates all things by His action, which is identical to His Will

and other attributes connected to creation. He does not create by His

Essence. In other words, the acting of God is a separate reality orig-

inated through itself but depending on God as its agent. As Shaykh

Aḥmad explains: “The actor (*fá‘il*) originates the acting through

itself, that is, through that very acting. As the Imám Ja‘far al-Ṣádiq

has said: *“Allah created the Willing through itself. Then He created*

*creation through the Willing.”*209 Shaykh Aḥmad argues that an infi-

nite regress of causes is avoided in this way because an act does not

require another act by which to subsist, just as primary matter does

not require another matter to act as its substratum.

The first expression of God’s action is matter, or created exis-

tence, which necessarily gives rise to form, or essence. Essence and

existence denote form and matter to Shaykh Aḥmad, and these two

together are the inseparable common ground of all creatures,

whether they be eternal and intelligible or perishable and material.

Matter (*máddah*), being coextensive with God’s action, is itself

active (*fá‘il*), but it requires its complement, form (*ṣúrah*), which is

receptive (*infi‘ál*), to be realized. (Note that Shaykh Aḥmad is

reversing traditional hylomorphism in which matter is receptive and

form is active.) Matter has no actual existence apart from form, just

as form has no realization apart from matter.210 Idris Hamid terms

this the “ontological polarity principle” by which “every created,

contingent thing is a complex of acting (*fi‘l*) and becoming-in-yield-

ing-to-acting (*infi ál*).”211

Shaykh Aḥmad conceptually divides the actional Will, by which

God creates, into two stages depending on the relation this single

reality has to things. It is within the actional Will that we find the

first hint of Platonic Forms or species essences of things:

He created the Will from itself, not from another Will besides it, and

this is … the domain of “tipping the scales” toward existence. By it

He made possible the Possible (*al-imkán*), which is the substratum of

all possible things and the Most Great Chasm. This is called the pos-

sible Will [or Will for the possible], which is connected to all possible

things. It is the knowledge which nothing encompasses …. When the

Eternal Providence ordained that something be brought into being, He

created it by His generative Will (*takwíníyah*), and it is connected to

all generated things …. These are one thing and only differ with

respect to the difference of its relation …. So the realities of possible

things in the first stage are generated in the second stage. The fixed

archetypes exist only in the first stage [that of the possible], not in the

Essence of God …. So when He desired to manifest something from

what is in the treasuries of the first stage and cause it to descend to the

treasuries of the second stage, He created matter and form for it by His

generative Will. He created it in these two things.212

All things, in short, exist first in the possible Will as possible (not

actual) realities, and this is why Shaykh Aḥmad says the first stage

of every creature is the Will (*al-mashíyah*). He says elsewhere that

the durational mode of the Possible is eternal (*sarmad*), meaning it

is timeless, having neither a beginning nor an end.213

As we saw earlier, Ṣadrá identified the archetypes or species

essences of things with Plato’s transcendent Forms, and Shaykh

Aḥmad does the same. He calls them the “first creation” because

they are the foundation through which individual entities, termed the

“second creation,” are called into being. In one reference he says:

Some have charged that Plato established the Forms of things, which

are their realities, in … the Essence of the True One [which is Mullá

Ṣadrá’s position] …. But as for those who know the intent of Plato

they recognize that he means by the plane of the Platonic Forms (*al-*

*muthul*) the original foundation from which all things were created, for

he follows the meaning of his predecessors, who derived wisdom from

the prophets.214

It is important to point out here that Shaykh Aḥmad’s conception

of Platonic Forms differs from that of his predecessors in one criti-

cal way: Platonic Forms, to him, are not immutable or fixed in them-

selves, because they are (to use Ḥamid’s translation of *infi‘ál*)

“becoming-in-yielding-to-acting.” Although they are active and

constant in relation to what is created through them, they are recep-

tive of God’s action, and hence their very essences are also acts of

becoming. Whatever is created through the Platonic Forms can only

become because they also change in themselves. It is not enough, as

Ṣadrá proposed, just for the being of entities to be changeable; the

essence also must be changeable in itself. Idris Hamid terms this

Shaykh Aḥmad’s “causal principle” whereby “every impression

(*athar*) resembles the actional quality of its proximate agent

(*mu’aththir*).” The result of this is that, unlike for earlier philoso-

phers who denied the external reality of action and passion, (1)

motions or actions are recognized as real, and (2) “whatever charac-

teristics … manifest in a given outcome-of-acting (*maf‘úl*) are latent

in the acting (*fi‘l*) from which the outcome-of-acting originated.”215

Without this even Mullá Ṣadrá’s universe, which posited motion

in substance, is doomed to a set of fixed, unchanging forms because

Ṣadrá located the archetypes of things in God’s changeless Essence.

But static essences are incapable of capturing the constantly chang-

ing modes of delimited existence. Consequently, Shaykh Aḥmad’s

causal principle allows for a real process of continuous evolution or

becoming within individuals and species. All whole systems in the

universe are subject to this kind of evolution. It does not, however,

allow for some members of one species or system to randomly cross

over into another, as in Darwinian evolution.

Furthermore, the Platonic Forms, in Shaykh Aḥmad’s conception

of them, are not sheer essences devoid of matter. Rather, they are

composites of form and matter, or essence and existence, which he

terms *al-dhawát* (pl. of *dhát*), which we can translate as “quintessence”

or “actual essence” to distinguish it from the purely conceptual essence

(*máhíyah*). Using the customary symbolism of his religious milieu,

Shaykh Aḥmad says: “In short, what is meant by the foundation

[containing the Platonic Forms] is the Inkwell, and it is both the

received thing [*maqbúl*, i.e., matter] and the receptacle [*qábil*, i.e.,

form]. The Pen, which is the First Intellect, is, more properly speak-

ing, derived from the Inkwell and produces the Tablet [upon which

the Pen writes].”216

Shaykh Aḥmad shares the doctrine of Suhrawardí that God knows

things by His created knowledge when He creates them. Before He

creates a thing He does not know it, because it does not yet exist and

the created knowledge is also identical to His act of creating.

We say that He knows Zayd in His Essence in the stage of Zayd, not

Zayd in the stage of His Essence; otherwise Zayd would be eternally

existent …. You are hearing, although there may be no one speaking

so that you can hear his words. So when an individual speaks, you hear

him; and this occurrence is generated by the generation of what is

heard. This is what they mean by “presential illuminational knowl-

edge.” … So when He created things, then they became known ….

This knowledge which is connected to and corresponds to things is

created with their creation.217

From this it should not be inferred that God does not know the

Platonic models or universal forms of things (i.e., their species

essences) before their particular manifestations in concrete individ-

uals in time, since this atemporal foreknowledge is itself part of

God’s created knowledge. As stated above, God’s “first creation” is

the timeless creation of the Platonic Forms. In regard to God’s

knowledge in the stage of His Essence, Shaykh Aḥmad affirms that

we can know nothing about this state:

As for Allah … His existentiation of a thing is not preceded by that

thing’s having a state in Himself as those ignorant ones, who make

comparisons between Him and His creation, profess …. From every

consideration, drawing parallels with creation constitutes assimilation

[of Allah with His creation] …. We only ascribe knowledge to Him

because He created knowledge within us; with life due to His creating

life within us; with existence due to our existentiation; none of this is

similar to the state wherein He is.218

Shaykh Aḥmad describes the priority of the universal species form

to the individual or particular form as follows: “For every possible

particular there is a related unlimited universal, which is God’s

knowledge of things preceding His generative Will …. Then He

desired by His generative Will the creation of what He had first

desired its possibility.”219 This act of creation through the genera-

tive Will takes place in four stages, all of which constitute God’s

existentiational motion (*ḥarakat íjádiyyah*):

The creative action that is connected to existence is the Will, and by

the archetype (*al-‘ayn*), i.e., the species form (*al-ṣúrat al-naw‘íyah*), it

becomes Purpose (*irádah*), and by the [intelligible] limitation of the

created, i.e., design, like length and breadth, stability and change,

fixed time, and the like, it becomes Predestination (*qadar*), and by the

realization of the act of creation and the thing itself, it becomes Fate

(*qaḍá’*) …. The fashioning of each existent is completed by these four

actions [i.e., Will, Purpose, Predestination, and Fate].”220

However, in explaining the sustaining causes by which things

subsist, Shaykh Aḥmad relies upon the Aristotelian four causes. He

says: “Each thing needs four causes to be brought into being: two

causes by which it subsists foundationally, which are matter and

form; a cause by which it subsists through emanation (*ṣudúr*), which

is the active cause; … and a final cause, which is its reason [for

being].”221 To show that the composite things created in the real

world are not composed from (*minhu*) God’s action but rather by it

(*bihi*), Shaykh Aḥmad often repeats the analogy of a writer com-

posing writing: “For the motion of the hand of the writer is not the

source of the writing itself, but only the cause of its coming-into-

being. But the writing is composed from the ink and the form of the

ink …. The recipient of the action (*al-maf‘úl*) is not composed from

the action but existentiated by the action and composed from matter

and form.”222

In agreement with earlier philosophers, Shaykh Aḥmad has more

simple and indeterminate realities act as the building blocks of more

complex and determinate realities in the divine intelligible order, so

that each is matter in one respect and form in another depending on

its relation. For example, wood is the form of the elements of wood,

but wood is the matter of chair, bed, and the like. At the highest

level, the totality of universals in the possible Will comprise a hier-

archy in which some are matter in relation to what is below them

and form in relation to what is above them. For example, Shaykh

Aḥmad writes: “What belongs to Zayd of existence and essence is

the same as what is in ‘Umar, because their matters are portions of

‘animal’ and their essences are portions of ‘rational.’”223

Shaykh Aḥmad appears to be saying that the individual members

of species, which correspond to the quintessences in the intelligible

order, become realized by these quintessences. Shaykh Aḥmad

states:

So the species essence (*al-máhíyat al-naw‘íyah*), which is the [active]

Matter of the real individual at the time of its actualization in the exter-

nal world, is a general universal belonging to the category of quintes-

sences (*al-dhawát*), as we stated before. A portion of this is “taken” for

Zayd and for ‘Umar, from which each derives his quintessence ….

But the characteristics belonging to a particular individual in the exter-

nal world are delimitations of that existential portion … [for] individ-

uals differ with respect to their particular qualities by intensity and

deficiency, paucity and abundance, and with respect to degree, aspect,

place, time, and situation. For this reason, the individuals of a species

differ in most of their states, attributes, stations, and appointed

times,224 despite their equality in respect to species.225

The quintessence (*dhát*) thus has “manifestations (*maẓáhir*) and

effects in the domain of bodies,” which Shaykh Aḥmad calls “its

accidents.”226 But the quintessence (*dhát*) is not absolute, inasmuch

as it is itself an accident in relation to the agent from which it

emanates. The quintessence, which is the first composite effect of

God’s creative action, then becomes by further emanation the cause

of another quintessence, which is accidental in relation to it. Shaykh

Aḥmad explains: “The truth is that … all created things are quin-

tessences in one respect and accidents in another. So the cause is a

quintessence to its effect, and the effect in relation to it is an acci-

dent, but in relation to its own effect and attribute, it is a quintes-

sence. This is the requisite of all things.”227 All things other than

God are called, in this sense, correlational accidents (*a‘ráḍ*

*iḍáfiyyah*) by Shaykh Aḥmad.228

What Shaykh Aḥmad delineates here is a typically Neoplatonic

process of emanation, but it is combined with a simultaneous

process of manifestation at each level of the entity being created. In

other words, to Shaykh Aḥmad, every created thing is a multi-

dimensional being with its highest aspect in the possible Will and its

lowest aspect in corporeal matter. But each level of the multi-dimen-

sional creature is distinct and has no connection to other levels

except through emanation, since each level is an active cause by

which subsequent lower levels subsist through emanation. Only

mutually necessary form and matter exist at every level of a crea-

ture’s existence as that by which it subsists foundationally, but form

and matter in each level stay within their own level.229 Each level

also shares the characteristics of the level below it, but “in a more

sublime way” (*‘alay naḥw ashraf*).

As Shaykh Aḥmad puts it in several places:

The lower was only created from the radiation of the more exalted ….

Every stage of a reality with respect to its substratum … is an effect

of what is above it ….In this way, until the earth, He created every

lower from the attribute of a higher …. Every individual in each of

these stages [of its being] has a portion which is its configuration, or

its form. Whatever of the two kinds of portions [form and matter]

exists in each stage, it subsists by what is above it through emanation.

Thus, each individual subsists foundationally by its matter and form,

but subsists through emanation with respect to the stage above it ….

Understand what I mean; subsistence by emanation is like the subsis-

tence of speech by a speaker, notwithstanding that the foundational

subsistence of the speech is in the air …. The stages of every lower

thing are the rays from higher things; it is not that the higher things

descend to its level … nor does anything belonging to the lower stage

ascend to the higher stage.230

Idris Hamid calls the idea that each level shares characteristics

that belong to the realm below it, but “in a more sublime way,”

Shaykh Aḥmad’s “topological principle.” He notes that this elimi-

nates the traditional dualism between intelligible and corporeal:

“Whatever is corporeal has an intelligible aspect; whatever is intel-

ligible has a corporeal aspect. As one climbs the ladder of existence

qua conditioned-by-something, in ascent towards the Divine Will,

the corporeal aspect becomes more and more subtle, while the intel-

ligible aspect becomes more intense …. Nothing is absolutely

incorporeal except God.”231 Another principle coined by Hamid,

which is evident in the passage above, is the “codependent origin-

ation principle” whereby “whatever is higher in the hierarchy of

conditioned existence depends on that which is lower for manifest-

ation (*ẓuhúr*),” while “that which is lower depends on that which is

higher for realization (*taḥaqquq*) …. Neither can exist without the

other.”232

Lastly, Shaykh Aḥmad’s “creation principle,” also coined by

Hamid, should be explained. This means that God has created every-

thing in the universe in the best possible way in accordance with the

dictates of His eternal wisdom. Nothing can be better than it already

is. As he so aptly expresses it in the Eighteenth Observation of *al*-

*Fawá’id al-Ḥikmiyyah*: “Allah … created what He created in accor-

dance with the most perfect of what ought to be, in the way of that

which is necessitated by Wisdom deriving from Possibility.”233 God

stands outside of and separate from the world-process, and the

beings He creates are not fixed substances but units of becoming or

“actings.”

Furthermore, Shaykh Aḥmad holds that “the act of becoming gen-

erated constitutes an act of choice on the part of the created entity in

the second creation,” which implies that the individual essences of

things are, in a certain sense, acts of self-creation.234 Shaykh

Aḥmad derives this idea from a principle of Ibn Sind, overlooked by

Mullá Ṣadrá, which recognizes that everything except God is a real

composite of essence and existence. Existence, or active matter, is

the part bestowed by God; essence, or receptive form, is the part

chosen by the creature, according to its disposition, from the set of

what is possible. The reason Shaykh Aḥmad includes choice in

receiving the act of creation and denies pure determinism is based

on his causal principle, explained above, that “every impression [or

effect] resembles the actional quality of its proximate agent.”

Therefore, he explains: “The choice of the Acting is an impression

of the Choice of His Quintessence. In the entirety of existence, there

is no sheer coercion and no pure compulsion. Rather, everything is

a chooser. Every mote of existence is a chooser because the impres-

sion of a chooser is a chooser.”235

## 3.11 Summary of the views of the “Philosophers of the East”

Except for Averroes, who had very little influence on other Islamic

philosophers, the philosophers of the East were united in the view

that a divine intelligible order—either the contents of God’s mind or

will, or belonging to the subordinate Active Intellect—is the forma-

tive cause of the compositions of biological species when they first

appear on earth. These compositions appear as soon as the physical

environment is suitable to receive them, with simpler compositions,

like minerals and plants, appearing first, and more complex struc-

tures, like animals and human beings, appearing last. The essential

attributes of each of these beings is created in accordance with the

predetermined intelligible order, not because of chance.

Although Avicenna mistakenly identified Plato’s Idea-Forms with

logical universals, he was still a Platonist in the sense that he had the

material forms of things result from an incorporeal intellect and in

making God’s knowledge the cause of the existence of things. The

main difference between a logical universal and a Platonic Form is

that while the former is abstracted from individuals, the latter is

causative of individuals.

Mullá Ṣadrá’s novel move of incorporating motion and transfor-

mation into the category of substance, and Shaykh Aḥmad’s exten-

sion of this principle to the essences of things themselves allowed

for the real, continuous, and dynamic transformation and evolution

of things in the temporal dimension. This was a dramatic departure

from the eternal static cosmos of classical biology, a departure

which was paralleled by the ideas of Leibniz among the European

philosophers.

The views presented represent mainly a “vertical order of becom-

ing” from God to physical things and from physical things back to

God, not a “horizontal order of becoming” restricted to the material

world, as is the concept of Darwinian evolution. Things “become”

as a result of their realities, whether this be gradually or at once.

According to Shaykh Aḥmad, a thing’s “coming-into-existence” is

not completely up to God’s will, but is also a voluntary act on the

part of the created to receive existence. The important notion here is

that everything that exists in the universe exists by design and has a

purpose. Movement toward that goal implies the unfoldment of pre-

viously existing potentials, whereas “evolution,” in the meaning of

Darwin, implies the transmutation of species without any underly-

ing goal.

[Photograph]

‘Abdu’l-Bahá in Oakland, California

at the home of Helen Goodall, October 23, 1912.

“All the divine teachings can be summarized as

this: that these thoughts singling out advantages to

one group … be banished from our midst ….”

Section 4
‘Abdu’l-Bahá’s response to
Darwinism

## 4.1 The principle of cause and effect

The arguments of ‘Abdu’l-Bahá against a materialistic interpretation

of the universe, which many thinkers believed to be implicit in

Darwinism, depend in one way or another on the principle of cause

and effect. ‘Abdu’l-Bahá states: “Every cause is followed by an

effect and vice versa; there could be no effect without a cause pre-

ceding it.”236 According to this statement even random processes,

which ‘Abdu’l-Bahá refers to by the expression “conditional fate”

(*qaḍá’yi mashrúṭ*),237 have a clear cause and effect relation. For

example, throwing dice is a typical random process. When you

throw a die (the cause), you know that at the end it will show a num-

ber between 1 and 6 (the effect). You only do not know which of the

numbers will appear.

This principle of cause and effect is frequently applied by

‘Abdu’l-Bahá to prove the existence of a Creator transcending the

material world, on the basis that it is inconceivable that this universe

should exist without a First Cause.

As we, however, reflect with broad minds upon this infinite universe,

we observe that motion without a motive force, and an effect without

a cause are both impossible; that every being has come to exist under

numerous influences and continually undergoes reaction. These influ-

ences, too, are formed under the action of still other influences ….

Such process of causation goes on, and to maintain that this process

goes on indefinitely is manifestly absurd. Thus such a chain of causa-

tion must of necessity lead eventually to Him who is the Ever-Living,

the All-Powerful, who is Self-Dependent and the Ultimate Cause.238

In place of a Creator, materialistic Darwinists, such as Shumayyil

and Ludwig Büchner, posited matter and force at the beginning of

the chain of causation and attributed matter’s orderly transform-

ations to blind necessity (see Section 1.10).

‘Abdu’l-Bahá’s proof for the existence of God is based on

Aristotle’s dictum that causes are finite both in series and kind, and

that in a series there must be a first cause (*Metaphysics* ii.2). The

impossibility of an infinite regress of causes has long been used by

both philosophers and theologians as a proof for the existence of

God, though not necessarily as a proof of God’s nature. Aristotle

used this proof to show that there must be a first cause of motion for

the universe, which he called the Unmoved Mover, but he did not

also assert that this mover was the cause of the existence of the uni-

verse.239

In another proof, based on the same principle of cause and effect,

‘Abdu’l-Bahá states that the very formation of things into orderly

structures is proof of the existence of a Creator: “The change of the

configuration of particular beings proves the existence of a Creator,

for can this great universe, which is endless, be self-created and

come into existence from the interaction of matter and the elements

alone? How self-evidently wrong is such a supposition!”200 It will

be recalled that Jamál al-Dín al-Afghání made the same argument

against certain materialists who believed the simple elements com-

bined themselves into complex and stable forms (see Section 1.12).

## 4.2 Formation by God’s voluntary will

‘Abdu’l-Bahá rejects both necessary and accidental causation as

sufficient to explain the formation of beings:

Now, formation is of three kinds and of three kinds only: accidental,

necessary and voluntary.241 The coming together of the various con-

stituent elements of beings cannot be accidental, for unto every effect

there must be a cause. It cannot be necessary, for then the formation

must be an inherent property of the constituent parts and the inherent

property of a thing can in no wise be dissociated from it …. The third

formation remains and that is the voluntary one, that is, an unseen

force described as the Ancient Power, causes these elements to come

together, every formation giving rise to a distinct being.242

In one of his talks in America, ‘Abdu’l-Bahá elaborates the same

argument, concluding similarly that “composition is effected

through a superior will.”243 ‘Abdu’l-Bahá is saying that if a thing

composed of parts has these parts combined as an inherent property,

then there is no possibility of active composition or decomposition.

Since the living and non-living objects we are talking about can be

taken apart and put together, then our logical choices are now nar-

rowed down to being composed either voluntarily (on purpose) or

accidentally (not on purpose). ‘Abdu’l-Bahá dismisses the latter

option by saying that every effect must have a cause, and, as

‘Abdu’l-Bahá argues above, the chain of natural causes must even-

tually end in God (see Section 4:1). This means that nothing in real-

ity happens accidentally.

This does not imply a dismissal of random occurrences, which

obey the cause and effect principle, and which contain a complex

order that is hard to see. Also, his rejection of “necessary formation”

does not imply a dismissal of natural causality, for ‘Abdu’l-Bahá

often mentions the “nature” of things: “The nature of fire is to burn;

it burns without will or intelligence. The nature of water is fluidity;

it flows without will or intelligence.”244 Elsewhere he refers to such

necessary cause and effect relationships between things as “decreed

fate” (*qaḍá’yi maḥtúm*).245 The point is that what appears to be nec-

essary causality (i.e., by the nature of something) is really *voluntary*

causality, in the sense that God’s eternal Will, through the species

essences, guides different and contrary elements to form into struc-

tures that act and react in certain ways.

‘Abdu’l-Bahá states that, in the Bahá’í view, “all of the realities

and conditions which the philosophers attribute to nature are the

same as have been attributed to the Primal Will in the Holy

Scriptures.”246 God’s Will, therefore, is recognized by ‘Abdu’l-

Bahá as the first cause of the formation of beings and the beginning

of natural causation. ‘Abdu’l-Bahá shares this doctrine with Shaykh

Aḥmad Aḥsá’í, who also locates the beginning of natural causation

in God’s actional Will and not in His Essence (see Section 3.10).

Like Shaykh Aḥmad, ‘Abdu’l-Bahá also affirms that the attribute

of volition in God’s act of creation extends to all created things, and

that this is necessary to uphold the justice and mercy of God. He

says: “Created things and the recipients of God’s action have each

accepted a degree of existence according to their own pleasure and

desire.”247 Creation thus entails both a voluntary act on the part of

the Creator and a voluntary act to receive existence on the part of the

created, each according to its own disposition.248

Two other important points about the Primal Will need mention-

ing: First, it is an atemporal, placeless reality which exists “with”

God as His action but not as part of God’s essence. Because it pre-

cedes time and space, time and space are its effects. ‘Abdu’l-Bahá

explains:

The first thing to emanate from God is that universal reality which the

philosophers of the past termed the First Intellect, and which the peo-

ple of Bahá call the Primal Will. This emanation, with respect to its

action in the world of God, is not limited by time or place; it is with-

out beginning or end …. His creation of the possible (*mumkin*) is an

essential creation, and not a temporal creation.249

In other words, *God’s creation of the realities of things takes place*

*outside of time*. As will be recalled from Shaykh Aḥmad, all possi-

ble things (*mumkinát*) exist potentially in God’s actional Will as part

of His “first creation.” Second, the Primal Will is identical to the inner

reality (*báṭin*) of all created things. This is also clearly stated by

‘Abdu’l-Bahá: “The Primal Will, which is the world of Command, is

the inner reality of all things, and all existing things are the manifes-

tations of the Divine Will.”250 This Will, which corresponds to the pos-

sible, manifests the realities of things as a sea manifests itself in the

forms of the waves. The actual creatures that have ever lived on earth

represent only a fraction of those hidden realities that are potential or

possible in God’s Will.

‘Abdu’l-Bahá explains that the composition, or formation, of

things when they first appear on this planet is a result of these real-

ities:

Each time that the isolated elements become combined in accordance

with the divine universal system,251 one being among beings comes

into the world. That is to say, that when certain elements are combined,

a vegetable existence is produced; when others are combined, it is an

animal; again others become combined, and different creatures attain

existence. In each case, the existence of things is the consequence of

their realities.252

Realities (*ḥaqá’iq*), here, as will be recalled from Section 2, are a

close synonym for essences (*máhíyát*), which are equivalent to

Platonic Forms and laws of nature.

Another principle that ‘Abdu’l-Bahá holds to is that when things

come into existence by formation, in the manner described above,

they are “created perfect and complete from the first, but their per-

fections appear in them by degrees (*bitadríj*).”253 He gives the

example of a seed in which all of the vegetable perfections exist in

a latent state; it is only later, after the seed is planted, that the veg-

etable perfections appear, little by little. Here we have the answer to

the question which was unanswered by Alfarabi as to how “becom-

ing” takes place in beings. ‘Abdu’l-Bahá says it takes place “by

degrees” (*bitadríj*), which means “by steps.” Sometimes the term

*bitadríj* has been translated in the selected passages by the adverb

“gradually,” but this does not imply a continuum of gradual change,

but only a ladder of distinct manageable steps in the development of

creatures.

## 4.3 The question of evolution

‘Abdu’l-Bahá’ does not deny the reality of evolution as a process by

which the universe and its creatures change and develop over time,

as some essentialists of classical biology did under the influence of

typological thinking. He certainly does not believe in a static cos-

mos of fixed populations corresponding to fixed essences. He

appears to confirm the process metaphysics of Shaykh Aḥmad,

which requires a real and continuous process of becoming in all cre-

ated things, whether corporeal or intelligible.

The only entity ‘Abdu’l-Bahá excepts from change is God’s exis-

tentiating Command by which all things are called into being. He

states in a letter: “All things are subject to transformation and

change, save only the existentiating Command (*al-amr al-wujúdí*),

since it is Constant and immutable, and upon it is founded the life of

every species and kind, of every contingent reality throughout the

whole of creation.”254 “Creation,” he says in another place, “is the

expression of motion, and motion is life …. All created forms are

progressive in their planes, or kingdoms of existence, under the

stimulus of the power or spirit of life. The universal energy is

dynamic. Nothing is stationary in the material world of outer phe-

nomena or in the inner world of intellect and consciousness.”255 But

this state of motion, which implies transformation, is not a purely

random and chaotic motion. It does not imply the transmutation of

one species into another or a purely arbitrary unfolding of events, as

would be the case in a non-goal-directed universe. ‘Abdu’l-Bahá is

adamant that physical species evolve purposively within the bound-

aries of their own essences. As he explains in a letter: “Some of the

philosophers of Europe think that evolution takes place from the

genus to the species. But the prophets teach that this theory is in

error, as we have explained already in the book *Some Answered*

*Questions* (*Mufávaḍát*). Nay, rather progress and development take

place within the species itself.”256

‘Abdu’l-Bahá supports the gradual change of biological species

over time, but for him “evolution” means progress toward a preex-

isting goal, not the mere natural selection of favorable random vari-

ations. In commenting on the words of Bahá’u’lláh in the Lawḥ-i

Ḥikmat: “That which hath been in existence had existed before, but

not in the form thou seest today,” he says: “From this blessed verse

it is clear and evident that the universe (*kawn*) is evolving (*tarraqí*).

In the opinion of the philosophers and the wise this fact of the devel-

opment and evolution of the world of existence is also established.

That is to say, it is progressively transferred from one state to anoth-

er.”257 He says the same thing about the planet earth, and explains

that this law of gradual progress toward greater perfection applies

equally to all creatures:

It is clear that this terrestrial globe in its present form did not come into

existence all at once, but that this universal existent gradually258

passed through different stages until it became adorned with its pres-

ent perfection. Universal existents resemble and can be compared to

particular existents, for both are subject to one natural system, one uni-

versal law, and one divine organization. So you will find that the

smallest atoms in the universal system are similar to the greatest exis-

tents of the universe.259

“All beings, whether universal or particular,” continues ‘Abdu’l-

Bahá, “were created perfect and complete from the first, but their

perfections appear in them by degrees …. So also the formation of

man in the matrix of the world was in the beginning like the

embryo;260 then gradually he progressed through various stages,

and grew and developed until he reached the stage of maturity, when

the mind and spirit became manifest in the greatest power.”261 It

will be recalled that “the movement of living bodies toward perfec-

tion,” which ‘Abdu’l-Bahá teaches here, was the only definition of

evolution that Iṣfahání found acceptable (see Section 1.12).

From these passages we can see that ‘Abdu’l-Bahá teaches that

physical beings, whether the universe itself or the creatures within

it, evolve step by step, from one distinct stage to another, toward

greater perfection. The fact that creatures may also decline or ret-

rogress, is also recognized by ‘Abdu’l-Bahá. But ‘Abdu’l-Bahá’s

doctrine of the “originality of species” (see Section 2) implies that

this whole process is goal-directed (i.e., guided by laws and

arranged according to divine wisdom), not arbitrary or the result of

blind environmental necessity. Should the transmutation of a popu-

lation occur, so that it becomes classed as a new species, this is only

possible because of God’s prior creation of the possible. “Creation”

and “evolution,” to ‘Abdu’l-Bahá, are not contrary, but complemen-

tary and mutually necessary processes. For God’s timeless creation

to become manifested, the evolution of the external universe is nec-

essary; otherwise the potentialities of creation could not unfold as a

temporal process. And for evolution to be realized, the creation of

primordial laws is necessary; otherwise a harmonious cosmos could

not arise out of chaos.

## 4.4 Some non-references to evolution

There are some passages in ‘Abdu’l-Bahá’s writings and talks that

might be construed as a reference to biological evolution, but which

most likely refer only to the descent and ascent of the soul of man

within human individuals. These passages are those in which

‘Abdu’l-Bahá mentions the passage of man through the lower king-

doms of nature. For example, in one of his talks in the United States,

‘Abdu’l-Bahá says:

In the world of existence man has passed through various stages until

he has attained the human kingdom. In each stage the capacity for

ascent to the next stage has appeared. While in the kingdom of the

mineral the capacity to progress to the stage of the plant appeared, and,

therefore, he came into the vegetable kingdom. In the vegetable king-

dom the capacity to progress into the world of the animal was

obtained, and thus he came into the animal kingdom. Similarly, from

the world of the animal he came into the world of man …. In this

world, also, it is necessary to prepare and make ready for the world to

come. Whatever is needed in the world of the Kingdom of God, man

must prepare and make ready for it here.262

This idea of the gradual ascent of the soul of man through the

three kingdoms of nature has its origin in the Islamic concept of arcs

of descent and ascent. According to the Qur’an, as God created

things, in a similar manner they will return to Him: “As He created

you, so you will return” (7:29). The Sufis and Ḥikmat philosophers

of Islam263 have elaborated this theory and explained it as follows:

Individuals commence their lives at conception as an emanation

from their Creator, descend through degrees in the incorporeal

dimension (the arc of descent) until they reach the level of the cor-

poreal elements, traditionally earth, air, fire, and water, from which

are produced the three kingdoms of the material world: mineral,

vegetable, and animal. The I-spirit of the individual does not really

“descend” but remains in its exalted state. It has, though, successive

manifestations which, in Neoplatonic cosmology, are like increas-

ingly darker shadows until the stage of the body composed of the

physical elements is reached. This is the lowest point of descent.

The arc of ascent commences with the manifestation of the human

spirit in the kingdom of the mineral, from whence it progresses to

the plant kingdom, to the animal kingdom, and finally to the human

kingdom. In the human kingdom, the soul is ready at last to disen-

gage itself from its attachment to the material world and return

toward its point of origin in the world of spirit. To do this it must

also traverse many degrees in the spiritual world. The spiritual

teachings of religion are directed toward releasing the soul from its

bondage to the attributes of the world of matter so that it can attain

to the knowledge of its Creator and the perfection of its own reality.

William Chittick explains that in Islam this theory is about the ori-

gin and return of individual souls to God and does not prefigure bio-

logical evolution. It concerns individuals, not the origin of

species.264 Man only analogously ascends through the kingdoms of

nature, not literally. The human body was believed to recapitulate

the levels of complexity of the lower kingdoms of nature in its own

development. So the human embryo first possesses the faculty of

cohesion of the mineral kingdom, then the faculties of growth and

metabolism of the plant kingdom, and then in the stage of the infant

it possesses the animal faculties of desire, volitional movement,

anger, and sense perception. As the child grows, it learns to use

these faculties properly, and gradually it acquires and develops the

faculties of intellect and the spiritual virtues that belong to the

human kingdom. The intellectual faculties and spiritual virtues, in

turn, open the door to higher levels of spiritual perfection.

## 4.5 ‘Abdu’l-Bahá’s arguments against Darwiniantransmutation

‘Abdu’l-Bahá’s arguments against the transmutation of species

(*taghyír-i naw‘*) from a Darwinian perspective, which occur in *Some*

*Answered Questions*, chapters 46 to 51, and elsewhere, should be

understood in the context of his doctrine of the originality of

species. In other words, he is not opposed to the modification and

change of biological forms but to their haphazard transformation

without any underlying goal. According to ‘Abdu’l-Bahá, each bio-

logical form depends upon a corresponding species essence in the

inner world of spirit. This is due to the “perfect harmony and corre-

spondence” of the worlds of God, whereby whatever exists in the

material world is the outer expression of the realities of the inner

intelligible realm.265 ‘Abdu’l-Bahá states:

“Know that this material world is the mirror of the Kingdom, and each

of these worlds is in complete correspondence with the other … for

the truth of all things is laid away in the treasuries of the Kingdom.

When that truth is manifested in the material world, the archetypes

(*a‘yán*) and realities (*ḥaqá’iq*) of beings attain realization.”266

The essential attributes of a biological organism cannot become

modified or changed in time into the attributes of an entirely differ-

ent species, unless the essence itself is replaced. Species, in other

words, are original, not derivative, while the material form (the clay

of creation) is dependent upon and derived from what precedes it.

What is material is only so much clay that can be molded into any

form as dictated by the complex system of forces or causes origi-

nating in the world of spirit. DNA and genes, from this perspective,

are simply tools created in the clay to accomplish purposes on a

higher level.

The first argument of ‘Abdu’l-Bahá against the transmutation of

species (*taghyír-i naw‘*), which sees the “clay” itself as fundamental

to speciation, is based on the idea of a predetermined harmonious

cosmos and the eternal perfection of the creation brought into being

by an all-wise Creator. For example, if the human species at one

time did not exist, then this chief member of the body of the universe

would have been missing, and the creation consequently would have

been imperfect. ‘Abdu’l-Bahá states:

We have now come to the question of the modification of species and

the evolution (*taraqqí*) of organs—that is to say, to the point of inquir-

ing whether human beings have descended from the animal or not.

This theory has found credence in the minds of some European

philosophers, and it is now very difficult to make its falseness under-

stood, but in the future it will become evident and clear, and the

European philosophers will themselves realize its untruth. For, verily,

it is an evident error. When man looks at the beings with a penetrating

regard, and attentively examines the condition of existents, and when

he sees the state, organization, and perfection of the world, he will be

convinced that in the contingent world there is nothing more wonder-

ful than what already exists. For all existing beings, terrestrial and

celestial, as well as this limitless space and all that is in it, have been

created and organized, composed, arranged, and perfected as they

ought to be. The universe has no imperfection, so that if all beings

became pure intelligence and reflected for ever and ever, it is impossi-

ble that they could imagine anything better than that which already

exists.

If, however, the creation in the past had not been adorned with the

utmost perfection, then existence would have been imperfect and

meaningless, and in this case creation would have been incomplete ….

Now, if we imagine a time when man belonged to the animal world, or

when he was merely an animal, we shall find that existence would

have been imperfect that is to say, there would have been no man,

and this chief member, which in the body of the world is like the brain

and mind in man, would have been missing. The world would then

have been quite imperfect. This is a categorical proof, because if there

had been a time when man was in the animal kingdom, the perfection

of existence would have been destroyed.267

By “man” here, ‘Abdu’l-Bahá does not mean the body of man but

the reality or essence of man within the divine intelligible order,

because biological man had a temporal origin on the planet earth.

‘Abdu’l-Bahá, speaking with the theologians, says: “The human

species on this planet had a beginning and is not eternal. And inas-

much as the existence of the human species [on this planet] had a

beginning, surely the first man [Adam] had neither father nor

mother.”268 The import of ‘Abdu’l-Bahá’s argument is that “man”

has always been part of God’s timeless intelligible creation, which

manifests in space and time whenever the material conditions are suit-

able. Since the perfection of the universe requires a being like man,

according to ‘Abdu’l-Bahá, and since we cannot ascribe imperfec-

tion to God’s creation, man, therefore, has always existed. Man is

not a haphazard descendant of an animal species, even though his

body is physically and genetically related to the animal and “grows

develops through the animal spirit.”269

In a variant of this same argument, ‘Abdu’l-Bahá focuses on the

necessity of the eternal existence of the human species to act as a

comprehensive mirror of God’s created names and attributes.

The proofs which we have adduced relative to the originality of the

human species are rational proofs. Now we will give theological

proofs …. We have many times demonstrated and established that

man is the noblest of contingent beings, the sum of all perfections, and

that all beings and all existents are centers for the appearance of the

divine effulgence that is to say, the signs of the divinity of God are

manifest in the realities of all created things. Just as the terrestrial

globe is the place where the rays of the sun are reflected where its

light, heat, and influence are apparent and visible in all the atoms of

the earth so, in the same way, the atoms of every universal existent

in this infinite space proclaim and prove one of the divine perfections.

Nothing is deprived of this benefit: either it is a sign of the mercy of

God, or it is a sign of His power, His greatness, His justice, His nur-

turing providence; or it is a sign of the generosity of God, His vision,

His hearing, His knowledge, His grace, and so on ….

The world, indeed each existing thing, proclaims to us one of the

names of God, but the reality of man is the collective reality, the gen-

eral reality, and the center for the appearance of the effulgence of all

the divine perfections. That is to say, for each name, each attribute,

each perfection which we affirm of God there exists a sign in man. If

it were otherwise, man could not conceive these perfections and could

not understand them …. Consequently, the divinity of God, which is

the sum of all perfections, appears resplendent in the reality of man ….

If man did not exist, the universe would be without result, for the

object of existence is the appearance of the perfections of God.

Therefore, it cannot be said there was a time when man was not. All

that we can say is that this terrestrial globe at one time did not exist,

and at its beginning man did not appear on it. But from the beginning

which has no beginning, to the end which has no end, this perfect man-

ifestation always exists. This man of whom we speak in not every

man; we mean the perfect man (*insán kámil*).270 For the noblest part

of the tree is the fruit, which is the reason of its existence. If the tree

had no fruit, it would have no meaning. Therefore, it is inconceivable

that the worlds of existence, whether the stars or this earth, were once

inhabited by the donkey, cow, mouse and cat, and that they were with-

out man. This supposition is false and meaningless.271

‘Abdu’l-Bahá is saying that the universe is designed by God to

produce perfect human beings who will reflect His attributes (such

as love, mercy, justice, wisdom, beneficence, etc.), and who can

therefore know His Essence befittingly. This was the reason why

He, as the Hidden Treasure, created the creation. All other things in

existence ultimately serve this purpose. “This world,” states

‘Abdu’l-Bahá, “is in the condition of a fruit tree, and man is like the

fruit; without the fruit the tree would be useless.”272 The implication

may be that biological manifestations of the species essences of all

things always exist in some part of the universe, wherever the con-

ditions are suitable. Or, the perpetual existence of species may indi-

cate only the species essences, because there was a long period in

the early phases of the formation of our universe when biological

species could not exist. Of course, it is not known whether or not the

temporal creation is limited to what arose from the singularity of the

Big Bang.

The above arguments regarding the necessity of perfect man

apply in a similar sense to all species because each has a necessary

purpose in the eternal plan of God: “The difference of degrees and

distinction of forms, and the variety of genera and species, are nec-

essary—that is to say, the degrees of mineral, vegetable, animal, and

man are inevitable; for the world cannot be arranged, organized, and

perfected with man alone.”273 The plan of God for a harmonious

cosmos requires the simultaneous presence of many species, so it is

inconceivable in this context that any species should exist merely by

mechanical causes and be the product of arbitrary evolution.

A second argument of ‘Abdu’l-Bahá against the transmutation of

species is based on the proposition that each biological organism

represents a prescribed composition.274 In other words, for each

species to realize the purpose or function intended for it by its

Creator, a certain type of structure or pattern of constituent elements

must be present in its make-up. Because of this, as long as man has

existed on the earth, even though he has evolved (*taraqqí*) toward

greater perfection, he has always had the same type of composition

and structural organization, or at least the specific potential for them

in the way that an acorn has the specific potential to become an oak:

There is another more subtle proof: all these endless beings which

inhabit the world, whether man, animal, vegetable, or mineral—what-

ever they may be are surely, each one of them, composed of ele-

ments. There is no doubt that this perfection which is in all beings was

realized by the creation of God from the composition of the elements,

by their appropriate mingling and proportionate quantities, by the

manner of their composition, and the influence of other beings. For all

beings are connected together like a chain; and reciprocal help, assis-

tance, and interaction belonging to the properties of things are the

causes of the existence, development, and growth of created beings. It

is confirmed through evidences and proofs that every being in the

verse influences other beings, either independently or through a series

of other beings. In brief, the perfection of each individual being that

is to say, the perfection you now see in man and apart from him with

regard to parts, organs, or faculties is due to the composition of the

elements, to their measure, to their balance, to the manner of their

combination, and to the interaction and influence of other beings. In

the case of man, when all these factors are gathered together, then man

exists. As the perfection of man is entirely due to the composition of

the elements, to their measure, to the manner of their combination, and

to the interaction and influence of different beings then, since man

was produced ten or a hundred thousand years ago from these earthly

elements with the same measure and balance, the same manner of

combination and mixture, and the same influence of other beings,

exactly the same man existed then as now. This is evident and not

worth debating. A thousand million years hence, if these elements of

man are gathered together and arranged in this special proportion, and

if the elements are combined according to the same method, and if

they are affected by the same influence of other beings, exactly the

same man will exist.275

The point of ‘Abdu’l-Bahá’s argument in this passage seems to be

that once the appropriate composition needed for a species to mani-

fest itself in the world is realized, and the right environmental con-

ditions, it does not evolve into another species because its essential

perfection, as determined by its essence, is already present. A

species essence will not allow its biological counterpart to exceed its

own potentialities. In this case, as ‘Abdu’l-Bahá explains, if the

same elements are combined again a thousand million years from

now in the same manner and under the same influence of other

beings (i.e., under the same environmental conditions), exactly the

same kind of biological being will be realized. This is because the

species essence, which allows the composition to exist, is time invari-

ant. It is a natural law, universally valid for all times and all places.

Hence, the human species could not have evolved by chance from

another species, since each is a unique creation in the divine intelli-

gible order.

In one of his letters, ‘Abdu’l-Bahá gives an argument which was

also given by Cuvier (see Section 1.3) as evidence for the generally

long-term invariability of biological species:

The species and essences of all things are permanent and established.

Only within the limits of each species do progress and decline occur.

For example, the human species and essence has always been and will

remain preserved and inviolable. As can be seen from the ancient,

dried, and embalmed bodies which have been exhumed from the pyr-

amids of Egypt 5,000 years after their death, there is not the slightest

change or variation, to the extent of a hair, from the human beings of

today. Similarly, the [ancient] pictures of animals on the frescoes of

Egypt are identical to present-day animals …. Man is man with his

beautiful, radiant countenance. “There is no change in the creation of

God” (Qur’án 30:30).276

‘Abdu’l-Bahá is not implying that the form of a biological species

at its first appearance on earth is created suddenly from nothing and

then undergoes no substantial change, as the special creationists

hold. The passage merely means that man in his present form hasn’t

changed for thousands, even tens of thousands of years. But there

was a time when the material reflection of the human essence, due

to the undeveloped nature of the planet, took on more primitive

forms. When a new biological species appears for the first time in

the matrix of the planet, it is complete but develops further perfec-

tions in a step-by-step fashion.

‘Abdu’l-Bahá emphasizes in several places that nothing attains its

full perfection at once: “When you consider this universal system,

you see that there is not one of the beings which at its coming into

existence has reached the limit of perfection. No, they gradually

grow and develop, and then attain the degree of perfection.”277 In

regard to the initial appearance of the human species, he clarifies:

It is evident and confirmed that the development and growth of man

on this planet, until he reached his present perfection, resembles the

growth and development of the embryo in the womb of the mother: by

degrees it passed from condition to condition, from form to form, from

one shape to another, for this is according to the requirement of the

universal system and divine law …. Man’s existence on this earth,

from the beginning until it reaches this state, form, and condition, nec-

essarily lasts a long time, and goes through many stages until it reach-

es this condition. But from the beginning of man’s existence he has

been a distinct species …. Now assuming that the traces of organs

which have disappeared actually existed, this is not a proof of the lack

of independence and nonoriginality of the species. At most it proves

that the form, appearance, and organs of man have evolved.278

This passage clearly differentiates ‘Abdu’l-Bahá from those classi-

cal essentialists who did not allow for any kind of evolution, and

shows that his conception of a “species essence” contains more than

just the ideal form of a species. It also must contain all of its possi-

ble evolutionary pathways from the most primitive to the most

advanced. Such an essence, though permanent, cannot be regarded

as fixed.

In addition to the above arguments against the transmutation of

species, in Chapter 49 of *Some Answered Questions* ‘Abdu’l-Bahá

also presents the Darwinian argument for transmutation based on the

presence of vestiges or rudimentary organs. He rebuts the Darwinian

argument using the same types of essentialist arguments found in

Section 1:

Certain European philosophers think that the species (*naw‘*) evolves,

and that even modification and transmutation are possible. One of the

proofs that they give for this theory is that through the attentive study

and verification of the science of geology it has become clear that the

existence of the vegetable preceded that of the animal, and that of the

animal preceded that of man. They believe that both vegetable and ani-

mal genera (*jins*) have changed, for in some of the strata of the earth

they have discovered plants which existed in the past and are now

extinct; in other words, they think these plants progressed and grew in

strength, and that their form and appearance changed; and, therefore,

the species has altered. In the same way, in the strata of the earth there

are some species of animals which have changed and become modi-

fied. One of these animals is the serpent. There are indications that the

serpent once had feet, but through the lapse of time those members

have disappeared. In the same way, in the vertebral column of man

there is a vestige which proves that man, like other animals, once had

a tail. They believe that at one time that member was useful, but when

man evolved, it was no longer of use; and, therefore, it gradually dis-

appeared. As the serpent took refuge under the ground and became a

creeping animal, it was no longer in need of feet, so they disappeared;

but their traces survive. Their principal argument is this: the existence

of traces of members proves that they once existed, and as now they

are no longer of service, they have gradually disappeared, and there is

no longer any benefit in or reason for these vestiges. Therefore, while

the perfect and necessary members have remained, those which are

unnecessary have gradually disappeared by the modification of the

species, but the traces of them continue.

The first answer to this argument is the fact that the animal hav-

ing preceded man is not a proof of the evolution, change, and trans-

mutation of the species, nor that man was raised from the animal world

to the human world. For while the creation of these different beings is

certain, it is possible that man came into existence after the animal. So

when we examine the vegetable kingdom, we see that the fruits of dif-

ferent trees do not all come into existence at the same time; on the con-

trary, some come first and others afterward. This priority does not

prove that the latter fruit of one tree was produced from the earlier fruit

of another tree.

Second, these slight signs and traces of members may have a great

wisdom of which minds are not yet cognizant. How many things exist of

which we do not yet know the reason! So the science of physiology—that

is to say, the knowledge of the composition of the members—records that

the reason and cause of the difference in the colors of animals, and of the

hair of men, of the redness of the lips, and of the variety of the colors of

birds, is still unknown; it is secret and hidden. But it is known that the

pupil of the eye is black so as to attract the rays of the sun, for if it were

another color—that is, uniformly white—it would not attract the rays of

the sun. Therefore, as the reason of the things we have mentioned is

unknown, it is possible that the reason and the purpose for these traces of

members, whether they be in an animal or in man, are equally unknown.

Certainly, there is a reason, even though it is not known.

Third, let us suppose [for the sake of argument] that there was a

time when some animals, or even man, possessed some members

which have now disappeared; this is not a sufficient proof of the trans-

mutation and evolution of the species. For man, from the beginning of

the embryonic period till he reaches the degree of maturity, goes

through different forms and appearances. His aspect, his form, his

appearance and color change; he passes from one form to another, and

from one appearance to another. Nevertheless, from the beginning of

the embryonic period he is of the species of man—that is to say, an

embryo of a man and not of an animal; but this is not at first apparent,

and only later does it become clear and evident. For example, let us

suppose that man once resembled an animal, and that now he has

evolved and changed. Supposing this to be true, it is still not a proof

of the transmutation of the species. No, as mentioned before, it is

merely like the change and modification of the embryo of man until it

reaches the degree of reason and perfection. We will state it more

clearly. Let us suppose that there was a time when man walked on his

hands and feet, or had a tail; this change and alteration is like that of

the fetus in the womb of the mother. Although it changes in all

respects, and grows and develops until it reaches this perfect form,

from the beginning it is a particular species. We also see in the veg-

etable kingdom that the original, separate species do not change and

alter, but the form, color, and bulk may change and alter, and they may

evolve within themselves.

To recapitulate: just as man in the womb of the mother passes from

form to form, from shape to shape, changes and develops, and is still

the human species from the beginning of the embryonic period—in the

same way man, from the beginning of his formation in the matrix of

the world, is also a distinct species—that is, man—and he has gradu-

ally passed from one form to another. Therefore, this change of

appearance, this evolution of organs, this development and growth,

does not prevent the originality of the species. This explanation is

assuming assent to the evolution of species (pl. *anwá‘*). But the fact is

that man, from the beginning, had this perfect form and composition,

and possessed the potentiality and capacity for acquiring inner and

outer perfections, and was the manifestation of these words, “We will

make man in Our image and likeness.” He has only become more

pleasing, more beautiful, and more graceful. Civilization has brought

him out of his wild state, just as the wild fruits which are cultivated by

a gardener become finer, sweeter and acquire more freshness and del-

icacy. The gardeners of the world of humanity are the prophets of

God.279

In his first rebuttal to the arguments of the Darwinists, ‘Abdu’l-

Bahá seeks to establish that the precedence of the animal kingdom

to the human kingdom does not in itself prove that man has evolved

from an animal species. All it proves is that the formation of man on

this earth was completed after the formation of the animal. In the

second rebuttal, ‘Abdu’l-Bahá states that the existence of vestiges of

organs that now apparently have no function is also not a proof of

the transmutation of the species, since these vestiges may have a

reason we do not yet understand. Abu al-Majd al-Iṣfahání and

Ḥussein al-Jisr also made this argument (see Section 1.12).

‘Abdu’l-Bahá’s third rebuttal takes the track of assuming for the

sake of argument that the species form has changed dramatically,

such that man once walked on four legs and had a tail. He then says

that if this were so, it would not prove the non-originality of the

species, because although the form has changed it could still be the

same species (i.e., under the influence of the same essence). He

gives the example of how the human embryo does not at all resem-

ble the state of a fully-developed human being, yet it still belongs to

the human species and has not traversed from one species to another.

‘Abdu’l-Bahá explains that this analogy is given for the sake of

those who assent to the theory of the transmutation and evolution of

species, meaning those who believe man descended from the ani-

mal.

In his talk on this subject at the Open Forum in San Francisco in

1912, ‘Abdu’l-Bahá uses the same qualifying language while pre-

senting the same argument, showing that he considers the idea that

man’s biological form descended from more primitive animal forms

belonging to other species to be improbable. He says:

The philosophers of the East say: If the human body was originally not

in its present composition, but was gradually transferred from one

stage to another until it appeared in its present form [as the philoso-

phers of the West say], then we would postulate that although at one

time it was a swimmer and later a crawler, still it was human, and its

species has remained unchanged …. Provided that we assent [to this

theory] that man was at one time a creature swimming in the sea and

later became a four-legged, assuming this to be true, we still cannot

say that man was an animal. Proof of this lies in the fact that in the

stage of the embryo man resembles a worm. The embryo progresses

from one form to another, until the human form appears. But even in

the stage of the embryo he is still man and his species has remained

unchanged.280

‘Abdu’l-Bahá is so certain of this position that he asserts in this

talk that the link assumed to be missing between man and the ani-

mal will never be found: “The link which they say is lost is itself a

proof that man was never an animal. How is it possible to have all

the links present and that important link absent? Though one spend

this precious life searching for this link, it is certain that it will never

be found.”281

Although ‘Abdu’l-Bahá does accept evolution and modification

within a species, he consistently does not assent to the idea of inter-

species evolution (i.e., the theory that one species can evolve into

another solely through environmental forces), which was how the

Darwinists understood the implications of modification.

‘Abdu’l-Bahá concludes his argument above by saying that man

has, in fact (*va ḥál án-ki*), always had “this perfect form and com-

position,” which belongs to the human species, and that he “has only

become more pleasing, more beautiful, and more graceful.” By

extension, the same would apply to all species.

Now a seeming dilemma arises here. How is this conclusion of

‘Abdu’l-Bahá, that the human species has “from the beginning” had

“this perfect form and composition” and “only become more pleas-

ing, more beautiful, and more graceful,” to be reconciled with this

equally clear statement of his:

Man in the beginning of his existence in the matrix of this terrestrial

globe, like the embryo in the womb of the mother, gradually grew and

developed, and passed from one form to another, from one shape to

another, until he appeared with this beauty and perfection, this force

and this power. It is certain that in the beginning he had not this love-

liness and grace and elegance, and that he only by degrees attained this

shape, this form, this beauty and this grace. There is no doubt that the

human embryo did not at once appear in this form; neither did it sud-

denly become the manifestation of the words “Blessed be God, the

best of creators.” … Thus it is evident and confirmed that the devel-

opment and growth of man on this planet, until he reached his present

perfection, corresponds to the growth and development of the embryo

in the womb of the mother: by degrees it passed from condition to con-

dition, from form to form, from one shape to another, for this is

according to the requirement of the universal system and the Divine

Law …. And in the same way, man’s existence on this earth, from the

beginning until it reaches this state, form and condition, necessarily

lasts a long time, and goes through many stages until it reaches this

condition. But from the beginning of man’s existence he has been a

distinct species.282

The solution to this seeming contradiction lies in the realization

that ‘Abdu’l-Bahá’s concept of evolution is very different from that

of Darwin. To ‘Abdu’l-Bahá “evolution” (*taraqqí*) means the

“progress” of something from a primitive though perfect and com-

plete seed state toward the state of fulfilling its innate potential or

reason for being. For example, an acorn is perfect and complete in

itself, but it has not yet realized its potential to become an oak tree.

To become an oak tree, which will have the capacity to feed and

shelter other creatures, it must pass through many stages of devel-

opment over a long period of time. But from the beginning the acorn

has the specific potential in its composition and configuration of ele-

ments to become an oak tree. It cannot become anything else; it

stays within its species. In the same way, when ‘Abdu’l-Bahá states

that “man, from the beginning, had this perfect form and composi-

tion,” he means this in the sense that a seed already has the perfect

composition and configuration to become a tree, even though it will

still change in outward form and pass through many stages of devel-

opment.

This view has been designated by some Bahá’ís as “parallel evo-

lution,” and it appears to correspond roughly to the views of such

thinkers as Augustine, Iṣfahání, and Leibniz (see sections 1.4, 1.12,

and 3.3). According to this idea, a parallel but distinct path of evo-

lution is maintained for each biological population from the time of

its original formation on this planet. In the beginning stages, such as

the single-celled stage and in other early stages, various species may

have looked alike and even been nearly identical genetically, but

they later gradually differentiated in appearance and continued to

evolve new characteristics separately from each other. This is analogous

to the way the nearly identical, undifferentiated cells of the blastula

begin to specialize into particular types of cells, such as bone cells,

blood cells, skin cells and so forth.

Although this type of evolution is designated “parallel,” the source

of parallelism is not in the biological forms themselves but in their

corresponding essences. For this reason, the evolutionary pathway of

all of earth’s life will physically take the form of a tree with certain

biological species appearing (because of physical similarity) to derive

from or branch out of others, while, in reality, their essences are dis-

tinct. Outwardly, then, as a physical process, parallel evolution

appears no different than Darwinian evolution. The critical difference

resides in the source of speciation. To Darwin speciation is arbitrary

and comes from the natural selection of favorable random variations;

to ‘Abdu’l-Bahá speciation is already determined and comes from

timeless nonspatial essences.

## 4.6 A Model for temporal creation

If, as ‘Abdu’l-Bahá proposes, “all beings, whether universal or par-

ticular, were created perfect and complete from the first, but their

perfections appear in them by degrees,”283 then how does the phys-

ical and temporal realization of this creation occur? In other words,

how do you get the *first* human being on earth, the seed of the

species, without reverting to literal biblical special creation?

‘Abdu’l-Bahá’s answer retains the idea of creation, but incorporates

the role of evolution in realizing a species’ potential. And of course

what is formed at first is not the finished product of the species but

only its most primitive form.

As explained in Section 4.2, ‘Abdu’l-Bahá teaches that “the com-

ing together of the various constituent elements of beings cannot be

accidental” and “cannot be necessary,” but arises from the Will of a

supreme Being.284 This Primal Will contains the species essences

(i.e., the realities, the possibilities, the natural laws) of all things,

which define the space of possible formations that can take place in

the universe in accordance with God’s perfect wisdom. As ‘Abdu’l-

Bahá explains:

Each time that the isolated elements become combined in accordance

with the divine universal system, one being among beings comes into

the world. That is to say, that when certain elements are combined, a

vegetable existence is produced; when others are combined, it is an

animal; again others become combined, and different creatures attain

existence. In each case, the existence of things is the consequence of

their realities.285

Before the elements became composed by God’s Will into the first

primitive forms of creatures, these elements themselves underwent

a period of evolution in their formation. ‘Abdu’l-Bahá says:

Therefore, it is evident that in the beginning there was a single matter,

and that one matter appeared in a particular form in each element.

Thus various forms were produced, and these various forms as they

were produced became independent, and each element was special-

ized. But this independence was not definite, and did not attain real-

ization and perfect existence until after a very long time. Then these

elements became composed, organized, and combined in infinite

forms; in other words, from the composition and combination of these

elements a limitless number of beings appeared.

This composition and arrangement, through the wisdom of God

and His preexistent might, were produced from one natural organiza-

tion. As the world was composed and combined with the utmost per-

fection, conformable to wisdom, and according to a universal law, it is

evident that it is the creation of God, and is not a fortuitous composi-

tion and arrangement.286

Given that all things at their first appearance in the temporal

domain are formed as ‘Abdu’l-Bahá has described, how might this

look in practice? Before answering this with a tentative model, two

general principles of ‘Abdu’l-Bahá first need closer examination.

The first principle is that the biological manifestations of species

are latent or potential (*kumún or bi‘l-quwah*) on this earth and

become manifested in stages: first inorganic structures of atomic and

molecular organization appeared and then gradually more complex

biological structures appeared, finally cumulating in the appearance

of the animal and human kingdoms. ‘Abdu’l-Bahá explains:

For example, in this seed all the vegetable perfections exist, but not

visibly; afterward, little by little, they will appear. So it is first the

shoot which appears from the seed, then the branches, leaves, blos-

soms, and fruits; but from the beginning of its formation all these

things exist in the seed potentially (*bi‘l-quwah*), though not outwardly

 …. In the same way, the planet earth from the beginning was created

with all its elements, substances, minerals, parts, and organisms; but

these only appeared by degrees: first the mineral, then the plant, after-

ward the animal, and finally man. But from the first these genera and

species existed, although they were latent (*kumún*) in the terrestrial

globe. Later they gradually appeared.287

What is significant in this passage is ‘Abdu’l-Bahá’s use of the

words *kumún* and *bi‘l-quwah*, latency and potentiality. Something

can be latent or potential in two senses: either it can be potential in

a general sense, or it can be potential in a specific sense. If some-

thing is potential in a general sense, such as the potentiality of a pile

of bricks to become a house, or a group of atoms to become a horse,

not even a trace of the actual existence of the thing is present in the

bricks or the atoms. In other words, this pile of bricks or these atoms

at some future time might become configured as such, but they

could just as well become configured as something else. ‘Abdu’l-

Bahá says every atom has the potentiality to be part of the composi-

tion of God’s creatures in each of the kingdoms of nature; this is a

general potentiality. The house is not in the bricks in any form, nor

is the horse in the atoms. The form of the house only preexists in the

mind of the architect or builder; and the ideal form of the horse, as

a species essence, only preexists in God’s created knowledge.

Therefore, when ‘Abdu’l-Bahá says “from the first these genera and

species existed, although they were latent in the terrestrial globe,” he

really means they were latent in what *causes* the forms in matter.

The potential is not in the clay; it is in the unseen essence. It is not

in the image, but in the object casting the image.

Unlike something that has a general potentiality, something that

has a specific potentiality can only become one thing. The seed of a

tree or the embryo of a human being, for example, can only become

one thing. The animal species that have appeared on this planet

since its inception could only have had a general potentiality in the

terrestrial globe in the early stages of its formation when the chem-

ical and biological constituents from which all organic life is com-

posed were developing. During this period, not even a trace of the

actual existence of plant and animal species was present. In this

respect, ‘Abdu’l-Bahá’s analogy of the seed (above) should not be

taken literally, since, in a sense, branches, blossoms, and fruit actu-

ally exist in the seed in its genetic code. The acorn can only become

an oak tree, but we could not say that certain atoms or molecules can

only become a horse.

The species essence can be compared with the intention to build

a house. First there is nothing visible, only the intention and perhaps

a preliminary design of it. Then it becomes a file of papers contain-

ing the drawings of the architect and the legal papers needed to con-

struct a house. Then it becomes a pile of bricks or lumber. Gradually,

you see the frame being raised, although the roof is still missing and

the finishing touches remain to be done. Finally, everything is ready

and you move in with your family. Only now is the house ready to

serve its original purpose; only now can it really be called a house.

But from the beginning it was planned to be a house for living.288

The steps for building other types of structures, such as libraries

or factories, would not be very different. The same kind of prelimi-

nary planning would be necessary, the same kind of materials, the

same workers. Only when a structure is finished does its original

purpose, or essence, become fully realized. Prior to that it is only a

potentiality. In the same way, the laws of formation, the biological

materials, and the mutual influence of different beings must be in

common for all biological species. Only when their biological struc-

tures become completed are their species essences (or plans) fully

realized. But God’s way of building living beings is more complex

than this analogy can show, since He has built the tools by which He

builds biological structures, such as DNA and genes, into the bio-

logical structures themselves.

The second relevant principle given by ‘Abdu’l-Bahá is that the

timeless divine emanations, which include the species essences of

things, become manifested in the temporal domain whenever capac-

ity has developed to receive them. In a talk to the Theosophical

Society in New York ‘Abdu’l-Bahá states: “The divine emanations

(*fayúḍát-i illáhíyyih*) pervading all created beings have had no

beginning and will have no end. That illimitable bounty becomes

effective in every station whenever the capacity appears to receive

it.”289 If this principle is applied to the idea of biological evolution,

then each timeless species essence should begin manifesting its

influence as soon as the environmental conditions are prepared to

receive it.

With these two principles, and assuming a species essence for each

unitary being, it is possible to give a tentative model for how temporal

creation by formation and evolution occurs according to ‘Abdu’l-

Bahá. By a unitary being is meant any of God’s creatures, each of

which is a unity-multiplicity or self-contained system consisting of

harmoniously interacting parts. Each atom, as a unitary being, has

appeared, according to this view, under the influence of its own unique

species essence and always remains under the influence of that species

essence in its individual being. Once the kinds of atoms required for

the composition of beings have appeared in their predetermined states,

in which they are able to fulfill the functions for which they have been

created, then another species essence, say the essence for water, allows

two atoms of hydrogen and one of oxygen to combine together to form

the molecule of water, provided the conditions are right for this trans-

formation. The other molecules are also formed when their constituent

elements are present and conditions are appropriate. The atoms have

not changed in essence and evolved into molecules; they have simply

been combined into a more complex structure under the influence of a

different species essence, so that collectively they manifest entirely dif-

ferent properties.

Molecules, such as amino acids, are combined by the influence of

new essences and the preparation of the environment into more

complex substances, such as proteins. The amino acids themselves

have not evolved into proteins, but in their new configurations they

manifest properties different from their individual properties.

In the philosophical terminology of the ḥikmat philosophers, each

new structure is *form* in relation to the less complex structure pre-

ceding it, and *matter* in relation to the more complex structure that

follows (see Section 3.9–10). So molecules are form in relation to

atoms, because they are configurations of atoms, but they are matter

in relation to proteins, because the proteins configure them.

According to the logic of this pattern, the components of living

things do not evolve arbitrarily into each other, but some can act as

building blocks for others. Each is the completed organization of

less complex components and appears as soon as those components

have attained their own perfection and environmental conditions

(i.e., the influence of other beings) are right.

It is important to remember that, according to ‘Abdu’l-Bahá’s

philosophy, the potential for all these things is not in the material

forms themselves but in their species essences. All material things

are composed (hence equivalent to matter) but what composes

(i.e., gives form) is an immaterial power emanating from a higher

realm. There is no dualism of spirit and matter in this view, only

one reality (God’s actional will) which through successive vertical

emanations and corresponding horizontal manifestations expresses

itself in infinite forms (cf. Section 3.10).

In general terms, plants began to appear as soon as atmospheric

and geological conditions became appropriate and all the inorganic

compounds necessary for their existence were present. Which

species essences became manifested depended on the preparation of

the environment. The latent potential of the plant species essences

could now begin to be realized. These plants, in turn, were necessary

to prepare the environment for the appearance of more complex

organisms. The same can be said for the microscopic one-celled

organisms. The one-celled organisms, in this view, did not evolve

from plants or from any other individual entities, but were com-

posed from less complex components under the influence of new

species essences. In the same way, these one-celled organisms may

have become combined in accordance with new essences into more

complex biological structures, as soon as conditions were suitable.

This process of the combination of already existing materials in

accordance with possible essences would then continue until the

primitive “seeds” of all the species existing on earth today were

formed. The seeds may not have been formed at the same time but

at different times in accordance with the preparedness of the envi-

ronment for certain essences. Once the seeds appeared, they would

evolve independently according to their essences but harmoniously

with each other (and perhaps indistinguishably from each other for

a long time) according to their physical circumstances.

Not only must the required components for new, more complex

structures be present, but the environment must possess the means

for each newly manifested species to survive and hopefully flour-

ish. This necessarily involves the appearance of many organisms

simultaneously which mutually influence and assist each other. The

environmental system as a whole is therefore more essential to the

continuance of life than any of its individual members. As ‘Abdu’l-

Bahá describes it, “all beings are connected together like a chain;

and reciprocal help, assistance and interaction belonging to the

properties of things are the causes of the existence, development,

and growth of created beings.”290 Thus, the environmental system

of all life, like a single being, has grown and evolved, each part

developing in relation to other parts, just as the diverse members of

the human body all develop in coordinated harmony.

As the plant kingdom, in general, was necessary for the appear-

ance of the animal kingdom, so was the animal kingdom, according

to ‘Abdu’l-Bahá, necessary for the appearance of the human king-

dom. The human body itself “grows and develops through the ani-

mal spirit.” As soon as conditions became right for the appearance

of man, man appeared, but he did not evolve by chance from another

species because his particular species essence has always existed.

Only his biological form was molded from the biological materials

already present and then continued to progress toward greater per-

fection.

## 4.7 Saltation

The following letter of ‘Abdu’l-Bahá on the possibility of man hav-

ing evolved from the animal summarizes his view well:

O seeker of the truth! Man is the greatest member of the world of exis-

tence and the fruit of the tree of this visible universe. His species is

eternal, and this eternal reality has no beginning and no end. That

which the philosophers of Europe have stated in regard to human evo-

lution—that man came from the kingdom of the mineral, the veg-

etable, and then the animal, and by means of evolution reached this

station, is pure supposition, for his species has always existed. It may

be that on this globe of earth in the beginning he was in the stage of a

seed, and afterwards he evolved and attained the station of manifest-

ing the words “Blessed be God, the best of creators!” But that seed

which evolved by degrees belonged to the human species, not an ani-

mal species. Therefore, this species is beyond time (*qadím*) and from

the outset was the noblest of creatures upon the earth. This is the truth,

and naught lies beyond the truth but evident error. God has ever exist-

ed while His creation renews itself continuously. Take for example the

sun and its rays. Without light it would be opaque darkness, and an

extinguished lamp is fit for the abode of the blind. The glory of glories

rest upon thee.291

‘Abdu’l-Bahá is saying that the potentiality or reality of man (and

implicitly all other species) is eternal. No species is the arbitrary

product of another by the process of evolution, since each possible

kind exists timelessly in the divine intelligible order and is necessary

for the unfoldment of a harmonious cosmos of which man is the

fruit. Once a species essence, by reason of the preparedness of the

environment, connects to a biological “seed,” that seed evolves or

progresses in parallel to other biological seeds under different

essences until it reaches its full potential perfection.

Now some questions arise: What is the nature of this seed? How

did the “seed” get there? Are we limited to the explanation given in

Section 4.6, that the seed came about through the *combination* of the

materials already present? Could the seed also have appeared

through *transmutation*?

If this seed came about through transmutation rather than by a

combination of elements, it would be easier to explain it in terms of

the presently accepted scientific theory of evolution. In this case the

seed would derive from a previously existing biological population

which jumped or “saltated” to a new essence. As long as that seed

develops under the human essence, it would develop in parallel to

other biological forms, because it belongs to the human species, not

an animal species. This view, called *saltation*, incorporates a com-

ponent of parallel evolution as well (see Section 1.4).

Saltation is an alternative to maintaining ‘Abdu’l-Bahá’s essen-

tialism without relying wholly upon parallel evolution or upon bib-

lical special creation. Saltation allows temporal creation to occur via

essences by using radical mutations that occur within the biological

populations already existing. If the species space is very dense then

each population would have a large number of closely related

species to which it could jump. In practice, this would be hard to dis-

tinguish from the idea of slow gradual evolution proposed by

Darwin. If, on the other hand, the species space is more sparse, a

population would have a smaller chance of jumping over to another

species.

Although ‘Abdu’l-Bahá does not refer to the saltation theory,

which was proposed by certain essentialists of his time, one of his

letters on the subject of the transmutation of elements allows for its

possibility. In that letter, he says:

As for the question of the transmutation of copper into gold, this is

possible and certain; that is to say, by means of the hidden science,

which in this cycle is one of the special bounties of the Blessed Beauty.

The materialistic philosophers of modern science believe that the metals

are isolated elements incapable of transmutation into one another; in

other words, they think that the essential qualities (*máhíyat*) of things

cannot become transformed. But in the future, it will become manifest

and clear that this is possible.292

Despite the fact that things have different essences, ‘Abdu’l-Bahá

is here saying that their transmutation is possible by external inter-

vention. In the case of the metals mentioned above, he says they

may be transmuted by means of the hidden science (i.e., alchemy),

which itself contains an element of divine permission. It is impossi-

ble for copper to suddenly transmute into gold unless it saltates, or

jumps, to the gold essence. By extending this principle to other

species, it means that new biological populations could be produced

by the transmutation (or mutation) of older ones if they jump to a

new essence. This is what saltation means. (Of course, it may be that

‘Abdu’l-Bahá does not intend to extend this principle of transmuta-

tion in alchemy to living forms.)

Despite these speculations there is no definite support for saltation

in ‘Abdu’l-Bahá’s statements, whereas a parallel evolution model is

more clearly supported.

## 4.8 The question of uniqueness

Is evolution as the temporal unfoldment of timeless essences bound

to ever repeat the same physical forms? Does the concept of

essences somehow limit the free and creative ability of life to

express itself in endless original forms that delight our senses with

their variety? One of the criticisms of classical biology was that a

static cosmos of unchanging species created perfect from the begin-

ning is incompatible not only with the appearance and extinction of

countless unknown species in the fossil record, but also with the

incredible variation of life and the continuous adaptation of organ-

isms to their environment. Darwin praised his theory of evolution

because it allowed for the continuous expression of uniqueness in

nature. He said: “There is a grandeur in this view of life [wherein] …

from so simple a beginning endless forms most beautiful and won-

derful have been, and are being, evolved.”293

Since timeless essences correspond to whatever structures and

kinds of beings are possible in the universe, they are in no sense a

limitation to the possible expressions of evolution. They only define

what can and cannot exist and under what conditions, and what can

exist is probably beyond the ability of our intelligence to grasp.

Furthermore, the continuous need and ability of organisms to adapt

to random environmental changes (what some call “chance”)

ensures that the varieties of the expressions of life are absolutely

infinite.

‘Abdu’l-Bahá affirms that uniqueness is a rule that applies to all

things in the universe, whether individuals or populations, as a con-

sequence of the uniqueness of the Creator. The possible individual,

temporal expressions of species essences are endless. The factors of

constantly changing environmental influences and the inheritance of

genes from two different parents ensure that appearances are never

exactly repeated and that endless diversity within the same species

is possible. Even if an organism is cloned from another, they will

never be exactly alike due to the differences of individual nurture

and experience. On the other hand, similar environmental pressures,

such as the need to move in water, can create very similar forms

among populations with distinct essences.

On this subject, ‘Abdu’l-Bahá says:

Now observe that in the sensible world appearances are not repeated,

for no being in any respect is identical with, nor the same as, another

being. The sign of singleness is visible and apparent in all things. If all

the granaries of the world were full of grain, you would not find two

grains absolutely alike, the same and identical, without distinction ….

As the proof of uniqueness exists in all things, and the oneness and

unity of God is apparent in the realities of all things, the repetition of

the same appearance is absolutely impossible.294

A similar sentiment is beautifully expressed in a prayer revealed by

Bahá’u’lláh in support of the uniqueness and exquisiteness of every

created thing:

Blind is the eye that faileth to behold Thee seated upon the throne of

Thy sovereignty, and that seeth Thee not exercising undisputed author-

ity over all Thou hast created of the manifestations of Thy names and

attributes …. Just as Thou hast assigned no partner to Thyself, in the

same way, whatever Thou hast called into being hath no peer or equal,

since Thou hast revealed Thyself in each thing through the effulgent

light of Thy divine unity …. In truth, every thing that proceedeth from

Thyself is the most excellent and most exquisite of all things that exist

betwixt Thy heaven and Thy earth, and by it the tokens of Thy glori-

ous sovereignty are revealed to Thy creatures, and Thy proof is per-

fected to all mankind.295

## 4.9 ‘Abdu’l-Bahá’s criticism of the “struggle for survival”

One of the things apparent in ‘Abdu’l-Bahá’s writings and talks on

the subject of Darwinian evolution is that his criticisms, rather than

attempting to judge its validity as a scientific theory, focus instead

on the implications Darwin’s theory will have in all the spheres of

human thought and civilization. ‘Abdu’l-Bahá was looking at the

broad scheme of things and seeing how these ideas affected our

ideas of God, purpose, and human progress in the future. He knew

that they are only part of the picture as seen from a limited materi-

alistic perspective, which recognizes no reality beyond what the

senses can behold and no authority outside of science.

One of the ideas spawned from Darwinism by late nineteenth-cen-

tury Victorian philosophers was that Darwin’s principle of the

“struggle for survival” should also be applied to the realm of human

society. According to this idea, it is natural and desirable for one

nation to behave aggressively toward another and to dominate it for

its own benefit. As mentioned in Section 1, this materialistic philos-

ophy was used as a justification for the horrors of World War I.

‘Abdu’l-Bahá was fiercely opposed to this idea, and called it the

greatest of all errors and the cause of utter ruin to humanity. The

tragic events of the twentieth century justify his position. In a letter

written to a society dedicated to the advancement of humanity, he

wrote:

Observe that the primary principle adhered to by every individual of

the human species is to attract benefit to himself and to avoid injury.

His aim is to secure his own tranquility and happiness. This is his sole

desire in life, and he strives to distinguish himself from all others

through the ease, wealth, and fame he has obtained. This is the goal of

every individual of the human species. But, in truth, this is a base, dan-

gerous, and inferior notion. If man advances a little in his thinking and

his aspirations become nobler, he will realize that he should strive to

benefit his whole family and to protect it from harm, for he perceives

that by bringing comfort and affluence to the whole family, his own

felicity and prosperity will increase. Should his thinking expand even

more and his aspirations grow in depth, he will realize that he should

endeavor to bring blessings to the children of his country and nation

and to guard them from injury. Although this aspiration and thought

are for his own sake and that of his family, all the children of the nation

will benefit therefrom. But this aspiration will become the cause of

injury to other nations, for he then exerts the utmost effort to bring all

the advantages of the human world to his own nation and the blessings

of the earth to his own family, singling them out for the universal felic-

ity of humankind. He imagines that the more other nations and neigh-

boring countries decline, the more his own country and nation will

advance, until by this means it surpasses and dominates the other

nations in power, wealth, and influence.

However, a divine human being and a heavenly individual is sancti-

fied from these limitations, and the expansion of his mind and the

loftiness of his aspirations are in the utmost degree of perfection. The

compass of his thinking is so vast that he recognizes in the gain of all

mankind the basis of the prosperity of every individual member of his

species. He considers the injury of any nation or state to be the same

as injury to his own nation and state, indeed, the same as injury to his

own family and to his own self. Therefore, he strives with heart and

soul as much as possible to bring prosperity and blessings to the entire

human race and to protect all nations from harm. He endeavors to pro-

mote the exaltation, illumination, and felicity of all peoples, and

makes no distinctions among them, for he regards humanity as a sin-

gle family and considers all nations to be the members of that family.

Indeed, he sees the entire human social body as one individual and

perceives each one of the nations to be one of the organs of that body.

Man must raise his aspiration to this degree so that he may serve the

cause of establishing universal virtues and become the cause of the

glory of humankind.

At present the state of the world is the opposite of this. All the

nations are thinking of how to advance their own interests while work-

ing against the best interests of other nations. They desire their own

personal advantage while seeking to undermine affairs in other coun-

tries. They call this the “struggle for survival” (*tanázu‘-i baqá*), and

assert that it is innate to human nature. But this is a grievous error; nay,

there is no error greater than this. Gracious God! Even in the animal

kingdom cooperation and mutual assistance for survival are observed

among some species, especially in the case of danger to the whole

group. One day I was beside a small stream and noticed some young

grasshoppers which had not yet developed wings seeking to cross to

the other side in order to obtain food. To accomplish their goal, these

wingless grasshoppers rushed forward into the water and vied with

each other to form a bridge across the stream while the remaining

grasshoppers crossed over on top of them. The grasshoppers were able

to pass from one side of the stream to the other, but those insects which

had formed the bridge in the water perished. Reflect how this incident

illustrates cooperation for survival, not struggle for survival. Insofar as

animals display such noble sentiments, how much more should man,

who is the noblest of creatures; and how much more fitting it is in par-

ticular that, in view of the divine teachings and heavenly ordinances,

man should be obliged to attain this excellence ….

All the divine teachings can be summarized as this: that these

thoughts singling out advantages to one group may be banished from

our midst, that human character may be improved, that equality and

fellowship may be established amongst all mankind, until every indi-

vidual is ready to sacrifice himself for the sake of his fellowman. This

is the divine foundation. This is the law come down from heaven.296

# Conclusion

Though I have tried to be thorough and objective in this study of

‘Abdu’l-Bahá’s response to nineteenth-century Darwinism, my ana-

lysis is necessarily influenced by the narrow compass of my special-

ized training in classical Greek and Islamic philosophy. Other writers

trained in other disciplines may draw different conclusions. Let me

therefore state plainly that although I deem the following conclusions

sound and reasonable, in the character of a true scientific hypothesis,

they are nevertheless tentative and subject to being either strengthened

or weakened as additional research is undertaken on this subject.

In my paper I hold that ‘Abdu’l-Bahá teaches a form of evolution

that is congruent with a teleological worldview and which corre-

sponds generally with certain philosophical concepts put forward by

the Greek and Islamic philosophers whom he calls the “philosophers

of the East.” His ideas, however, should not be confused with the

essentialism of classical Western biology, which promoted a static

harmonious cosmos without evolution. As we saw in Section 1,

many of ‘Abdu’l-Bahá’s Muslim contemporaries responded to

Darwinism from a similar point of view.

The debate between ‘Abdu’l-Bahá and “certain European

philosophers” is not so much scientific, but philosophical. One of

the main points of controversy is the question of whether the term

“species” refers to merely the nominal classification of a biological

population of mutually interbreeding individuals (the modern scien-

tific definition), or to a reality transcending space and time by which

a thing is what it is (the Platonic definition). In this essay such a real-

ity is referred to as a “species essence” in order to distinguish the

Platonic definition from the modern scientific definition.

The word “species,” to ‘Abdu’l-Bahá, refers primarily to such

timeless realities, or laws, which are part of God’s eternal creation.

By “laws” here are meant “natural laws” by which God causes the

universe to operate. In other words, a species is not just the biolog-

ical form with which we are all familiar; rather it is also that by

which such a biological form exists. A biological population is con-

sequently both a changing reflection of the influences of its envi-

ronment and a unique temporal manifestation of a timeless natural

law. As ‘Abdu’l-Bahá stated, “this question [of evolution] will be

decided by determining whether species are original or not—that is

to say, has the species of man been established from the beginning

or was it afterward derived from the animal?”297

Another important point of controversy is the question of whether

or not mechanical causes (random variation and natural selection)

are sufficient to account for the evolution of complex order in the

universe. ‘Abdu’l-Bahá infers that mechanical causes are not suffi-

cient to explain the origin of complex order, because these causes,

too, require an explanation. Since the regress of causes and effects

cannot be infinite, it must end in a self-sufficient First Cause at least

as sophisticated as the order it creates and possessing the power and

wisdom to call creation into being. The difference between these

two views, if each is carried to its logical end, is the difference

between biological populations that are purely self-created by blind

environmental selection and evolve arbitrarily into new species, and

biological populations that evolve according to designed laws created

by a transcendent Creator.

‘Abdu’l-Bahá supported the doctrine of creation and the inde-

pendence of species, which was held in one way or another by all

the essentialists studied in sections 1 and 3. But he certainly did not

take the biblical story of genesis literally, requiring all living kinds

to have been created fully formed in two day’s time about 6,000

years ago. Like Abu al-Majd al-Iṣfahání, ‘Abdu’l-Bahá held that

religion and science must ultimately agree, and in his teachings, he

has retained essential components from each. From the Holy

Scriptures, he affirmed the concept of God as the Creator of species

by His voluntary will; from science he accepted what had been cat-

egorically established, such as the great age of the earth and the fact

that numerous biological populations have appeared and disap-

peared during the vast expanse of geologic time. He supported the

idea of evolution, but in his own special way as progress and devel-

opment “within the species itself.”

As this essay has explained, evolution to ‘Abdu’l-Bahá is goal-

directed so that each temporal material reflection of a species

essence progresses gradually towards its goal in a step-by-step fash-

ion under (or “within”) the boundaries set by its essence. The possi-

bility of the retrogression and/or temporal extinction of a species is

also accepted by ‘Abdu’l-Bahá. But Darwinian or inter-species evo-

lution, from this perspective, is considered to be an error.

‘Abdu’l-Bahá, like most of his Muslim and Christian contempo-

raries and his predecessors in medieval Islamic philosophy, viewed

the universe and its possible species as preexisting, in plan and in a

general way, in the mind of the Creator. This “plan” eternally

unfolds itself in the unique and endlessly diverse expressions of life

in the cosmos.

To say that God has a “plan” and a “mind,” of course, does not

mean that we can know them or that they resemble anything with

which we are familiar. The use of such terms reflects the limitations

of the human condition, not the reality of God. This understanding

of the universe intends to preserve for it a predetermined, non-arbi-

trary meaning and purpose. From this perspective, biological

species and the relationships between them are the unfolding of pre-

existing potentials inherent by design in the universe. When and

where these potentials become manifested varies by the needs and

preparedness of the environments in which they appear.

Notes

### Preface

1. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 2, p. 299; *The Promulgation of Universal Peace*,

 p. 356, revised translation.

2. All of the revised translations of ‘Abdu’l-Bahá’s writings and talks contained in

 this essay are provisional and have not been authorized by the Universal House

 of Justice.

### Section 1: The historical context

3. The description of the reception of Darwinism in Europe in this section depends

 heavily on two works: David L. Hull, *Darwin and His Critics: The Reception*

 *of Darwin’s Theory of Evolution by the Scientific Community* (Cambridge:

 Harvard University Press, 1973), which is largely a collection of reviews of

 Darwin’s published works by his peers; and Ernst Mayr’s *The Growth of*

 *Biological Thought* (Harvard University Press, 1982).

4. Quoted in Ernst Mayr, *The Growth of Biological Thought, Diversity, Evolution,*

 *and Inheritance* (Cambridge: Harvard University Press, 1982) p. 141.

5. A U.S. News poll conducted in 1994 indicated that 93% of Americans “believe

 in a benevolent God who hears prayers and is able to intervene in human

 events.” (*U.S. News & World Report*, April 4, 1994, pp. 48–49) A Gallop poll

 conducted in 1993 found that 47% of Americans believe “God created humans

 pretty much in their present form at the same time within the last 10,000 years.”

 (Raymo, *Skeptics and True Believers*, p. 122)

6. Quoted in Mayr, *Growth of Biological Thought*, p. 257.

7. Quoted in David L. Hull, *Darwin and His Critics: The Reception of Darwin’s*

 *Theory of Evolution by the Scientific Community* (Cambridge: Harvard

 University Press, 1973) p. 89.

8. Quoted in Ashley Montagu, ed. *Science and Creationism* (Oxford: Oxford

 University Press, 1984) pp. 245, 247.

9. Mayr, *Growth of Biological Thought*, p. 376.

10. One of Darwin’s critics, Richard Owen, noted that ancient species also could

 have disappeared for the same reasons species disappear today: not adapting to

 a changing environment, destruction by another species, etc. (Hull, *Darwin and*

 *His Critics*, p. 196)

11. Charles Darwin, *The Origin of Species by Means of Natural Selection*, 6th ed.

 (London: E. P. Dutton, 1928) p. 67.

12. Mayr, *Growth of Biological Thought*, p. 490.

13. Ibid., p. 491.

14. Thomas Kuhn, *The Structure of Scientific Revolutions*, 2nd ed. (Chicago:

 University of Chicago Press, 1970) pp. 171–172.

15. Darwin, *Origin of Species*, p. 463.

16. Darwin, May 22, 1860, *Life and Letters* (1887) vol. 2, no. 105; quoted in Hull,

 *Darwin and His Critics*, pp. 62, 65–66.

17. For an essentialist answer to this objection, see Section 1:4.

18. Hull, *Darwin and His Critics*, p. 71.

19. Today’s biologists would add that the similarity continues down to the funda-

 mental steps of biochemistry. The genetic code is the same in all organisms as

 well as the mechanism that translates the genetic message into proteins.

20. Darwin, *Origin of Species*, p. 422.

21. Ibid., p. 145.

22. Quoted in Hull, *Darwin and His Critics*, p. 299.

23. Extracts from Albertus Magnus, Thomas Aquinas, and Nicolaus Cusanus quot-

 ed in Arthur Lovejoy, *The Great Chain of Being* (Harvard University Press,

 1964) pp. 79–80.

24. Francis Hitching relates that Ernst Mayr, one of Darwin’s staunchest twentieth-

 century supporters, conducted an experiment on *Drosophila* which ironically

 supported Agassiz’s point: “He selectively bred successive generations of flies

 to try to increase or decrease the number of bristles they grew, normally aver-

 aging thirty-six. He reached a lower limit, after thirty generations, of twenty-

 five bristles; and an upper limit, after twenty generations, of fifty-six bristles.

 After that the flies rapidly began to die out. Then, Mayr brought back nonse-

 lective breeding, letting nature take its course. Within five years, the bristle

 count was almost back to average.” (*Neck of the Giraffe*, p. 41)

25. Quoted in Hull, *Darwin and His Critics*, pp. 436, 441.

26. Darwin, *Origin of Species*, p. 82.

27. Herschel (1861) 12; quoted in Hull, *Darwin and His Critics*, p. 61.

28. Quoted in Hull, *Darwin and His Critics*, p. 211.

29. Quoted in Hull, *Darwin and His Critics*, pp. 442–443.

30. Quoted in Mayr, *Growth of Biological Thought*, p. 368.

31. Mayr, *Growth of Biological Thought*, p. 365.

32. Darwin, *Origin of Species*, p. 293.

33. Quoted, in Montagu, *Science and Creationism*, p. 123.

34. Quoted in Hull, *Darwin and His Critics*, p. 150.

35. Hull, *Darwin and His Critics*, p. 149.

36. Mayr, *Growth of Biological Thought*, p. 508.

37. Quoted in Hull, *Darwin and His Critics*, p. 318.

38. Quoted in Hull, *Darwin and His Critics*, p. 338.

38. Quoted in Mayr, *Growth of Biological Thought*, p. 324.

40. Ibid. pp. 129, 326–327.

41. Lovejoy, *Great Chain of Being*, p. 256.

42. Quoted in Hull, *Darwin and His Critics*, p. 135.

43. Quoted in Hull, *Darwin and His Critics*, p. 141.

44. John Locke, “An Essay Concerning Human Understanding,” Book 3, Chapter

 6, in *Classics of Western Philosophy* (Cambridge: Hackett, 1990) p. 673.

45. Mayr, *Growth of Biological Thought*, pp. 270, 458.

46. Although scientists today accept evolution as a fact, they are still engaged in

 scientifically healthy debate over exactly how species originate. For example,

 Darwinian gradualism and the role of natural selection are both being chal-

 lenged. (See Augros, *New Biology*, Chapter 8,)

47. For the general Arab response to Darwinism, I have relied on Adel A. Ziadat,

 *Western Science in the Arab World: The Impact of Darwinism: 1860–1930*

 (New York: St. Martin’s Press, 1986). For the details, I have referred to the orig-

 inal works of Arabic-speaking authors.

48. Adel A. Ziadat, *Western Science in the Arab World: The Impact of Darwinism:*

 *1860–1930* (New York: St. Martin’s Press, 1986) pp. 13–14.

49. R. al-Barbárí, “Fí Aṣl al-Insán” (On the Origin of Man), *al-Muqtaṭaf*, vol. 1

 (Beirut 1876), pp. 242–244, 279–280.

50. Ibid., p. 242.

51. Ibid., p. 243.

52. Ibid., p. 279.

53. Ibid., p. 280.

54. Ziadat, *Western Science*, p. 23.

55. Y. Sarruf, “al-Madhhab al-Darwiní” (Darwinism), *al-Muqtaṭaf*, vol. 7 (1882)

 65–72; 121–27; J. Denis, 7 (1882–1883) 233–236; Edwin Lewis, 7 (1882–1883)

 287–290; Y. al-Ḥá’ik, 7:290–292.

56. This idea of a fixed chain of being dominated biological thinking until Darwin.

 Aristotle had no concept of evolution. Cf. Section 3.1.

57. Y. Sarruf, “al-Madhab al-Darwiní,” *al-Muqtaṭaf*, vol. 7 (1882) p. 65.

58. Ibid., p. 66.

59. Ibid., pp. 66–67.

60. Ibid., p. 67.

61. Ibid.

62. Ibid., pp. 67–68.

63. Ibid., p. 68.

64. Ibid., p. 69.

65. Ibid.

66. Ibid.

67. Ibid., p. 71.

68. Ibid., pp. 121–122.

69. Ibid., pp. 122–123.

70. Ibid., p. 124.

71. Ibid., p. 125.

72. Ibid., p. 126.

73. Ibid., p. 127.

74. J. Denis, *al-Muqtaṭaf*, vol. 7 (1882–1883), p. 235.

75. Ibid.

76. Ibid.

77. Ibid., p. 236.

78. Edwin Lewis, *al-Muqtaṭaf*, vol. 7 (1882–1883), p. 288.

79. Ibid., p. 289.

79. Ibid., p. 290.

80. Y. al-Ḥá’ik, *al-Muqtaṭaf*, vol. 7 (1882–1883) p. 290.

81. Ibid., p. 291.

82. The full title is *Sechs Vorlesungen fiber die Darwin’sche Theorie von der*

 *Verwandlung der Arten and die erste Entstehung der Organismenwelt* (Six

 Lessons on Darwin’s Theory of the Transmutation of Species and the First

 Origin of the World of Living Things) 3rd ed. Leipzig: Thomas, 1872.

84. Quoted in Shiblí Shumayyil, “Lesson Two,” *Falsafat al-Nushú’ wa’l-Irtiqá’*

 (The Theory of Evolution) (Cairo 1910) p. 129.

85. Shumayyil, *Falsafat al-Nushú’*, pp. 39–40.

86. Shumayyil explains that the modern concept of “ether” is identical to the idea

 of matter: “Whether we call the original substance of the universe ether or mat-

 ter, and the forces which are its transformations energy or motion, the meaning

 is the same.” (*Falsafat al-Nushú’*, p. 35)

87. Shumayyil, *Falsafat al-Nushú’*, p. 33.

88. Ibid., pp. 40–41.

89. Ziadat, *Western Science*, p. 41.

90. *al-Muqtaṭaf*, vol. 7 (1883), pp. 606–612.

91. Ibid., p. 606.

92. Ibid., p. 609.

93. *al-Muqtaṭaf*, vol. 48 (1916) pp. 299–300; 397–399.

94. *al-Hilal*, vol. 23 (1925) pp. 464–468; cited in Ziadat, *Western Science*, pp. 57-

 58.

95. *al-Usur*, vol. 2 (1928) pp. 678–680; cited in Ziadat, *Western Science*, p. 60.

 Contemporary authors Robert Augros and George Stanciu present convincing

 evidence that Darwinian struggle for survival does not characterize the rela-

 tionship between species in the natural state, but rather harmony and coopera-

 tion is the norm. See *The New Biology*, chapters 4 and 5.

96. *al-Mashriq*, vol. 9 (1913) pp. 694–695; quoted in Ziadat, *Western Science*, p.

 79.

97. Ziadat, *Western Science*, p. 81.

98. Jamál al-Din Afghání, *al-Radd ‘ala’l-Dahriyín*, trans. Nikki Keddie in *An*

 *Islamic Response to Imperialism* (Berkeley: University of California Press,

 1968) p. 133.

99. Ibid., p. 135.

100. Ibid., p. 136.

101. Ibid., p. 137.

102. Hussein al-Jisr, *Al-Risála al-ḥamídíya fí ḥaqíqa al-Diyána al-Islámíya wa*

 *ḥaqqíya al-Sharí’a al-Muḥammadíya* (The Praiseworthy Epistle on the Truth of

 Islam and Islamic Canon Law) (Beirut, 1887) pp. 293, 300.

103. Ibid., p. 297.

104. Ibid., p. 303.

105. Ibid., pp. 310–311.

106. Ibid., p. 314.

107. Ibid., p. 311.

108. Ibid., pp. 316–317.

109. Ibid., pp. 311–312.

110. Ibid., p. 318.

111. Ibid., p. 319.

112. Ibid., p. 323.

113. Abu al-Majd al-Iṣfahání, *Naqd Falsafah Darwin* (Critique of Darwin’s

 Philosophy). 2 vols, (Baghdad, 1914) vol. 1, pp. 16–17.

114. Ibid., p. 19.

115. Ibid., p. 39.

116. Ibid., pp. 39–40.

117. Ibid., p. 49.

118. Ibid., p. 51.

119. Quoted in Iṣfahání, *Naqd Falsafah Darwin*, vol. 1, p. 53.

120. Iṣfahání, *Naqd Falsafah Darwin*, p. 54.

121. Ibid., p. 66.

122. Ibid., p. 69.

123. Ibid., pp. 71–72.

124. Ibid., pp. 73–74.

125. Ibid., pp. 76–77.

126. Ibid., p. 98.

127. Ibid., pp. 101–102.

128. Ibid., p. 102.

129. The difference in understanding between the essentialists and the Darwinists

 on the role of variation illustrates precisely the point at issue between teleolog-

 ical and population thinking.

130. Iṣfahání, *Naqd Falsafah Darwin*, pp. 133–134.

131. Ibid., vol. 2, p. 33.

132. Ibid., vol. 1, p. 135.

133. Quoted in Iṣfahání, *Naqd Falsafah Darwin*, pp. 135–136.

134. Iṣfahání, *Naqd Falsafah Darwin*, p. 136.

135. Ibid., p. 144.

136. Ibid., p. 147. Elsewhere Iṣfahání notes that Darwin has the eye evolve gradu-

 ally from a light-sensitive spot through limitless transformations solely by nat-

 ural selection. He is amazed at this view and asks: “How can it be hidden from

 them that these organs are among the greatest proof of the existence of a Creator

 and His wisdom and providence …. Eternal Providence prepares organs for

 animals over a long period of time, according to their needs, then He completes

 their creation and they become capable of performing their function.” (*Naqd*

 *Falsafah Darwin*, vol. 2, p. 40)

137. Ibid., p. 179.

138. Ibid., p. 221.

139. Ibid., p. 180.

140. Ibid., p. 225.

141. Ibid., vol. 2, pp. 30–31.

 Personal communication with Professor Amin Banani, Department of Near

 Eastern Languages and Cultures, University of California, Los Angeles, June

 1996.

### Section 2: The originality of species

143. This book, known in Persian as *Mufávaḍát*, is Laura Clifford Barney’s col-

 lection of the table talks that ‘Abdu’l-Bahá gave in ‘Akká’ between the years

 1904–1906. It was later corrected by ‘Abdu’l-Bahá and he encouraged Miss

 Barney to publish it.

144. ‘Abdu’l-Bahá, *Má’idiy-i Ásmání* (The Heavenly Bread) (New Delhi: Bahá’í

 Publishing Trust, 1984). Reprint of vols. 2, 5, and 9 formerly published in

 Tehran. Vol. 2, p. 69.

145. ‘Abdu’l-Bahá, *Mufávaḍát* (Table Talks) (New Delhi: Bahá’í Publishing Trust,

 1984) pp. 135–136; *Some Answered Questions* [*SAQ*] (Wilmette, Ill.: Bahá’í

 Publishing Trust, 1981) p. 191, revised translation.

146. ‘Abdu’l-Bahá, *Mufávaḍát*, pp. 130–131; *SAQ*, p.184, revised translation.

147. ‘Abdu’l-Bahá, *Má’idiy-i Ásmání*, vol. 9, p. 27.

148. For example, he says: “The species existing on this planet had a beginning,

 for it is established that there was a time when these species did not exist on the

 surface of the earth. Moreover, the planet earth has not always existed, but the

 world of existence has always been, for the universe is not limited to this ter-

 restrial globe.” (*Mufávaḍát*, p. 107; *SAQ*, p. 151, revised translation)

149. Toshihiko Izutsu, *Concept and Reality of Existence* (Tokyo: The Keio

 Institute of Cultural and Linguistic Studies, 1971) p. 101.

150. Fazlur Rahman, *The Philosophy of Mullá Ṣadrá* (Albany: State University of

 New York Press, 1975) pp. 29, 47.

151. William Chittick, *The Sufi Path of Love. The Spiritual Teachings of Rumi*

 (Albany: University of New York Press, 1983) p. 84.

152. Mullá Ṣadrá, *Al-Ḥikmat al-Muta’álíya fi’l-Asfár al-’Aqlíya al-Arba’a* (The

 Sublime Wisdom in Four Journeys of Reason), 9 vols. (Qum 1368–1379 A.H.)

 vol. 2, pp. 56–57.

153. Ibid., vol. 6, pp. 256–257.

154. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 203; *SAQ*, p. 292, revised translation.

155. ‘Abdu’l-Bahá, *Má’idiy-i Ásmání*, vol. 9, p. 27.

156. Montagu, *Science and Creationism*, p. 120.

### Section 3: Species, essence, and becoming: The views ofthe “Philosophers of the East”

157. Mayr, *Growth of Biological Thought*, p. 88.

158. Aristotle, *Categories*, 1b.35, 2b.6.

159. Ibid., 2b.8–12.

160. Ibid., 3b.10–18.

161 Aristotle, *Metaphysics*, vii.13, 1038b–1039a.

162. Ibid., vii.8, 1034a; cf. xii.3, 1070a.25.

163. Ibid., xii.7, 1073a.

164. Ibid., xii.7, 1072a.20–1072b.30.

165. Plato, *Timaeus* 28a–29a, 52d–53a. The Greek *eidé*, translated here as

 “Form,” or “Idea,” is the same word used to translate “species.”

166. Plato, *Republic*, v.479d–480.

167. Ibid., 508e; 509b.

168. Plato, *Phaedo*, 97c.

169. Plato, *Timaeus*, 52d–53c.

170. Proclus, *Commentary on Plato’s Parmenides*, trans. Glenn Morrow and John

 Dillon (Princeton: Princeton University Press, 1987) 2, iv, 735.

171. Some of Aristotle’s objections to Plato’s Forms can be read in the

 *Metaphysics*, i.9, 990b–993a; vii.14, 1039a.25–1039b.15. The whole of

 Aristotle’s *Metaphysics* is really a critique of the theory of separate Forms, and

 an attempt to set up an alternate theory based on the idea of immanent forms.

172. The Ideas of species are not one in an absolute sense; rather they are one as

 unity-multiplicities. The Idea “Man himself” would include the Ideas of “ani-

 mal,” “two-legged,” “rational,” etc.

173. Plato, *Timaeus*, 27d.

174. Ibid., 48e.

175. For a fuller discussion of how Plato understood the relation between the sep-

 arate Form and its concrete images, see Keven Brown, “A Bahá’í Perspective

 on the Origin of Matter,” *The Journal of Bahá’í Studies* 2.3 (1989–1990) pp. 30–

 35.

176. Albinus, *Didaskalos*, ix.1 and 3 cited by Harry A. Wolfson, “Extradeical and

 Intradeical Interpretations of Platonic Ideas,” *Journal of the History of Ideas*,

 vol. 22 (January–March 1961) pp. 4–5.

177. Thanks to Aly Kassam Khan for reminding me of Augustine’s seminal rea-

 sons without which this section would have been missing a critical idea in the

 development of pre-Darwinian philosophical concepts.

178. Frederick Copleston, *A History of Philosophy*, vols. 1–3 (New York:

 Doubleday, 1985) vol. 1, p. 389.

179. Ibid., vol. 2, p. 77.

180. Quoted in Copleston, *A History of Philosophy*, vol. 2, p. 73.

181. Mayr, *Growth of Biological Thought*, pp. 129, 264.

182. See *Pseudo-Aristotle in the Middle Ages: The Theology and Other Texts*, eds.

 J. Kraye, W. F. Ryan, and C. B. Schmitt (London: University of London, 1986)

 for an extensive discussion of this book.

183. Alfarabi, *Mabádi’ Ará’ Ahl al-Madína al-Fáḍila*, trans. Richard Walzer as *Al-*

 *Farabi on the Perfect State* (Oxford: Clarendon Press, 1985) p. 137; revised

 translation.

184. Ibid., pp. 139–141.

185. Avicenna, Naját, quoted in A. M. Goichon, *Lexique de la Langue*

 *Philosophique d’Ibn Síná* (Paris: Desclée de Brouwer, 1938) p. 405.

186. Ibid., p. 386.

187. Ibid., p. 257.

188. Ḥikmat is a term referring to a form of wisdom combining the esoteric teach-

 ings of the Shí’ah Imams, the illuminationist knowledge of Suhrawardí, the

 teachings of Ibn ‘Arabí and other Sufis, and the heritage of the Greek philoso-

 phers. For more on this see Seyyed Hossein Nasr, “The School of Ispahán” *A*

 *History of Muslim Philosophy*, vol. 2, M. M. Sharif ed. (Wiesbaden: Otto

 Harrassowitz, 1966) pp. 907–908.

189. Avicenna, *Dánish Náma-i ‘alá’í*, trans. Parviz Morewedge as *The*

 *Metaphysica of Avicenna*. (New York: Columbia University Press, 1973) p 33.

190. Ibid., p. 61.

191. Avicenna, “On the Proof of Prophecies” in *Medieval Political Philosophy*,

 eds. Ralph Lerner and Muhsin Mahdi (Ithaca: Cornell University Press, 1972)

 pp.117–118.

192. Avicenna, *Shifá’: Iláhiyyát*, ed. Ibrahim Madkour (Cairo 1960) pp. 402–409.

193. Etienne Gilson, *History of Christian Philosophy in the Middle Ages* (New

 York: Random House, 1955) p. 482.

194. Herbert A. Davidson, *Alfarabi, Avicenna, and Averroes, on Intellect* (New

 York: Oxford University Press, 1992) pp. 227–228.

195. Ibid., p. 250.

196. Suhrawardí, *Kitáb Ḥikmat al-Ishráq* (The Philosophy of Illumination). Typed

 manuscript belonging to John Walbridge and Hossein Ziai, dated May 30, 1996;

 pp. 144–145.

197. Ibid., p. 146, revised translation.

198. Ibid., p. 156.

199. Ibid., p. 155.

200. Ibid., p. 152.

201. Fazlur Rahman, *The Philosophy of Mullá Ṣadrá* (Albany: State University of

 New York Press, 1975) p. 96.

202. Ibid., p. 97.

203. Mullá Sadrá, *Al-Ḥikmat al-Muta ‘ál íya fi’l-Asfár al-’Aqlíya al-Arba’a* (The

 Sublime Wisdom in Four Journeys of Reason), 9 vols, (Qum 1368–1379 a.h.)

 vol. 6, pp. 256–257.

204. Rahman, *Philosophy of Mullá Ṣadrá*, p. 77.

205. Mullá Ṣadrá, *Asfár*, vol. 2, pp. 56–57.

206. Ibid., vol. 6, p. 234.

207. Rahman, *Philosophy of Mullá Ṣadrá*, p. 97.

208. The reader is referred to “The Metaphysics and Cosmology of Process

 According to Shaykh Aḥmad al-Aḥsá’í” by Idris Hamid (Dissertation, State

 University of New York, Buffalo, 1998) for an excellent and comprehensive

 treatment of Shaykh Aḥmad’s philosophy.

209. Quoted in Idris Samawi Hamid, “The Metaphysics and Cosmology of Process

 According to Shaykh Aḥmad al-Aḥsá’í: Critical Edition, Translation, and

 Analysis of Observations in Wisdom”, (Dissertation: State University of New

 York at Buffalo, 1998) p. 166.

210. Shaykh Aḥmad Aḥsá’í, *Sharḥ ‘al-Mashá’ir* (Tabriz 1278 A.H.) p. 25.

211. Hamid, “Metaphysics and Cosmology of Process”, p. 136.

212. Shaykh Aḥmad, *Sharḥ al-Mashá’ir*, p. 204.

213. Hamid, “Metaphysics and Cosmology of Process”, p. 253.

214. Shaykh Aḥmad, *Sharḥ ‘al-Mashá’ir*, p. 16.

215. Hamid, “Metaphysics and Cosmology of Process”, p. 134.

216. Shaykh Aḥmad, *Sharḥ al-Mashá’ir*, p. 17.

217. Ibid., pp. 182, 185.

218. Quoted in Hamid, “Metaphysics and Cosmology of Process”, pp. 169, 345.

219. Shaykh Aḥmad, *Sharḥ ‘al-Mashá’ir*, p. 53.

220. Ibid., pp. 16, 38.

221. Ibid., pp. 200–201.

222. Ibid., p. 153.

223. Ibid., p. 128.

224. By “appointed time” (*ajal*) is meant a creature’s lifespan.

225. Shaykh Aḥmad, *Sharḥ al-Mashá’ir*, p. 57.

226. Ibid., p. 67.

227. Ibid. p. 124.

228. Hamid, “Metaphysics and Cosmology of Process”, p. 258.

229. This is the basis of Shaykh Aḥmad’s doctrine of the resurrection body, select-

 ed writings of which have been translated by Henry Corbin in *Spiritual Body*

 *and Celestial Earth* (Princeton 1977) pp. 180–221. So at death the elements of

 man’s physical body are dispersed but the elements of the spiritual body at the

 next higher level still subsist. It is in this next dimension, sometimes called the

 autonomous world of forms and images (*‘álam al-mithál*), that the events of the

 resurrection take place. According to Shaykh Aḥmad, *‘álam al-mithál* is one

 stage below the world of the Kingdom (*malakút*). The same I-spirit speaks

 through the body at each level and is itself inseparable from the most essential

 body. Shaykh Aḥmad says, for example: “Zayd is the one who speaks, but his

 soul which speaks to you in this cage [of the body] is not at this moment in the

 domain of time; his soul is only generated in time through its connection to the

 body which it administers …. The sanctified intellects are free in themselves

 from the mixtures of the material substances, temporal duration, and geometri-

 cal shapes, but they are not free from matter, form, and extension absolutely as

 most recent thinkers have imagined. Nay, they have luminous matters, atempo-

 ral duration, and subtle forms.” (*Sharḥ ‘al-Mashá’ir,* p. 228)

230. Shaykh Aḥmad, *Sharḥ ‘al-Mashá’ir*, pp. 37, 53, 109.

231. Hamid, “Metaphysics and Cosmology of Process”, p. 122.

232. Ibid., p. 123.

233. Quoted in Hamid, “Metaphysics and Cosmology of Process” (*Fá’idah* 18) p. 373.

234. Hamid, p. 243.

235. Quoted in Hamid, “Metaphysics and Cosmology of Process” (*Fá’idah* 12) p. 346.

### Section 4: ‘Abdu’l-Bahá’s response to Darwinism

236. ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, p. 307.

237. ‘Abdu’l-Bahá, *Some Answered Questions* [*SAQ*], p. 244.

238. ‘Abdu’l-Bahá, *Tablet to Forel* published in John Paul Vader, *For the Good of*

 *Mankind, August Forel and the Bahá’í Faith* (Oxford: George Ronald, 1984)

 pp. 75–76.

239. For a full and excellent discussion of Aristotle’s proof and other proofs for the

 existence of God in medieval philosophy, see Herbert A. Davidson, *Proofs for*

 *Eternity, Creation and the Existence of God in Medieval Islamic and Jewish*

 *Philosophy* (Oxford University Press 1987).

240. ‘Abdu’l-Bahá, *Mufávaḍát*, pp. 4–5; *SAQ*, p. 6, revised translation.

241. Ilzámí, as a philosophical term, is translated consistently here as “necessary”

 for the sake of clarity. In Shoghi Effendi’s translation above, he had translated

 the first appearance of ilzámí as “necessary” and the second as “compulsory.”

242. ‘Abdu’l-Bahá, *Tablet to Forel*, p. 75.

243. ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, p. 424.

244. ‘Abdu’l-Bahá, *SAQ*, p. 3.

245. Ibid., p. 244.

246. ‘Abdu’l-Bahá, *Má’idiy-i Ásmání*, vol. 2, p. 70.

247. ‘Abdu’l-Bahá, *Makátíb* (Collected Letters) (Cairo 1912), vol. 2, p. 38.

248. A similar statement is found in the writings of the Báb: “He [God] knows the

 dispositions of all things, and through the dispositions of all, He creates all, giv-

 ing each one a portion according to its disposition …. Were He to create some-

 thing other than in accord with the state of its own receptivity, this would be an

 injustice to it.” (*Amr va Khalq*, vol. 1, p. 76)

249. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 144; *SAQ*, p. 203, revised translation.

250. ‘Abdu’l-Bahá, *Min Makátíb*, vol. 1, p. 275.

251. i.e. the divine intelligible order in God’s mind or will.

252. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 204; *SAQ*, p. 292, revised translation.

253. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 141; *SAQ*, p. 199, revised translation.

254. ‘Abdu’l-Bahá, *Muntakhabát az Makátíb-i Ḥáḍrat-i ‘Abdu’l-Bahá* (Wilmette:

 Bahá’í Publishing Trust, 1979) p. 154; Selections from the Writings of ‘Abdu’l-

 Bahá, p. 157, revised translation.

255. ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, p. 140.

256. ‘Abdu’l-Bahá, *Má’idiy-i Ásmání*, vol. 2, p. 69.

257. Ibid., pp. 68–69.

258. The Arabic word translated here as “gradually” (*bitadríj*) literally means “step

 by step” or “by degrees.”

259. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 129; *SAQ*, p. 182, revised translation.

260. This statement: “the formation of man in the matrix of the world was in the

 beginning like [the development of] the embryo” should not necessarily be

 interpreted to mean the two processes are equivalent. Rather, they have an ana-

 logical resemblance.

261. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 141; *SAQ*, pp. 198–199, revised translation.

262. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 2, pp. 170–171; *Promulgation of Universal*

 *Peace*, pp. 225–226, revised translation.

263. See, for example, William Chittick’s explanation of the arcs of ascent and

 descent in the poetry of Rúmí in *The Sufi Path of Love* (Albany: SUNY, 1983)

 pp. 72–82.

264. Chittick, *Sufi Path of Love*, p. 72.

265. ‘Abdu’l-Bahá, *SAQ*, p. 283; *Promulgation of Universal Peace*, p. 270.

266. ‘Abdu’l-Bahá, *Makátíb*, vol. 3, p. 172.

267. ‘Abdu’l-Bahá, *Mufávaḍát*, pp. 124–125; *SAQ*, pp. 177–178, revised transla-

 tion.

268. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 64; *SAQ*, p. 88, revised translation.

269. ‘Abdu’l-Bahá, *SAQ*, pp. 143–144.

270. “Perfect man” is a technical term used by Ibn ‘Arabí and his followers to refer

 to human individuals who reflect in perfect equilibrium all the names and attrib-

 utes of God, though in their specific functions (as determined by time and place)

 they may display only certain names. All of the prophets and saints are “perfect

 men,” and as such they are exemplars to the rest of humanity and reveal the

 fullness of what other men possess only potentially. Ibn ‘Arabí says: “The high-

 est cosmic level is … ‘poverty toward all things.’ This is the level of perfect man,

 for everything was created for him and for his sake and subjected to him” (qtd.

 in Chittick, *Sufi Path of Knowledge* 46).

271. ‘Abdu’l-Bahá, *Mufávaḍát*, pp. 139–140; *SAQ*, pp. 195–197, revised transla-

 tion.

272. ‘Abdu’l-Bahá, *SAQ*, p. 201.

273. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 94; *SAQ*, p. 129, revised translation.

274. In a paper by Aly-khan Kassam called “Matter, Spirit, and Complexity,” post-

 ed on the newsgroup Talisman on December 18, 1996, he explains cogently

 ‘Abdu’l-Bahá’s understanding of the relation of spirit to matter. By “spirit” here

 is meant an emergent property of matter that is dependent on particular kinds of

 compositions of constituent elements. In other words, spirit, in this case, is not

 the same as a species essence, which guides the composition; rather, it is a man-

 ifestation of a species essence realized through a particular arrangement of con-

 stituent elements. The whole of a composition, being more than just the sum of

 its parts, “attracts” a spirit to itself. “It adds,” Kassam explains, “another dimen-

 sion which cannot be inferred by simply examining the constituent parts.” So “a

 collection of elements when arranged according to a specific pattern will attract

 an ordained level of spirit to the group, which is then manifested in the group

 by certain properties or behavior in the physical world. The spirit thus attracted

 will not be attributable to any part of the group, and if the group is broken up

 the spirit vanishes.” All spirits realized in this manner are perishable, except for

 the human spirit. According to ‘Abdu’l-Bahá, once the human spirit, i.e. the

 rational soul, comes into existence, it continues forever (*SAQ*, p. 151). But the

 other spirits, such as the plant and animal spirits, are perishable (*SAQ* p. 143).

 The point of Kassam’s paper is that all complex systems, which can be anything

 from a group of cells in the body to a rain forest or a galaxy, exhibit just such

 emergent properties, which are “associated with the system as a whole and not

 any part of it.”

275. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 126; *SAQ*, pp. 178–179, revised translation.

276. ‘Abdu’l-Bahá, *Má’idiy-i Ásmání*, vol. 9, pp. 27–28.

277. ‘Abdu’l-Bahá, *SAQ*, p. 199.

278. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 130; *SAQ*, pp. 183–184, revised translation.

279. ‘Abdu’l-Bahá, *Mufávaḍát*, pp. 136–138; *SAQ*, pp. 191–194, revised transla-

 tion.

280. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 2, p. 303; *Promulgation of Universal Peace*, pp. 358-

 359, revised translation.

281. Ibid., pp. 303–304; *Promulgation of Universal Peace*, p. 359, revised transla-

 tion.

282. ‘Abdu’l-Bahá, *Mufávaḍát*, pp. 129–130; *SAQ*, p. 183–184, revised translation.

283. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 141; *SAQ*, p. 199, revised translation.

284. ‘Abdu’l-Bahá, *Tablet to Forel*, p. 75.

285. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 204; *SAQ*, p. 292, revised translation.

286. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 128; *SAQ*, p. 181, revised translation. Shaykh

 Aḥmad proposes in his *Sharḥ al-Masha‘ir* that the concept of “unity of exis-

 tence,” if we are not referring to the special meaning of this expression used by

 the leaders of the Sufis, can only refer to the unity between a whole and its parts.

 He says: “Unity of existence is inconceivable except between a whole and its

 parts. For example, man is a single existent by the existence of his parts” (228).

 In the same manner, ‘Abdu’l-Bahá says that the true meaning of “unity of exis-

 tence,” at the level of physical things, is to be found in the elements or atoms

 from which all things are composed, because every atom is capable of becom-

 ing part of the constitution of any being in the universe and consequently

 expressing the properties of that level of organization (*Promulgation*, p. 286).

287. ‘Abdu’l-Bahá, *Mufávaḍát*, pp. 141–142; SQA, p. 199, revised translation.

288. I owe this analogy to Eberhard von Kitzing, who shared it with me in one of our

 many email correspondences.

289. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 2, p. 106; *Promulgation of Universal Peace*, p. 160,

 revised translation.

290. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 126; SQA, pp. 178–179, revised translation.

291. ‘Abdu’l-Bahá, *Makátíb*, vol. 3, p. 257.

292. ‘Abdu’l-Bahá, letter 440 of a collection sent to author from the Bahá’í World

 Center, 12 July 1998.

293. Darwin, *Origin of Species*, p. 463.

294. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 197; *SAQ*, p. 283.

295. Bahá’u’lláh, *Tasbíh va Tahlíl*, pp. 88–89.

296. ‘Abdu’l-Bahá, *Khiṭábát*, vol. 3, pp. 35–37.

297. ‘Abdu’l-Bahá, *Mufávaḍát*, p. 136; *SAQ*, p. 191, revised translation.

Bibliography

‘Abdu’l-Bahá. *Khiṭábát* (Talks of ‘Abdu’l-Bahá). Hofheim-

 Langenhain: Bahá’í Verlag, 1984. (Reprint of the 3 volume origi-

 nal edition published in Egypt in 1921, 1942/43, and in Tehran

 1970/71.)

———. *Má’idiy-i Ásmáni* (The Heavenly Bread). Part 2. Comp.

 ‘Abdu’l-Ḥamíd-i Ishráq Khávarí. New Delhi: Bahá’í Publishing

 Trust, 1984. (Reprint of vols. 2, 5, and 9 formerly published in

 Tehran.)

———. *Makátíb-i ‘Abdu’l-Bahá* (Collected Letters). Vol. 2 and

 Vol 3. Cairo 1912.

———. *Min Makátíb-i ‘Abdu’l-Bahá*. (From the Collected

 Letters). Vol. 1. Rio de Janeiro: Editora Bahá’í Brasil, 1982.

———. *Mufávaḍát* (Table Talks). New Delhi: Bahá’í Publishing

 Trust, 1984. (Reprint of the 1920 Cairo edition.)

———. *The Promulgation of Universal Peace*. Talks Delivered

 by ‘Abdu’l-Bahá during His Visit to the United States and Canada

 in 1912. Comp. Howard MacNutt. Wilmette: Bahá’í Publishing

 Trust, 1982.

———. *Some Answered Questions*. [*SAQ*] Trans. Laura

 Clifford Barney. Wilmette: Bahá’í Publishing Trust, 1981.

———. “Tablet from ‘Abdu’l-Bahá to August Forel” in John

 Paul Vader. *For the Good of Mankind, August Forel and the*

 *Bahá’í Faith*. Oxford: George Ronald, 1984.

Afghání, Jamál al-Dín. *al-Radd ‘ala al-Dahriyín* (The Refutation of

 the Materialists). Trans. Nikki Keddie in An Islamic Response to

 Imperialism. Berkeley: University of California Press, 1968.

Alfarabi. *Mabádi’ Ará’ Ahl al-Madína al-Fáḍila*. Trans. Richard

 Walzer as Al-Farabi on the Perfect State. Oxford: Clarendon

 Press, 1985.

Aristotle. *Metaphysics*. Trans. Hippocrates G. Apostle. Grinnell,

 Iowa: The Peripatetic Press, 1979.

———. *A New Aristotle Reader*. Ed. J. L. Ackrill. Princeton:

 Princeton University Press, 1987.

Augros, Robert, and George Stanciu. *The New Biology: Discovering*

 *the Wisdom in Nature*. Boston: New Science Library, 1988.

Avicenna. “On the Proof of Prophecies.” *Medieval Political*

 *Philosophy*. Eds. Ralph Lerner and Muhsin Mandi. Ithaca:

 Cornell University Press, 1972.

———. *Al-Shifá’, al-Iláhiyyát*. Ed. Ibrahim Madkour. Cairo

 1960.

———. *Dánish Náma-i ‘álá’í*. Trans. Parviz Morewedge as “The

 Metaphysica of Avicenna.” New York: Columbia University

 Press, 1973.

Balínús. *Sirr al-Khalíqa wa Ṣan’at aṭ-Ṭabí’at*. Ed. Ursula Weisser.

 Aleppo, Syria: University of Aleppo, 1979.

Chittick, William C. *The Sufi Path of Knowledge. Ibn al-‘Arabí’s*

 *Metaphysics of Imagination*. Albany: State University of New

 York Press, 1989.

———. *The Sufi Path of Love. The Spiritual Teachings of Rumi*.

 Albany: University of New York Press, 1983.

Copleston, Frederick. *A History of Philosophy*. Vols 1–3. New York:

 Doubleday, 1985.

Darwin, Charles. *The Origin of Species by Means of Natural*

 *Selection*. 6th ed. London: E. P. Dutton, 1928.

Davidson, Herbert A. *Alfarabi, Avicenna, and Averroes, on Intellect*.

 New York: Oxford University Press, 1992.

Gilson, Etienne. *History of Christian Philosophy in the Middle*

 *Ages*. New York: Random House, 1955.

Goichon, A. M. *Lexique de la Langue Philosophique d’Ibn Sind*.

 Paris: Desclée de Brouwer, 1938.

Hamid, Idris Samawi. “The Metaphysics and Cosmology of Process

 According to Shaykh Aḥmad al-Aḥsá’í: Critical Edition,

 Translation, and Analysis of Observations in Wisdom.” Ph.D.

 Dissertation. State University of New York at Buffalo, 1998.

Hitching, Francis. *The Neck of the Giraffe: Darwin, Evolution, and*

 *the New Biology*. New York: New American Library, 1982.

Hull, David L. *Darwin and His Critics: The Reception of Darwin’s*

 *Theory of Evolution by the Scientific Community*. Cambridge:

 Harvard University Press, 1973.

al-Iṣfahání, Abu al-Majd. *Naqd Fasafat Darwin* (Critique of

 Darwin’s Philosophy). 2 vols. Baghdad, 1914.

Izutsu, Toshihiko. *The Concept and Reality of Existence*. Tokyo:

 The Keio Institute of Cultural and Linguistic Studies, 1971.

al-Jisr, Hussein. *Al-Risála al-Ḥamidáya fí Ḥaqíqa al-Diyána al-*

 *Islámíya wa Ḥaqqíya al-Sharí’a al-Muḥammadíya* (The Praise-

 worthy Epistle on the Truth of Islam and Islamic Canon Law). Beirut,

 1887.

Kuhn, Thomas S. *The Structure of Scientific Revolutions*. 2nd ed.

 Chicago: University of Chicago Press, 1970.

Lovejoy, Arthur. *The Great Chain of Being*. Cambridge: Harvard

 University Press. 1964.

Mayr, Ernst. *The Growth of Biological Thought: Diversity, Evolution,*

 *and Inheritance*. Cambridge: Harvard University Press, 1982.

Montagu, Ashley, ed. *Science and Creationism*. Oxford: Oxford

 University Press, 1984.

Mullá Ṣadrá. *al-Ḥikmat al-Muta‘álíya fi’l-Asfár al-‘Aqlíya al-*

 *Arba‘a* (The Sublime Wisdom in Four Journeys of Reason). 9

 vols. Qum 1368–1379 a.h.

*al-Muqtaṭaf*. Beirut and Cairo, 1876–1930.

Plato. *The Collected Dialogues*. Ed. Edith Hamilton and H. Cairns.

 Princeton: Princeton University Press, 1961.

———. *Timaeus and Critias*. Trans. Desmond Lee. Baltimore:

 Penguin Books, 1971.

Proclus. *Commentary on Plato’s Parmenides*. Trans. Glenn Morrow

 and John Dillon. Princeton University Press, 1987.

Rahman, Fazlur. *The Philosophy of Mullá Ṣadrá*. Albany: State

 University of New York Press, 1975.

Raymo, Chet. *Skeptics and True Believers*. New York: Walker and

 Company, 1998.

Shaykh Aḥmad Aḥsá’í. *Sharḥ al-Mashá’ir*. Tabriz, 1278 a.h.

Shumayyil, Shiblí. *Falsafat al-Nushú’ wa’l-Irtiqá’* (The Theory of

 Evolution and Progress). Cairo, 1910.

Suhrawardí. *Kitáb Ḥikmat al-Ishráq* (The Philosophy of

 Illumination). Typed manuscript belonging to John Walbridge and

 Hossein Ziai, dated May 30, 1996.

Wolfson, Harry A. “Extradeical and Intradeical Interpretations of

 Platonic Ideas.” *Journal of the History of Ideas*, vol. 22 (January-

 March 1961) pp. 3–32.

Ziadet, Adel A. *Western Science in the Arab World: The Impact of*

 *Darwinism: 1860–1930*. New York: St. Martin’s Press, 1986.

Part Two

**The origin of complex order in biology:
‘Abdu’l-Bahá’s concept of the
“Originality of species”
compared to concepts in modern biology**

by

Eberhard von Kitzing

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My discussions with Ron Somerby and Stephen Friberg clarified

important points in this work.

[Photograph]

‘Abdu’l-Bahá

“… we may acknowledge the fact that at one time man

was an inmate of the sea, at another period an inverte-

brate, then a vertebrate and finally a human being stand-

ing erect. Though we admit these changes, we cannot say

man is an animal.”

Section 1
Evolution and Bahá’í Belief

## 1.1 Darwin’s challenge to the classical worldview

Today it is commonly accepted that the introduction of general rel-

ativity by Albert Einstein and quantum mechanics by Max Planck

led to and still requires a reorganization of our philosophical con-

cepts about the universe as a whole and our previous understanding

of space, time, and matter.1 That the consequences of modern biol-

ogy may cause an even more drastic reformulation of our under-

standing of our existence is the central theme of Dennett’s book

Darwin’s Dangerous Idea.2 According to Ernst Mayr, Darwin

changed not only the science of biology but our whole way of think-

ing:

For no one has influenced our modern worldview—both within and

beyond science—to a greater extent than has this extraordinary

Victorian. We turn to his work again and again, because as a bold and

intelligent thinker he raised some of the most profound questions

about our origins that have been asked, and as a devoted and innova-

tive scientist he provided brilliant, often world-shaking answers.3

Dawkins emphasizes the far-reaching, but often neglected, implica-

tions of natural selection, for philosophy: “Today the theory of evo-

lution is about as much open to doubt as the theory that the earth

goes round the sun, but the full implications of Darwin’s revolution

have yet to be widely realized …. Philosophy and the subjects

known as ‘humanities’ are still taught almost as if Darwin had never

lived.”4

When Darwin published his book *The Origin of Species* in 1859,5

he presented the first consistent theory that explained the diversity

of biological species by natural means. Until this date, the majority

of naturalists, including the most illustrious ones, were convinced

that God’s special creation was the only reasonable explanation for

the existence of the complex order of life.6 The central theme of

Darwin’s theory is the “modification of species,” which stands in

sharp contrast to most previous theories in biology. Most biologists

before Darwin thought of species as fixed, timeless entities.

According to Mayr, Darwin replaced voluntary design as the main

origin of order with the concept of natural selection:

It dealt with the mechanism of evolutionary change and, more partic-

ularly, how this mechanism could account for the seeming harmony

and adaptation of the organic world. It attempted to provide a natural

explanation in place of the supernatural one of natural theology. In that

respect Darwin’s, theory was unique; there was nothing like it in the

whole philosophical literature from the pre-Socratics to Descartes,

Leibniz or Kant. It replaced teleology in nature with an essentially

mechanical explanation.7

The main challenge of Darwin’s new theory was not that it pre-

sented an alternative origin of the complex forms of life, but that it

threatened the commonly accepted worldview. At least in biology,

the picture of a God caring for His creatures was replaced by the

mechanistic and aggressive concept of the survival of the fittest: If

biological characteristics are subject to natural selection, one should

expect the same for instincts and social behavior. If our reality is

grounded in the unity of nature, the development of human society

should not be contrary to the laws of nature. Rather, the same fun-

damental driving forces should operate in the evolution of life and

in the formation of the social characteristics of humanity. From the

late nineteenth century until today, many people have concluded that

the concept of the survival of the fittest means that our universe is

driven by a blind mechanism, and that no purpose, plan, or goal

exists behind our universe.

Today, biological evolution is the model widely accepted to

explain the appearance and development of life on this planet.

Statements similar to the following ones are common place—

Dawkins: “No serious biologist doubts the fact that evolution has

happened nor that all living creatures are cousins of one another”8;

Howells: “Evolutionary theory is now the center of the whole sci-

ence of biology”9; and Mayr: “It is perhaps fair to state at the outset

that no well-informed biologist doubts evolution any longer; in fact,

many biologists consider evolution not a theory but a simple fact

documented by the change of gene pools from generation to gener-

ation and by the changes in the sequence of fossils in the successive

accurately dated geological strata.”10 Nevertheless, there are still

objections to the theory of evolution, especially among fundamen-

talist Christian groups.11

## 1.2 The seminal nature of ‘Abdu’l-Bahá’s statementson Evolution

During the second half of the nineteenth century, the consequences

of Darwinism were not only heatedly discussed in the Occident but

also in the Near East.12 They were also considered by ‘Abdu’l-

Bahá, the son of the prophet-founder of the Bahá’í Faith, who devot-

ed considerable attention to the subject of evolution. This fact indi-

cates that he was aware of the far-reaching consequences of these

new ideas about the origin of life. The opinions formulated in this

essay are based on the assumption that the statements of ‘Abdu’l-

Bahá about evolution are not intended to be a detailed explanation

of cosmogony and biological evolution. They are understood rather

as seminal statements from which Bahá’í scholars may develop a

relevant Bahá’í philosophy. Based on the cornerstones established

by ‘Abdu’l-Bahá, a later chapter will speculate on how a non-trivial

origin of our universe may be formulated in the language of modern

natural sciences. It is important to note that this essay does not

address the question of the particular mechanisms of evolution as

such.

Most of ‘Abdu’l-Bahá’s talks on evolution were given on two

occasions: during the visit of Miss Barney to ‘Akká between 1904–

1906[13] and during his journey through the United States.14 In his

table talks with Miss Barney, published under the title *Some*

*Answered Questions*, ‘Abdu’l-Bahá explicitly mentions “some

European philosophers” who believed in the “modification of the

species” and the “evolution of beings.” As ‘Abdu’l-Bahá referred to

the understanding of evolution discussed during the second half of

the nineteenth century and at the beginning of the twentieth century,

much attention is devoted in this essay to clarifying that under-

standing.

Because of the general nature of ‘Abdu’l-Bahá’s statements about

evolution, it is assumed that he was not interested in the details of

evolution biology, but in the philosophical consequences of

Darwinism. He was one of the few great religious figures at the end

of the nineteenth century who accepted the development of the bio-

sphere as an evolutionary process. However, he severely criticized

the philosophic concepts of purposelessness and atheism. Contrary

to many contemporary scientists and philosophers, ‘Abdu’l-Bahá

understood evolution to support the existence of God.15

A second group of philosophers that ‘Abdu’l-Bahá explicitly

mentions in his talks about evolution are the “philosophers of the

East,” whose understanding of the origin and nature of species, sim-

ilar to that of Western classical biology, were rooted in concepts for-

mulated by Plato and Aristotle. The diverse species concepts of the

Islamic philosophers are not further considered in this essay. The

reader is referred to the accompanying essay by Keven Brown for a

detailed discussion of these concepts.

## 1.3 About “some European philosophers”

In the Near East the evolution discussion addressed mainly philo-

sophical and social issues. The early literature about evolution avail-

able in Arabic were translations of representations of Darwinism

addressed to the general public by authors such as Ludwig Büchner

and Ernst Haeckel, who wrote their books to spread a new world-

view based entirely on the empirical sciences. They explained the

theory of biological evolution as an atheistic, mechanistic philo-

sophy. Those ideas were presented as a direct consequence of the

new findings of modern science.

Because ‘Abdu’l-Bahá explicitly refers to “some European

philosophers,” the views of Ludwig Büchner and Ernst Haeckel are

presented and discussed in this essay. Ludwig Büchner (1824–1899)

wrote many books and pamphlets about his philosophic ideas which

were published in many languages. He popularized Darwinism

together with a materialistic worldview in the West, but also in the

Near East. He tried to base his worldview on natural sciences. The

first edition of his famous and well-known book *Kraft und Stoff*

(Force and Matter)16 was published in 1855, four years before

Darwin’s *Origin of Species*.

As early as 1855, Büchner postulated the evolution of species fol-

lowing the teachings of Lamark. The book *Kraft und Stoff* appeared

in twenty-one editions and was translated into fifteen languages.

German and English editions were reprinted several times in North

America, where he gave many lectures during his visit in the winter

of 1872-1873. His book *Sechs Vorlesungen fiber die Darwin’sche*

*Theorie* (Six Lessons on Darwinism)17 was translated into Arabic

by Shiblí Shumayyil and published in 1884. It soon became the cen-

ter of a heated debate in the Near East over Darwinism, a debate that

continued for a long time in the pages of Lebanese and Egyptian

newspapers. Büchner severely criticized prevalent Christian beliefs

as myths and childish ideas undermining the moral of society. He

presented his worldview, which he claimed was based only on the

facts and discoveries of modern science, as the reasonable alterna-

tive. Büchner taught that the golden rule is the foundation for all

human moral behavior, and solidarity is the essence of human

ethics. Of course, such a view, divorced from traditional religion,

provoked the resistance of German conservative circles, including

the churches. As a consequence, Büchner had to give up his position

at Tübingen University.

When Haeckel published his *Welträtsel* (World’s Mysteries) in

1899,18 he was a famous scientist and professor of zoology at Jena

University. He was one of the first supporters of Darwin’s evolution

theory. One of the main reasons he wrote *Welträtsel* was to overcome

the “artificial and pernicious distinction between natural sciences and

philosophy, between the results of experience and thinking.” Haeckel

insisted that empirical studies (natural sciences) must be guided by

reason (philosophy): “An overemphasis on empiricism is just as dan-

gerous an error as the opposite one of speculation. Both paths of

understanding are mutually indispensable.”19

According to Haeckel, revelation consists either of “fiction or

deception and imposture.”20 He caricatured the Christian view of God

as being extremely anthropomorphic: “This anthropomorphism

results in the paradoxical view of God as a gaseous vertebrate.”21 His

book further polarized the heated public debate about evolution. He

not only promoted Darwinism, but also claimed that Christian dogma

and evolution are incompatible. Haeckel tried to build a monistic reli-

gion on the classical ideals of truth, beauty, and goodness: “Within the

pure cult of ‘the true, the good, and the beautiful,’ which is at the cen-

ter of our monistic religion, we find sufficient reparation for the lost

anthropomorphic ideals of ‘God, freedom, and immortality.’”22 He

claimed that his monistic religion was based on experience and rational

arguments: “This monistic religion and ethics differs from all others for

it is exclusively based on pure reason, and its worldview is grounded

in science, experience, and reasonable faith.”23

## 1.4 Evolution discussions in the Bahá’í community

There are a growing number of books and articles dealing specifi-

cally with the question of evolution in Bahá’í literature. John

Esslemont,24 Anjam Khursheed25 and B. Hoff Conow26 understand

‘Abdu’l-Bahá to propose a biologically distinct evolution of the

human species parallel to the animal kingdom. Julio Savi27 does not

present specific interpretations of ‘Abdu’l-Bahá’s evolution state-

ments. Craig Loehle28 claims the compatibility of the Bahá’í writ-

ings with today’s commonly used scientific model of the evolution

of life on earth: “In conclusion, in the context of the Bahá’í teach-

ings, it is possible to take both a religious view of evolution without

altering science and an evolutionary view of religion without losing

faith.” A lively discussion about Loehle’s article followed in suc-

ceeding issues of the *Journal of Bahá’í Studies*.29 Keven Brown30

proposes that ‘Abdu’l-Bahá’s statements about “man” in the context

of evolution refer primarily to the archetype of the human species.

More recently William Hatcher31 presented “A Scientific Proof of

the Existence of God” based on a short proof of the existence of God

by ‘Abdu’l-Bahá.

The repeated statements of ‘Abdu’l-Bahá that “from the begin-

ning of man’s existence he is a distinct species,” that the human

species does not descend from the animal, and similar ones, have led

many Bahá’ís to the conclusion that humanity developed biologi-

cally in parallel to the animal kingdom. This concept is designated

in this essay as the *parallel evolution model*. Esslemont, Khursheed,

Conow, and others assume that there was a separate biological line

for the human race running in parallel to the vegetable and animal

lines. The supporters of parallel evolution consider the line consist-

ing of pre-human creatures to be biologically distinct from the ani-

mal world, but shaped like animal species. Esslemont formulates

such a view in his introduction to the Bahá’í Faith, *Bahá’u’lláh and*

*the New Era*:

Each individual human body develops through such a series of stages,

from a tiny round speck of jelly-like matter to the fully developed

man. If this is true of the individual, as nobody denies, why should we

consider it derogatory to human dignity to admit a similar develop-

ment for the species? This is a very different thing from claiming that

man is descended from a monkey. The human embryo may at one time

resemble a fish with gill-slits and tail, but it is not a fish. It is a human

embryo. So the human species may at various stages of its long devel-

opment have resembled to the outward eye various species of lower

animals, but it was still the human species, possessing the mysterious

latent power of developing into man as we know him today, nay more,

of developing in the future, we trust, into something far higher still.32

In a footnote, a remark about “species” is given: “The word

‘species’ is used here to explain the distinction which has always

existed between men and animals, despite outward appearances. It

should not be read with its current specialized biological meaning.”

Esslemont gives an analogy between human phylogeny and ontogeny

that ‘Abdu’l-Bahá used in a similar form.

Khursheed describes the same idea of parallel human evolution:

“At one stage it may have resembled a fish, at another an ape, but all

the way through its evolution it was a distinct species undergoing a

process of design.”33 Conow expresses a similar interpretation:

“Bahá’u’lláh and ‘Abdu’l-Bahá say simply that the human being has

always occupied a distinct evolutionary tier although his form and

shape evolved and changed over millions of years … even though

in his first stage man was aquatic, and in a later stage may have

appeared ape-like.”34

How one interprets the statements of ‘Abdu’l-Bahá on evolution

depends crucially on the meaning of the term “species” in those

quotations. The definition of “species,” however, has changed drastically

during the last two-hundred years. Did ‘Abdu’l-Bahá use this term

in its modern sense which was formulated during the first half of the

twentieth century? Or did he have a concept of species close to the

one current at the beginning of the nineteenth century? Or did he

have another definition of his own?

Section 2
“Species” and “evolution”
in occidental biology

The modification of species is an idea fundamental to the theories of

biological evolution developed during the nineteenth century. The

present chapter provides some background for understanding the

arguments of ‘Abdu’l-Bahá in favor of the originality of the humans

species. It describes the development of the concepts of species and

evolution in Europe before and after Darwin, giving special atten-

tion to the meaning of these terms during the last two centuries.

Sometime between the beginning of the nineteenth century and

the middle of the twentieth century, the classical concept of a bio-

logical species was replaced by a modern definition. According to

the classical species definition, the particular members of a popula-

tion derive their outer form, that is their phenotype, from a timeless

species essence. The species essence was thought to be like a blue-

print in the Creator’s mind. In modern biology, a biological species

is defined by a population of particular individuals, i.e., by a gene

pool common to a group of interbreeding organisms.

## 2.1 Classical concepts of species and evolution

Plato and Aristotle initiated the discussion about how to understand

the existence of distinct, stable biological populations. Because

horses remain horses over many generations, these populations are

stable. A cat can produce fertile offspring only with other cats, but

not with dogs. This stability and distinction suggest that cats and

dogs are separate universal entities. Plato was interested in discov-

ering the order on which our cosmos is built. He was looking for

unchanging realities behind all the constantly changing particular

events. He proposed the existence of Ideas, or essences, to be the

true timeless realities behind our everyday experiences. For Plato

the prototypes of essences were geometric objects such as triangles,

squares, tetrahedra, and cubes (i.e., the platonic ideal bodies). These

objects are clearly distinct, for there exists no “smooth” way to

transform a triangle into a square, or a tetrahedron into a cube. Mayr

describes this view:

For Plato, the variable world of phenomena in an analogous manner

was nothing but the reflection of a limited number of fixed and

unchanging forms, *eide* (as Plato called them) or *essences* as they were

called by the Thomists in the Middle Ages. These essences are what is

real and important in this world. As ideas they can exist independent

of any objects. Constancy and discontinuity are the points of special

emphasis for the essentialists. Variation is attributed to the imperfect

manifestation of the underlying essences.35

Because animals and plants form distinct classes, such as roses, cats,

etc., Plato assumed the existence of essences for each of those classes,

the species. These essences were believed to assure the stability of

the species, i.e., that cats will always remain cats and not eventual-

ly become cows or birds. Plato assumed that such species essences

are timeless realities existing independently of the biological popu-

lations of particular members.

In contrast to Plato, Aristotle was particularly interested in biology

and invented many biological disciplines. He did not believe in the

existence of essences in the sense that Plato did, but assumed that

the existence of particular members of a biological population is suf-

ficient to maintain the existence and the stability of its kind.

Although Aristotle had a rather modern concept of the species as a

population, he insisted on a purely static worldview. Mayr explains:

Not so with Aristotle. He held too many other concepts irreconcilable

with evolution. Movement in the organic world, from conception to

birth to death, does not lead to permanent change, only a steady-state

continuity. Constancy and perpetuity are thus reconcilable with move-

ment and with the evanescence of individuals and individual phenom-

ena. As a naturalist, he found everywhere well-defined species, fixed

and unchanging, and in spite of all his stress on continuity in nature,

this fixity of species and their forms (*eide*) had to be eternal …. There

is order in nature, and everything in nature has its purpose. He stated

clearly (*Gen. An.*, 2.1.731b35) that man and the genera of animals and

plants are eternal; they can neither vanish nor have they been created.

The idea that the universe could have evolved from an original chaos,

or the higher organisms could have evolved from lower ones, was

totally alien to Aristotle’s thought. To repeat, Aristotle was opposed to

evolution of any kind.36

Plato’s concept of fixed essences and Aristotle’s view of fixed

biological populations laid the foundations of classical biology and

philosophy. Today the progress of Western science is often present-

ed as an emancipation from those concepts. Although modern biol-

ogy has rejected the concept of essences, which was firmly estab-

lished in nearly every branch of the sciences in the eighteenth and

nineteenth centuries, physics today remains basically essentialistic.

2.1.1 *Essentialism in physics and chemistry*. The following state-

ment by Isaac Newton about the relation between God and nature

reflects the general belief of his time about the origin of complex

order:

We know Him only by His most wise and excellent contrivances of

things, and final causes; we admire Him for His perfections; but we

reverence and adore Him on account of His dominion; for we adore

Him as His servants; and a God without dominion, providence, and

final causes, is nothing else but Fate and Nature. Blind metaphysical

necessity, which is certainly the same always and everywhere, could

produce no variety of things. All the diversity of natural things which

we find, suited to different times and places, could arise from nothing

but the ideas and will of a Being necessarily existing.37

Nature was understood to be a realization of God’s ideas, an expres-

sion of His eternal plan. According to Newton, accidental and nec-

essary forces cannot produce the diverse complex order found in

biology, but can repeat only the same things again and again. The

diversity found in nature, therefore, was assumed to require a

Creator. This type of argument remained nearly unchallenged until

the publication of Darwin’s *Origins*.38

The concept of essences worked particularly well in physics and

in chemistry. Originally, essences in physics were thought to be con-

crete, but today they have become rather abstract. After the discov-

ery of the chemical elements, these elements were considered to be

the expression of time-invariant essences. Chemical elements can-

not be transmutated by chemical means. Within chemical reactions

their properties can be modified, but one can always get them back

afterwards completely unchanged. The smallest units of these ele-

ments are the atoms.39 Later Rutherford discovered that the atoms

themselves are composed of a nucleus and an electron shell. Nuclear

physics revealed that the nucleus is composed of subatomic particles.

For some time those subatomic particles were considered to be ele-

mental, designated elemental particles, and regarded as the funda-

mental timeless units of our universe. The growing zoo of “elemental

particles,” however, and the possible transmutation of one type of par-

ticle into other ones brought into question their elementary status. At

present, quarks are generally considered to be the elemental, timeless

subunits of the physical world. All the higher levels of existence

depend on and consist of them.

In his book *Das Teil and das Ganze* (The Part and the Whole),

Werner Heisenberg explains how much his work in quantum physics

owes to Plato’s ideas. In his lectures, Friedrich Hund also frequently

emphasized the close relation between Plato’s ideal bodies and

group theory in modern particle physics.40 Nonetheless, modern

physics is clearly distinguished from classical essentialism by its

emphasis on continuity, unity of nature, and the wholeness of the

universe.

In physics one often searches for conserved entities. In his famous

treatise *Über die Erhaltung der Kraft*, published in 1847, Hermann

Helmholtz (1821–1894) formulated the law of the conservation of

energy. This discovery paralleled the earlier findings of Lavoisier on

the conservation of mass and elements. Energy may change its form,

but it is not created or eliminated in any physical process.

Consequently, the search for timeless properties became essential in

physics and dominates most of its branches. This is best expressed

by the fundamental assumption that physics should be the same yes-

terday, today, and tomorrow. In other words, the general laws of

physics are time-invariant.

In the nineteenth century, physics and physical chemistry concen-

trated mainly on equilibrium and close-to-equilibrium systems in

thermodynamics. In mechanics, generally so-called integrable sys-

tems and closely related ones were carefully studied, that is, those

systems for which an analytical solution can be formulated. In

astronomy such methods were used to calculate the motion of the

planets. Such systems often are sufficiently simple that their basic

properties can be studied and the necessary mathematical instru-

ments for their proper quantitative description derived. It was often

assumed that this kind of simple behavior is typical for nature.

However, because living systems exist far from equilibrium, nine-

teenth century concepts in physics and chemistry were generally

inappropriate for the description of biological phenomena.41

Therefore, repeated efforts to physicalize biology, as for instance

attempted by Helmholtz, generally failed and provoked a counter

reaction in biology resulting in the development of vitalistic theo-

ries.

At the end of the nineteenth century Henry Poincaré42 analyzed

the stability of the solar planetary system. He discovered that stability

in a many particle system is more the exception than the rule. The

Russian scientist Lyapunov further developed these ideas, but they

were then forgotten for some time. In recent years, this kind of insta-

bility has been shown to be typical for most dynamic systems, and

has become popular under the name *chaos theory*. Thus, dynamic sys-

tems show a much richer behavior than originally thought during the

nineteenth century. Only during the twentieth century have physics

and chemistry become sufficiently developed to make the study of

far-from-equilibrium systems possible.

2.1.2 *Essentialism in classical biology*. Darwin’s idea of explaining

biological evolution by means of natural selection led to a revolu-

tion in the philosophical concepts behind biology. In this sense, one

must speak about a pre- and post-Darwinian biology, here referred

to as *classical* and *modern* biology respectively.

Classical biology was dominated by two concepts originating

from Plato: (1) that the phenotypes of the members of a population

were determined by their species essence, and (2) that the origin and

actual existence of a species required a creative force, a *demiurg*. In

Christianity and Islam, the required creative force was equated with

God. These ideas were still firmly rooted in the scientific community

in the middle of the nineteenth century. The biologist Louis Agassiz

stated that “it is the task of the philosopher to reveal the blueprint of

the Creator.”43 The same author emphasized in his “Essay on

Classification” published in 1857: “All organized beings exhibit in

themselves all those categories of structure and of existence upon

which a natural system may be founded, in such a manner that, in

tracing it, the human mind is only translating into human language

the Divine thoughts expressed in nature in living realities.”44 This

credo was not a singular opinion of a somewhat obscure scientist; it

represented the belief of a considerable number of his colleagues.

The famous Swedish naturalist Carl Linné, who made the first

attempt to systematize the manifold forms of life in 1735, in his

*Systema Naturae*, stated: *“Species tot sunt diversae, quot diversaes*

*formas ab initio creavit infinitum ens.”* Translated into English:

“There are as many species as originally created by the infinite

being.” The French biologist Georges Cuvier, who invented paleon-

tology as a branch of biology, assumed that all particular members

of a single species have their root in the first couple of their species

created by God:

We imagine that a species is the total descendence of the first couple

created by God, almost as all men are represented as the children of

Adam and Eve. What means have we, at this time, to rediscover the

path of this genealogy? It is assuredly not in structural resemblance.

There remains in reality only reproduction, and I maintain that this is

the sole certain and even infallible character for the recognition of the

species.45

Cuvier considered it to be impossible to trace the genealogy of a

particular member of a population back to its original couple.

However, because only members of the same species can interbreed,

the ability to produce fertile offspring was in itself considered a suf-

ficient proof that both parents belong to the same species. What

Cuvier thought to be the consequence of God’s creation today serves

as a definition of a biological species, i.e., the ability of its members

to interbreed.

Additionally, following Plato’s concept of Ideas, each species was

believed to be determined by a prototype, by a species essence. In

his *Histoire Naturelle* Georges Louis Buffon explained:

There exists in nature a general prototype of each species upon which

all individuals are moulded. The individuals, however, are altered or

improved, depending on the circumstances, in the process of realiza-

tion. Relative to certain characteristics, then, there is an irregular

appearance in the succession of individuals, yet at the same time there

is a striking constancy in the species considered as a whole. The first

animal, the first horse for example, was the exterior model and the

internal mould from which all past, present, and future horses have

been formed.46

The species essence was thought to be the unchanging idea in the

mind of God of the ideal form of the members of a biological pop-

ulation. Because the particular members of a population were

assumed to be the direct representations of their species essences,

their phenotypes were also assumed to not change over time. Michel

Adanson stated in 1769: “The transmutation of species [i.e., biolog-

ical populations] does not happen among plants, no more than

among animals, and there is not even direct proof of it among min-

erals, following the accepted principle that constancy is essential in

the determination of a species.”47 The invariability of species

according to classical biology is clearly stated by Mayr: “Each

species had its own species-specific essence and thus it was impos-

sible that it could change or evolve.”48 In classical biology, the bio-

logical population was believed to exactly mirror its species

essence. These populations, therefore, were assumed not to change

and to remain an exact and constant manifestation of their fixed

species essences.

The combination of Plato’s timeless essences, his idea of a per-

fect, harmonious universe, Aristotle’s fixed populations, and bib-

lical cosmology taken literally gave wide support to the concept of

fixed species existing in a static world. In a world created from the

beginning in its full perfection, there can exist, by definition, no

process that increases this perfection. Any change could only

decrease the degree of perfect harmony. To distinguish this kind of

biological essentialism from the much more general form of

Platonism current in physics, it is designated as *typological thinking*

throughout this essay.

During the nineteenth century, accumulating fossil records, show-

ing evidence of extinctions and the existence of species vastly dif-

ferent in appearance from those on earth today, increasingly brought

into question the view of unchanging populations. New theories had

to be developed to account for the findings of the fossil record. Early

theories of biological evolution remained grounded in variants of the

essentialistic species concept. For example, the evolution theory of

Lamark maintained the idea of species essences. (See Section 2.1.4)

For some early theorists, the appearance of a new biological form in

the fossil record could only be explained by the creation of a new

species essence. According to Mayr, all theories of biological

change before Lamark were more or less variants of this idea.

Because the invention of a new species in this concept is not grad-

ual, such theories are designated *saltational evolution*. Thus Mayr

explains:

Saltational evolution is a necessary consequence of essentialism: if

one believes in evolution and in constant types, only the sudden pro-

duction of a new type can lead to evolutionary change. That such salta-

tions can occur and indeed that their occurrence is a necessity are old

beliefs. Almost all theories of evolution described by Osborn in his

history of evolution, *From the Greeks to Darwin*, were saltational the-

ories, that is, theories of the sudden origin of new kinds.49

Mayr summarizes the basic concepts of classical biology:

It had two major theses. The first was the belief that the universe in

every detail was designed by an intelligent creator. This together with

the other one, the concept of a static, unchanging world of short dura-

tion, were so firmly entrenched in the Western mind by the end of the

Middle Ages that it seemed quite inconceivable that they could ever be

dislodged.50

According to Mayr, “real” theories of evolution could be developed

only after the erosion of those ideas.

2.1.3 *The mechanization of biology*. With the publication of the

*Principia* in 1687, Newton “unified” terrestrial with celestial

mechanics. Newton’s theory explains the falling of apples on earth

as well as the path of the planet Venus around the sun. That apples

falling to the ground should be subjected to the same kinds of forces

as Venus circling around the sun was not at all self-evident at that

time. This achievement and many others made mechanics a science

*par excellence*. Until the beginning of the twentieth century, the

quality of a science was often equated with the degree this science

was based on mechanics.

In the Renaissance, the mechanization of nature generally had no

atheistic tendencies, as shown in the quotation from Newton given

above. But two opposing views about nature became established as

a result. In the mechanistic view, the universe was created by God to

run on the basis of a few natural laws,51 (e.g., Newton’s laws, with

only minor interventions by the Creator). Living creatures were con-

sidered to be nothing but mechanisms. This mechanistic view, how-

ever, seemed at variance with the abundance of life. Natural theology,

which arose as a reaction to such mechanization tendencies, consid-

ered nature to be the result of the direct and detailed providence of the

Creator:

Everything in the living world seemed to be so unpredictable, so spe-

cial, and so unique that the observing naturalist found it necessary to

invoke the Creator, his thought, and his activity in every detail of the

life of every individual of every kind of organism …. John Ray’s *The*

*Wisdom of God Manifested in the Works of the Creation* (1691) is not

only a powerful argument from design but also a very sound natural

history …. Natural theology was a necessary development because

design was really the only possible explanation for adaptation in a static

“created” world. Any new finding in this early age of natural history

was grist on the mill of natural theology. The supposedly idyllic life of

the inhabitants of the tropics, in particular, was seen as evidence for

the providential design by the Creator.52

In Britain natural theology was influential until the middle of the

nineteenth century. No contradictions were found between biology

and theology. The biosphere proved the glory of its Creator. At that

time many British biologists were also theologians. In France and in

Germany natural theology lost its importance much earlier, by

around 1780. In Germany in the eighteenth and nineteenth centuries,

various romantic movements determined the schools of thought.

These movements were, in part, a reaction to mechanistic concepts.

The names of Herder and Goethe are related to these schools, which

culminated in the *Naturphilosphie* developed by Schelling, Oken,

and Carus.

The nineteenth century experienced an explosive development of

the natural sciences. Mechanics, as formulated by Newton and

developed by Euler, Hamilton, Lagrange, Laplace, and Poincaré (to

name only a few), was considered the basis of natural sciences.

Important discoveries of modern science were the conservation of

matter in 1789 by Lavoisier (1743–1794), and the conservation of

energy in 1842 by Robert Mayer (1814–1878) and in 1847 by

Helmholtz.

The high esteem for the physical sciences and the influence of

vitalistic schools gave rise to a strongly reductionistic physicalism

in physiology in the middle of the nineteenth century in Germany. A

considerable number of prominent scientists expected any good sci-

ence to explain its phenomena by mechanistic causes, at least in the

long run. One of the most prominent advocates of the physicaliza-

tion of physiology was the German physician and physicist

Hermann Helmholtz. During the opening lecture at the meeting of

German naturalists and physicians in Innsbruck in 1869, he outlined

his scientific program: “The ultimate objective of the natural sci-

ences is to reduce all processes in nature to the movements that

underlie them and to find their driving forces, that is, to reduce them

to mechanics.”53 According to Büchner, such sciences reasonably

prove “that macroscopic as well as microscopic beings in all aspects

of their growth, life and decay follow only mechanical laws, grounded

in the things themselves.”54 Haeckel also emphasized that living

beings and evolution follow exclusively mechanical laws:

This mechanical or monistic philosophy claims that all phenomena of

human life as well as the rest of nature are ruled by rigid and unfalter-

ing laws, that everywhere there exists a necessary, causal relation

between all phenomena … and that all phenomena are brought forth

by mechanical causes (*causae efficientes*), but not by thought and pur-

poseful causes (*causae finales*).55

Consequently, the existence of independent higher qualities, like

free will, were denied. Haeckel described free will as a dogmatic

delusion: “Free will is not an object of scientific investigation,

because as a mere dogma it is based on illusion and does not exist

in reality.”56 The complexity of our universe, including all levels of

life, was thought to emerge from the laws of physics and chemistry.

Such ideas, popularized by Ludwig Büchner, Ernst Haeckel,

Johannes Miller, Jacob Moleschott,57 Wilhelm Ostwald, and Karl

Vogt, became known as *positivism*. They should not be mistaken

with the neopositivism of the Vienna School.58 To develop and pro-

mote a scientific view of life, Büchner in 1881 co-founded the

*Deutschen Freidenkerbund*, and until his death he was the head of

this society. Haeckel established the *Monistenbund* in, Jena in 1906.

The central goal of such societies was to develop and promote a sci-

entific worldview based upon a materialistic and atheistic philosophy.

2.1.4 *Orthogenetic evolution*. Most early concepts of biological

evolution were based on essentialism. Generally, they assumed a

plan, or a purpose, in evolution “implemented” by a Creator. Such

goal-directed evolution concepts are sometimes designated *ortho-*

*genetic evolution*. Many of the early philosophical approaches to

evolution, such as those proposed by the German *Naturphilosophert*,

were essentialistie and goal directed. They had, however, nearly

nothing to do with biology. According to Mayr: “Teleological think-

ing was extremely widespread in the first half of the nineteenth cen-

tury. For Agassiz and other progressionists the sequence of fossil

faunas simply reflected the maturation of the plan of creation in the

mind of the Creator.”59

Jean Baptiste de Monet de Lamark (1744–1829) formulated the

first systematic theory of biological evolution. From his studies of

huge numbers of living and extinct molusks, he drew the revolu-

tionary conclusion that all species, including man, are descended

from earlier, less complex forms because of the ability of biological

systems to accumulate complexity. In his *Philosophie Zoologique*

published in 1809, fifty years before Darwin’s *Origins*, he stated:

“Nature, in successively producing all species of animals, beginning

with the most imperfect of the simplest, and ending her work with

the most perfect, has caused their organization to become more com-

plex.”60 For Lamark the central force motivating evolution was the

observation that organisms always strive to be in perfect harmony

with their environments.61 That such harmony can be discovered

nearly everywhere in nature was always emphasized by natural theo-

logians. Because the findings of geology documented drastic

changes within the environment during geological history, Lamark

concluded that animals must have evolved, that is, adapted to the

new situation, simply to maintain their harmony with the environ-

ment and so became different in their species form.

During the first half of the nineteenth century, belief in ortho-

genetic evolution was widespread; that is, it was supposed that

nature was following the plan and goals given it by a Creator. For

instance, the embryologist von Baer stated in a review of Darwin’s

*Origin of Species*: “My goal is to defend teleology …. Natural

forces must be coordinated or directed. Forces which are not directed—

so-called blind forces—can never produce order …. If the higher

forms of animal life stand in causal relationship to the lower, devel-

oping out of them, then how can we deny that nature has purposes

or goals?”62 Von Baer argued as Paley did in his watchmaker argu-

ment. Accidental influences cannot produce order.

Orthogenetic theories were defended until the middle of this cen-

tury. A recent prominent advocate of orthogenetic evolution was

Teilhard de Chardin63 with his omega principle. He considers evo-

lution to be a goal-directed process that will eventually lead to the

unification of humankind. Most modern philosophies related to evo-

lution biology, however, reject such directedness. Mayr describes

this shift from accepting teleology, to rejecting it:

From the Greeks on, there was a widespread belief that everything in

nature and its processes has a purpose, a predetermined goal. And

these processes would lead the world to ever greater perfection. Such

a teleological worldview was held by many of the great philosophers.

Modern science, however, has been unable to substantiate the exis-

tence of such a cosmic teleology. Nor have any mechanisms or laws

been found that would permit the functioning of such a teleology. The

conclusion of science has been that final causes of this type do not

exist.64

Despite this, presentations of biological evolution to the general

public often depict evolution as a directed process. Invertebrates are

followed by fishes, which are followed by amphibians, which are

followed by reptiles, which are followed by mammals, and finally

*Homo sapiens*. The existence of evolution directed from the simple

towards the complex would be a good argument in favor of ortho-

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genetic theories. According to Gould, however, no directionality can

be found in evolution, if studied in detail:

Our impression that life evolves toward greater complexity is probably

only a bias inspired by parochial focus on ourselves, and consequent

overattention to complexifying creatures, while we ignore just as many

lineages adapting equally well by becoming simpler in form. The mor-

phologically degenerate parasite, safe within its host, has just as much

prospect for evolutionary success as its gorgeously elaborate relative

coping with the slings and arrows of outrageous fortune in a tough

external world.65

## 2.2 Modern concepts of species and evolution

Today, Darwinism is one of the central theories in biology. All con-

cepts developed in modern biology have to be compatible with evo-

lution. In 1973 Theodosius Dobzhansky stated this very clearly in

*The American Biology Teacher*: “Nothing in biology makes sense

except in the light of evolution.”66 The philosophical implications

of Darwinism, of course, strongly influence the definitions of bio-

logical nomenclature. This is particularly true for the term “species.”

Before considering modern species concepts some background in

neo-Darwinism is given.

2.2.1 *The neo-Darwinian theory of biological evolution*. The com-

monly proposed scientific model for the biological evolution of life on

earth starts with the pre-biotic soup.67 The soup is believed to have

provided our planet with preliminary forms of life. The historical

details of this process are largely unknown and may resist any attempt

to become uncovered.68 The oldest fossils are between two and four

billion years old, originating from single celled organisms.

Multicellular organisms appeared at the beginning of the Cambrium

about 600 million years ago.69

According to neo-Darwinian theory, the target of evolution is the

genome, or the *genotype*. It consists of a “program” containing the

complete genetic constitution of an organism: how to run the cell,

how to find food, how to react in difficult situations, how to inter-

pret the program, etc., in short, its total potentiality. The actual prop-

erties an organism displays, as produced by interaction with the

environment, is called the *phenotype*. The genotype is encoded in

long polymer RNA chains for a few primitive organisms or in DNA

chains for most primitive and all higher organisms. It consists only

of four monomers, the elementary building blocks of DNA. The four

elementary units, the nucleotides, are designated by the characters

A, C, G and T (U for RNA). These four characters stand for the

bases adenine, cytosine, guanine and thymine (uracil for RNA). The

whole genome is made up of these four letters, and the precise

sequence of these letters defines the genomic message and its trans-

lation-product, the phenotype, i.e., the particular living organism.

The total chain length for bacteria is typically five million and for

humans three billion nucleotides.70 DNA and RNA are the genetic

material common to all known living system on earth. Even the

rules of translation into phenotype are exactly the same in all living

cells with only rare exceptions.

For single-celled organisms reproduction means cell division,

wherein a mother cell divides into two daughter cells. To provide

both daughter cells with the necessary genetic information, the DNA

must be copied. Although fidelity in gene-reproduction is very

high,71 occasionally. errors occur. If a single letter is replaced by one

of the three others, such a mutation is designated a point mutation.

Deletions or insertions of parts of sequences are also possible. After

cell division there is a certain probability that the genes of the two

daughter cells will be different. Because the positions and directions

of the mutations are unpredictable, they are considered to be ran-

dom.

Many alterations in the genomic sequence will be lethal or will

reduce the ability of the cell to face the needs of life. In rare cases,

however, a mutation will improve the cell’s capability to survive and

to reproduce in its given or in a neighboring environment. Cells with

the highest reproduction rates also have a good chance to spread

their genes in the future. This rule is designated as *natural selection*

or *the survival of the fittest*. Evolution in terms of neo-Darwinism

can be considered the “diffusion” of the DNA sequences through the

space of possible sequences using a four letter code accumulating

increasingly potent genes. In principle, very similar rules apply for

multicellular sexual reproduction.

2.2.2 *Natural selection as a two-step process*. Mayr and others

describe natural selection as a two-step process. During the first

step, mutations and recombination produce a wide range of varia-

tions. Random changes are, of course, a good way to achieve this

goal. For example, after conception the male and female chromo-

somes mix to some extent. A few genes on the male chromosomes

are randomly exchanged with those from, the female chromosomes

and vice versa. By this mechanism of *crossing over*, the different

genes of a population reshuffle continuously.72

The second step consists in the selection of the most potent organ-

isms that are best adapted for their particular environment. Mayr

explains this view by contrasting it to typological thinking, to the

static essentialistic species concept:

Selection, for an essentialist, is a purely negative factor, a force which

eliminates deleterious deviations from the norm. Darwin’s opponents,

therefore, insisted in the spirit of essentialism that selection could not

create anything new. By saying this, they revealed that they have nei-

ther understood the two-step process of selection nor its populational

nature. The first step is the production of an unlimited amount of new

variation, that is, of new genotypes and phenotypes, particularly

through genetic recombination rather than by mutation. The second

step is the test to see which of the products of the first. step are sub-

jected to natural selection. Only those individuals that can pass this

scrutiny become contributors to the gene pool of the next genera-

tion.73

Mayr breaks the process of evolution into two steps: (1) creating

random variations in the genotypes, and (2) selecting phenotypes

according to their ability to cope with the challenges of their envi-

ronment. The question still remains how random changes in the

genotype can lead to such “well-designed” adaptations as are found

in nature.

The chances of obtaining the DNA sequence of an efficient

enzyme within a few large mutation steps from scratch are by far too

small. Such an event can practically be excluded by simple proba-

bilistic estimates. Evolution becomes plausible only if it is possible

to split up large evolutionary steps into many small gradual steps.

Dawkins designates this concept as *cumulative selection*:

We have seen that living things are too improbable and too beautifully

‘designed’ to have come into existence by chance. How, then, did they

come into existence? The answer, Darwin’s answer, is by gradual,

step-by-step transformations from simple beginnings, from primordial

entities sufficiently simple to have come into existence by chance.

Each successive change in the gradual evolutionary process was sim-

ple enough, *relative to its predecessor*, to have arisen by chance. But

the whole sequence of cumulative steps constitutes anything but a

chance process, when you consider the complexity of the final end-

product relative to the original starting point. The cumulative process

is directed by nonrandom survival. The purpose of this chapter is to

demonstrate the power of this *cumulative selection* as a fundamentally

nonrandom process.74

Dawkins particularly emphasizes the cumulative character of evo-

lution. The survival of DNA chains conserves small random favor-

able mutations. Each little improvement becomes subject to further

gradual success.75 Only if evolution can be decomposed into a suf-

ficient number of small gradual progresses does neo-Darwinism

become reasonable.76

2.2.3 *Relationships between species*. In classical biology the simi-

larity between distinct species was understood to result from a

unique “construction” plan of God resulting in the appearance of

similar kinds of design several times in nature. The *scala naturae*

was considered to represent a continuous spectrum of increasingly

complex species. Although there was this scale of species, each

species was seen to be distinct from all others from the very begin-

ning, that is, from the time point of creation. Breeding was known

to be possible only within species but not across species boundaries.

Because in classical biology the species is defined by its timeless

essence, the resulting populations were likewise thought to be

unchanging over time.

In the Darwinistic view, the situation is radically different. Here

species do not depend on timeless essences, rather they are uniquely

defined by their respective populations, and due to evolution popula-

tions change over time. If we go back in time, two closely related

species that are clearly distinct today at some time merge in their com-

mon predecessor. The scale of originally distinct species of classical

biology was replaced by a phylogenetic tree in Darwinian evolution.

At branch points species split up into two separate populations to

become distinct in the future.

Because most predecessors of modern species became extinct, we

are not in the position to directly follow the tree of evolution down

to its roots. How then can we infer the degree of biological relation-

ship between putative cousin species? There are several ways to

estimate the biological “distance” between species. The classical

method is to compare the morphology. A similar form and constitu-

tion, and the presence of similar organs, often indicate a relation-

ship. For the parts of a body preserved in the fossil record, such a

comparison can be made throughout its history. Darwin’s theory was

based on this kind of data. Comparing modern and ancient species

relics, Darwin arrived at a treelike relationship. Species can also be

compared at the level of cellular organization.77

The most quantitative measure of biological relationship is RNA,

DNA, and protein sequence analysis. Different parts of the genome

of an organism have very different mutation rates. Genes coding for

fundamental processes inside the cell, such as translating the DNA

into protein sequences, are generally well conserved. Because no

cell can live without such fundamental processes, they must have

evolved very early during evolution. They are very similar through-

out all organisms. Such sequences are important for estimating

“long distance” relationships. Parts of the genome subject to inter-

mediate mutation rates indicate relationships of intermediate dis-

tances. For example, between *Homo sapiens* and chimpanzees about

98% of the DNA sequences are identical. This is commonly inter-

preted to mean that the higher primates and *Homo sapiens* share a

common ancestor. There are biological essays available to estimate

the distances among DNA or RNA sequences directly. According to

such a measure of the degree of relationship, the closest living non-

human relatives to *Homo sapiens* are the chimpanzees.78 Other parts

of the genome, such as mitochondrial DNA, have very high muta-

tion rates. They reveal relationships within species, for example,

between human races.79

Neo-Darwinism predicts a specific kind of relationship pattern

between the species: the “relationship distances” should clearly

form a tree. If the sequence distances of many sequences are com-

pared, one can distinguish mathematically different topologies such

as trees, stars, or networks. A starlike pattern, for example, would

suggest that all sequences originated from a separate origin and

since then developed independently in parallel to other sequences.

An arbitrary network would indicate no evolutionary relationship at

all between the sequences. The comparison of t-RNA, RNA, DNA,

or other protein sequences generally leads to a treelike relationship

between distantly related species.80 There exist examples where we

can study evolution “at work.” The analysis of viral DNA, where the

mutation rates are sufficiently large to make evolution visible,

favors the treelike relationship.81 This treelike form of sequence dis-

tances is a strong argument in favor of neo-Darwinism.

2.2.4 *Population thinking as the basis for modern species*

*Definitions*. A major distinction between classical and modern defi-

nitions of biological species is the complete rejection of essentialis-

tic species concepts, (i.e., of typological thinking) in modern views.

According to Mayr: “Essentialism was not the only ideology Darwin

had to overcome.”82 Consequently, a new fundament for a species

definition was adopted which does account for evolution:

The old species concept, based on the metaphysical concept of an

essence, is so fundamentally different from the biological concept of a

reproductively isolated population that a gradual changeover from one

into the other was not possible. What was required was a conscious

rejection of the essentialist concept …. The first [difficulty with

applying essentialistic concepts to life] was that no evidence could be

found for the existence of an underlying essence of “form” responsi-

ble for the sharply defined discontinuities in nature. In other words,

there is no way of determining the essence of a species, hence no way

of using the essence as a yardstick in doubtful cases. The second dif-

ficulty was posed by conspicuous polymorphism, that is, the occur-

rence of strikingly different individuals in nature which nevertheless,

by their breeding habits or life histories, could be shown to belong to

a single reproductive community. The third difficulty was the reverse

of the second one, that is the occurrence, in nature of “forms” which

clearly differed in their biology (behavior, ecology) and were repro-

ductively isolated from each other yet could not be distinguished mor-

phologically.83

For the classification of the different life forms, no clear-cut fea-

tures could be discovered that define a species and that necessarily

distinguish it from all others. Such features should define a species

uniquely, not only compared to present populations, but also in rela-

tion to the ancestors of the present ones. In contrast, one can clearly

give a set of characteristics that uniquely define an electron. If all

those characteristics are found for a certain particle, one can be sure

that it is an electron. These characteristics are timeless. They would

have applied a billion years ago and will be the same in another bil-

lion years. Such unchanging characteristics, however, do not exist in

living systems. This situation becomes even more complicated by

the existence of species where members show extreme variability in

their appearance. There are also populations of morphologically

indistinguishable individuals belonging to different reproductive

communities, that is, to different species!

A characteristic of important physical features of the universe is

their time invariance. A typical example is the law of the conserva-

tion of energy. In contrast, most important biological characteristics

are the product of a long history. The physicist Max Delbrück states:

“A mature physicist, acquainting himself for the first time with the

problems of biology, is puzzled by the circumstance that there are no

‘absolute phenomena’ in biology. Everything is time-bound and

space-bound. The animal or plant or micro-organism he is working

with is but a link in an evolutionary chain of changing forms, none

of which has any permanent validity.”84 Such a dependence of pop-

ulations on their own particular history is alien to the idea of a static

world. Species in classical biology were assumed to have been per-

fectly created by means of a first original couple, and thereafter to

have no history of change. They were perfect from the beginning,

living in a harmonious, perfect, static universe. Only minor adapta-

tions within a population were allowed in this view.

The *historicity* of the fauna and flora clearly distinguishes most

fields of biology from physics and chemistry.85 In biology, refer-

ences to an organism’s history is the rule and not the exception:

There is hardly any structure or function in an organism that can be fully

understood unless it is studied against this historical background. To

find causes for the existing characteristics, and particularly adaptations,

of organisms is the main preoccupation of the evolutionary biologist. He

is impressed by the enormous diversity as well as the pathway by which

it has been achieved. He studies the forces that bring about changes in

faunas and floras (as in part documented by paleontology), and he stud-

ies the steps by which have evolved the miraculous adaptations so char-

acteristic of every aspect of the organic world.86

This explicit dependence of life on its history makes it impossible to

apply the classical concept of essences as it was applied in classical

biology, which assumes that the form of a particular cat is defined

only by a timeless reality considered to be independent of the details

of the particular history of the ancestors of this cat.

Instead of referring to a timeless species essence, the concept of

species in modern biology is related to actually existing populations.

A species is defined by an existing community of interbreeding indi-

viduals. Only recently it was recognized that this concept of species

has much in common with the respective ideas of Aristotle.

According to Mayr the major difference between essentialistic

species concepts and those based on populations is the emphasis on

the individual:

Population thinkers stress the uniqueness of everything in the organic

world. What is important for them is the individual, not the type. They

emphasize that every individual in sexually reproducing species is

uniquely different from all others, with much individuality even exist-

ing in uniparentally reproducing ones. There is no “typical” individ-

ual, and mean values are abstractions. Much of what in the past has

been designated in biology as “classes” are populations consisting of

unique individuals.87

Modern definitions of a species are based on a group of individu-

als being able to produce common fertile offspring. Mayr defines a

“species” as follows: “A species is a reproductive community of

populations (reproductively isolated from others) that occupies a

specific niche in nature.”88 There also exist other modern species

definitions, but their particular differences are irrelevant to the pur-

pose of this essay.

## 2.3 Summary

In classical biology species were thought to be defined and main-

tained by their species essence. The species present today were

assumed to be the offsprings of the first couples originated by a

Creator. In this view, only an intelligent Creator could have pro-

duced such a diversity of purposely well-adapted organisms.

Typological thinking remained widely accepted into the second half

of the nineteenth century. Biologists such as Cuvier (1769–1832)

easily won disputes against evolution in favor of this classical

understanding of biology.89

Because of the findings made in biology and paleontology, the

classical concept of species became increasingly questionable. The

biological populations inhabiting the earth were not always the

same. They changed drastically during the geological history of this

planet. The increasing number of facts pointing toward the evolution

of life and toward the historical development of the characteristics

of various populations made it more and more clear that the classi-

cal concept of fixed species essences corresponding to unchanging

biological populations was unfeasible.

This situation led to a complete rejection of the classical concept

of species essences. Typological thinking was replaced by popula-

tion thinking. Today, species are defined as reproductively isolated

populations occupying an ecological niche. The ability to interbreed

and produce fertile offspring is a necessary condition to include two

members of different sex in the same species. The particular char-

acteristics of a species are thought to be entirely defined by its gene

pool and to be maintained by the high fidelity of gene reproduction.

According to this modern definition, species have no timeless, inde-

pendent essence. They are names used by human scientists to clas-

sify an interbreeding population. Thus, Darwin’s theory of evolution

not only changed the theory of the origin of the different organisms

on earth, but by replacing essentialism with a nominalistic school of

thought, it modified the whole philosophy of biology.

|  |  |  |
| --- | --- | --- |
| [Image] | A Victorian cartoon (c. 1890) | Satirizes the theory of evolution by depicting the development of lower forms of life into apes. Notethat one ape looses his tail when it is bitten off by the one behind. Birds develop from flying fish.Evolution culminates with a figure of Darwin himself. |

Section 3
The origin of complex order in our
universe

One of the central questions in philosophy and religion has ever

been the question of the origin of the universe in general and that of

the complex order of life in particular. The nearly perfect adapted-

ness of living systems to their environment, their expediency and

complexity cries for an explanation. Dawkins in one of his books

has the aim of impressing “the reader with the power of the illusion

of design.” He continues: “We shall look at a particular example and

shall conclude that, when it comes to complexity and beauty of

design, Paley91 hardly even began to state the case.”90 For instance,

the hawk’s eye is able to see from a long distance a little mouse

moving in the fields, bees can determine the position of the sun,

even in the presence of clouds, to relocate flowers rich with nectar,

and some crabs in the deep sea are able to detect single photons. One

can fill a series of books with examples where “nature” has found

marvelous solutions for survival under extreme conditions or in spe-

cial situations.

It is an everyday experience that all kinds of order have the ten-

dency to disperse. Books, marbles, and tools are only seldom at

places we expect them to be! Keeping a certain level of order

requires our attention, time, and energy. This tendency of order

toward corruption is very general; it holds for our desk as well as for

nearly every aspect of life. In physics, this tendency has been for-

mulated as a fundamental law of nature: the second law of thermo-

dynamics. Consequently, the origin, existence, and maintenance of

order requires an explanation, a cause.

## 3.1 Explaining complex order

What does it mean to “explain” something and what is meant by the

term “complex order.” Does explaining always imply that the

explained may be grounded in something else? But this would lead

to an infinite chain of explanations! Are there things or events which

are self-evident without need of an explanation? Complex order is

particularly evident in biology and in human artifacts. How can we

distinguish complex order, such as that found in living organisms,

from trivial order?

Three possible causes of the origin of order are generally accept-

ed: (1) accident, (2) necessity, and (3) voluntary design. Keith Ward

describes these three kinds of explanations for the origin of complex

order: “There are three main possible answers to these questions.

One is that there is simply no explanation. The universe just ‘came

into existence by chance, for no reason, and that is that. Another is

that it all happened by necessity. There was no alternative. A third is

that the universe is created by God for a particular purpose.”92 The

origin of order by chance is called a *bottom-up* process. The order is

assumed to come from nothing. Necessary causation is regarded as

a horizontal process: only those events can occur which are neces-

sary all along. Nothing is added, nothing escapes. In contrast to

these, voluntary design is a *top-down* process in which complex

order is created by a Creator at least as “complex” as His creation.

3.1.1 *Explaining things*. It is one of the central messages of

Dawkins’ book *The Blind Watchmaker* that life is complex and that

this intricate order, so characteristic for living organisms, is in need

of an explanation: “The complexity of living organisms is matched

by the elegant efficiency of their apparent design. If anyone doesn’t

agree that this amount of complex design cries out for an explana-

tion, I give up.”93 “Explaining” a particular event generally means

to tell what causes that event to have occurred at that time. Apples

fall to the ground because the wind shakes the tree. Such kinds of

explanations often lead to a chain of explanations, to an infinite

regression, because one can extend the question to what causes the

wind to blow and shake the apple tree, and what causes that, and

what causes … and so on.

“Explanation” can also mean that particular events are explain-

able by general rules. For instance, Newtonian mechanics explains

the paths of the planets and the falling of apples on earth by the same

law of gravitation. But this second kind of explanation may also lead

to a chain because Einstein’s general theory of relativity “explains”

Newton’s particular theory. The temporal regression leads to the

question of a First Cause, and the hierarchical regression leads to the

question of the most general theory.94

Of course, by stating the need for an explanation one, implicitly

assumes that such an explanation exists. All natural sciences depend

essentially on such an assumption. Science would make no sense in

a reality that has no structure allowing for explanations, i.e., for a

clear relation between cause and effect. A universe in which events

have no (or only weak) relations, in which everything occurs acci-

dentally, cannot be explained. The Bahá’í writings explicitly pro-

pose that our universe follows strong cause and effect relations. In

the Lawḥ-i Ḥikmát, Bahá’u’lláh states:

Every thing must needs have an origin and every building a builder …

Nature in its essence is the embodiment of My Name, the Maker, the

Creator. Its manifestations are diversified by varying causes, and in

this diversity there are signs for men of discernment. Nature is God’s

Will and is its expression in and through the contingent world. It is a

dispensation of Providence ordained by the Ordainer, the All-Wise.95

In this passage, Bahá’u’lláh clearly states the necessity of cause

and effect relations by claiming an “origin” for “every thing” and a

“builder” for “every building.” Such cause and effect relations are

not only applied to individual instances, (e.g. the sun as the cause

and its rays as the effect) but are used on a general level. God’s Will

is stated to be the general cause of our universe, which is the effect.

“Nature” is considered to be the effect of the creative force of God’s

name “the Creator” and the expression of God’s Will “in and

through the contingent world.” ‘Abdu’l-Bahá likewise emphasized

the significance of cause and effect: “Every cause is followed by an

effect and vice versa; there could be no effect without a cause pre-

ceding it.”96 According to this statement, every effect requires a

cause, and nothing may happen without a cause. A substantially

complex outcome requires a respectively complex origin. This argu-

ment is analogous to the second law of thermodynamics. Only dis-

order occurs on its own; complex order needs a non-trivial origin.

3.1.2 *Complex order*. The origin of our universe as well as the ori-

gin of life is closely related to the question of the origin of complex

order. According to modern physics, matter is made up of a combi-

nation of a few types of quarks. The different forms of matter, there-

fore, show various kinds of order of those quarks. The existence of

quarks as such is not sufficient to produce multiple kinds of matter,

so the order among the quarks is crucial.

One can distinguish two kinds of order: (1) regular patterns as in

crystals, and (2) meaningful messages as in a text (e.g., hopefully

this essay). The first kind of order is that of physics; its measure is

entropy. It is subject to the second law of thermodynamics.97 The

second kind of order, related to the meaning of a message, depends

on a specific context. In this case, the order of the letters is not

important, but the message those letters convey. Outside a specific

context, the order becomes meaningless. For most Europeans, a

Sanskrit or Arabic text would not contain much information. The

entropy measure does not apply to such kinds of order.

A possible measure of complex order is the degree by which a

system deviates from randomness. A repetitive pattern, for instance,

deviates from randomness. The design of functional watches as well

as the precise amino acid sequence of an efficient enzyme are also

clear deviations from randomness. Something showing all signs of

good design we would not consider to be produced accidentally.

Accordingly, Dawkins defines complex order as follows:

A complex thing is something whose constituent parts are arranged in

a way that is unlikely to have arisen by chance alone …. The mini-

mum requirement for us to recognize an object as an animal or plant

is that it should succeed in making a living *of some sort* (more pre-

cisely that it, or at least some members of its kind, should live long

enough to reproduce) …. The answer we have arrived at is that com-

plicated things have some quality, specifiable in advance, that is high-

ly unlikely to have been acquired by random chance alone.98

Dawkins here uses probability and functionality as criteria to

define complex biological order. According to this understanding,

something is complex if it is functional and the probability of form-

ing it by chance alone is so small that its occurrence is unlikely dur-

ing the existence of our universe.

‘Abdu’l-Bahá presents a similar definition of complex order, but

like Paley he concludes that complex order must be the result of

design:

Likewise every arrangement and formation that is not perfect in its

order we designate as accidental, and that which is orderly, regular,

perfect in its relations, and every part of which is in its proper place

and is the essential requisite of the other constituent parts, this we call

a composition formed through will and knowledge.99

Proper design constitutes a clear deviation from randomness.

Because an accidental formation of such order is highly improbable,

chance cannot explain complex order. The major difference between

modern and classical explanations is that modern theories often try

to base order on trivialities whereas classical concepts base it on vol-

untary design.

## 3.2 The origin of order in modern cosmologies

Modern explanations for the origin of complex order in this universe

generally try to avoid getting trapped in the problem of an infinite

regression. Such chains of causation are not satisfying because they

always ask for further elements of the chain, for further even more

fundamental explanations. Any explanation given at a certain level

invites iteration to its meta-level, and again to its meta-level, and so

forth. There is no obvious way to finish this regress.

3.2.1 *Physical cosmologies*. The cosmological concepts Of the nine-

teenth century were generally based on the laws of the conservation

of energy and matter: energy cannot be created or destroyed but only

changes in form. Haeckel wrote: “the conservation of energy and mat-

ter ruled at all times, as it applies today.”100 The universe was

thought, to be infinite in space and time. Haeckel understood the

laws of conservation as a proof that this universe was not created:

“All … forms of belief in creation are incompatible with the laws

of the conservation of matter, which do not know a beginning of the

world.”101

Büchner believed that by means of such a concept he could escape

the problem of an infinite regression: “What cannot be destroyed

cannot be created. In other words, the world as such is without a

cause; it is uncreated and everlasting.”102 Here, Aristotle’s argu-

ment against an infinite regression is “solved” by assuming that the

chain of temporal causes is infinite indeed and, therefore, does not

need any “first” cause. Although the assumed eternity of the uni-

verse solves the problem of a temporal regression, the question of

the hierarchical regress and the origin of order still remains.

Consequently, Haeckel concluded that the only world mystery

(German: *Welträtsel*) left unsolved by his monistic philosophy was

the existence of matter as such: “This monistic philosophy accepts

only a single, all-embracing mystery: the problem of matter.”103

Today the situation in cosmology is fundamentally different. The

universe is considered to be finite in space and time. Thus, temporal

regression starts at the Big Bang. Particularly in cosmology, modern

materialistic authors try to ground regression in self-evident states,

claiming that complex order emerges from a trivial self-evident

structure of matter. Atkins states:

There is nothing that cannot be understood, there is nothing that can-

not be explained, and everything is extraordinarily simple …. A great

deal of the universe does not need any explanation. Elephants, for

instance. Once molecules have learned to compete and to create other

molecules in their own image, elephants, and things resembling ele-

phants, will in due course be found roaming through the country-

side.104

In these concepts, the structure of our universe is claimed to be

ultimately reducible to a self-evident level. Ward shows that the fun-

damental assumptions of Atkins are based purely on faith, not on

facts or on science.

Wheeler proposes a trivial origin of the universe as a result of the

concept that “the boundary of boundary is zero”:

So far as we can see today, the laws of physics cannot have existed

from everlasting to everlasting. They must have come into being at the

big bang. There were no gears and pinions, no Swiss watchmakers to

put things together, not even a pre-existing plan …. Only a principle

of organization which is no organization at all would seem to offer

itself. In all of mathematics, nothing of this kind more obviously offers

itself than the principle that “the boundary of boundary is zero.”105

Here Wheeler refers to the fact that fundamental laws in physics

are often formulated or can be transformed into conservation laws:

the conservation of energy, the conservation of electric charge, etc.

These laws can be stated to say that the change of the total energy

of a whole system (or a respective conserved entity) is zero during

any time interval. The laws of motion can also be formulated with

respect to the conservation of momentum. Wheeler apparently iden-

tifies the zero on the left-hand side of those equations with nothing,

which in turn gives rise to the complex theory on the right-hand

side.106 The complexity of the equation is not found in the “zero”

but in the right-hand side, in the algebra of the equations which are,

therefore, non-trivial.107 Obviously, Wheeler only hides the prob-

lem of an infinite regression behind the phrase “the boundary of

boundary is zero,” but he does not solve it.

3.2.2 *Dennett’s Darwinian cosmology*. Dennett tries to escape the

problem of an infinite regression not in a single step as Atkins or

Wheeler do, but in many small gradual steps. Dennett proposes a

kind of “Darwinian cosmology.” As biological order is obtained via

natural selection, he considers cosmological order to be generated

by cosmological selection. He extends Darwin’s concept of natural

selection to cosmology and consciousness:

Darwin’s idea had been born as an answer to questions in biology, but

it threatened to leak out, offering answers—welcome or not—to ques-

tions in cosmology (going in one direction) and psychology (going in

the other direction). If *re*design could be a mindless, algorithmic

process of evolution, why couldn’t that whole, process itself be the

product of evolution, and so forth, *all the way down*? And if mindless

evolution could account for the breathtakingly clever artifacts of the

biosphere, how could the products of our own “real” minds be exempt

from an evolutionary explanation? Darwin’s idea thus also threatened

to spread *all the way up*, dissolving the illusion of our own authorship,

our own divine spark of creativity and understanding.108

In biology the concept of natural selection is explained/by random

variation of the genotype and selection by means of the survival or

death of the phenotype. Dennett does not explain what is varied or

what the criteria for selection are. In principle, his concept implies

the existence of a meta-universe where meta-genotypes (the laws of

the different cosmoses) are varied and meta-phenotypes (the differ-

ent cosmoses themselves) survive or die according to the rules of

meta-selection. Thus, Dennett only adds an element in the hierar-

chical regression without explaining the existence of the meta-uni-

verse and the origin of the meta-selection rules.

Dennett assumes that the existence of accidentally found cosmo-

logical order does not need any further explanation:

What is left is what the process, shuffling through eternity, mindlessly

finds (when it finds anything): a timeless Platonic possibility of order.

That is indeed a thing of beauty, as mathematicians are forever

exclaiming, but it is not itself something intelligent but, wonder of

wonders, something intelligible. Being abstract and outside of time, it

is nothing with an *initiation* or *origin* in need of explanation.109

The only Platonic element which Dennett thinks his system

requires is “a timeless Platonic possibility of order.” All the rest of

the order we discover in our universe is proposed to be found by the

“mindless, algorithmic process of evolution.” But does not “to find

something” always mean that this “something” existed before it was

found? And what does “to find something” mean in this context? To

randomly sample some laws does not lead to cosmological order.

Only if cosmological selection “knows” what to look for can order

result!

Dennett does not explain why his “Platonic possibility of order”

which is “abstract and outside of time” does not require “an *initia*-

*tion* or *origin* in need of explanation.” He simply takes its existence

for granted. Apparently, Dennett proposes a set of self-creative laws

of nature similar to what Monod envisioned for the self-creation of

biological characteristics. (See Section 3.3.2) In this sense, the laws

of nature are not preexistent but self-selected for during cosmology.

Dennett’s approach parallels that of Wheeler who similarly

assumes “a principle of organization which is no organization at

all.” According to Dennett, the laws ruling the existence and inter-

action of elementary particles must have been selected for at some

time, because the selection step always needs some time. The

launching of the chemical laws must have taken place at a very early

stage of the universe. Otherwise one would expect that the chem-

istry of the early phase of the universe would have been different

from today. If the form of the laws are not predetermined by any

kind of timeless abstract order, one would expect different

chemistries in different parts of the universe. In addition, without

time-invariant laws of nature, new self-creations could change them

at any time point and at any place within our universe. Dennett

would have to explain why the chemical laws are apparently the

same everywhere and all the time in the known universe.110

Atkins and Dennett as well as Wheeler propose a bottom-up version

of cosmogony, for the origin of complex order within our universe.

Each of them claim to have reduced this origin to some self-evident

principle, to “primeval simplicity.” Atkins and Wheeler principally

assume a timeless natural law which determines their cosmogony;

that is, that order exists potentially from the beginning, but its

unfolding requires time. Consequently, they really are suggesting a

horizontal kind of evolution in which the actual order consists in the

unfolding of a time-invariant potential order. Only Dennett appears

to propose a genuine bottom-up cosmogony. However, as shown

below, because he describes his model as an algorithmic process, his

model is also at best horizontal. Thus, a more careful analysis of

these cosmogonies shows that they assume the a priori existence of

the complexity they claim to explain. The general cause and effect

principle holds for these concepts: A complex outcome requires a

complex origin.

## 3.3 The origin of order in modern biology

In cosmology the resulting order often appears to be a direct conse-

quence of laws of nature with little room left for alternatives. In con-

trast, in biology complex order seems to be rather arbitrary with

uncountable ways in which it could be different. In addition, the

order in biology is always functional and generally extremely com-

plex. How can such a complex biological order be explained; where

does it come from? Is it the result of pure chance as proposed by

Monod, or is it the outcome of a mindless algorithm as suggested by

Dennett? What guides nature to select between efficient and ineffi-

cient forms of life? Such questions are analyzed below.

3.3.1 *Forces deciding life or death*. If the process of evolution is

able to produce and maintain the complex order of the biosphere, the

particular process that creates this order has to be identified. As

explained by Mayr, evolution consists of two steps: (1) creating ran-

dom, undirected variations in the genotypes (that is, the DNA

sequences), and (2) selecting the phenotypes (that is, the resulting

organisms) according to their ability to cope with the odds of their

environment. The random production of variability in the genetic

information by means of mutations and recombinations needs no fur-

ther explanation. It agrees with the second law of thermodynamics

that the order stored in the DNA chains, as with any other kind of

order, has the tendency to get corrupted.

In neo-Darwinism complex biological order is considered to be

formed gradually by likely probabilistic causes (mutation and recom-

bination) and accidental or necessary causes (natural selection).

Because the unsuccessful genes quickly get lost, successful informa-

tion is kept and reproduced; and the repeated cumulation of small

improvements over a long time leads to the creation of complex bio-

logical order. According to Dawkins: “Cumulative selection, by slow

and gradual degrees, is the explanation, the only workable explanation

that has ever been proposed, for the existence of life’s complex

design.”111 Accidental improvements, however, cannot result in evo-

lution as long as they are not selected for. Natural selection decides

which individuals and, in the long run, which species survive. It is the

“driving force” of evolution. It “preserves” successful genes and

“rejects” defective ones. Consequently, to understand the origin of

order in biology, this selection step must be understood.

What kind of force “selects” for survival? According to Mayr,

there exists no particular external force which decides over life and

death: “There is no particular selective force in nature, nor a definite

selecting agent. There are many possible causes for the success of

the few survivors …. It is not the environment that selects, but the

organism that copes with the environment more or less successfully.

There is no external selection force.”112 But where does complex

order come from? In nature one finds that order sometimes appears

spontaneously, as for instance, in the case of the Bénard instability.113

But what is the origin of such a kind of order?

Systems almost always have the peculiarity that the characteris-

tics of the whole cannot (not even in theory) be deduced from the

most complete knowledge of the components, taken separately or in

other partial combinations. The appearance of new characteristics in

wholes has been designated *emergence*. Emergence has often been

invoked in attempts to explain such difficult phenomena as life,

mind, and consciousness. Actually, emergence is equally character-

istic of inorganic systems.114

Today two major positions are held regarding the origin of genetic

information, of where the “knowledge” to form wings and eyes

comes from. The first position assumes the *ad hoc* origination of

order, as for instance proposed by Monod. The information emerges,

created *de novo* on the path of evolution. If the newly evolved char-

acteristics art not the consequence of laws of nature, they must

emerge as new *ad hoc* creations. The second position understands

evolution as the unfolding of order inherent in laws of nature, as a

process that makes implicit order visible, that transforms potential

order into actual order. This understanding of the origin of complex

biological order is closer to Plato’s concept of essences.

Monod compares these two concepts of the origin of order in evo-

lution. He designates the *ad hoc* emergence of order as *creation* and

the unfolding of an inherent order of nature as *revelation*. For him,

evolution consists in the emergence of absolutely new biological

characteristics:

Bergson, on s’en souvient, voyait dans l’évolution l’expression d’une

force créatrice, *absolue* en ce sens qu’il ne la supposait pas tendue à

une autre fin que la création en elle-même. En cela, il diffère radicale-

ment des animistes (qu’il s’agisse d’Engels, de Teilhard ou des posi-

tivistes optimistes tels que Spencer) qui tous voient dans l’évolution le

majestueux déroulement d’un programme inscrit dans la trame même

de l’Univers. Pour eux, par conséquent, l’évolution n’est pas vérita-

blement création, mais uniquement *révélation* des intentions jusque-là

inexprimées de la nature. D’où la tendance à voir dans le développe-

ment embryonnaire une émergence de même ordre que l’émergence

évolutive. Selon la théorie moderne, la notion de *révélation* s’applique

au développement épigénétique, mais non, bien entendu, à l’émer-

gence évolutive qui, grâce précisément au fait qu’elle prend sa source

dans l’imprévisible essentiel, est créatrice de nouveauté *absolue*.115

Monod explains Bergson’s ideas, for whom evolution is the

expression of a life-giving force, of an *élan vital*, whose only pur-

pose is creation as such. He transforms this concept, which for

Bergson was a vitalistic one, into a materialistic one, making

absolutely new characteristics emerge during evolution as *de novo*

creations. Monod compares the view of the “animists” with ontoge-

nesis, that is, with the development of the embryo. The fertilized cell

starts to repeatedly divide itself. The daughter cells then specialize

and organize according to their genetic plan. In this case, the poten-

tial order encoded in the assembly of genes originating from the

sperm and the egg cell, the genotype, is transformed into the actual

order of the organism, the phenotype. Just as embryonic develop-

ment consists in the actualization of the information stored in its

genome, evolution based on the existence of a potential order

“reveals” the implicit order encoded in fundamental laws of nature.

3.3.2 *Evolution as ad hoc self-creation*. Monod claims that evolu-

tion is mainly based on chance.116 He bases this conclusion on his

discovery that DNA sequences appear to be largely random; in other

words, DNA sequences show only a weak pattern of statistical

order: “Message qui, par tous les critères possibles, semble avoir été

écrit au hasard …. D’un jeu totalement aveugle, tout, par définition,

peut sortir, y compris la vision elle-même.”117 According to Monod,

the apparent randomness of DNA sequences excludes the possibili-

ty that life is the reflection of laws inherent in nature. He then con-

cludes that the appearance of life on earth as well as on other plan-

ets is an extremely unlikely event. He expects that terrestrial life is

singular in our universe:

L’hypothèse n’est pas exclue, au contraire, par la structure actuelle da

la biosphère, que l’événement décisif ne se soit produit *qu’une seule*

*fois*. Ce qui signifierait que sa probabilité a priori était quasi nulle ….

Nous n’avons, à l’heure actuelle, pas le droit d’affirmer, ni celui de

nier que la vie soit apparue *une seule fois* sur la Terre, et que, par con-

séquent, avant qu’elle ne fût, ses chances d’être étaient quasi

nulles.118

Because of the gigantic improbability of the result of evolution by

chance, today chance as the primary source of complex life is gen-

erally rejected. Most modern evolution biologists would agree that

pure chance cannot explain the complex order of life: “The essence

of life is statistical improbability on a colossal scale. Whatever is the

explanation for life, therefore, it cannot be chance. The true expla-

nation for the existence of life must embody the very antithesis of

chance.”119 Using the results of modern molecular biology, it is

clear that the diverse complex order present in the biosphere cannot

have originated by pure chance. Such a view can be excluded by

means of a simple probabilistic argument.120 Consequently, a purely

accidental origin of life can be excluded.

Thus, Monod claims a bottom-up process in which order appears

by chance as an *ad hoc* self-creation. It is not clear what Monod

meant by “créatrice de nouveauté absolue.” Does he claim that a cer-

tain protein molecule can catalyze certain reactions today that it

could not have done yesterday? For instance, since when could

myoglobin bind oxygen and what function did it have before, if it

had any? Only with such an understanding of evolution can one

speak of an “absolutely new creation.” The alternative view that the

protein function existed as a potential function before its first real-

ization, but was not yet disclosed, would depict evolution as the

unfolding of inherent potentials, a view rejected by Monod. Thus,

Monod’s concept of the creation of absolutely new characteristics

raises severe problems for studying evolution. We would have nearly

no means to reconstruct the past from the present. We would not

know which of the biological laws relevant today are applicable to

past organisms. For those rules that did change we would not know

their “ancient” forms.121 In such a world, palaeontology would be

rather difficult, if not impossible.

With Monod’s concept of self-creative evolution, a scientific theo-

ry of evolution is impossible. Essential unpredictability cannot be the

foundation for formulating laws that predict certain outcomes. An

irreproducible reality does not allow the formulation of statements

about reproducible experiments, which are essential requirements for

modern scientific theories.122 Evolution as *ad hoc* self-creation thus

implies that a scientific explanation for the existence of complex bio-

logical order does not exist!123

3.3.3 *Evolution as cumulative selection*. Whereas Monod considers

life to be the result of pure chance, for Dawkins evolution is the very

opposite of chance. According to his view, life evolves in a neces-

sary manner by cumulative selection:

There is the familiar, and I have to say rather irritating, confusion of

natural selection with “randomness.” Mutation is random; natural

selection is the very opposite of random …. This belief, that

Darwinian evolution is “random,” is not merely false. It is the exact

opposite of the truth. Chance is a minor ingredient in the Darwinian

recipe, but the most important ingredient is cumulative selection

which is quintessentially nonrandom.124

According to Dawkins, cumulative natural selection necessarily

leads to the evolution of a complex biosphere. Thus, cumulative

selection appears to present a mechanism which produces complex

order nearly out of nothing, by means of a long, long series of very

likely little accidents: “It took a very large leap of the imagination

for Darwin and Wallace to see that, contrary to all intuition, there is

another way and, once you have understood it, a far more plausible

way, for complex ‘design’ to arise out of primeval simplicity.”125

Dawkins’ explanation of order emerging from a trivial origin is

that death is a trivial event:

In nature, the usual selecting agent is direct, stark and simple. It is the

grim reaper. Of course, the *reasons* for survival are anything but sim-

ple—this is why natural selection can build animals and plants of such

formidable complexity. But there is something very crude and simple

about death itself. And nonrandom death is all it takes to select phe-

notypes, and hence the genes that they contain, in nature.126

Apparently, Dawkins considers the lack of virtues of those who

die in the battle of evolution to be more important than the virtues

of those who survive, who are the “fittest.” But of course, evolution

is driven by the biological characteristics of those who survive and

not of those who die. Analogously, the excellence of those who pass

an examination cannot be evaluated by the lack of knowledge of

those who fail. Although Dawkins claims a bottom-up process for

his evolution concept (where order emerges “out of primival sim-

plicity”), he still does not explain where the order ultimately comes

from.

As pointed out correctly by Ward, the gradual appearance of order

begs the same level of explanation as its sudden emergence:

It is false to suggest that it is somehow less puzzling to have a long

step-by-step building up of complexity than to have an instantaneous

origin of complexity. If lots of bits of metal slowly assemble them-

selves on my doorstep by simple stages into an automobile engine, that

is just as puzzling as the sudden appearance of an automobile engine

on my doorstep …. If complexity needs explaining, it needs explain-

ing, however long it took to get there!127

The concept of cumulative selection solves the problem of proba-

bility, but it does not solve the problem of selection. It only shifts the

problem to the question, how does “selection know” what to select?

Although natural selection is generally assumed to “choose” all

those well-adapted organisms against the rest of lesser qualified

competitors, many evolution biologists assume that the selection

step requires no further explanation, and that no particular *selective*

*force* is necessary to explain evolution. If this step is trivial, selec-

tion would be an elegant name for the tautology of the *survival of*

*the survivor*. If this step is non-trivial, as indicated by mathematical

evolution models,128 then this selection step needs further explana-

tion.

3.3.4 *Evolution as algorithm*. Dennett recently elaborated on evolu-

tion in his book *Darwin’s Dangerous Idea*: “Darwin described how

a Nonintelligent Artificer could produce those adaptions over vast

amounts of time, and proved that many of the intermediate stages

that would be needed by that proposed process have indeed

occurred.”129 After reformulating the process of evolution as an

algorithmic process, he states:

It is hard to believe that something as mindless and mechanical as an

algorithm could produce such wonderful things. No matter how

impressive the products of an algorithm, the underlying process

always consists of nothing but a set of individually mindless steps suc-

ceeding each other without the help of any intelligent supervision ….

Can it [the actual biosphere] really be the outcome of nothing but a

cascade of algorithmic processes feeding on chance? And if so, who

designed that cascade? Nobody. It is itself the product of a blind, algo-

rithmic process.130

Dennett describes biological evolution as an *ad hoc* process of the ori-

gin of order. The complex forms of life are created by a mindless algo-

rithm. Life has no purpose, no goal. According to him, we are merely

“the product of a blind, algorithmic process.” However, only for utterly

simple algorithms one might expect that no further explanation is need-

ed. But what are the characteristics of “simple” algorithms? It is certain-

ly the opposite of complex! So what is the complexity of an algorithm?

At present, there exists no generally accepted definition for complexity.

A reasonable, however not optimal, definition for measuring the degree

of complexity is Kolmogorov’s algorithmic complexity.131 Because

Dennett describes evolution as an algorithm, this measure of complexi-

ty is particularly applicable for his approach.132 According to this meas-

ure, Dennett’s evolution algorithm cannot be simple.133 The claim that a

simple algorithm without need of explanation can produce complex

results is, therefore, self-contradictory. Consequently, although Dennett

claims to describe a bottom-up mechanism of evolution without “need

of explanation,” his formulation of evolution as an algorithmic process

actually places his concept into the category of horizontal evolution.

3.3.5 *Evolution as the unfolding of inherent potentials*. In the sec-

ond view about the origin of order, emergent properties represent

inherent properties of the system. The emergent properties are

assumed to “reveal” an inherent potential order encoded in timeless

laws of nature, often completely unexpected.134 Mathematical biol-

ogists generally support this second concept of evolution, since the

self-creation of essentially new, unpredictable, and irreproducible

characteristics cannot be modeled mathematically.

Interestingly, Dawkins proposes a similar idea. He speaks about

the DNA sequence space as a mathematical space which potentially

contains all possible forms of life: “There is another mathematical

space filled … with flesh and blood animals made of billions of

cells, each containing tens of thousands of genes …. The actual ani-

mals that have ever lived on Earth are a tiny subset of the theoreti-

cal animals that *could* exist.”135 Dawkins states here that there

exists a space of all possible DNA sequences that define all possible

forms of life. If all possible life forms exists a priori in the form of

an abstract timeless DNA (RNA) sequence space, then, in principle,

the universe is complex a priori. All potential forms of life are pre-

existent. Mutations, recombinations, and natural selection provide

the dynamics within this sequence space. In a stochastic sense, they

determine the time points of the appearance of the different popula-

tions, and they unfold the potential forms of life into actually exist-

ing biological organisms.

In practice, the fitness related to a particular DNA sequence, its

capacity for survival, can be estimated only for extremely simplified

systems.136 The fitness function directly reflects the reproduction

rate, that is, the ability of a system to produce as many qualified off-

springs as possible. In evolution models based on an abstract time-

less order, the genotype is selected according to criteria which are at

least in principle objective and reproducible. Consequently, this kind

of evolution is the unfolding of potential forms of life preexistent in

the known or unknown laws of nature. These laws are assumed to be

the ultimate causes and are not explainable themselves. Because this

kind of evolution describes the unfolding of something already

potentially existing, it is called horizontal evolution. Thus, actual

order reflects a potential complexity that exists from the very begin-

ning. According to such a view, during cosmogony, and during the

development of life, nothing happens that, at least in principle, could

not have happened at any other place and time, given the necessary

environment.

## 3.4 Summary

Monod called his famous book *Chance and Necessity*. This title

reflects the two steps of evolution explained by Dawkins and Mayr.

Often the selection step is considered to be trivial in that one has

only to look for the survivors. But the survivors are the products of

selection and, consequently, need an explanation. The selection step

can be compared with the final examination of students at a univer-

sity. The selection between better and lesser qualified students

requires skillful examiners and cannot be done by a “blind, mindless

algorithm.”137 The examiners must encompass the students in

knowledge if they want to give a fair judgment, if the outcome is

supposed to reflect the student’s knowledge.

Analogously, the selection for complex biological order requires

a respectively complex fitness function. Biological evolution is pos-

sible not because many die, but because particular complex assem-

blies of chemical elements which form well-adapted, complex

organisms exist.138 In other words, evolution can be described as the

revelation of this complex order defined by time-invariant laws of

nature. The fitness function is only a consequence of the preexisting

order. Thus, at a fundamental level, the appearance of biological

order is not a problem of probability, as discussed by Hatcher139 or

Ward, but a question of the genuine source of this order.

A major advantage of concepts of *ad hoc* evolution is that they

apparently solve the problem of an infinite regression. In such bot-

tom-up models of evolution, complex order appears as an absolute,

new creation, or, in the words of Monod, as a “créatrice de nou-

veauté *absolue*.” But as shown above, the origin of small gains of

order is not explained in those theories; it is simply assumed to exist.

In contrast to *ad hoc* evolution models, concepts of evolution based

on an abstract timeless order explain the appearance of order on a

certain level, but they shift the problem of the origin of order to the

assumed potential order. In principle, Dennett proposes such a con-

cept by describing evolution as an algorithmic process. A typical

mathematical evolution algorithm consists in a mutation step

(chance) and in a selection step where the members of populations

are selected according to predefined fitness functions (necessity).

Dawkins’ model of cumulative selection by means of a sequence

space or fitness function containing all possible forms of life also

refers to such an evolution model. But the question of the origin of

this fitness function, of the “expertise” to distinguish between fruit-

ful and fruitless phenotypes, is not answered. Because a First Cause

is not included in this second type of evolution model, it suffers

from the problem of an infinite regression, and from Gödel’s incom-

pleteness theorem. (See Section 4.1 for more on these problems.)

PUNCH’S FANCY PORTRAITS.—No. 54.

Charles Robert Darwin, LL.D., F.R.S.

In his descent of man he brought his own species down as

low as possible—i.e., to “a hairy quadruped furnished

with a tail and pointed ears, and probably arboreal

in its habits”—which is a reason for the very general

interest in a family tree.” “He has lately been

turning his attention to the “politic worm.”

A Punch Cartoon (c. 1880)

lampoons Darwin and his theory of evolution.

Section 4
Top down evolution: Assuming a
voluntary origin of order

In the previous chapter it was shown that true bottom up concepts of

evolution assume the non-existence of a scientific explanation for

evolution. In contrast, in horizontal evolution models scientific

explanations are possible and explain the details of evolution quite

well. However, these models suffer from the problem of an infinite

regress and the principle of incompleteness. In this chapter, a top

down concept of evolution is presented, based on the Bahá’í scrip-

tures, which overcomes the problem of an infinite regress of causes

and incompleteness.

## 4.1 Three Possible causes of formation: A proof forvoluntary design

‘Abdu’l-Bahá, in his Letter to Forel, formulates a proof for the exis-

tence of a Creator by analyzing the three possible causes of the for-

mation of things.

Now, formation is of three kinds and of three kinds only: accidental,

necessary and voluntary. The coming together of the various con-

stituent elements of beings cannot be accidental, for unto every effect

there must be a cause. It cannot be necessary, for then the formation

must be an inherent property of the constituent parts and the inherent

property of a thing can in no wise be dissociated from it …. The third

formation remaineth and that is the voluntary one, that is, an unseen

force described as the Ancient Power, causeth these elements to come

together, every formation giving rise to a distinct being.140

In this argument, ‘Abdu’l-Bahá considers the three possible ori-

gins of the complex order found in this world: accident, necessity,

and voluntary design. These three possible causes of formation cor-

respond to the three possible models of evolution introduced above:

the bottom up, horizonal, and top down concepts of the origin of

order. Accident (or chance) is not considered a real possible cause,

because it is a non-explanation. It is like saying something happens

without a cause. As shown above, complex order, the “effect,”

requires an explanation, a “cause.” The origin of complex order by

chance alone is too improbable for such a possibility to be taken

seriously.

4.1.1 *Evolution as a necessary process*. ‘Abdu’l-Bahá refutes the

evolution-by-necessity model by two arguments. By saying neces-

sary formation means “formation must be an inherent property of

the constituent parts,” he is implying that one should see only

upward development in evolution. According to Gould,141 such uni-

directionality is not seen in nature. Thus, ‘Abdu’l-Bahá rejects triv-

ial forms of orthogenetic evolution frequently assumed at the time

he wrote that letter. His other argument against necessary formation

is based on the hierarchical version of an infinite regression. The

complexity of the set of laws which is able to produce the particular

universe we live in is certainly not less complex than the complex

order it produces. Now the question for the origin is iterated one

level. What is the origin of the natural laws ruling our universe and

implicitly coding for the complex order produced by these laws? In

principle, one can assume a set of meta-laws which rule the origin

of all possible universes and which once originated the particular

laws ruling our universe. Because these meta-laws have to be more

general, more encompassing than the laws of our universe, which

they ground, they cannot be less complex. In other words, the itera-

tion from laws to meta-laws to additional meta-laws, etc. simply

does not solve the problem of the origin of the universe and the

order therein. Such an iteration only “shifts” the problem of the ori-

gin from one meta-level to another, where this problem does not

become simpler but becomes even more complex, a dilemma posed

by Gödel’s incompleteness theorem. This kind of argument applies

not only to deterministic laws, but to stochastic theories as well.

In principle, stochastic models of evolution (e.g., diffusion in a

fitness landscape) show the behavior found in evolution, if the fit-

ness function is sufficiently well behaved.142 Stochastic models of

evolution combine random elements (mutation) and necessary ele-

ments (the fitness function). The argument against an infinite regres-

sion of causes, however, which is given by ‘Abdu’l-Bahá in the

same letter to Forel, applies also to the origin of the fitness function

as a representative of horizontal evolution. Thus, although stochas-

tic evolution models explain evolution on a scientific level, they do

not explain the origin of order as such, because the existence of the

fitness function as the implicit source of complex order has to be

assumed to exist a priori. Again, the model is trapped by the prob-

lem of infinite regress.

But how can the problem of an infinite regress be resolved? If

each effect depends on a previous or more general cause, that like-

wise should be the effect of still another cause. At what point does

an explanation start?

The origin, the possible starting points for chains of explanations

have been studied throughout human history. Early answers for such

a question are found in ancient creation myths. The Greeks

addressed this problem by rational means. That a regression of caus-

es cannot extend to infinity was first postulated by Aristotle in

*Metaphysics* II.2.143 In a letter to the Swiss scientist Auguste Forel,

‘Abdu’l-Bahá uses this kind of argument to establish the need of a

voluntary First Cause:

As we, however, reflect with broad minds upon this infinite universe,

we observe that motion without a motive force, and an effect without

a cause are both impossible; that every being hath come to exist under

numerous influences and continually undergoeth reaction. These influ-

ences, too, ,are formed under the action of still other influences ….

Such process of causation goes on, and to maintain that this process

goes on indefinitely is manifestly absurd. Thus such a chain of causa-

tion must of necessity lead eventually to Him who is the Ever-Living,

the All-Powerful, who is Self-Dependent and the Ultimate Cause.144

Here ‘Abdu’l-Bahá proposes the need of a voluntary First Cause

to avoid the problem of an infinite regression of causes. The First

Cause is a special kind of meta-cause with the ability to create new

chains of causation without requiring a predecessor. For ‘Abdu’l-

Bahá the regression of causes and effects, a problem of all, horizon-

tal evolution models, automatically implies the existence of an

uncaused reality where the chain of causation stops, because an infi-

nite regression makes no sense.

In the light of modern mathematics, this argument to initiate the

universe by the voluntary acts of a First Cause is a reasonable way

to escape the incompleteness theorem formulated by the Austrian

mathematician Gödel.145 Formal systems are essentially incom-

plete, that is, there are always true statements regarding the formal

system which cannot be proven to be true within the system, but

require a meta-system. Because the same incompleteness theorem

applies to the meta-system, any formal system is necessarily incom-

plete. This purely mathematical theorem implies that there exists no

complete formal theory to explain our universe. Because of the

essential incompleteness of formal systems, it is certainly not unrea-

sonable to go beyond formal systems and postulate “free will” as the

primary entity of causation.

4.1.2 *Voluntary design*. A famous statement in favor of the design

of nature by an intelligent Creator is the watchmaker argument.146

William Paley in his book *Natural Theology*, published in 1805,

compares the fact that all life forms have a complex functional order

with the design of a watch. Suppose that someone finds a watch.

From the purposefulness of the design and the high workmanship,

the finder would naturally conclude that the watch was made by a

watchmaker and cannot have been assembled by accident. Paley

then argues that it is also very unlikely that the complex order of life

occurred by accident, and that it is much more reasonable to assume

purposeful design by a Creator. Such an argument in favor of vol-

untary design was generally understood as a powerful proof against

evolution by chance.

‘Abdu’l-Bahá’s statement in favor of a Creator can be formulated

in the language of a modernized watchmaker argument. Paley, in

agreement with most evolution biologists, assumes that complex

biological order requires an explanation, just as the existence of a

watch requires an explanation which points to a watchmaker. The

evolutionist could respond to Paley’s argument that modern watches

are not produced by watchmakers but by an automatic appliance.

This appliance would be able not only to produce watches automat-

ically, but would contain a mechanism to improve the design and

function of the produced watches. This appliance certainly would

have to be much more complicated than the individual watches it

produces. But who made this appliance? It would require designers

more skillful than common watchmakers. In a similar way, one can

argue that the natural laws which can produce highly complex sys-

tems are more complex than the particular complex structures they

produce and are in just as much need of an explanation.

4.1.3 *Creation. A reflection of the names and attributes of God*:

Virtually every religion provides a picture of the origin of the world

we inhabit. For instance in Judaic, Christian, and Muslim traditions

the origin of complex order is believed to result from a creative act

of God. It owes its existence to a divine order which is complex

beyond human comprehension. This is the kind of origin of order

accepted in classical biology, particularly in natural theology. As

correctly stated by Dawkins,147 in such concepts complex order is

not explained to result from a few simple principles, but complexity

is assumed to exist from the very beginning. Many passages in the

Bahá’í scriptures place the Bahá’í Faith within this tradition.

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Bahá’u’lláh writes:

A drop of the billowing ocean of His endless mercy hath adorned all

creation with the ornament of existence, and a breath wafted from His

peerless Paradise hath invested all beings with the robe of His sancti-

ty and glory. A sprinkling from the unfathomed deep of His sovereign

and all-pervasive Will hath, out of utter nothingness, called into being

a creation which is infinite in its range and deathless in its duration.

The wonders of His bounty can never cease, and the stream of His

merciful grace can never be arrested. The process of His creation hath

had no beginning, and can have no end …. From time immemorial He

hath been veiled in the ineffable sanctity of His exalted Self, and will

everlastingly continue to be wrapt in the impenetrable mystery of His

unknowable Essence. Every attempt to attain to an understanding of

His inaccessible Reality hath ended in complete bewilderment, and

every effort to approach His exalted Self and envisage His Essence

hath resulted in hopelessness and failure.148

Although our Creator reigns above human comprehension, this

universe reveals the signs of His creative force and discloses the

traces of His revelation. Bahá’u’lláh describes creation as a mirror

reflecting the names and attributes of God:

Know thou that every created thing is a sign of the revelation of God.

Each, according to its capacity, is, and will ever remain, a token of the

Almighty. Inasmuch as He, the sovereign Lord of all, hath willed to

reveal His sovereignty in the kingdom of names and attributes, each

and every created thing hath, through the act of the Divine Will, been

made a sign of His glory. So pervasive and general is this revelation

that nothing whatsoever in the whole universe can be discovered that

doth not reflect His splendor.149

According to this statement, each created thing in the universe is

able to reflect the Light of God and to mirror forth His names and

attributes to a certain prescribed degree. The creation as a whole is

considered a revelation of God’s sovereignty. Nothing exists which

does not reflect His splendor. Bahá’u’lláh defines humanity as the

most complete reflection of God’s bounty:

Upon the inmost reality of each and every created thing He hath shed

the light of one of His names, and made it a recipient of the glory of

one of His attributes. Upon the reality of man, however, He hath

focused the radiance of all of His names and attributes, and made it a

mirror of His own self. Alone of all created things man hath been sin-

gled out for so great a favor, so enduring a bounty.150

This ability to potentially reflect all the names and attributes of

God is used in the Bahá’í writings to define human beings. It is an

ability not necessarily limited, however, to the human species on

this planet (*Homo sapiens*), since other humanlike beings may exist

on other planets.

According to ‘Abdu’l-Bahá, God and His names and attributes are

independent from time:

Consequently, just as the reality of Divinity never had a beginning—

that is, God has ever been a Creator, God has ever been a Provider,

God has ever been a Quickener, God has ever been a Bestower—so

there never has been a time when the attributes of God have not had

expression …. So, likewise, if we say there was a time when God had

no creation or created beings, a time when there were no recipients of

His bounties and that His names and attributes had not been manifested,

this would be equivalent to a complete denial of Divinity, for it would

mean that Divinity is accidental.151

This argument complements Plato’s argument for a perfectly har-

monious universe subsisting by timeless essences, where the uni-

verse is assumed to be perfect from the beginning. The eternal

names and attributes Of God are the ultimate origins of all existing

things in our universe and the source of complex order. The natural

theologians likewise thought that nature everywhere reflects the

presence of a benevolent Creator. Studying nature was the same as

studying the plan of God.

## 4.2 Linking voluntary design and modern sciences

Many approaches to the origin of our universe based on physics try

to reduce the fundament of this world to a few, apparently self evi-

dent, trivial rules. In the Bahá’ í writings, however, the origin and

foundation of this world is assumed to be substantially non-trivial,

complex from its very beginning. If this assumed non-trivial origin

of order in our cosmos and in biology is thought to correspond to

reality, one should expect practical consequences for our physical

world. The kingdoms of nature introduced by Aristotle, and restated

in the writings and talks of ‘Abdu’l-Bahá, may serve as a model of

how reality may have a non-trivial origin without being in conflict

with the laws of modem physics.152 In the present section, a concept

of a hierarchical order is outlined where the more complex levels are

not the result of the complicated interactions of more simple levels

but, on the contrary, the complex levels represent a framework with-

in which the simple ones can exist.

4.2.1 *‘Abdu’l-Bahá’s concept of the kingdoms*. ‘Abdu’l-Bahá

describes the structure of this world in the form of a hierarchy. In his

letter to Auguste Forel, ‘Abdu’l-Bahá wrote:

As to the existence of spirit in the mineral: it is indubitable that min-

erals are endowed with a spirit and life according to the requirements

of that stage …. In the vegetable world, too, there is the power of

growth, and that power of growth is the spirit. In the animal world

there is the sense of feeling, but in the human world there is an all-

embracing power. In all preceding stages tie power of reason is

absent, but the soul existeth and revealeth itself. The sense of feeling

understandeth not the soul, whereas the reasoning power of the mind

proveth the existence thereof.153

Here, ‘Abdu’l-Bahá distinguishes between four levels of “spirit”:

the mineral, the vegetable, the animal, and the human kingdoms. In

modem biology the kingdoms, originally introduced by Aristotle,

are today used in a taxonomic sense; they designate distinct classes

of organisms. ‘Abdu’l-Bahá is obviously not concerned with a tax-

onomic distinction of biological classes, but with a hierarchy of

increasingly complex faculties. Each higher level includes all the

lower ones, but not those above.

This hierarchical understanding of the kingdoms is explained in

another passage of the letter to Forel, where ‘Abdu’l-Bahá empha-

sizes the interrelation between the kingdoms:

All divine philosophers and men of wisdom and understanding, when

observing these endless beings, have considered that in this great and

infinite universe all things end in the mineral kingdom, that the out-

come of the mineral kingdom is the vegetable kingdom, the outcome

of the vegetable kingdom is the animal kingdom, and the outcome of

the animal kingdom the world of man.154

Thus, in this context, the “kingdoms” do not designate taxonomi-

cally distinct classes but hierarchical levels. ‘Abdu’l-Bahá describes

this hierarchy phenomenologically, by the essential characteristics

related to each level: by “growth,” the “sense of feeling,” and “rea-

son.”155 But how are these levels distinguished in practice? Is there

something added at each level, a kind of *élan vitale*? ‘Abdu’l-Bahá

gives a rather atomistic view of those levels:

In its ceaseless progression and journeyings the atom becomes imbued

with the virtues and powers of each degree or kingdom it traverses. In

the degree of the mineral it possessed mineral affinities; in the king-

dom of the vegetable it manifested the virtue augmentative, or power

of growth; in the animal organism it reflected the intelligence of that

degree, and in the kingdom of man it was qualified with human attrib-

utes or virtues …. No atom is bereft or deprived of this opportunity or

right of expression. Nor can it be said of a given atom that it is denied

equal opportunities with other atoms; nay, all are privileged to possess

the virtues existent in these kingdoms and to reflect the attributes of

their organisms.156

According to ‘Abdu’l-Bahá, “no atom is bereft” of the ability to

reflect the respective names and attributes of God at the different

levels. The emergence of more complex characteristics, however,

requires an appropriate environment, certain necessary boundary

conditions, and a sufficiently complex organization.

4.2.2 *Hierarchical levels of information processing*. A possible

interpretation of these “kingdoms” compatible with findings of mod-

ern science relates them to hierarchical levels of information pro-

cessing. This understanding is supported by the ideas of Wheeler and

Weizsäcker, who propose basing physics not on energy, as is the case

today, but on information.157 With information as the fundamental

entity of our universe, and energy and matter only its derivatives, the

concept of the kingdoms provides a model for a non-trivial, hierar-

chical order of our universe. Whereas today’s physics refer mainly to

the level of the mineral kingdom, the “influence” of the higher levels

of the hierarchy would become detectable only in complex biological

systems.158

The lowest kingdom is the mineral kingdom showing no infor-

mation processing at all. It describes an organization level of atoms

found in stones, water, air, etc. The second level is the vegetable

kingdom, represented by the plants. As explained by ‘Abdu’l-Bahá,

there are no special mineral atoms or vegetable atoms, but the same

atoms travel through all the kingdoms of life and observe the same

laws of chemistry and physics. But the vegetable kingdom shows

attributes not found in the mineral kingdom: growth, metabolism,

and replication.

Ernst Mayr stresses the complexity of biological systems, the

existence of a genetic plan, and the ability to perform purposeful

actions:

It is now widely admitted not only that the complexity of biological

systems is of a different order of magnitude, but also that the existence

of historically evolved programs is unknown in the inanimate world.

Teleonomic processes and adapted systems, made possible by these

programs, are unknown in physical systems.159

Biological cells are able to reproduce themselves because of their

genetic plan. The vegetable kingdom represents information pro-

cessing on the molecular level; the genetic plan regulates the molec-

ular organization in the cell. Replication transfers the knowledge

encoded in the genes from one generation to the next. The process

of natural selection results in adaptations to the environment, to

“learning” on a molecular level.

The third level in this hierarchy is occupied by the animal king-

dom. The special properties of this level are the senses, mediated by

a sufficiently complex neural network (i.e., the central nervous sys-

tem), which receives input from the environment and allows animals

to react instantaneously to this external input. This ability distin-

guishes the animal kingdom from the vegetable kingdom. The animal

kingdom encompasses both the mineral and vegetable kingdoms

insofar as it depends, at its own level, on incorporating the structural

and qualitative complexity of the kingdoms preceding it. At this

level, one finds information processing on the intra-cellular level; the

neural network enables the animal to take advantage of the sensual

input and to react to it. It also provides the means for learning and

simple forms of tradition.

The fourth stage is the human kingdom. The main attribute distin-

guishing human beings from the lower kingdoms is the human intel-

lect. This does not mean that other species do not show intelligence.

But no other species has the capacity to develop speech, technology,

culture, and civilization to the extent found with *Homo sapiens*.

Individuals of the human species share many attributes in common

with the animal world, though cooperation among human beings is

stronger than in most other species. The human mind constructs an

intellectual model of the surrounding environment. Speech provides

the means to live and work in large, complex human societies.

Knowledge is not only stored on the cellular level in the genes (veg-

etable kingdom), or in the pattern of neuronal connectivity (animal

kingdom), it becomes largely independent of its individual biological

carriers in the form of stories and myths, and more recently in the

form of published literature, films, and disks. The human intellect

supports sophisticated interactions among individuals resulting in a

complex global society.

Each higher level in the hierarchy encompasses the lower ones,

but it is not the trivial outcome of them. The characteristics of each

level are emergent properties in the best sense of the word. By the

“spirit of growth” of the plant, ‘Abdu’l-Bahá refers to more than the

effect of a complex grouping of atoms. ‘Abdu’l-Bahá makes this

clear in the case of the human spirit:

Moreover, these members, these elements, this composition, which are

found in the organism of man, are an attraction and magnet for the

spirit; it is certain that the spirit will appear in it …. When these exist-

ing elements are gathered together according to the natural order, and

with perfect strength, they become a magnet for the spirit, and the spir-

it will become manifest in them with all its perfections.160

The human spirit (i.e., the essence of humanity) is not the result

of a particular composition of the atoms. Rather the spirit is preex-

istent and only appears when the corresponding complexity in the

atomic composition is obtained. Using Monod’s terminology, the

human spirit is not “created” during evolution, but it is revealed, or

made manifest.

In contrast to the taxonomic understanding of distinct kingdoms

in modern, biology, ‘Abdu’l-Bahá uses the concept of kingdoms to

describe the complex order of the biosphere in the form of a hierar-

chy. These levels represent degrees of increasingly complex reflec-

tions of the names and attributes of God. Each higher level includes

the lower ones, but not vice versa.

## 4.3 Hatcher’s interpretation of the “three causes offormation”

In *The Journal of Bahá’í Studies* and in a recently published book,

William Hatcher presents an article entitled “A Scientific Proof of

the Existence of God.”161 He derives his proof from ‘Abdu’l-Bahá’s

argument of the three possible causes of formation, and he provides

a translation of this argument into the language of modem science.

Hatcher bases his proof on two premises: (1) because complex bio-

logical order is not random it cannot be accidental, and (2) the non-
randomness of life requires’ a particular evolutionary force which he

identifies with God.

4.3.1 *Complex biological order is non-random*. As shown above,

complex biological order is certainly non-random. According to the

second law of thermodynamics, closed systems on the average tend

to evolve from more probable toward less probable states. Hatcher

states that the appearance of order requires the input of free energy,

such as sunlight in the case of plant growth, and an external order-

ing force in the case of human artifacts: “Those that exhibit evolu-

tion from more probable to less probable states cannot be the result

of a random process. The cause of such growth patterns can only be

some observable input of energy (e.g., plant growth on earth that is

fueled by solar energy) or else some nonobservable (invisible)

force.”162

But this list of possible sources for the emergence of ordered pat-

terns is incomplete. There exists also inherent order in nature. If

steam is cooled, it first becomes fluid; then at or below the freezing

point of water, it forms ice crystals, as in the case of snow. Despite

their beauty, snow crystals only represent an inanimate form of

order. Protein folding is an example much closer to the situation of

evolution. Protein folding reveals implicit order encoded in a partic-

ular sequence of amino acids. Even so, the folding does not imply

the transition from a probable (unfolded protein) to an improbable

state (folded protein). Because of the chemical interactions between

the amino acids within a certain environment, the folded protein

(e.g., an active enzyme) represents the more probable state, the state

of lowest free energy.

Hatcher adds the observation that the evolution of life is an exam-

ple of a development from more simple towards more complex life

forms:

All these sedimentary layers show the same basic configuration,

namely, that higher, more complex forms of life followed simpler, less

complex forms. In other words, the process of evolution was a process

of complexification, of moving from relative simplicity and disorder

towards relative complexity and order. It was therefore a process of

moving from more probable configurations towards less probable con-
figurations.163

From this movement of evolution uphill (i.e., against the direction

which would be adopted automatically by nature), Hatcher con-

cludes that there must be a special kind of force which causes this

complexification during the evolution of life on earth. Most evolu-

tionists can follow Hatcher’s reasoning in this conclusion. Dawkins,

for instance, uses á similar probabilistic argument to show that “the

essence of life is statistical improbability on a colossal scale.”

4.3.2 *The evolutionary force*: Most evolution biologists will, how-

ever, generally not accept Hatcher’s identification of this evolution-

ary force with “God” in a non-trivial sense: “It seems reasonable to

call this force ‘God,’ but anyone uncomfortable with that name can

simply call it ‘the evolutionary force’ (or, more precisely, ‘the force

that produced evolution and thus produced the human being’).”164

Mayr, for instance, explicitly rejects the existence of a particular

evolutionary force.

Hatcher’s rejection of the more conventional explanations of evo-

lution may be influenced by his particular understanding of evolu-

tion: “This is why the currently accepted theory of evolution

attempts to explain the upward movement (the movement towards

greater order) in evolution as the fortunate coincidence of two ran-

dom phenomena: the action of natural selection (essentially random

environmental impact) on random mutations (spontaneous genetic

change).”165

Although most evolutionists will agree that the mutation step is

random, most of them will disagree that the’ selection step is random

as well. Dawkins, for instance, emphatically emphasizes that evolu-

tion is not the result of pure chance; rather it “is the very opposite of

random.” Hatcher’s understanding of the selection step applies to

bottom-up models of evolution. There, order is assumed to originate

*ad hoc*, resulting from unpredictable and quasi-random new cre-

ations.

In mathematical biology, the selection step is determined by a fit-

ness function. In such theories, selection is not random but, on the

long run, occurs according to the fitness values of the individuals. In

this case, the complexity found in life represents the unfolding of the

potential complexity inherent in laws of nature. This is similar to the

protein-folding example. In his response to Gordon Dicks’ com-

ments about his article,166 Hatcher claims that neo-Darwinism can-

not explain evolution:

Clearly and indisputably, this (narrow) process of natural selection

could never, even theoretically, account for the progressive complexi-

fication of life forms in the evolutionary process …. In any case,

under the neo-Darwinian assumption, mutations favorable to

increased complexity would, at best, only be sporadic (or sparse), i.e.,

insufficiently frequent to allow for any significant process of conver-

gence.167

Hatcher apparently assumes that this kind of evolution can be

rejected on the basis of ‘Abdu’l-Bahá’s statement that evolution

“cannot be necessary, for then the formation must be an inherent

property of the constituent parts and the inherent property of a thing

can in no wise be dissociated from it.”168 Hatcher concludes that

“the clearly random element involved in the process of evolution

utterly refutes the ‘inherent necessity’ objection to the classical

design argument.”169

‘Abdu’l-Bahá’s rejection of a necessary cause as the origin of

complex biological order in his argument of the three causes cer-

tainly applies to the models of evolution assumed in the second half

of the nineteenth century, where only necessary causes were consid-

ered and the element of chance was explicitly excluded.170 The

dynamics of matter were believed to follow Newton’s laws exclu-

sively, laws which are entirely deterministic. According to Büchner,

nature can produce “only the results of strictest necessity.”171

Modern mathematical evolution theories explicitly include the

“clearly random element involved in the process of evolution.”

According to those studies, not every fitness function leads to evo-

lution, but some do.172 Consequently, Hatcher’s argument does not

apply to evolution theories where a suitable, objective fitness func-

tion exists.

4.3.3 *God’s will in evolution*. Hatcher envisions a kind of temporal

regression where chains of causation important for evolution are ini-

tiated by God’s voluntary intervention: “The evolution-based argu-

ment thus establishes not only the existence of God but also provides

at least one clear instance when God has intervened in (or interacted

with) the ongoing process of the world.”173 Such an intervention by

God is likewise proposed by Loehle: “I postulate (the Bahá’í writings

‘do not specify this) that divine Will may have operated at times to help

guide the process towards humanity; it was God’s intention from the

beginning that humanity should arise.”174

Ward made a similar suggestion. According to him, the physical

laws of our universe represent idealizations which do not rule out

the possibility of God’s actions: “The element of indeterminism

involved in the ‘freedom hypothesis’ is simply that not everything

that happens is the result solely of the operation of a general law, or

combination of general, laws, upon some previous physical state.

Such indeterminism, or at least the appearance of it, is commonplace

in ordinary human affairs.”175 He discusses the proposed goal-
directedness in terms of human values, addressing the question of

socio-biology (i.e., the source of human values): “Its biological ori-

gins would be a natural consequence of the grounding of the whole

evolutionary process in a divine plan.”176

Although there are differences in the details of the arguments of

Hatcher, Ward, Loehle, and the author of this essay, they agree in the

conclusion that God’s will is necessary to explain the origin of the

complex order of life.

## 4.4 Does evolution have a goal

The Bahá’í writings describe the universe and particularly humanity

as mirrors of the names and attributes of God. These names and attrib-

utes can be considered as the “eternal building blocks,” the “elemen-

tary units” of our universe. According to Bahá’u’lláh, this universe is

a mirror image of the world of eternal reality and depends on the ema-

nation of God’s grace: “There can be no doubt whatever that if for one

moment the tide of His mercy and grace were to be withheld from the

world, it would completely perish.”177 From this perspective the fun-

damental order of this universe is complex from the very beginning.

Cosmological and biological evolution are the realization of this pre-

existing order. In this view, evolution means the unfolding of possible

complex order (building on the names and attributes of God) into

actual complex order.

‘Abdu’l-Bahá describes the order in this material universe in the

form of a hierarchy, consisting of the mineral, vegetable, animal,

and human kingdoms. The higher kingdoms build upon the lower

ones. In this essay, a concept is proposed that relates the kingdoms,

as they are used by ‘Abdu’l-Bahá, to hierarchical levels of informa-

tion processing. This interpretation shows how a spiritual view of

our universe can include the results of modem sciences without

insisting on a dualism that would divide our universe into an (evil)

material world and a (divine) spiritual realm. But do not the conclu-

sions of modem biology imply that evolution is undirected, without

purpose or goal? Are those claims based on strict science and rea-

son, or do they merely reflect the personal metaphysical views of

their promoters?

4.4.1 *Can the randomness of evolution be proven?*  Now the ques-

tion is considered whether or not the known body of biological data

definitely implies a random direction in evolution and, therefore,

excludes any kind of goal-directed evolution. During the second-
half of the nineteenth and the first-half of the twentieth century in

Germany, authors such as Büchner, Haeckel, and Oswald success-

fully popularized the view that a scientific worldview (i.e., the

acceptance evolution) implies a materialistic world which per se

excludes the existence of a higher purpose and destiny. Similar

views were put forward in Britain by Huxley, Spencer, and others.

Even today, the concept of teleological evolution is generally con-

sidered to be incompatible with the known facts of biology and the

evolution of life. This is one of the central messages of Monod’s

famous book *Le Hazard et la Necessité*: that evolution has no pur-

pose, no goal: “Message qui, par tous les critères possibles, semble

avoir été écrit au hasard …. D’un jeu *totalement* aveugle, tout, par

définition, peut sortir, y compris la vision elle-même.”178 This leads

him to his conclusion that life is a strange phenomena in our uni-

verse and we are the strangers:

S’il accepte ce message dans son entière signification, il faut bien que

l’Homme enfin se réveille de son rêve millénaire pour découvrir sa

totale solitude, son étrangeté radicale. Il sait maintenant que, comme

un Tzigane, il est en marge de l’univers où il doit vivre. Univers sourd

à sa musique, indifférent à ses espoirs comme à ses souffrances ou à ses

crimes.179

Gould proposes that in the evolution of individual species no

directionality in its development can be detected. One finds com-

plexification as well as drastic simplifications (e.g., in the case of

some parasites). Dawkins suggests that evolution is absolutely

blind, without any final goal. He formulates this position rather dras-

tically in his *Blind Watchmaker*:

Evolution has no long-term goal. There is no long-distance target, no

final perfection to serve as a criterion for selection, although human

vanity cherishes the absurd notion that our species is the final goal of

evolution. In real life, the criterion for selection is always short-term,

either simple survival or, more generally, reproductive success ….

The ‘watchmaker’ that is cumulative natural selection is blind to the

future and has no long-term goal.180

These statements propose that there is no obvious trend in evolu-

tion, no final goal which is necessarily discernable by our biological

knowledge. Consequently, there is no obvious need to introduce

final causes into biology. Deterministic and probabilistic processes

(necessity and chance) appear sufficient to model all those aspects

of reality which are known with a reasonable degree-of precision.

Now the question is asked whether or not the absence of clear

directionality implies that evolution definitely excludes any direc-

tionality or any finality which could represent a Creator’s purpose.

How can we determine whether sequences of events are directed by

some inherent plan or not? A precondition for undirectedness would

be the randomness of those events. The apparent randomness of a

sequence of numbers does not imply that they are created randomly.181

This fact makes any conclusion questionable that deduces from the

apparent randomness of evolution that evolution as a whole must be

random and without any direction.

Even if each mutation step is fully random, the directionality of

evolution as a whole cannot be excluded. An illustrative counter-

example is the diffusion of a spoon of crystalline sugar from the bot-

tom to the top in a glass of tea182 Here the random thermal motion

directs sugar molecules towards the upper part of the glass. Another

excellent example for directed evolution is the refolding of denaturat-

ed proteins into their native state. The thermal motion of the folding

protein is restricted by the form of the conformational free energies to

only a very small subspace of the whole conformational space. The

important aspect of protein folding in this discussion is that even ran-

dom driving forces can effectively result in directedness if there is an

additional guiding force (e.g., the free energy of folding). In the case

of evolution, random mutations and recombinations may be guided by

the structure of the selectivity of the mutations, by the landscape of the

fitness functions.

The question of whether or not cosmogony and evolution follow

a pre-given plan may be further obscured by the problem of how to

evaluate such directedness. To detect a direction in evolution one

needs a measure for directionality, some kind of “compass.” For

instance, increasing complexity could be a possible direction of evo-

lution. But what does complexity mean in terms of a clear unique

definition? Is it the number of nucleic acids required to code for the

organism? Is it the degree of adaptedness of an organism to a certain

environment? As noted by Gould, in general, complexification

increases simply due to the fact that non-artificial inanimate systems

are generally simpler than living systems and consequently they can

evolve only towards complexity. Such “diffusion” into “empty”

complex regions, however, requires that those “regions” actually

exist and that complex organisms may be at least as well equipped

to face the needs of our world as the simpler ones.

4.4.2 *Finality in evolution*. Of course, the philosophical compatibility

between evolution and purpose as such does not prove that a purpose

really exists. But what means do we have to decipher the purpose of

our universe? How difficult is it to grasp “simpler” aspects of our uni-

verse, such as the laws ruling the physical realm. Why do we expect

that understanding the purpose of the universe should be simpler than,

for instance, learning quantum electro-dynamics? Why should a gen-

eral purpose of our universe be easy to detect? What happens if the

purpose of our universe is something completely beyond our imagi-

nation? Are we sure that we understand the “language of nature”?

Why should our ideas of progress have any resemblance to the direc-

tion our universe may possibly be designed to follow? What measures

do we have to evaluate progress if we do not know the final purpose

of this universe, or even if such a purpose exists? Perhaps we will dis-

cover some intermediate achievements obtained during evolution still

far away from the intended far-end goal.

Complex finality in evolution is rather unlikely if one assumes a

trivial self-creative origin. If the origin is assumed to be essentially

complex, the situation is different. The “complexity” of the origin of

our universe may, for instance, by far exceed any level of complexity

obtained by any particular organism or civilization at any time dur-

ing evolution. Such a situation is stated in the Bahá’í writings:

For whatever such strivings may accomplish, they never can hope to

transcend the limitations imposed upon Thy creatures …. The loftiest

sentiments which the holiest of saints can express in praise of Thee,

and the deepest wisdom which the most learned of men can utter in

their attempts to comprehend Thy nature, all revolve around that

Center Which is wholly subjected to Thy sovereignty, Which adoreth

Thy Beauty, and is propelled through the movement of Thy Pen.183

The complexity of the final goal of evolution may simply surpass

the imagination of all evolving civilizations. In such a situation,

directionality in cosmogony, evolution, and even history might

remain undetectable for humanity because we have no measure to

evaluate the direction of the development and to detect possible

progress. Of course, this line of argument does not prove that final-

ity exists in our universe, but it shows that the claim for the absence

of directionality is not well founded. It is a statement of faith.

## 4.5 Summary

The cause of order, particularly the complex order of our biosphere,

is by no means self-evident. It needs an explanation. Three different

kinds of origin of order are generally considered: (1) chance, (2)

order as a necessary result of laws of nature, and (3) order as a result

of voluntary design. These three kinds of causes correlate with the

three fundamental concepts of the origin of the complex order of

life: evolution as a bottom-up, horizontal, or top-down process.

Chance as the origin of order, a bottom-up concept, can be exclud-

ed by simple probabilistic arguments. (See Section 3.3.2) Evolution

models describing the origin of order as a necessary outcome of laws

of nature, as the unfolding of a hidden potential order, are horizontal

concepts. Such models suffer from the problem of an infinite regres-

sion and incompleteness. (See Sections 3.4 and 4.1) If the existent

order is the result of laws of nature, what causes the existence of the

laws of nature? Popular presentations of modem cosmologies gener-

ally tend to hide this regression behind an apparently self-evident ori-

gin, claimed to be without need of a further explanation. Alternatively,

some modem evolution biologists propose a stochastic process as the

origin of order, a combination of chance and necessity, The problem

of the “colossal improbability” of pure chance is claimed to be solved

by cumulative selection. If selection is quasi-random, as in models of

*ad hoc* origination, the problem of the “colossal improbability”

remains and Hatcher’s argument applies. If selection is based on an (in

principle) objective and reproducible fitness function defining the fit-

nesses of all sequences of the DNA sequence space, the origin of this

fitness function must be explained. This, again, leads to the problem

of an infinite regression.

In a letter to Forel, ‘Abdu’l-Bahá uses this situation to conclude

that only the third alternative of three possible causes of order is sat-

isfactory: the origin of order by voluntary design (i.e., evolution as

a top-down process). This is really the same as extending the hori-

zontal model to a top-down model by adding to it a voluntary “First

Mover,” who is identified as the Creator of our universe and the

fashioner of the laws of nature. In this model the universe has a goal

and a purpose, and is considered to manifest the eternal names and

attributes of God.

A forest in Borneo, with mammals

A plate from Wallace’s *Geographical Distribution of*

*Animals* (1876) intended to show differences between ani-

mals of the Oriental and Australian regions. Note a tarsier

(top left), a tree shrew (center left), and a tapir (center right).

Section 5
Evolution and the
Originality of Species

In talks on several occasions given to Western audiences, ‘Abdu’l-

Bahá criticized the theory of evolution of “some European philo-

sophers.” In this chapter, the arguments of ‘Abdu’l-Bahá are presented,

analyzed, and related to modern concepts of evolution.

At the beginning of this chapter a methodological issue must be

raised. Why did ‘Abdu’l-Bahá devote so much attention to the sub-

ject of evolution? As a non-scientist, he was not concerned with the

biological details of evolution, such as whether or not chimpanzees

are biologically more closely related to gorillas or to orangutans, or

whether or not mice, rabbits, and guinea pigs belong to the same tax-

onomic family. Very few of his statements can be reasonably inter-

preted as addressing biological issues. His particular interest was in

the social and religious consequences of Darwinism as it was inter-

preted by “some European philosophers.” This was the focus of the

interest of most of ‘Abdu’l-Bahá’s Near Eastern contemporaries

who addressed the subject of evolution.184

According to Bahá’u’lláh, the purpose of religion is to educate

mankind: “God’s purpose in sending His prophets unto men is

twofold. The first is to liberate the children of men from the dark-

ness of ignorance, and guide them to the light of true understanding.

The second is to ensure the peace and tranquillity of mankind, and

provide all the means by which they can be established.”185 In

*Miracles and Metaphors*, Mírzá Abu’l-Faḍl Gulpáygání argues that

the prophets who come to fulfill such a purpose are not meant to be

authorities in such areas as history, philosophy, and science as well:

“It is clear that the prophets and Manifestations of the Cause of God

were sent to guide the nations, to improve their characters, and to

bring the people nearer to their Source and ultimate Goal. They were

not sent as historians, astronomers, philosophers, or natural scien-

tists.”186

Consequently, ‘Abdu’l-Bahá’s main concern was the “education

of mankind.” He presented, a view of evolution which, on the one

hand, agreed with the facts of contemporary science, and which, on

the other hand, preserved the purpose of religion. Most of the few

biological statements of ‘Abdu’l-Bahá can be understood primarily

as analogies used to establish spiritual truths and principles support-

ive of ateleological worldview.

In the talks and writings of ‘Abdu’l-Bahá, the principle of the

originality of species (*aṣálat-i naw‘*) forms a cornerstone for his

conception of the origin of complex biological order and the evolu-

tion of life. Most secondary Bahá’í literature covering the subject of

evolution emphasizes such a concept. In several chapters of *Some*

*Answered Questions* and in one, talk given in the United States,

‘Abdu’l-Bahá claims the originality of species. He contrasts the

principle of the originality of species with the theories of “some

European philosophers” who claim the human species is derived

from the animal kingdom:

We have now come to the question of the modification of species …

that is to say, to the point of inquiring whether man’s descent is from

the animal. This theory has found credence in the minds of some

European philosophers, and it is now very difficult to make its false-

ness understood, but in the future it will become evident and clear, and

the European philosophers will themselves realize its untruth.187

But what particular aspect of the theory of the European philoso-

phers is really the object of ‘Abdu’l-Bahá’s criticism here? As the

spiritual leader of the Bahá’í community, and as the authoritative

interpreter of the Bahá’í scriptures, which claim the creation of the

universe by God and a special purpose for humanity, the social and

spiritual consequences of Darwinism, as taught by “some European

philosophers” (such as Büchner, Haeckel, and Spencer) constituted

the real challenge to the new Faith. If the concept that complex bio-

logical order originates from a mindless, mechanical process, and

does not follow ancient God-given laws, could be applied to the

biosphere, it could be applied to the human social world as well. If

the biological order is largely accidental, the principles ruling

human society would also be arbitrary. Such an idea was certainly

unacceptable to ‘Abdu’l-Bahá.

Another reason ‘Abdu’l-Bahá had to address the question of evo-

lution is the central Bahá’í teaching of the unity of science and reli-

gion. This principle contradicts the explicit claim made by Büchner

and Haeckel that evolution and creation are two mutually exclusive

worldviews. ‘Abdu’l-Bahá’s formulation of a concept of evolution

agreeable with the known biological and paleontological facts, and

compatible with the teachings of his father, gave evidence of the

progressive nature of the new faith in the West. The principle of the

harmony of science and religion was ‘Abdu’l-Bahá’s answer to athe-

istic movements (such as the German monists) and to materialistic

interpretations of Darwinism, which were receiving wide attention

at the time.

## 5.1 The theory of “some European philosophers”

During her table talks with ‘Abdu’l-Bahá in ‘Akká, Miss Laura

Clifford Barney asked concerning the theory of biological evolution:

“What do you say with regard to the theory of the evolution of

beings held by some European philosophers?”188 ‘Abdu’l-Bahá

reformulated the question and expressed the problem as an alterna-

tive between arbitrarily derived and non-arbitrarily created species:

“Briefly, this question will be decided by determining whether

species are original or not—that is to say, has the species of man

been established from the beginning, or was it afterward derived

from the animal?”189 ‘Abdu’l-Bahá then presents the arguments of

the European scientists which were used to support evolution:

Certain European philosophers think that the species evolve, and that

even modification and transmutation are possible. One of the proofs that

they give for this theory is that through the attentive study and verifi-

cation of the science of geology it has become clear that the existence of

the vegetable preceded that of the animal, and that of the animal pre-

ceded that of man. They believe that both vegetable and animal genera

have changed, for in some of the strata of the earth they have discovered

plant§ which existed in the past and are now extinct; in other words,

they think these plants progressed and grew in strength, and that their

form and appearance changed; and, therefore, the species has altered.

In the same way, in the strata of the earth there are some species of ani-

mals which have changed and become modified. One of these animals

is the serpent. There are indications that the serpent once had feet, but

through the lapse of time those members have disappeared. In the

same way, in the vertebral column of man there is a vestige ,which

proves that man, like other animals, once had a tail. They believe that

at one time that member was useful, but when man evolved, it was no

longer of use; and, therefore, it gradually disappeared. As the serpent

took refuge under the ground and became a creeping animal, it was no

longer in need of feet, so they disappeared; but their traces survive.

Their principal argument is this: the existence of traces of members

proves that they once existed, and as now they are no longer of service,

they have gradually disappeared, and there is no longer any benefit in or

reason for these vestiges. Therefore, while the perfect and necessary

members have remained, those which are unnecessary have gradually

disappeared by the modification of the species, but the traces of them

continue.190

At the time of ‘Abdu’l-Bahá, these were two major lines of argu-

ment presented in favor of evolution: emphasizing fossil records and

atrophic organs. Lamark’s studies of the existing and extinct

molusks showed clearly that their outer form changed throughout

history. Some of them are now extinct; others still living today have

a clear relationship to earlier forms. The famous French biologist

Cuvier

… clearly demonstrated for the Tertiary strata of the Paris basin that

each horizon had its particular mammalian fauna. More importantly,

he showed that the lower a stratum was, the more different the fauna

was from that of the present. It was he who proved extinction conclu-

sively, since the extinct proboscidians (elephants) described by him

could not possibly have remained unnoticed in some remote region of

the world, as was postulated for marine organisms.191

These findings presented clear evidence that the biological popu-

lations living during earlier phases of our planet were different from

those of today. Another argument in favor of evolution was the exis-

tence of atrophic organs, such as the blind eyes of the cave sala-

mander or the relics of legs in the case of the serpent. Those organs

very likely had a function in earlier times. Because they were no

longer used, they became stunted. ‘Abdu’l-Bahá does not deny the

truth of those findings, but criticizes the philosophic interpretation

of the data.

## 5.2 ‘Abdu’l-Bahá’s critique of the theory of theEuropean philosophers

In *Some Answered Questions*, ‘Abdu’l-Bahá formulates two argu-

ments critical of the theory that the human species descended from

the animal world. The first argument is based on Plato’s concept that

the whole universe is created in perfect harmony from the begin-

ning. In the second argument, ‘Abdu’l-Bahá grounds the originality

of the human species on the time invariance and completeness of

universal laws of nature.

5.2.1 *A harmonious universe*. In his argument based on the perfect

harmony of the universe, ‘Abdu’l-Bahá concludes that the missing

of “humanity” during a certain period would imply a partly imper-

fect universe, which violates the principle of perfect harmony:

When man looks at the beings with a penetrating regard, and atten-

tively examines the condition of existents, and when he sees the state,

organization, and perfection of the world, he will be convinced that in

the contingent world there is nothing more wonderful than what

already exists. For all existing beings, terrestrial and celestial, as well

as this limitless space and all that is in it, have been created and organ-

ized, composed, arranged, and perfected as they ought to be. The uni-

verse has no imperfection, so that if all beings became pure intelli-

gence and reflected for ever and ever, it is impossible that they could

imagine anything better than that which already exists.

If, however, the creation in the past had not been adorned with the

utmost perfection, then existence would have been imperfect and

meaningless, and in this case creation would have been incomplete ….

Now, if we imagine a time when man belonged to the animal world, or

when he was merely an animal, we shall find, that existence would

have been imperfect that is to say, there would have been no man,

and this chief member, which in the body of the world is like the brain

and mind in man, would have been missing. The world would then

have been quite imperfect. This is a categorical proof, because if there

had been a time when man was in the animal kingdom, the perfection

of existence would have been destroyed; for man is the greatest mem-

ber of this world, and if this world were without its chief member,

surely it would be imperfect.192

First, ‘Abdu’l-Bahá describes our universe as a perfect, harmo-

nious whole. Then the argument concludes that if there had been a

time when the human species did not exist, or merely belonged to

the animal kingdom, the harmony we see today would not have

existed, and the universe would have been imperfect, since it would

have been missing its chief member. The perfection and harmony of

our universe, according to ‘Abdu’l-Bahá, is founded on the eternal

manifestation of the names and attributes of God. (As described in

Section 4.1) ‘Abdu’l-Bahá says: “The effulgence of the divine per-

fections appears in the reality of man, so he is the representative of

God, the messenger of God. If man did not exist, the universe would

be without result, for the object of existence is the appearance of the

perfections of God.”193 Thus, the most perfect representative of

God (i.e., humanity) needs to exist eternally.

5.2.2 *Time invariant universal laws*. In the second half of Chapter 46

of *Some Answered Questions*, ‘Abdu’l-Bahá augments Plato’s classical

argument of a harmonious universe with the idea of time-invariant

laws, as proposed by modem physics, to substantiate the originality

of the human species:

In brief, the perfection of each individual being that is to say, the per-

fection which you now see in man and apart from him, with regard to

parts, organs, or faculties is due to the composition of the elements,

to their measure, to their balance, to the manner of their combination,

and to the interaction and influence of other beings. In the case of man,

when all these factors are gathered together, then man exists. As the

perfection of man is entirely due to the composition of the elements,

to their measure, to the manner of their combination, and to the inter-

action and influence of different beings—then, since man was pro-

duced ten or a hundred thousand years ago from these earthly elements

with the same measure and balance, the same manner of combination

and mixture, and the same influence of other beings, exactly the same

man existed then as now. This is evident and not worth debating. A

thousand million years hence, if these elements of man are gathered

together and arranged in this special proportion, and if the elements

are combined according to the same method, and if they are affected

by the same influence of other beings, exactly the same man will

exist.194

‘Abdu’l-Bahá states that a certain composition of chemical elements

leads to the same human being today, “ten or a hundred thousand years

ago,” or in “a thousand million years.” Thus, in this argument,

‘Abdu’l-Bahá derives the originality of the human species from the

assumed existence of universal time-invariant laws of nature, which

rule the interactions between the chemical elements and between other

natural relationships. Because human beings would materialize when-

ever the required conditions are met, the “human species” is always

potentially present in the universe, even if no particular biological pop-

ulation of human beings exists. This concept parallels Dawkins’ idea

that the space of DNA sequences defining all possible forms of life

exists as an a priori potential.

‘Abdu’l-Bahá considers the concept of time-invariant laws to be

self evident: “… exactly the same man existed then as now. This is

evident and not worth debating.”195 In a later part of the same quote,

‘Abdu’l-Bahá uses the example of a lamp to illustrate the argument

of the time invariance of the laws of nature: “For example, if after a

hundred thousand years there is oil, fire, a wick, a lamp, and the

lighter of the lamp—briefly, if there are all the necessary things

which now exist, exactly the same lamp will be obtained.”196

According to this argument, the laws of nature that “ensure” the

burning of the oil lamp were not created at some time point of cos-

mology, but they exist from the infinite beginning. And they will

remain the same into the endless future.

That ‘Abdu’l-Bahá applies this argument to human beings as well

as to oil lamps indicates that ‘Abdu’l-Bahá considers this argument

a general one. It applies to salt crystals, oil lamps, computers, myo-

globin molecules, viruses, bacteria, mice, human beings, and so on.

According to this argument, whenever chemical elements are com-

bined in the necessary order and under the right influence of other

beings (environment), the respective result is obtained. This result is

independent of the time point, if the respective boundary conditions

are met (e.g., the necessary environment for viruses, bacteria, etc.).

‘Abdu’l-Bahá concludes from this argument that the order to form

salt crystals and all other things, exists a priori. It is not created *ad*

*hoc* as proposed by Monod, but it reveals the inherent properties of

nature.

‘Abdu’l-Bahá distinguishes between natural (God-given) and

accidental order:

This composition and arrangement, through the wisdom of God and

His preexistent might, were produced from one natural organization.

As the world was composed and combined with the utmost perfection,

conformable to wisdom, and according to a universal law, it is evident

that it is the creation of God, and is not a fortuitous composition and

arrangement. This is why from every natural composition a being can

come into existence, but from an accidental composition no being can

come into existence.197

Only when the composition and ordering of atoms follows the

“natural organization” (i.e., the plan defined by the Creator) and

forms stable assemblies of the chemical elements according to the

laws of physics, will a living organism result. Only precise combi-

nations of pinions and gears lead to functioning clockworks, but not

arbitrary ones. In the language of evolution biology, this argument

means that only those compositions of chemical elements and only

those organisms which possess high fitness values can survive.

Accidental assemblies of atoms, however, will produce no such sta-

ble complex structures as are found in the biosphere.

In a universe where evolution is real, not all possible forms of

order are always realized. There has been a time in our universe

without salt crystals or human beings. But ‘Abdu’l-Bahá assumes

that salt crystals and human beings are formed “automatically” with

the appropriate combinations of the necessary chemical elements

and the right environment. If this idea is correct, the structure found

in salt crystals and human beings exists independently of actually

existing salt crystals and human beings. This idea is contrary to

Aristotle’s concept of an immanent order and closely related to

Plato’s concept of transcendent essences.

According to ‘Abdu’l-Bahá, the human species essence accounts

for the ability of chemical elements to eventually form human

beings. In this second argument, ‘Abdu’l-Bahá refers to concepts of

classical and modern physics also held by Büchner and Haeckel.

According to them, matter, energy, and the laws of nature are not

created but eternal. Modern physicists, likewise, generally assume

the reality of a unique, universal set of time-invariant laws of nature.

According to such a view, the root of the human species is an

abstract timeless order where humanity has existed potentially from

the very beginning of the universe, even though in the early phases

of the universe the required environment for human life did not

exist.

With the arguments of a harmonious universe and time-invariant,

universal laws, ‘Abdu’l-Bahá rejects theories which assume the

completion of the laws of nature within time and the self-creation of

absolutely new characteristics during evolution. These arguments

reject the new generation of species considered by some naturalists,

such as Maupertius, within the framework of classical biology,198 as

well as the *ad hoc* self-creation of new biological characteristics as

proposed by Monod. According to ‘Abdu’l-Bahá’s arguments, all

possible forms of life exist potentially from the “beginning” of our

universe. Only predetermined assemblies of chemical elements pro-

duce living organisms; arbitrary compositions quickly disintegrate.

‘Abdul-Bahá thus assumes a universe which has both a First Cause

and potential complexity from its very origin. This is a top-down

process.

## 5.3 The compatibility of evolution with an abstract,timeless order

The question now arises: how can an abstract, timeless order be

compatible with the evolution of the biosphere? Mayr, in his *Growth*

*of Biological Thought*, explains that the concept of a harmonious

universe was one of the major obstacles impeding the development

of Darwin’s theory of evolution.199 The reason for this is that in

classical biology, Plato’s concept of a perfect universe was under-

stood to mean that God had created the universe perfect from the

beginning, both with respect to its essences and with respect to its

outer form. In such an outwardly perfect world, evolution makes no

sense because all organisms are perfect from the time point of their

creation and cannot be improved. They can only vary within certain

limits. In such a universe, natural selection would have the task of

removing oddities which deviate too strongly from the perfect form

dictated by its species essence. Classical biology was based on a

static world view in which biological populations maintain a more

or less fixed outer appearance. This interpretation of Plato’s princi-

ple of a harmonious universe definitely excludes evolution. From

this standpoint, Mayr’s statement is correct that the idea of a perfect,

harmonious universe constituted one of the major obstacles to the

development of a theory of biological evolution.

‘Abdu’l-Bahá, however, did not accept the classical worldview of

a fixed and perfect cosmos. Instead, he combined the idea of a per-

fect cosmos with the idea of evolution. It is also important to know

that not all neo-Platonic philosophies have the same view about the

effect of timeless essences in the material world. Mullá Ṣadrá (c.

1571–1640) in Iran, for instance, formulated the concept of substan-

tial motion (which allows for the temporalization of the effect of

essences) before Leibniz (1646–1716) did in Europe. ‘Abdu’l-Bahá

corroborates the idea of substantial motion in one of his talks pub-

lished in *Some Answered Questions*:

Know that nothing which exists remains in a state of repose that is

to say, all, things are in motion. Everything is either growing or declin-

ing; all things are either coming from nonexistence into being, or

going from existence into nonexistence. So this flower, this hyacinth,

during a certain period of time was coming from the world of nonex-

istence into being, and now it is going from being into nonexistence.

This state of motion is said to be substantial (*jawharí*)—that is, natu-

ral; it cannot be separated from beings because it is their essential

requirement, as it is the essential requirement of fire to burn.200

‘Abdu’l-Bahá describes motion, and by implication change and

evolution, as substantial in the world of being. The objects of this

world grow, decline, and die. They are assembled by chemical ele-

ments, which are later redistributed again. These continuous

changes are an essential aspect of this world. In another place,

‘Abdu’l-Bahá explains that continuous change and transformation

apply to all things save the realm of time-invariant essences:

Physical bodies are transferred past one barrier after another, from one

life to another, and all things are subject to transformation and change,

save only the essence of existence itself since it is constant and

immutable, and upon it is founded the life of every species and kind,

of every contingent reality throughout the whole of creation.201

5.3.1 *An evolving universe*. Evolution and transformation are not

limited to particular individual objects. In the Bahá’í writings, the

concept of ‘transformation rules cosmogony and life as a whole. In

this world all things, both wholes and parts, change and experience

evolution. The elemental building blocks of animate and inanimate

things—the atoms—are in constant motion and are constantly being

transferred from one state to another, and from one form of life to

another, so that the whole universe and its contents are undergoing

endless transformations as new forms are unfolded from the timeless

potential order.

Bahá’u’lláh presents cosmogony itself as an evolutionary process:

God was, and His creation had ever existed beneath His shelter from

the beginning that hath no beginning …. That which hath been in exis-

tence had existed before, but not in the form thou seest today. The

world of existence came into being through the heat generated from

the interaction between the active force and that which is its recipi-

ent.202

Only two parts of this statement are considered: (1) The creation

as a whole is eternal (independent of time). It is an eternal reflection

of the names and attributes of God, upon which the essences of our

universe are based. (2) The universe as we know it today is the result

of a long-lasting process; it is not static but dynamic. Although it is

eternal as a whole, its particular states evolve and change within

time and are subject to evolution.

‘Abdu’ l-Bahá gave the following interpretation of the second sen-

tence of this quote from the Lawḥ-i Ḥikmát:

From this blessed verse it is clear and evident that the universe is

evolving. In the opinion of the philosophers and the wise this fact of

the development and evolution of the world of existence is also estab-

lished. This is to say, it is progressively transferred from one state to

another.203

In interpreting the statement of Bahá’u’lláh given above, ‘Abdu’l-

Bahá explicates the dynamics of the universe. The terms “develop-

ment and evolution” indicate that ‘Abdu’l-Bahá assumes considerable

changes in the unfoldment of the universe and not only minor adap-

tions. The cosmology ‘Abdu’l-Bahá presents is essentially dynamic;

changes are the rule and not the exception. In comparing the classical

and modern views of biology, ‘Abdu’l-Bahá’s cosmology fits in much

better with the concept of historicity emphasized in modern theories

of the development of the universe, and found in the evolution of liv-

ing systems, than with the static universe adopted by Aristotle and still

by much of the scientific community during the nineteenth century

(under the influence of scriptural fundamentalism).

‘Abdu’l-Bahá explains that evolution applies to all levels of

organization; even the atoms from which all physical things are

composed underwent a period of development:

It is necessary, therefore, that we should know what each of the great

existents was in the beginning—for there is no doubt that in the begin-

ning the origin was one: the origin of all numbers is one and not two.

Then it is evident that in the beginning there was a single matter, and

that one matter appeared in a particular form in each element. Thus

various forms were produced, and these various forms as they were

produced became independent, and each element was specialized. But

this independence was not definite, and did not attain realization and

perfect existence until after a very long time.204

This quote clearly indicates that, according to ‘Abdu’l-Bahá, our

universe underwent evolution over a very long period of time; it did

not appear suddenly in its present form with all its beings simulta-

neously created in their present external forms. The whole material

universe required an unimaginably long time (e.g., cosmological

time scales of 10 to 30 billion years) to evolve to the state that we

know today. During the development of the universe, matter, stars

and planets appeared originating from a common origin.

## 5.3.2 Biological evolution

‘Abdu’l-Bahá’s concept of evolution applies also to the biosphere.

Life unfolds gradually in stages on earth:

But it is clear that this terrestrial globe in its present form did not come

into existence all at once, but that this universal existent gradually

passed through different stages until it became adorned with its present

perfection …. In the same manner, it is evident that this terrestrial

globe, having once found existence, grew and developed in the matrix

of the universe, and came forth in different forms and conditions, until

gradually it attained this present perfection, and became adorned with

innumerable beings, and appeared as a finished organization.205

The development of life on earth is explained as a long-lasting

process (geological time scales of about 5 billion years). Life is not

static or in a steady state as believed by Aristotle and the “classical”

Christian world, but it continuously changes: “Similarly,” continues

‘Abdu’l-Bahá, “the terrestrial globe from the beginning was created

with all its elements, substances, minerals, parts, and organisms; but

these only appeared by degrees: first the mineral, then the plant,

afterward the animal, and finally man.”206

In brief, ‘Abdu’l-Bahá emphasizes that the laws of nature for the

formation of planets and for biological development are eternal and

stable in relation to their objects. The unfolding realization of these

potential realities, and of the eternal names and attributes of God,

into actual existents, however, takes the form of evolution. After a

very long time, the universe evolved to the state we see today. In the

matrix of the universe, the terrestrial globe came into being and

developed slowly until it attained its present form. Similarly, bio-

logical life evolved over a long period of time. Representatives of

*Homo sapiens* appeared after plants and animals.

The general view of evolution presented by ‘Abdu’l-Bahá agrees

with the findings of modem science. This universe and all its sub-

systems are essentially dynamic.

5.3.3 *Phylogeny resembles ontogeny*. To establish both evolution

and the concept of the originality of species, ‘Abdu’l-Bahá had to

argue against the conviction of most classical and modem biologists

that species essences and evolution mutually exclude each other.

This conviction is clearly stated by Mayr:

Darwin was fully conscious of the fact that the change from one

species into another one was the most fundamental problem of evolu-

tion. Indeed, evolution was, almost by definition, a change, from one

species into another one. The belief in constant, unchangeable species

was the fortress of antievolutionism to be stormed and destroyed.207

Nevertheless, ‘Abdu’l-Bahá clearly supported a form of evolution

which he believed to be compatible with time-invariant laws of

nature (i.e., species essences). To prove this compatibility, ‘Abdu’l-

Bahá presented a particular biological argument: the analogy

between human ontogeny (the development of the embryo) and

phylogeny (human evolution on earth). There are several passages

in *Some Answered Questions* and one talk in *The Promulgation of*

*Universal Peace* where ‘Abdu’l-Bahá presents the ontogeny-resem-

bles-ontogeny argument.

But it is clear that this terrestrial globe in its present form did not, come

into existence all at once, but that this universal existent gradually

passed through different stages until it became adorned with its pres-

ent perfection. Universal existents resemble and can be compared to

particular existents, for both are subject to one natural system, one uni-

versal law, and one divine organization. So you will find that the

smallest atoms in the universal system are similar to the greatest exis-

tents of the universe. It is clear that they come into existence from one

laboratory of might under one natural system and one universal law;

therefore, they are analogous to one another. Thus the embryo of man

in the womb of the mother gradually grows and develops, and appears

in different forms and conditions, until in the degree of perfect beauty

it reaches maturity and appears in a perfect form with the utmost

grace. And in the same way, the seed of this flower which you see was

in the beginning an insignificant thing, and very small; and it grew and

developed in the womb of the earth and, after appearing in various

forms, came forth in this condition with perfect freshness and grace. In

the same manner, it is evident that this terrestrial globe, having once

found existence, grew and developed in the matrix of the universe, and

came forth in different forms and conditions, until gradually it attained

this present perfection, and became adorned with innumerable beings,

and appeared as a finished organization.208

In this paragraph, ‘Abdu’l-Bahá argues for the evolution of

humanity on earth. First, ‘Abdu’l-Bahá states that the planet earth

once had a beginning and then developed. The situation we see

today was obtained after a long evolution. Then ‘Abdu’l-Bahá

argues in three steps: (1) Because the universe is based on a single

origin and is ruled by “one universal law,” small and large systems

are comparable. (2) The human embryo develops from the time

point of conception and passes through many different stages. The

same is true for the growth of plants from their seeds. (3) Because

of the similarity between small and large systems, the phylogeny, or

evolution, of life on earth follows rules analogous to the ontogeny

of a particular human being in its mother’s womb.

The relation between ontogeny and phylogeny has long been dis-

cussed in Occidental biology. Embryos of different biological

species in their early phases of differentiation are often very similar.

For instance, bird embryos and mammal embryos become morpho-

logically distinct only at a certain stage of development. Both form

gill arches during their early embryonic life which disappear later. In

the above argument, ‘Abdu’l-Bahá uses only a weak form of paral-

lelism: an analogy. For the sake of the argument, only the develop-

ment of the embryo as such is required. Particular concepts, such as

the Meckel-Serrès law209 or Haeckel’s law of recapitulation210 are

not involved. The appeal to those well-known and widely accepted

concepts, however, certainly helped to support ‘Abdu’l-Bahá’s argu-

ment.

In classical biology, species essences were thought to be directly

responsible for the inner and outer appearance of their particular

representatives. Only minor variations from the “ideal” were

thought to be tolerable. Since this view is incompatible with any

form of evolution, ‘Abdu’l-Bahá’s analogy between embryonic

ontogeny and human phylogeny represents a way to bridge these

differences. Starting from a single cell, the embryo passes through

very different biological stages and forms, but all the way through it

is human. Its development is determined by the same genome, by

the same chromosomes, by the same DNA chains. Analogously,

species essences (i.e., time-invariant laws of nature) can be assumed

to guide evolution on earth and to rule its dynamics. Without the

translation of the information stored in the genes, no complex living

organism could develop. The same “unchanging” genome rules its

development through these different forms.

Consequently, according to ‘Abdu’l-Bahá’s analogy, biological

evolution does not imply that the species essence must change to

allow for all the different stages and developments during evolution.

On the contrary, the existence of the species essences ensure that

development towards complex life forms is possible. Species

essences define the “natural compositions,” that is, the requirements

to form a functional, dynamic living system that doesn’t immediate-

ly disintegrate. As the constant genomic information regulates the

development of an individual, the time-invariant species essences

“guide” evolution as a whole. The species essences ensure that a

certain composition of chemical elements always leads to the same

result.

The analogy between human ontogeny and phylogeny may also

be used to get a first impression of what ‘Abdu’l-Bahá means by

species essence. In classical biology, the essence was assumed to

represent an ideal picture for the members of the species, for exam-

ple, an ideal horse. Such an essence definition is certainly alien to

evolution. Species essences which are assumed to guide evolution

have to be more general. What characteristic of the embryo remains

constant during ontogeny? At least the biological side of the

embryo’s development depends on the genetic information content.

This is largely constant from the time point of conception through

birth and until death. Analogously, one could understand species

essences as the information determining which compositions of

chemical elements lead to living beings. ‘Abdu’l-Bahá’s concept of

species essences may be equivalent to the assumption of the exis-

tence of an objective, reproducible fitness function. In mathematical

evolution models, the fitness function guides evolution because it

“decides” which members survive and which die. Of course, the

strict link between biological species as a reproductive community

and species essences, assumed in classical biology, is lost in such a

generalized concept of species essences.

5.3.4 *Human identity during ontogeny and phylogeny*. In Chapter 47

of *Some Answered Questions*, ‘Abdu’l-Bahá elaborates on the comparison

between the development of the embryo and the evolution of the

human species on earth. ‘Abdu’l-Bahá puts forward the major con-

clusion, that the human species remains original throughout the

development of humanity on earth:

And in the same way, man’s existence on this earth, from the begin-

ning until it reaches this state, form and condition, necessarily lasts a

long time, and goes through many stages until it reaches this condition.

But from the beginning of man’s existence he has been a distinct

species. In the same way, the embryo of man in the womb of the mother

was at first in a strange form; then this body passed from shape to

shape, from state to state, from form to form, until it appeared in the

utmost beauty and perfection. But even when in the womb of the

mother and in this strange form, entirely different from its present

form and figure, it was the embryo of a distinct species, and not the

embryo of an animal. Man’s species and essence have undergone no

change whatsoever. Now, assuming that the traces of organs which

have disappeared actually existed, this is not a proof of the imperma-

nence and the nonoriginality of the species. At the most it proves that

the form, appearance, and organs of man have evolved. But man was

always a distinct species, a man, not an animal …. For the originali-

ty of the human species and the independence of the essence of man,

is clear and evident.211

This quote starts with the major conclusion drawn by ‘Abdu’l-

Bahá in Chapter 47 of *Some Answered Questions*. Although human-

ity undergoes an evolution on this planet, changes in all respects as

the embryo does in the mother’s womb, still “… from the beginning

of man’s existence he is a distinct species.” Here ‘Abdu’l-Bahá

extends the analogy between ontogeny and the evolution of human-

ity. The embryo is human from the time point of conception,

although during ontogeny it changes in all respects. In the same

manner, the human “species and essence” exists from the beginning

of the universe and does not change during evolution; it remains

original. A similar statement is given in another chapter:

To recapitulate: just as man in the womb of the mother passes from

form to form, from shape to shape, changes and develops, and is still

the human species from the beginning of the embryonic period—in the

same way man, from the beginning of his formation in the matrix of

the world, is also a distinct species that is, man—and he has gradu-

ally passed from one form to another. Therefore, this change of

appearance, this evolution of organs, this development and growth,

does not prevent the originality of the species.212

The embryo in the womb of the mother starts as a single cell and

passes through many states, until it obtains maturity and strength to

survive in this world. Throughout all this development, beginning

with a single cell, this embryo is human. The biological aspects of

the embryonic growth depend necessarily on the DNA as a (more or

less) constant, “time-invariant” origin of development. The genome,

the DNA, guides the necessary formation of the organs and their

mutual interactions. Changes, mutations, or defects in the genome

generally tend to ruin the new life. The embryo is human from the

time point of conception, its DNA is human, not that of fishes, nor

that of higher primates. It maintains its particular genome, its poten-

tial to express human characteristics, through all the stages of devel-

opment from conception to birth.

Just as the embryo remains human, “man, from the beginning of

his formation in the matrix of the world, is also a distinct species.”

According to this view, the human “species and essence” is a time-

invariant law of nature, but its physical expressions have a temporal

origin, and evolve and change over time.213 The evolution of

humanity, and of every creature on this planet, depends upon the

intelligible timeless order, designated “essences” by ‘Abdu’l-Bahá.

## 5.4 Parallel evolution

How literally are we to understand ‘Abdu’l-Bahá’s analogy between

phylogeny and ontogeny? If, on the one hand, it is understood to

present a general philosophical understanding about the fundamen-

tal nature of the universe, and about the metaphysical origin of com-

plex order in our world, then this analogy should be accepted as a

convincing argument that essentialism and evolution are not mutu-

ally exclusive. Because the “European philosophers” (e.g., Büchner,

Spencer, and Haeckel), representing an important philosophical

school of modem evolution at the turn of the nineteenth century,

believed in mechanistic evolution and rejected essentialism in gen-

eral (which they equated with typological thinking), ‘Abdu’l-Bahá’s

argument is an important counter-argument to the mechanistic world

view.

If, on the other hand, ‘Abdu’l-Bahá’s analogy is understood to

argue for a particular scientific concept of how biological life

evolved on earth, then it can be understood to support parallel evo-

lution. The analogy between human phylogeny and embryonic

ontogeny particularly invites this interpretation. In this case, state-

ments such as: “But from the beginning of man’s existence he has

been a distinct species … a man, not an animal”214 and “Man, from

the beginning, had this perfect form and composition, and possessed

the potentiality and capacity for acquiring inner and outer perfec-

tions,”215 might be understood to refer to the biological evolution of

humanity, where “beginning” indicates the time point of the first

appearance of the human species on earth. In this case, ‘Abdu’l-

Bahá’s arguments would present a picture of biological evolution

radically different from the theories of modem evolution biology.

In a parallel evolution model, a biologically distinct line of the

human species would exist from the beginning of life on earth, i.e.,

at the stage of very primitive life forms, until modem *Homo sapiens*

*sapiens*. Because the originality of species is a general principle, dis-

tinct lines of parallel evolution would have to be assumed for each

individual biological species. The following statement of ‘Abdu’l-

Bahá, if understood in a biological sense, would support this: “All

beings, whether universal or particular, were created perfect and

complete from the first, but their perfections appear in them by

degrees.”216

As indicated in the introduction, some authors understand

‘Abdu’l-Bahá’s statements as a proposal for parallel evolution. In

such an interpretation, the terms “species,” “man,” and similar ones

are assumed to refer to the biological organisms. But in view of the

different species concepts introduced in this article, it should be

clear that a mere biological interpretation of these terms is insuffi-

cient and may result in misleading interpretations of ‘Abdu’l-Bahá’s

teachings. Consequently, any biological interpretation of this con-

cept requires one to find corresponding biological species defini-

tions in the Bahá’í writings. Philosophically, it is not difficult to

argue for a model of parallel evolution, but if one claims that it also

describes biological reality, then it must be supported by evidence

from applied biology. Otherwise, such a claim would “begin with

words and end with words.”217

5.4.1  *Practical problems with the concept of parallel evolution*.

There exists no necessary correlation between the human embryo

being human from the time point of conception and human phy-

logeny being biologically human all the way down. Such a concept

is not implicit in the paradigm of classical biology nor in that of

modern biology. Lamark, however, proposed a similar idea.

According to Mayr: “Lamark attributed it [i.e., the creation of new

species] to a *deus ex machina*, spontaneous generation. Each evolu-

tionary line, according to him, was the product of a separate sponta-

neous generation of simple forms which subsequently evolved into

higher organisms.”218 But this theory, although prominent at the end

of the nineteenth century, does not explain the known paleontologi-

cal and biological data.219 It requires that new simple starting points

of new species be continually created. Such a constant creation is

not found.

If one prefers to understand ‘Abdu’l-Bahá’s writings as teaching

parallel evolution, then a series of questions must be answered if this

concept is to be taken seriously:

(1) Parallel evolution requires at least a single branching point.

Every biological species appeared at a certain time point for the first

time on earth. Where did it come from? According to ‘Abdu’l-Bahá,

“there is no doubt that in the beginning the origin was one: the ori-

gin of all numbers is one and not two.”220 All kingdoms originate

from the same root. With respect to the chemical elements, there is

no distinction between the higher kingdoms; there are no atoms spe-

cialized just for vegetables but not for animals or humans. If all

kingdoms have the same root, a model of parallel evolution requires

points to be defined where the vegetable, animal, and human species

branched from their common roots.

(2) A biological definition of the term species must be developed

that is compatible with the concept of parallel evolution and with the

known facts of biology. In particular, the documented cases of spe-

ciation221 would have to be taken into account. Of course, specia-

tion in this context means speciation according to the modern

species definition. A redefinition would require some care to avoid

getting trapped in unspecific species definitions which would be of

little practical value for applied biology.

(3) Because all the species existed from the beginning in the pri-

mordial soup, the maximal number of species must have lived at that

time and became constantly reduced due to extinctions.222 What

was the distinction between all these species?

(4) Comparing the similarity between the DNA sequences of var-

ious organisms, one definitely Obtains a tree-like pattern compatible

with neo-Darwinism, but not a star pattern as expected in the case of

a single branching point, and not a network, which would indicate

no phylogenetic relation at all. A theory of parallel evolution would

have to explain why DNA sequence similarities among human

beings (e.g., ‘the mitochondria) Eve) reflect biological relationships,

whereas DNA sequence similarities between various species would

not account for such relationships.

(5) Apparently, all multicellular higher taxa stem from a very few

eukaryontic cells. In a model of parallel evolution, one either has to

assume that all higher taxa branch from those few eukaryontic cells,

or one would have to explain how the eukaryontic cell was rein-

vented millions or even billions of times for each existing species.

Parallel evolution would be plausible if the space of possible

forms of living organisms were strongly bounded and the transition

within these possible forms along the developmental line of a

species very likely. Such a type of evolution is generally designated

convergent evolution. An astonishing case of convergent evolution

is the extinct marsupalian wolf in Australia which had much in com-

mon with the European wolf. To establish parallel evolution, one

would have to prove that due to the bounds within which life is pos-

sible, the reinvention of the same organs, the same organelles, and

often the same or very similar DNA sequences was inevitable.

Without such a proof the concept of parallel evolution would remain

unsubstantiated. The assumption of parallel evolution produces

more problems than it solves. Therefore, it is considered in this

essay to be the less likely interpretation of the analogy between phy-

logeny and ontogeny.

5.4.2 *‘Abdu’l-Bahá’s talk given in San Francisco*. There is a state-

ment in one of the talks ‘Abdu’l-Bahá gave during his journey

through North America, published in *The Promulgation of*

*Universal Peace*, where a biological interpretation supportive of a

parallel evolution model appears to be inevitable. Shoghi Effendi,

however, considers the translation of ‘Abdu’l-Bahá’s talks in this

book as “too inaccurate, in some places, to use them as an absolute

basis for discussing some points”223; consequently, a revised trans-

lation of a passage from the talk presented in San Francisco is given

here, based on the Persian original.

The reservations of Shoghi Effendi were confirmed when com-

paring both texts. Certain statements given in the original free

English translation are absent in the Persian original. For instance,

the passage “in the protoplasm, man is man,” which most strongly

supports parallel evolution, has no counterpart in the Persian text, as

can be seen if one compares the new translations below with the

original English translation found in *The Promulgation of Universal*

*Peace*:

Briefly, the evidences of the intellect of man are manifest and clear.

Man is man by reason of this intellectual faculty. Therefore, the ani-

mal kingdom is other than the human kingdom. Notwithstanding this,

the philosophers of the West have adduced evidences to demonstrate

that man had his origin in the animal kingdom …. In other words, he

was transferred from one state to another until he reached this human

shape and form. They say that the manner of man’s formation can be

compared to the links of a chain, which are connected to one another.

However, between man and the ape one link is missing. Great scien-

tists and philosophers have searched for it, some even devoting their

whole lives to solving this problem, but until now they have been

unable to find that missing link.224

First ‘Abdu’l-Bahá emphasizes the distinction between the human and

the animal kingdoms. After explaining the theory of the European

philosophers of the descent of *Homo sapiens* from the animal world,

‘Abdu’l-Bahá stresses that no link has been found between *Homo sapi*-

*ens* and higher primates. Then ‘Abdu’l-Bahá describes his position and

the position of the “philosophers of the East” concerning Darwinism:

The philosophers of the East say: If the human body was originally not

in its present composition, but was gradually transferred from one

stage to another until it appeared in its present form [as the philoso-

phers of the West say], then we would postulate that although at one

time it was, a swimmer and later a crawler, still it was human, and its

species has remained unchanged. The proof for this is that the human

embryo is at first a mere germ. Gradually the hands and feet appear

and the lower limbs become separated from each other, and it is trans-

ferred from one form to another, from one shape to another, until it

becomes born with this shape and appearance. But from the time it

was in the womb in the form of a germ, it was the species of man and

not like the embryo of other animals. It was in the form of a germ, but

it progressed from that form to this most beautiful form. Therefore, it

is clear that the species is preserved.

Provided that we assent [to this theory] that man was at one time a

creature swimming in the sea and later became a four-legged creature,

assuming this to be true, we still cannot say that man was an animal.

Proof of this lies in the fact that in the stage of the embryo man resem-

bles a worm. The embryo progresses from one form to another, until

the human form appears. But even in the stage of the embryo he is still

man and his species remains unchanged.

The link which they say is lost is itself a proof that man was never

an animal. How is it possible to have all the links present and that

important link absent? Though one spend this precious life searching

for this link, it is certain that it will never be found.225

‘Abdu’l-Bahá’s reference to the missing link cannot be under-

stood to support parallel evolution. Any fossil finding of an ancient

human form, which should exist according to the parallel evolution

model, could be interpreted as such a missing link. At the time

‘Abdu’l-Bahá was in the United States, the question of the missing

link was heatedly discussed in scientific circles as well as by the

public. It was hotly debated whether or not Darwin’s theory of bio-

logical evolution also applied to the human species.

The first missing link ever presented, the Piltdown man, was

bogus, and it took nearly forty years to discover this forgery.226

Haeckel227 presented the Java man, discovered by the Dutch mili-

tary physician Eugen Dubois in 1891, as the missing link between

apes and humanity. The time thought to be required to evolve *Homo*

*sapiens* from ancestral primates varied widely during the nineteenth

century. Darwin located this branch point at 30 million years ago.228

In contrast, at the beginning of the twentieth century, Haeckel

considered time ranges of between 100,000 and 1,000,000 years as

necessary for human evolution from ancestral primates. His view

corresponded with the general opinion of paleontologists at that

time. Most estimates given during the middle of the nineteenth cen-

tury were much shorter. Those earlier estimates, however, were still

dominant in the general public opinion at the time ‘Abdu’l-Bahá vis-

ited the United States.229

A direct link between modem higher primates and *Homo sapiens*,

expected by some scientists at the time of ‘Abdu’l-Bahá’s visit in the

States, however, was never found. Today, many fossil findings are

known which allow us to trace back human evolution much more

accurately. Modem paleontologists generally assume that *Homo*

*sapiens* and the modem higher primates have a common ancestor,

but they are not directly linked. Putative predecessors of the human

species lived about 5 million years ago in Africa.230 The branching

point between *Homo sapiens* and higher primates is assumed to be

at least 10 million years ago.

## 5.5 The meaning of the term “species”

In several of his talks, ‘Abdu’l-Bahá criticized the “theory of some

European philosophers” that the human species stems from the ani-

mal kingdom. The interpretation of those passages depends critically

on the meaning of the term “species” in his writings. Therefore, the

various meanings of the term “species” are now carefully analyzed.

Any interpretation of ‘Abdu’l-Bahá’s statements about evolution

has to make clear which species definition is being used and why

this particular interpretation should be preferred over the others.

Here three species concepts are distinguished:

(1) Modern species definitions are characterized by their empha-

sis on the individual, by *population thinking*. One of the current def-

initions of a species in modem biology sets the boundaries between

different kinds by their ability to interbreed: “A species is a repro-

ductive community of populations (reproductively isolated from

others) that occupies a specific niche in nature.”231 This is a rather

nominalistic concept because the species is not defined by some

general rule but, following the Aristotelian tradition, simply by the

members of a group of related organisms.

(2) In classical biology species definitions were dominated by

Platonic essences, by *typological thinking*. A species was consid-

ered to represent an ideal picture of the represented kind (e.g., an

ideal cat):

Every earthly thing is a sort of imperfect copy or reflection of an ideal

exemplar or Form that existed timelessly in the Platonic realm of

Ideas, reigned over by God …. Their individual members came and

went, but the species itself remained unchanged …. In fact; the word

“species” was at one point a standard translation of Plato’s Greek word

for Form or Idea, i.232

All existing populations were thought to represent, in a fixed way,

one particular species essence. And because these species were con-

sidered to be created perfectly in their outward forms, any changes

within respective populations were thought to be confined to certain

narrow limits. Evolution is impossible with this species concept.

(3) Another species concept we may designate as that of the

“philosophers of the East.” Although the Arabic-speaking philoso-

phers accepted the classical view of fixed essences and a harmonious

cosmos, they added to it the idea of “progress toward perfection”

(*taraqqí ila’l-kamál*). In other words, the timeless potentiality of

creatures was realized through temporal unfoldment. ‘Abdu’l-Bahá

obviously supports some form of this concept.

This concept applied to evolution implies that the species

essences not only contain an “ideal picture of a cat,” but also its pos-

sible evolutionary pathways (just as Newtonian mechanics not only

contains all possible stable constellations of the planets, but also

their evolution).

5.5.1 *‘Abdu’l Bahá s concept of the “human species.”* In *Some*

*Answered Questions*, ‘Abdu’l-Bahá argues in favor of the originali-

ty of the human species based on the ideas of a perfect harmonious

universe and time-invariant laws of nature. The point of these argu-

ments is that the “species of man” exists eternally without change,

so ‘Abdu’l-Bahá is clearly not using the terms “human species” or

“man” in their modern meaning, where they would refer to a bio-

logical population of human beings. ‘Abdu’l-Bahá’s understanding

of the term “species” instead falls under the category of the classi-

cal concept of a “species essence.” His claim, in Chapter 50 of *Some*

*Answered Questions*, that the human species exists eternally makes

sense only within an essentialistic species concept:

Now we will adduce theological proofs that human existence that is,

the species of man—is a necessary existence, and that without man the

divine perfections would not appear …. We have many times demon-

strated and established that man is the noblest of contingent beings, the

sum of all perfections, and that all beings and all existents are centers

for the appearance of the divine effulgence—that is to say, the signs of

the divinity of God are manifest in the realities of all created things ….

The world, indeed each existing being, proclaims to us one of the

names of God, but the reality of man is the collective reality, the gen-

eral reality, and the center for the appearance of all the divine perfec-

tions—that is to say, for each name, each attribute, each perfection

which we affirm of God there exists a sign in man …. Consequently,

the divinity of God, which is the sum of all perfections, appears

resplendent in the reality of man—that is to say, the Essence of

Oneness is the possessor of all perfections, and from this unity He

casts an effulgence upon the human reality. Man, then, is the perfect

mirror facing the Sun of Truth and is its place of appearance: the Sun

of Truth shines in this mirror.233

‘Abdu’l-Bahá describes our world as a mirror reflecting the

names and attributes of God. If the “species of man” were missing,

this would imply the corresponding non-existence of certain names

and attributes of God. As he says in another place, “the names and

attributes of God require the existence of objects or creatures upon

which they have been bestowed and in which they have become

manifest.”234 In this context, the term “species” is certainly not used

in a biological sense, but in an essentialistic sense referring to the

eternal reality of our universe. In the light of ‘Abdu’l-Bahá’s state-

ments on evolution as a process of unfolding, “species” here indicates

the potential of the laws of nature to form human beings wherever the

environment is suitable.

The Guardian of the Bahá’ í Faith, Shoghi Effendi, gave a few

explanations concerning the originality of the human species: “The

Bahá’í Faith teaches man was always potentially man, even when

passing through the lower stages of evolution.”235 In a letter Shoghi

Effendi wrote:

We cannot prove man was always man for this is a fundamental doc-

trine, but it is based on the assertion that nothing can exceed its own

potentialities, that everything, a stone, a tree, an animal and a human

being, existed in plan, potentially, from the very “beginning” of cre-

ation. We don’t believe man has always had the form of man, but

rather that from the outset he was going to evolve into the human form

and species and not be a haphazard branch of the ape family.236

Shoghi Effendi states that the *originality of species* is based on the

principle that “nothing can exceed its own potentialities.” This prin-

ciple means that the ability of the human species to show forth intel-

ligence was not developed during evolution, but was potentially

present from the beginning of the universe.

## 5.6 Summary

‘Abdu’l-Bahá does not accept the idea that creation and evolution

are two mutually exclusive concepts, or that the development of our

universe is accidental, without a purpose, goal, or destiny. He does

not deny the facts that are generally used to support biological evo-

lution, but he criticizes the frequently made conclusion of “some

European philosophers” (such as Büchner and Haeckel) that evolu-

tion excludes the existence of a Creator, creation, and a higher pur-

pose for our universe. He emphatically argues against the idea that

Darwinism alone can explain the origin of complex order out of

“primeval simplicity.”237

In support of the concept of the originality of the species, ‘Abdu’ 1-

Bahá refers to the argument of a perfect harmonious universe (orig-

inating from Plato) and to the existence of timeless universal laws of

nature, a concept that was firmly accepted in physics and chemistry

in the second-half of the nineteenth century. Both arguments imply

that if the human species as a potential reality was missing, this

would render the universe imperfect and incomplete.

The first of the two arguments was well established in Occidental

philosophy and was understood to represent a strong counterargu-

ment against evolution. The concept of a perfect harmonious uni-

verse implies that all possible forms of life exist from the very

beginning of creation. As God is timelessly perfect, His creation,

reflecting His names and attributes, is also eternally complete.

Consequently, the origin of the universe is presupposed to be essen-

tially complex. But ‘Abdu’ l-Bahá formulated an understanding of

Plato’s harmony argument radically different from the philosophic

concepts of classical Western biology, because he expanded this old

concept to include evolution.

The constancy of matter and energy, and the time invariance of the

laws of nature were understood by Büchner and Haeckel to exclude

creation. By his argument, ‘Abdu’l-Bahá reversed a well-known

interpretation of those concepts to support creation. He considers it

evident that a certain composition of chemical elements which today

results in a human being (or a myoglobin molecule) some time ago

would have produced the same human being (or the same kind of

myoglobin molecule) and nothing else. If the same composition under

the same boundary conditions always produces the same outcome,

then the evolution of humanity is not a principally unpredictable, irre-

producible outcome of haphazard self-creations, but the unfolding of

potential characteristics inherent in laws of nature. In neo-Platonic

language, evolution translates the timeless species essences into actu-

ality, and in Bahá’ í terminology, evolution realizes mirrors capable of

reflecting the names and attributes of God.

By the analogy between human ontogeny and phylogeny,

‘Abdu’l-Bahá demonstrated that the assumption of a human species

essence does not contradict the evolution of *Homo sapiens* on earth.

Although the fertilized human egg passes through many very differ-

ent phases, it is human from the time point of conception. Its “being

human” does not prevent all those changes; the genetic information

is even a necessary precondition for the unfolding of all the inherent

potentials of this new member of human society. Just as the infor-

mation stored in DNA chains regulates the development of growing

organisms and unfolds their hidden potentials during the life of their

“hosts,” species essences “guide” evolution on cosmological and

geological time scales. Thus the existence of a universal law pre-

defining “humanity” or other species may be understood as a neces-

sary precondition for making the evolution of a complex biosphere

possible. Interestingly, the constancy of the genome discovered by

modem microbiology, strengthens ‘Abdu’l-Bahá’s argument.

Because of the conviction of many Western philosophers and

biologists that evolution and the existence of species essences are

mutually exclusive, this analogy is an important and original ele-

ment in ‘Abdu’l-Bahá’s concept of evolution. ‘Abdu’l-Bahá’s con-

cept, however, although closely related to Plato’s essences, should

not be mistaken with the typological thinking current in classical

biology. The major purpose of ‘Abdu’l-Bahá’s arguments is to show

the compatibility between evolution and creation.

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[Image]

Christ presides over creation

This title page from Thomas Burnet’s *Sacred Theory of the*

*Earth* (1690) shows Jesus Christ straddling the first and last

stages of the earth’s development. Shown in a sequence of

seven spheres, Burnet attempted to explain the present form of

the world by natural events, rather than a single act of creation.

# Section 6Spiritual dimensions of the humanorigin discussion

After the publication of Darwin’s *The Origin of Species*, it became

obvious that his concept of evolution undermined the classical,

largely biblical worldview of creation prevalent in the Occident. In

natural theology, the existence of well-adapted, complex life forms

were considered to strongly support the biblical picture of a world

originating from a powerful and benevolent Creator. Because

Darwin, according to Dennett, reduced the origin of species to a

“mindless, algorithmic process of evolution,”238 the philosophy of

modem biology together with other influences destroyed the foun-

dation of natural theology and undermined belief in creation.

The problem of morality under the influence of a materialistic

form of Darwinism was seen rather early. Many of the nineteenth-

century materialists, however, assumed that reason would be suffi-

cient to formulate generally accepted moral values. For instance,

Haeckel says about his monistic, quasi-religious movement: “This

monistic religion and ethics differ from all others, for we base it

exclusively on pure reason. It is a worldview grounded in science,

experience, and reasonable belief.”239 Büchner considers the

Golden Rule to be the basis of any workable ethics and solidarity the

quintessence of morality.240

Mayr clearly sees the tendency of Darwinism to destroy classical

value systems:

Biology has an awesome responsibility. It can hardly be denied that it

has helped to undermine traditional beliefs and value systems. Many

of the most optimistic ideas of the Enlightenment, including equality

and the possibility of a perfect society, were ultimately (although very

subconsciously) part of physico-theology. It was God who had made

this near-perfect world. A belief in such a world was bound to collapse

when the belief in God as designer was undermined.241

Mayr tries to solve this problem by grounding human values on

Darwinism:

If, instead of defining man as the personal ego or merely a biological

creature, one defines man as mankind, an entirely different ethics and

ideology is possible. It would be an ideology that is quite compatible

with the traditional values of wanting to “better mankind” and yet

which is compatible with any of the new findings of biology. If this

approach is chosen, there will be no conflict between science and the

most profound human values.241

Ward, however, severely doubts that “metaphysical Darwinism”

is sufficient to ground human values:

Only a theory that is completely certain should be allowed to under-

mine this moral sense. Metaphysical Darwinism is far from being such

a theory. Indeed, its inability to account for the moral consciousness in

a satisfactory way is one of the strongest arguments for its incom-

pleteness as a total explanation of human behavior, and therefore of

the evolution of life.242

Thus, Darwin’s new theory revolutionized not only the biological

sciences, but it challenged a whole worldview, particularly the con-

cepts of human purpose and destiny. These far-reaching conse-

quences were seen and discussed soon after the publication of

Darwin’s *Origin of Species*. Many of the more popularized publica-

tions about Darwin’s theory directly addressed religious and philo-

sophical issues, and often claimed that the “new worldviews” were

the direct consequence of the “new facts” of modem sciences.

## 6.1 Implications of the unity of nature

Why should particular biological results challenge worldviews and,

to use Dennett’s words, threaten “to leak out, offering answers—

welcome or not—to questions in cosmology (going in one direction)

and psychology (going in the other direction)”?243 This challenge is

a direct consequence of the idea of the unity of nature. Haeckel

based his concept of the unity of nature on the agreement of physi-

cal and chemical forces in the inorganic as well as organic world.

From this he concluded: “the unity of natural forces or alternatively

the monism of energy.”244 Weizsäcker formulates this principle in

more traditional physical terms, whereas Dennett applies the con-

cept of natural selection to cosmology as well as to psychology.

Thus, if such a unity of nature exists, the fundamental laws which

bring forth the complex order of our biosphere should be relevant in

all “directions.” If we assume that our universe does not divide up

into several disconnected parts of reality, then we should assume a

unity in the fundamental principles ruling this universe.

In contrast, to escape the consequences of materialism, many

Protestant theologians divided the world into two contrary parts: a

materialistic and a spiritual one. By this separation of reality into a

world of facts and a world of values, religion was thought to be

immune against the attacks of materialistic philosophy.245 A similar

separation was recently proposed by Gould.246

The Bahá’í Faith upholds the concept of the unity of our reality.

‘Abdu’l-Bahá explains that everything in our universe stems from a

single root: “… for there is no doubt that in the beginning the origin

was one.”247 ‘Abdu’l-Bahá often repeats that “truth is one” and

makes this principle the reason for the harmony that should exist

between science and religion.248 Thus, if the unity of nature is

assumed, in the last analysis the fundamental driving forces should

be the same in particle physics, the evolution of life, cultural and sci-

entific development, and in human ethics and moral behavior.

6.1.1 *Evolution and human values*. Since Laplace, many have con-

sidered mechanics to be “atheistic.” Haeckel formulated this view:

“Once Laplace based the fundamental laws of our world in mathe-

matics, all inorganic natural sciences became mechanistic and con-

sequently purely atheistic.”249 At the time of Laplace, the complex

order of the biosphere, however, was still considered to require an

explanation which could not be given by mechanics alone. The com-

plex forms of life were still accepted as a good argument in support

of the existence of a benevolent Creator. Darwin’s natural selection

filled this “gap” by providing the means to explain complex biolog-

ical order on mechanistic grounds.

Thus, many of Darwin’s contemporaries understood Darwinism

to show that complex biological order does not require an external

origin. According to Büchner: “Neither does nature know a super-

natural beginning, nor a supernatural continuation; as all begetting

and all devouring, she is in herself origin and end, birth and death.

Of her own resources, she procreated the so-called creation and

humanity as its apex.”250 In the same spirit, Haeckel presented athe-

ism as a direct consequence of Darwin’s discovery, although he him-

self preferred the term monism for his new belief. Explaining the

concept of atheism, Haeckel states that “this ‘god-less worldview’

essentially agrees with the monism and pantheism of our modern

natural sciences …. It is only another expression for the non-exis-

tence of an otherworldly, supernatural deity.”251

From the very beginning, Darwinism was understood to challenge

the foundation of the classical worldview. This consequence of the

new theory was seen by friend and foe alike. Societies were founded

to support and distribute these new “scientific” ideas. In 1881[]Ludwig

Büchner co-founded the *Deutschen Freidenkerbund*. To spread his

monistic religion, Haeckel promoted the *Deutschen Monistenbund* in

1906 in Jena. He himself considered his “new faith” to be a competi-

tor against Christianity: “It is obvious that the Christian worldview

must be replaced by this monistic philosophy.”252 According to

Büchner, “science must replace religion, faith in a natural and

absolute world order must substitute for belief in spirits and ghosts,

and natural morals must overcome artificial dogmas.”253 In Great

Britain, similar campaigns were supported by Huxley and Spencer.

The existence of a final cause, goal, or destiny for evolution has

been denied by many Darwinists. Not only in the past, but also

today, Darwinism is often presented as incompatible with belief in

traditional religion. Dawkins formulates this rejection rather drastically.

He claims that only “scientifically illiterate” people assume a pur-

pose in nature:

Nature is not cruel, only pitilessly indifferent. This lesson is one of the

hardest for humans to learn. We cannot accept that things might be nei-

ther good nor evil, neither cruel nor kind, but simply callous: indiffer-

ent to all suffering, lacking all purpose …. In a universe of electrons

and selfish genes, blind physical forces and genetic replication, some

people are going to get lucky, and you won’t find any rhyme or reason

in it, nor any justice. The universe that we observe has precisely the

properties we should expect if there is, at the bottom, no design, no

purpose, no evil and no good, nothing but pitiless indifference.254

According to modem meta-biology, life and finally humanity is the

“product of a blind, algorithmic process.” It has to escape the “slings

and arrows of outrageous fortune in a tough external world.”

If all biological characteristics did develop on the path of evolu-

tion, this should also be true for instincts and social behavior.

Following Herbert Spencer, Haeckel supposed human social behav-

ior to be the consequence of instincts: “Social duties … are only

highly developed forms of social instincts which are found with all

higher animals living in social groups.”255 Similar positions were

also formulated by Büchner. Haeckel applied the rule of the survival

of the fittest to human history. From the obvious lack of morality in

most historical events, he concludes that no higher moral order

exists.

In the case of the oxygen-binding ability of a myoglobin mole-

cule, it is certainly only of academic interest whether this particular

characteristic is the result of ad hoc[] self-creation or whether it

reveals the timeless properties of the chemical elements. But in the

case of social laws, this question has implications for daily life.

Whether those laws are arbitrary, mere’ conventions introduced by

powerful groups within our society to serve their particular interests,

or whether they reflect some objective, God-given order, makes a

great deal of difference. If social laws and concepts are not grounded

in a fundamental structure of nature or in some higher order, but are

arbitrary *ad hoc* creations, then “anything goes” as formulated by

the German philosopher Paul Feyerabend.256

On the one hand, social norms would then be partly based on

social instincts inherited from our predecessors. In this case, a “nat-

ural social order” would be determined by social instincts adapted

from an environment that was inhabited by human beings several

million years ago. For instance, the ability of humanity to address

the problems of racism and war is often evaluated on the basis of our

animal heritage: “Uncritical assent is given to the proposition that

human beings are incorrigibly selfish and aggressive and thus inca-

pable of erecting a social system at once progressive and peaceful,

dynamic and harmonious, a system giving free play to individual

creativity and initiative but based on cooperation and reciprocity.”257

On the other hand, the part of our norms which are not bound by

archaic patterns of behavior would be absolutely arbitrary and very

likely would serve only the interests of certain influential groups.

Then the deconstructionists would be correct in stating that any con-

cept of our world has the same level of validity. Some are not better

than others.258 Alan Sokal caricatured such a view by saying that

then even the laws of nature would be the result of social agreements

and lack objectivity.259

6.1.2 *Values based on a “complex origin.”* But what if moral val-

ues are not arbitrary? There are certainly moral values which are

constructive and others which destabilize a society. If we assume

that nature has inherent purpose, then our behavior would have

adapted at least partly to this purpose. In a reality that mirrors the

names and attributes of God, human behavior would not be confined

by the achievements of the past, but could change according to

human destiny, and could be realized during evolution. If evolution

serves a God-given destiny, evolutionary achievements not only

reflect the history of evolution but also its goals. Then our behavior

is not only determined by our animal heritage, which undoubtedly

exists, but also will adapt to our evolutionary destiny.

Does such an approach help us to formulate social concepts and

moral value systems that solve the actual problems of our time? As

proposed by the leading body of the Bahá’í Faith,260 any definitely

new insight and solution for the question of the “natural social

order” must consider traditional religious value systems. Whereas

the interactions between electrons or planets are fixed by the laws of

physics, laws of social interaction are (at least to some extent) not

fixed. They can be willfully modified and they are known to have

changed throughout history. What freedom do we have to choose

values compatible with a peaceful, progressive society? Are there

objective sources for human values? It is certainly difficult, if not

impossible, to answer such questions by scientific means. Our social

concepts, however, create facts in this real world by means of our

deeds, and in this real world we have to manage our lives. One can

at least objectively study the impact of certain values on human

behavior. For instance, what practical consequences does faith in

purpose in life have on human conduct?

Should we simply trust in our “traditional values”? This solution

may work locally, but worldwide there are too many different tradi-

tional value systems for each one to be applied to a world society.

Thus, lastly, we have to refer to some kind of trial and error, to an evo-

lutionary strategy. If social interactions are dependent on a timeless

reality, the success of a community depends on their “fitness” to fos-

ter a lively community. In this case, social laws are subject to the “sur-

vival of the fittest,” where the fitness would be set by an unknown but

objective “fitness function.” Thus, the multiple value systems which

are offered on the market of the world have to be tested to see whether

or not they serve their purpose.

According to the Bahá’í Faith, the purpose of religion is to edu-

cate humanity: “The purpose underlying the revelation of every

heavenly Book, nay, of every divinely-revealed verse, is to endue all

men with righteousness and understanding, so that peace and tran-

quillity may be firmly established amongst them.”261 Thus, reli-

gious value systems can be investigated to see whether or not they

serve their self-defined purpose.

## 6.2 *At Home in the Universe*

Teachings about the purpose and destiny of life are the central sub-

jects of virtually every religion. For instance, Bahá’u’lláh, the

prophet-founder of the Bahá’í Faith, states in his Hidden Words:

O Son of Man! Veiled in My immemorial being and in the ancient

eternity of My essence, I knew My love for thee; therefore I created

thee, have engraved on thee Mine image and revealed to thee My

beauty.

O Son of Man! I loved thy creation, hence I created thee. Wherefore,

do thou love Me, that I may name thy name and fill thy soul with the

spirit of life.262

In ‘Abdu’l-Bahá’s talks on the subject of evolution addressed to

his Western followers, he attempts to resolve the question of how

evolution can be compatible with creation and a purpose of life.

‘Abdu’l-Bahá did not address the particular mechanisms of the evo-

lution of different forms of life. As the appointed leader of the young

Bahá’í community, he recognized the tendency of Darwinism to

“leak out” to give answers to problems in cosmology and social evo-

lution as well.

According to the author of this essay, the purpose of ‘Abdu’l-

Bahá’s arguments is to show that our cosmological, biological, and

social order is not arbitrary, accidental, or trivial, but that it is based

on a potential complex order existing from the very beginning.

On the one hand, it may be impossible to detect purpose by sci-

entific means. On the other hand, our belief in the existence or

absence of a non-arbitrary purpose for our universe has huge impli-

cations for our visions of the future! If mankind has a non-trivial

destiny, we may be able overcome archaic patterns of aggressive

behavior and the destructive aspects of “social instincts” inherited

from our predecessors. The conviction of the destiny of a peaceful

future invests us with the necessary will, fortitude, and optimism to

take the required actions to establish a peaceful and progressive

society. Such “positive thinking” may be a necessary precondition to

solving the world’s problems. We are not “gypsies at the edge of the

universe.”263 We really should feel “*At Home in the Universe*.”264

The future will demonstrate whether the “meme”265 of the “selfish

gene” or the meme of “All men have been created to carry forward

an ever-advancing civilization”266 will enable humanity to create a

“progressive and peaceful, dynamic and harmonious” society.

# Notes

### Section 1: Introduction

1. M. Gell-Mann, *The Quark and the Jaguar* (New York: WH Freeman, 1994) and

C. F. von Weizsäcker, *Aufbau der Physik*, 2nd edition (München; Carl Hanser

 Verlag, 1986).

2. D. C. Dennett, *Darwin’s Dangerous Idea* (New York: Simon & Schuster, 1995).

3. E. Mayr, *One Long Argument* (Cambridge: Harvard University Press, 1991).

4. R. Dawkins, *The Selfish Gene*, new edition (Oxford: Oxford University Press,

 1989), p. 1.

5. C. Darwin, *The Origin of Species* (London: Penguin Books, 1985).

6. R. Dawkins, *The Blind Watchmaker* (London: Longmans, 1986) and E. Mayr

 (1991).

7. Mayr, *One Long Argument*, p. 68.

8. Dawkins, *The Blind Watchmaker*, p. 287.

9. W. Howells, *Getting Here: The Story of Human Evolution* (Washington:

 Compass Press, 1993) p. 4.

10. E. Mayr, *The Growth of Biological Thought* (Cambridge: Harvard University

 Press, 1982) p. 626.

11. T. Beardsley, “Darwin Denied: Opponents of Evolution Make Gains in

 Schools,” *Scientific American*, vol. 273, no. 1 (1995) pp. 12-14.

12. For details see Keven Brown’s accompanying essay: ‘Abdu’l-Bahá’s Response

 to Darwinism: Its Historical and Philosophical Context.

13. The origin of these talks in Palestine is described in the foreword of the book

 *Some Answered Questions*: “The talks between ‘Abdu’l-Bahá and Laura

 Clifford Barney took place during the difficult years, 1904–1906, when he was

 confined to the city of ‘Akká by the Turkish government and permitted to

 receive only a few visitors. At the time he was under constant threat of removal

 to a distant desert confinement. As interlocutor, Miss Barney arranged for one

 of ‘Abdu’l-Bahá’s sons-in-law, or for one of the three distinguished Persians of

 his secretariat of that period, to be present during the talks to ensure accuracy in

 recording his replies to the questions asked him. ‘Abdul-Bahá later read the

 transcriptions, sometimes changing a word or a line with his reed pen. They

 were later translated into English by Miss Barney. The original Persian texts are

 today a part of the Bahá’í archives of Haifa.” (From the publisher’s foreword to

 the 1964 edition) Miss Barney published these talks under the title *Some*

 *Answered Questions* (hereafter cited as *SAQ*).

14. During his visit to the United States in 1912, ‘Abdu’l-Bahá gave public talks

 on many occasions. Many talks were recorded in Persian and in English. They

 were published under the title *The Promulgation of Universal Peace* (cited

 below as *PUP*) in English and as *Khatábat-i Ḥaḍrat-i ‘Abdu’l-Bahá* in Persian.

15. J. Hatcher and W. Hatcher, *The Law of Love Enshrined* (Oxford: George

 Ronald, 1996).

16. L. Büchner, *Kraft und Stoff*, 21st edition (Leipzig: Theodor Thomas, 1904).

17. L. Büchner, *Sechs Vorlesungen über die Darwin’sche Theorie von der*

 *Verwandlung der Arten and die erste Enstehung der Organismenwelt*, 2nd edi-

 tion (Leipzig: Theodore Thomas, 1868).

18. E. Haeckel, *Die Welträtsel*, 11th Edition (Stuttgart: Kröner, 1984).

19. Ibid., p. 30.

20. Ibid., p. 29.

21. Ibid., p. 366.

22. Ibid., p. 480.

23. Ibid., p. 507.

24. J. E. Esslemont, *Baha’u’llah and the New Era* (Wilmette: Bahá’í Publishing

 Trust, 1980).

25. A. Khursheed, *Science and Religion: Towards the Restoration of an Ancient*

 *Harmony* (London: Oneworld Publications, 1987).

26. B. H. Conow, *The Bahá’í Teachings: A Resurgent Model of the Universe*

 (Oxford: George Ronald, 1990).

27. J. Savi, *The Eternal Quest for God* (Oxford: George Ronald, 1989).

28. C. Loehle, “On Human Origins: A Bahá’í Perspective,” *The Journal of Bahá’í*

 *Studies*, vol. 2, no. 4 (1990), pp. 67–73 and C. Loehle, *On the Shoulders of*

 *Giants* (Oxford: George Ronald, 1994).

29. A. Abizadeh, “Commentary to Craig Loehle Article,” *The Journal of Bahá’í*

 *Studies*, vol. 3, no. 1 (1990) pp. 45–58; I. Ayman, “Response to Commentary on

 ‘On Human Origins’,” *The Journal of Bahá’í Studies*, vol. 5, no. 2 (1992) pp.

 67–71; K. Brown, “Response to Commentary on ‘On Human Origins’,” *The*

 *Journal of Bahá’í Studies*, vol. 5, no. 4 (1994) pp. 59–62; J. S. Hatcher,

 “Response to Commentary on ‘On Human Origins’,” *The Journal of Bahá’í*

 *Studies*, vol. 5, no. 2 (1992) pp. 60–66; C. Loehle, “Response to, Commentary

 on ‘On Human Origins’,” *The Journal of Bahá’í Studies*, vol. 5, no. 2 (1992)

 pp. 72–76.

30. Keven Brown, “Response to Commentary on ‘On Human Origins,’“ *The*

 *Journal of Bahá’í Studies*, vol. 5, no. 4 (1994) pp. 59–62.

31. W. S. Hatcher, “A Scientific Proof of the Existence of God,” *The Journal of*

 *Bahá’í Studies*, vol. 5, no. 4 (1993) pp. 1–16, and Hatcher (1996).

32. Esslemont, *Bahá’u’lláh and the New Era*, p. 206.

33. Khursheed, *Science and Religion*, p. 91.

34. Conow, *A Resurgent Model of the Universe*, pp. 59–60.

### Section 2: “Species” and “evolution” in Occidentalbiology

35. Mayr, *Growth of Biological Thought*, p. 38.

36. Ibid., pp. 305–106.

37. Qtd. in Mayr, *Growth of Biological Thought*, p. 141.

38. Although Hume in 1779, criticized the design argument, he could provide no

 mechanism for the generation of the diverse order of life. (See Dennett,

 *Darwin’s Dangerous Idea* or E. Sober, *Philosophy of Biology* (Oxford: Oxford

 University Press, 1993) But without such a mechanism the design argument

 remains valid, since the existence of complex order requires an explanation. R.

 Dawkins states in *The Blind Watchmaker*: “But what Hume did was criticize the

 logic of using apparent design in nature as positive evidence for the existence of

 God. He did not offer any alternative explanation for apparent design, but left

 this question open.”

39. Many chemists assume that the chemical characteristics of a particular mole-

 cule are entirely determined by the laws of quantum mechanics, e.g., the

 Schrödinger equation. (See for instance P. Dirac, “Quantum Mechanics of

 Many-Electron Systems,” *Proc. Roy. Soc. London, series A*, vol. 123 [1929] pp. 714–733)

 Whenever this molecule is formed, it shows exactly the same physical and

 chemical properties. This means that in chemistry one assumes a time-invariant

 reality in the form of quantum mechanical laws that define “chemistry” inde-

 pendently of actually existing molecules. Consequently, the properties of a mol-

 ecule potentially exist even before it appears in this universe for the first time.

40. W. Heisenberg, *Das Teil and das Ganze* (München: Piper, 1969), and F. Hund,

 *Geschichte der physikalischen Begriffe: Die Entstehung des mechanischen*

 *Naturbildes*, vols. 543, 544 (Mannheim: Bibliographisches Institut, 1978).

41. I. Prigogine, *Vom Sein zum Werden* (München: Piper, 1979). I. Prigogine and

 I. Stengers, *Dialog mit der Natur* (München: Piper, 1981).

42. P. Holmes, “Poincaré, celestial mechanics, dynamical-systems theory and

 ‘chaos’,” *Physics Reports*, vol. 193, no. 3 (1990) pp. 137–163.

43. Quotd in Mayr, *Growth of Biological Thought*, p. 305.

44. Ibid., p. 865.

45. Ibid., p. 257.

46. Ibid., p. 261

47. Ibid., p. 260; the text in square brackets is added by the author.

48. Mayr, *Growth of Biological Thought*, p. 404.

49. Mayr, *One Long Argument*, p. 42.

50. Mayr, *Growth of Biological Thought*, p. 310.

51. These natural laws were considered to be secondary causes. The Creator him-

 self was the Primary Cause, but by means of the secondary causes He was

 believed to rule the world. The mechanization of the world culminated in the

 concept of Laplace, that the world started a long time ago and is now following

 its world trajectory like clockwork as predicted by Newton’s laws.

52. Mayr, *Growth of Biological Thought*, p. 104 ff.

53. Ibid., p. 115. Helmholtz studied medicine as well as physics and mathematics.

 He made important contributions to physics, chemistry, and medicine. In 1847

 he wrote his famous treatise about the conservation of energy. Three years later,

 he measured the velocity of neuronal excitation along nerve fibers. He therefore

 showed that the neurons work by material means and do not require some spe-

 cial vital substance for their functioning.

54. Büchner, *Kraft und Stoff*.

55. E. Haeckel, *Anthropogenie oder Entwicklungsgeschichte des Menschen*, vol. 2

 (Leipzig: Wilhelm Engelmann, 1891) p. 851 ff.

56. Haeckel, *Die Welträtsel*, p. 27.

57. At a naturalist’s meeting in Göttingen in 1854, the Swiss physiologist Jacob

 Moleschott explained that the brain secretes thoughts, as the kidneys secrete

 urine. This statement provoked a comment from the philosopher Hermann

 Lotze: “Listening to colleague Moleschott, one gets the impression that he is

 right” (E. Bloch, *Das Materialismusproblem, seine Geschichte and Substanz*,

 vol. 7 [Frankfurt a.M.: 1972] p. 289.)

58. Kraft, *Der Wiener Kreis: Der Ursprung des Neopositivismus* (Wien: Springer

 Verlag, 1968).

59. Mayr, *Growth of Biological Thought*, p. 528.

60. Qtd. in Mayr, *Growth of Biological Thought*, p. 353.

61. Today Lamark is mostly known for his assumption that learned characteristics

 can be inherited. This idea does not go back to Lamark, but is was generally

 accepted by the scientists of his time. Darwin and Haeckel, also believed in the

 inheritance of acquired characteristics. See for instance E. Mayr, “Evolution,”

 *Scientific American*, vol. 239, no. 3 (1978) pp. 46–55.

62. Qtd. in Mayr, *Growth of Biological Thought*, p. 529.

63. T. de Chardin, *Le Phénomène humain* (Paris: Edition du Leuil, 1947).

64. Mayr, *One Long Argument*, p. 67.

65. S. J. Gould, “The Evolution of Life on the Earth,” *Scientific American*, vol.

 271, no. 4 (1994) pp. 85–91.

66. T. Dobzhansky, F. J. Ayala, G. L. Stebbins, and J. W. Valentine, *Evolution* (San

 Francisco, 1977).

67. L. E. Orgel, “The Origin Of Life on the Earth,” *Scientific American*, vol. 271,

 no. 4 (1994) pp. 77–83.

68. M. Eigen, *Steps Towards Life: A Perspective of Evolution* (Oxford: Oxford

 University Press, 1992), and Orgel (1994).

69. Gould, “The Evolution of Life on the Earth,” *Scientific American*, vol. 271, no. 4

 (1994).

70. Alberts, et al., *Molecular Biology of the Cell*.

71. The probability for replication errors in RNA viruses is approximately a single

 error per gene and copy. In the case of DNA viruses and higher organisms, it is

 in the order of one error in 1000 genes. (See M. Eigen, “The origin of genetic

 information: viruses as models,” *Gene*, vol. 135, no. 1–2 (1993) pp. 37–47; and

 M. Eigen, “Viral quasispecies,” *Scientific American*, vol. 269, no. 1 (1993) pp.

 42–49.

72. Alberts, et al., *Molecular Biology of the Cell*.

73. Mayr, *Growth of Biological Thought*, p. 591.

74. Dawkins, *The Blind Watchmaker*, p. 43.

75. The huge effect of cumulative selection can be illustrated by throwing dice to

 get the six 100 times. On the one hand, if I take 100 dice and try to get all 100

 dice to show a six on a single throw of all 100 dice, on the average I would have

 to throw 6100~7 \* 1077 times until all dice show a six. If I threw the hundred

 dice every second from the time the universe began with the Big Bang, this

 would not be sufficient to get the requested result even once. On the other hand,

 if I take each die of the hundred dice individually, throw it until it shows a six

 and keep it then, I would have to perform about 600 throws. In the first case it

 was an all or none selection. Only if all hundred dice would show the six in a

 single throw, would it be selected. In the second case, the sixes were sampled

 cumulatively, one six was accepted after the other. Although this is not a good

 example to show the evolution of complex biological order, it clearly shows the

 huge distinction between “all and none” and cumulative selection.

76. Neo-Darwinistic evolution requires the mutation rate, that is, the number of

 mutations per generation, to obey certain limits. If it is too large, the genetic

 information defining a species will be lost within a few generations. If it is too

 small, only the locally fittest sequence of a given species will survive, but there

 will be no further progress. At the optimal mutation rate, not only the locally

 fittest sequence does survive, but also a large number of closely related ones.

 This set of sequences forms the so-called quasi species (Eigen, 1993). Another

 important property is that the sequence path between different but closely relat-

 ed species must not be too long. The probability to progress in the sequence

 space to increasingly complex biological forms of life must be considerably

 above zero. The requirements of the fitness landscape to favor the progress of

 evolution in the sequence space are studied by S. Kauffman, *At Home in the*

 *Universe* (New York: Oxford University Press, 1995). It is shown from first

 principles that evolution would be impossible if the fitness-sequence relation

 were quasi-random.

77. There exist two types of cellular organization: the primitive prokaryonts and

 the more complex eukaryonts. Prokaryonts contain no nucleus. In eukaryontic

 cells the DNA is packed into the cell nucleus. (Alberts, et al. [ 1989]; C. de

 Duve, “The birth of complex cells,” *Scientific American*, vol. 274, no. 4 [ 1996]

 pp. 50–57.) The eukaryonts are assumed to have organized by means of the

 fusion of prokaryonts. There still exist some relicts of these ancient precursors.

 Some organelles, such as the mitochondria, until today have their own DNA.

 All higher taxa, plants and animals, are formed by eukaryont cells. The agree-

 ment in the complex organization of all eukaryontic cells is understood to indi-

 cate that all eukaryontic taxa originate from a small group of eukaryontic cells.

78. C. G. Sibley, J. A. Comstock, and J. E. Ahlquist, “DNA hybridization evidence

 of hominoid phylogeny: a reanalysis of the data,” *Journal of Molecular*

 *Evolution*, vol. 30, no. 3 (1990) pp. 202–236.

79. Mitochondria are organelles, the “organs” of the cells, which produce energy

 rich molecules designated as ATP (adenosine triphosphate). This chemical ener-

 gy stored in those molecules is degraded in many energy demanding processes

 inside the cells, such as copying DNA or contracting muscle fibers. Those mito-

 chondria have their own DNA. Because mitochondria lack the sophisticated

 proofreading machinery of its host cell, the mutation rate of mitochondrial DNA

 is large compared to the mutation rate of the host’s DNA. Recently mitochon-

 drial DNA has been used to estimate the biological relationship between

 humans around the world (A. C. Wilson, and R. L. Cann, “The recent African

 genesis of humans,” *Scientific American*, vol. 266, no. 4 [ 1992] pp. 68–73.)

 According to this study modern Homo Sapiens originated about 200,000 years

 ago in Africa.

80. Dawkins, *The Blind Watchmaker*; Dayhoff, “Computer Analysis of Protein

 Evolution,” *Scientific American*, July (1969) pp. 86–95; and Eigen, Steps

 Towards Life.

81. Dopazo, et al., 1993; Eigen 1993.

82. Mayr, *One Long Argument*.

83. Mayr, *Growth of Biological Thought*, p. 271; text in brackets added by the

 author.

84. Ibid., p. 69.

85. The phenomena of the aging of materials and the behavior of non-equilibrium

 dynamic systems, however, require us to introduce history into physics and

 chemistry. Only recently have those subjects obtained specific interest in

 physics and chemistry. (Gell-Mann [ 1994], Land [1991], Prigogine [ 1979],

 Prigogine and Stengers [1981], or R. Ruthen, “Trends in nonlinear dynamics.

 Adapting to complexity,” *Scientific American*, vol. 268, no. 1 [1993] pp. 110–

 117.

86. Mayr, *Growth of Biological Thought*, pp. 69–70.

87. Ibid. p. 46.

88. Ibid. p. 263.

89. Ibid., p. 3 63 ff.

### Section 3: The origin of complex order in ouruniverse

90. R. Dawkins, *The Blind Watchmaker*.

91. William Paley was one of the British theologians and naturalists who saw in

 the wonders of nature, and particularly biology, the best proofs of the existence

 of God. In 1805 Paley published his famous book *Natural Theology*. It contains

 several proofs for the existence of God using the argument by design. Those

 proofs were based on the complexity and adaptedness of life. For instance, he

 elaborated the watchmaker argument: Just as the existence of a well-designed

 watch proves the existence of a watchmaker, the existence of the well-adapted

 biosphere proves the existence of an intelligent designer. See E. Sober,

 *Philosophy of Biology* (Oxford: Oxford University Press, 1993) for a discus-

 sion.

92. K. Ward, *God, Chance and Necessity* (Oxford: Oneworld, 1996).

93. Dawkins, *The Blind Watchmaker*, p. xii.

94. For instance, the Grand Unification Theory in high energy physics described

 by M. Gell-Mann, *The Quark and the Jaguar*.

95. Bahá’u’lláh, *Tablets of Bahá’u’lláh Revealed after the Kitáb-i-Aqdas* (Haifa:

 Bahá’í World Centre, 1982) p. 142.

96. ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, p. 307.

97. In modern physics, the second law of thermodynamics states that locally

 entropy (that is, disorder) is always generated but never destroyed. A decrease

 of entropy in a small volume element can be obtained by a free energy influx,

 which corresponds to an influx of “negative entropy,” equivalent to an outflow

 of entropy. Systems which exchange energy with their environment are called

 open systems. The planet earth is such an open system. Light from the sun enters

 the geosphere, and the surplus of energy is reemitted into the universe in form

 of thermal radiation. The resulting free energy difference drives non-equilibri-

 um processes, such as weather, and provides our planet with the necessary

 means to develop life. Thus, the second law of thermodynamics does not con-

 tradict evolution; it defines necessary conditions for the development of com-

 plex biological order.

98. Dawkins, *The Blind Watchmaker*, pp. 7 and 9.

99. ‘Abdu’l-Bahá, “Tablet to Forel,” in John Vader, *For the Good of Mankind:*

 *August Forel and the Bahá’í Faith* (Oxford: George Ronald, 1984) p. 78.

100. E. Haeckel, *Die Welträtsel*, 11th edition, p. 308.

101. Ibid., p. 301.

102. L. Büchner, *Kraft und Stoff*, 21st edition, p. 11.

103. E. Haeckel, *Die Welträtsel*, p. 281.

104. P. W. Atkins, *The Creation* (Oxford: Freeman & Company Limited, 1981).

105. J. A. Wheeler, “Information, Physics, Quantum: the Search for Links,” in

 *Proceeding of the 3rd International Symposium on the Foundation of Quantum*

 *Mechanics*, (Tokyo: 1989) pp. 354–368

106. Here Wheeler’s (1989) idea is simplified. But the argument also holds for the

 more complex form of the idea proposed by Wheeler.

107. If the understanding of the left-hand side zero takes several years of dedicat-

 ed studies of theoretical physics, such a zero is also certainly not trivial, and not

 self evident.

108. Dennett, *Darwin’s Dangerous Idea*, p. 63, emphasis by Dennett.

109. Ibid, p. 184, emphasis by Dennett.

110. The chemistry of different galaxies can be studied by means of the optical

 spectra of atoms and molecules. If the chemical laws were different in distant

 galaxies, which also means earlier galaxies due to the limited speed of light, one

 would expect to find absorption and excitation spectra different from those we

 find today. But according to scientific studies, the chemistry is the same within

 the known universe.

111. Dawkins, *The Blind Watchmaker*, p. 317.

112. E. Mayr, *One Long Argument*, pp. 86–87.

113. If oil is continually heated from below, a hexagonal pattern of convection

 cells appears (I. Prigogine, *Vom Sein zum Werden* [München: Piper, 1979]). In

 this particular case, the order is maintained by energy dissipation.

114. E. Mayr, *Growth of Biological Thought*, p. 63.

115. Monod, *Le Hasard et la Nécessité*, pp. 129–130.

116. As shown by modern mathematics (D. Hofstadter, Gödel Escher Bach (New

York: Basic Books, 1979), the randomness of a sequence of numbers or char-

acters cannot be proven. Good counter examples are pseudo random number

generators. Although the numbers of good generators fulfill nearly every test for

randomness, they are completely deterministic, reproducible, and therefore not

random. This means that Monod’s argument is not well founded because the

apparent randomness of DNA sequences does not prove their actual random-

ness.

117. Monod, *Le Hasard et la Nécessité*, pp. 111–112.

118. Ibid., pp. 160–161.

119. Dawkins, *The Blind Watchmaker*, p. 317.

120. A small protein may consist in 130 of its building blocks, the amino acids.

 There are twenty different naturally occurring amino acids. The number of all

 possible sequences (20130~10170) of this small protein with 130 amino acids

 exceeds by orders of magnitude the estimated number of neutrons in our uni-

 verse or its estimated age given in seconds (C. F. von Weizsäcker, *Aufbau der*

 *Physik* 2nd edition (München: Carl Hanser Verlag, 1986). Because changes in

 the sequence often result in the complete loss of the function of the protein, it is

 not likely that even a single small protein endowed with a highly specific and

 efficient function was generated by pure chance during the existence of the uni-

 verse. The probability of creating a complete organism by accident is again

 many, many orders of magnitude lower than the probability of forming a sim-

 ple protein. Using such probabilistic arguments the accidental existence of life

 can be practically excluded.

121. In principle, self-creative evolution would make the current interpretation of

 fossil findings doubtful. These interpretations ground on the assumption that the

 physical, chemical, and biological laws and principles we know today apply in

 exactly the same way to those ancient forms of life. Self-creative evolution,

 however, assumes the *ad hoc* creation of essentially new characteristics.

122. K. R. Popper, *Objective Knowledge* (Oxford: The Clarendon Press, 1972).

123. Ward (1996) argues similarly: “To say that such a very complex and well-

 ordered universe comes into being without any cause or reason is equivalent to

 throwing one’s hands up in the air and just saying that anything at all might hap-

 pen, that it is hardly worth bothering to look for reasons at all. And that is the

 death of science.”

124. Dawkins, *The Blind Watchmaker*, pp. 41 and 49.

125. Ibid, p. xvi.

126. Ibid, p. 62.

127. Ward, *God, Chance and Necessity*, p. 18.

128. S. Kauffman, *At Home in the Universe*.

129. Dennett, *Darwin’s Dangerous Idea*, p. 47.

130. Ibid, p. 59.

131. The “algorithmic complexity” (AC) of a given sequence of symbols is the

 length (number of bits) of the shortest possible algorithm, the shortest possible

 text of computer code to produce this sequence. In the worst case, the AC of a

 particular sequence is determined by the length of this sequence as it is, plus the

 necessary commands to print it. But often the AC is much smaller than the

 length of a given sequence. For instance, a sequence consisting in the character

 ‘a’ repeated one million times can be produced by a loop that repeats 1,000,000

 times the command to print ‘a.’ Thus, the, AC measures the internal complexi-

 ty of a sequence of symbols. It is “simple” if it can be compressed to a short text

 of code.

132. Of course, one can reject Kolmogorov’s algorithmic complexity as a reason-

 able measure for biological complexity. But one would have to present a “more

 reasonable” definition for it. Without such a definition, Dennett’s claim that his

 evolution algorithm explains biological complexity by a simple algorithm

 becomes meaningless.

133. It is obvious that mankind has produced sequences of symbols, for instance

 books, of large algorithmic complexity. Consequently, such books can be pro-

 duced only by algorithms with a large AC, but not by those with a small AC. If

 the evolution of the biosphere is the product of an algorithm, the AC of this

 algorithm cannot be smaller than the AC of its product, that is, natural DNA

 sequences and the artifacts of human culture. This conclusion follows directly

 from the definition of AC. Consequently, the AC of the evolution algorithm

 must exceed the AC of any natural or human product. Some human products are

 considered to have a high AC; therefore, the evolution algorithm cannot be sim-

 ple. According to Dawkins (1986), assuming a complex origin is not an expla-

 nation for the evolution of life: “To explain the origin of the DNA/protein

 machine by invoking a supernatural Designer is to explain precisely nothing, for

 it leaves unexplained the origin of the Designer.” Taking Dawkins by his own

 word implies that the assumption of an evolution algorithm does not explain the

 existence of a complex biosphere, because it was shown above that this algo-

 rithm cannot be of “primeval simplicity.” The problem of the origin of complex

 life was merely shifted to the question of the origin of the algorithmically com-

 plex evolution algorithm.

134. A well-known example is the Bénard instability of oil when heated from

 below (Prigogine (1979); I. Prigogine, and I. Stengers, *Dialog mit der Natur*

 (München: Piper, 1981). Beyond a certain temperature gradient, the oil forms

 hexagonally ordered convection cells. Probably no one would claim that the

 Bénard instability was created during its discovery and did not potentially exist

 before in the laws of fluid dynamics.

135. Dawkins, *The Blind Watchmaker*, p. 73.

136. S. Spiegelman, “An in vitro analysis of a replicating molecule,” *American*

 *Scientist*, vol. 55 (1967) 63–68.

137. A herd of monkeys hammering on typewriters, or computers producing ran-

 dom sequences of characters, would (given enough time) produce sonnets of

 Shakespeare, Einstein’s general relativity, etc. They would, however, be unable

 to select such excellent pieces of work out of the remaining garbage. Thus the

 difficult step is not to produce a wide range of variability but to find the needles

 in the haystack.

138. Selection can be compared with learning. Nobody can understand mathemat-

 ics by eliminating non-mathematical thoughts, but only by learning mathemat-

 ics. A removal of non-mathematical ways of thinking is, of course, necessary,

 but certainly by no means sufficient for the education of a good mathematician.

139. J. Hatcher, and W. Hatcher, *The Law of Love Enshrined* (Oxford: George

 Ronald, 1996).

### Section 4: Top-down evolution: assuming avoluntary origin

140. ‘Abdu’l-Bahá, “Letter to Forel,” in *For the Good of Mankind, August Forel*

 *& the Bahá’í Faith*, ed. by J. P. Vader, (Oxford: George Ronald, 1984) p. 75.

141. S. J. Gould, “The evolution of life on the earth,” *Scientific American*, vol.

 271, no. 4 (1994) pp. 85–91.

142. S. Kauffman, *At Home in the Universe* (New York: Oxford University Press,

 1995) and “Climbing Mount Improbable: Richard Dawkins,” *Nature*, vol. 382,

 no. 6589 (1996) pp. 309–310.

143. W. S. Hatcher gives a careful formal analysis of Aristotle’s proof of the exis-

 tence of God in *Logic and Logos* (Oxford: George Ronald, 1990) and J. Hatcher

 and W. Hatcher, *The Law of Love Enshrined* (Oxford: George Ronald, 1996).

144. ‘Abdu’l-Bahá, “Letter to Forel,” p. 76.

145. See, for instance, D. Hofstadter, *Gödel Escher Bach* (New York: Basic Books,

 1979).

146: For a discussion of this argument, see R. Dawkins, *The Blind Watchmaker*,

 and E. Sober, *Philosophy of Biology*.

147. In *The Blind Watchmaker* Dawkins states: “But of course any God capable of

 intelligently designing something as complex as the DNA/protein replicating

 machine must have been at least as complex and organized as that machine

 itself. Far more so if we suppose him additionally capable of such advanced

 functions as listening to prayers and forgiving sins. To explain the origin of the

 DNA/protein machine by invoking a supernatural Designer is to explain pre-

 cisely nothing, for it leaves unexplained the origin of the Designer.”

148. Bahá’u’lláh, *Gleanings from the Writings of Bahá’u’lláh* (Wilmette: Bahá’í

 Publishing Trust, 1971) pp. 61,63.

149. Ibid., p. 184.

150. Ibid., p. 65.

151. ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, pp. 462–463.

152. See also B. H. Conow, *The Bahá’í Teachings: A Resurgent Model of the*

 *Universe* (Oxford: George Ronald, 1990).

153. ‘Abdu’l-Bahá, “Letter to Forel,” pp. 71–72. A similar and more detailed

 description of the hierarchical structure of the kingdoms of nature can be found

 in ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, p. 258.

154. Ibid., p. 73.

155. In an e-mail group Juan Cole posted: “‘Abdu’l-Bahá accepts an essentially

 Aristotelian notion of a hierarchy of types of soul, where soul really means a set

 of abilities or faculties. Thus, plants have a vegetative soul, which is equivalent

 to the faculty of growth/reproduction. Animals have an animal soul which is

 equivalent to the faculty of deliberate movement. Humans have a rational soul,

 which is equivalent to the faculty of rational thinking. These ‘souls’ or capaci-

 ties are seen to exist apart from matter, perhaps in the World of Forms, but are

 ‘attracted’ by matter when it is arranged in a certain way.” (cited with permis-

 sion of the author)

156. ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, p. 285; see also p. 350.

 Conow, in *A Resurgent Model of the Universe*, describes the journey of the

 atoms through the kingdoms.

157. In nonrelativistic mechanics formulated by Newton, mass points were the

 central objects of consideration, and kinetic and potential energy were certain

 characteristics of these mass points. Einstein reversed this relation. Energy

 became the central entity, and matter one possible form of energy. Today, infor-

 mation is considered to be a form of matter. But according to the expectations

 of J. A. Wheeler (“Information, Physics, Quantum: the Search for Links,” in

 *Proceeding of the 3rd International Symposium on the Foundation of Quantum*

 *Mechanics*, (Tokyo: 1989) 354–368 and C. F. von Weizsäcker (*Aufbau der*

 *Physik* 2nd edition (München: Carl Hauser Verlag, 1986) one can consider an

 analogous reformulation of physics similar to the transformation from nonrela-

 tivistic to relativistic physics: information may become the fundamental entity

 of our universe, its substance; and energy and matter only particular aspects of

 it, its forms.

158. It is well known that physical theories generally have a limited range of appli-

 cability. For instance, Newton’s mechanics apply if the velocities of the mass

 points are small compared to the speed of light, if the considered length scale is

 small compared to cosmological dimensions but large compared to the de

 Boglie wavelength of ordinary electrons, etc. Analogously, in a hierarchical

 order of nature, certain types of characteristics may only be detectable in suffi-

 ciently complex systems, but not necessarily at the atomic or molecular level.

159. E. Mayr, *Growth of Biological Thought*, p. 131.

160. ‘Abdu’l-Bahá, *Some Answered Questions*, p. 201.

161. W. S. Hatcher, “A Scientific Proof of the Existence of God,” *The Journal of*

 *Bahá’í Studies*, vol. 5, no. 4 (1993) pp. 1–16; and Hatcher, *Law of Love*

 *Enshrined*.

162. Hatcher, *Law of Love Enshrined*, p. 54.

163. Hatcher, “A Scientific Proof of the Existence of God,” *The Journal of Bahá’í*

 *Studies*, vol. 5, no. 4 (1993) p. 12.

164. Ibid, p. 13.

165. Ibid.

166. G. Dicks, “Comment on ‘A Scientific Proof of the Existence of God’,” *The*

 *Journal of Bahá’í Studies*, vol. 6, no. 3 (1994) pp. 75–80.

167. W. S. Hatcher, “Reply to Gordon Dicks’ comment on ‘A Scientific Proof of the

 Existence of God’,” *The Journal of Bahá’í Studies*, vol. 6, no. 3 (1994) pp. 81–85.

168. ‘Abdu’l-Bahá, “Letter to Forel,” p. 75.

169. Hatcher, *Law of Love Enshrined*, p. 13.

170. During the nineteenth century chance was not considered to be important for

 evolution. Ludwig Büchner explicitly denies the existence of chance in the

 process of the development of life: “… but chance … does not exist in nature,

 where at last everything occurs in a natural, necessary way” (*Kraft und Stoff*,

 21st edition [Leipzig: Theodor Thomas, 1904] p. 112) Consequently, Büchner

 as well as Haeckel based evolution entirely on necessary causes.

171. Büchner, *Kraft und Stoff*, p. 84.

172. In principle, Hatcher assumes in his argument rejecting neo-Darwinism that

 there exists only a weak correlation between DNA sequences, the genotypes,

 and the fitness of their respective phenotypes by assuming only “sparse”

 improving mutations. He assumes that the fitness values are more or less ran-

 domly scattered through the sequence space. And, indeed, for such a sequence-

 fitness relation, evolution would be by far too slow, if not impossible. Of course,

 the possibility of progressive evolution in a fitness landscape is not trivial and

 is subject to intensive mathematical studies. (M. Eigen, *Steps towards Life—A*

 *perspective of evolution* (Oxford: Oxford University Press, 1992); Kauffman

 (1995); I. Prigogine, *Vom Sein zum Werden* (Munchen: Piper, 1979); I.

 Prigogine and I. Stengers, *Dialog mit der Natur* (Munchen: Piper, 1981); R.

 Ruthen, “Trends in nonlinear dynamics. Adapting to complexity,” *Scientific*

 *American*, vol. 268, no. 1 (1993) pp. 110–117). Evolution models can account

 only for the known fossil records if there exists a sufficiently strong sequence-

 fitness relation (Kauffman [ 1996])

 Estimates of the possible speed of evolution have an analogy in the protein

 folding problem. The a priori probability of obtaining a correctly folded protein

 by searching through all possible states is much too low for even fairly small pro-

 teins to fold within reasonable times (C. B. Anfinsen, “Principles that Govern the

 Folding of Protein Chains,” *Science*, vol. 181, no. 49096 [1973] 223–230). A

 small water soluble protein has typically 130 amino acids. If for simplicity we

 assume four different conformations for each monomer, that total protein has

 about 4130~1080 different possible conformations. If during the folding process

 the protein would have to find its native conformation by purely random search,

 on the average, it would need 1,060 years if it tries one conformation per pico sec-

 ond. Because it is known that those proteins fold within seconds or hours, in prac-

 tice, the protein appears to search roughly 1017 conformations instead of 1080

 ones. The folding pathway of the protein is determined by the free energy of each

 of the possible states. Only if this free energy landscape satisfies certain require-

 ments and prevents the protein from searching the complete conformational space

 during folding is protein folding possible. (R. L. Baldwin, “Pieces Of the folding

 puzzle,” *Nature*, vol. 346 [1990] 409–410) Thus, the folding of the protein is not

 purely random, but is conformational free energy is encoded in the particular

 amino acids sequence; it enforces adoption of those conformations which lead to

 rapid folding. In a similar way, a high sequence-fitness correlation would help for

 fast evolution. Consequently, the possibility of neo-Darwinism as a horizontal

 evolution model cannot be excluded a priori by mean as a simple probability argu-

 ment.

173. Hatcher, *Law of Love Enshrined*, p. 14.

174. Loehle, *On the Shoulders of Giants*, p. 110.

175. K. Ward, *God, Chance and Necessity* (Oxford: Oneworld, 1996) pp. 132–133.

176. Ibid., p. 183.

177. Bahá’u’lláh, *Gleanings from the Writings of Bahá’u’lláh*, p. 68.

178. Monod, *Le Hasard et la Nécessité*, pp. 111–112.

179. Ibid., pp. 187–188.

180. Dawkins, *The Blind Watchmaker*, p. 50.

181. Gödel proved that the randomness of a sequence of numbers cannot be ascer-

 tained. Perfect pseudo random number generators, for instance, are purely

 deterministic, even if they meet nearly every test for randomness.

182. If one puts crystalline sugar in a glass of tea, the sugar dissolves and after

 some time it becomes distributed all over the volume of the tea in the glass. On

 average, the sugar performs a directed motion, from the bottom to the middle of

 the glass. If one would follow the path of a single sugar molecule, however, one

 would detect a random Brownian motion. The molecule would go up and down

 without preference to any direction. Only when looking at the average motion

 of many molecules can a directionality of the sugar motion be seen.

183. Bahá’u’lláh, *Gleanings*, p. 4.

### Section 5: Evolution and the originality of species

184. See Keven Brown’s essay.

185. Bahá’u’lláh, *Gleanings*, pp. 79–80.

186. Mírzá Abu’l-Faḍl Gulpáygání, *Miracles and Metaphors* (Los Angeles:

 Kalimát Press, 1981) p. 9.

187. ‘Abdu’l-Bahá, *Some Answered Questions*, p. 177, cited below as *SAQ*.

188. *SAQ* p. 191; provisional revised translation by Keven Brown.

189. Ibid.

190. Ibid., pp. 191–192.

191. E. Mayr, *Growth of Biological Thought*, p. 363.

192. *SAQ*, pp. 177–178; provisional revised translation by Keven Brown.

193. Ibid., p. 196; see also ‘Abdul-Babá, “Letter to Forel,” pp. 74, 77.

194. *SAQ*, p. 179; provisional revised translation by Keven Brown.

195. Ibid.

196. Ibid.

197. *SAQ*, p. 181; provisional revised translation by Keven Brown.

198. Some pre-Darwinian approaches to evolution, which Mayr does not consider

 to represent “real” evolution, because they are still based on an essentialistic

 species concept, assumed saltations or “mutations” in the species essence, thus

 the appearance of a new species is accompanied by the creation of a new species

 essence. Maupertius in 1756 proposed the following concept of speciation:

 “Could we not explain in this way how from only two individuals the multipli-

 cation of the most various species could have resulted? Their first origin would

 have been due simply to some chance production, in which the elementary par-

 ticles would not have kept the order which they had in the paternal and mater-

 nal animals: each degree of error would have made a new species; and by

 repeated deviations the infinite diversity of animals which we know today

 would have been produced.” (Mayr, *Growth of Biological Thought*, 403.)

199. According to Mayr (*The Growth of Biological Thought*, p. 305), during the

 nineteenth century, the harmonious universe argument was considered one of

 several strong arguments against Darwinism that for a long time hindered the

 invention of evolution theories: “The second was the concept of an animate cos-

 mos, a living, harmonious whole, which made it so difficult in later periods to

 explain how evolution could have taken place, because any change would dis-

 turb the harmony.”

200. *SAQ*, p. 233; provisional revised translation by Keven Brown.

201. ‘Abdu’l-Bahá, *Selections from the Writings*, p. 157.

202. Bahá’u’lláh, *Tablets*, p. 140.

203. ‘Abdu’l-Bahá, *Má’idiy-i Ásmání*, vol. 2, p. 68; provisional translation by

 Keven Brown.

204. *SAQ*, p. 181; provisional revised translation by Keven Brown.

205. Ibid., pp. 182–183.

206. Ibid., p. 199.

207. E. Mayr, *One Long Argument*.

208. *SAQ*, pp. 182–183; provisional revised translation by Keven Brown.

209. In classical biology until the beginning of the eighteenth century, the animal

 world was thought to consist in a single scale of animal organization, the *scala*

 *naturae*, starting from the most primitive animals and ending in humanity as the

 apex of creation. In classical biology parallel ontogeny was understood to mean

 that the higher animals in their embryonic growth start on a primitive level of

 the *scala naturae*, and continue through the intermediate levels until they reach

 their own place. This concept should not be mistaken for evolution; it is

 designed to apply to a static biosphere. For instance, the French anatomist Eti-

 enne Serrès considered “the whole animal kingdom … ideally as a single ani-

 mal, [which] … here and there arrests its own development and thus determines

 at each point of interruption, by the very state it has reached, the distinctive

 characters of the phyla, the classes, families, genera, and species.” (Mayr,

 *Growth of Biological Thought*, p. 472) Serrès thought of the *scala naturae* as a

 continuous scale of increasingly complex organisms. A particular species sim-

 ply got stuck at a certain point of this scale. This concept became known as the

 Meckel-Serrès law. Later Agassiz extended this law to the fossil records so that

 the embryo not only should go through the more primitive stages of life, but it

 also should reflect the extinct predecessors of its own class: “It may therefore

 be considered as a general fact … that the phases of development of all living

 animals correspond to the order of succession of their extinct representatives in

 past geological times. As far as this goes, the oldest representatives of every

 class may then be considered as embryonic types of their respective orders or

 families among the living.” (Mayr, quoted in *Growth of Biological Thought*, p.

 474)

210. In his, *Origin*, Darwin used the parallelism between ontogeny and phylogeny

 as an argument in favor of evolution. Here this parallelism is no longer thought

 to result from the general law of increasing complexification in the scala natu-

 rae, as proposed by Meckel and Serrès, but each embryo. was considered to

 repeat individually the evolution of its own species. Ernst Haeckel (*Die*

 *Welträtsel*, 11th edition, p. 111) reformulated the Meckel-Serrès law into the law

 of recapitulation: “Ontogeny is a concise and compressed recapitulation of phy-

 logeny, conditioned by laws of heredity and adaption.” This law became popu-

 lar and strongly influential in biology, especially in embryology. Around the

 beginning of this century this law became more and more questionable and was

 shown to be wrong at least in its extreme variants.

211. *SAQ*, p. 184; provisional revised translation by Keven Brown.

212. Ibid., p. 194.

213. It is interesting to note that Monod used the same example to explain that

 human evolution should not be compared with ontogeny, because the embryo

 develops according to its inherent genetic potentials, and evolution, according

 to Monod, consists in new creations.

214. *SAQ*, p. 184; provisional revised translation by Keven Brown.

215. Ibid., p. 194.

216. Ibid., p. 199.

217. Bahá’u’lláh, *Tablets*, p. 52.

218. Mayr, *Growth of Biological Thought*, p. 403.

219. Abdu’l-Bahá certainly is not a Lamarkian. ‘Abdu’l-Bahá (*SAQ*, Chapter 51)

 proposes that the less complex species appeared first: “first the mineral, then the

 plant, afterward the animal, and finally man.” For Lamark the sequence is

 reversed. He assumed an evolution towards increasing complexity and perfec-

 tion. Each species started simple and slowly accumulated perfections. For him,

 speciation, i.e., the appearance of new species, is a continuous process which

 should occur even today. Humanity is the result of the evolution of “ancient

 worms,” whereas “modern worms,” which appeared only recently, did not have

 much time to acquire perfections, and are still at the beginning of their evolu-

 tion to develop elaborate morphologies.

220. *SAQ*, p. 181.

221. *The World Wide Web*, Talk.

 Origins Archive <http://www.talkorigins.org/faqs/faq-speciation.html> has a

 long list of articles reporting discovered speciations.

222. R. A. Kerr, “Who Profits from Ecological Disaster?,” *Science*, vol. 266

 (1994), pp. 28–30.

223. Shoghi Effendi, letter 19 March 1946 to an individual, cited from a

 Memorandum of the Research Department of the Universal House of Justice,

 dated 19 March 1995.

224. ‘Abdu’l-Bahá, *Promulgation of Universal Peace*, pp. 358–359; the retransla-

 tion was done from ‘Abdu’l-Bahá, *Khaṭábat*, Vol. 2, pp. 301–304.

225. Ibid.

226. W. Howells, *Getting Here: The Story of Human Evolution* (Washington:

 Compass Press, 1993).

227. Haeckel, *Die Welträtsel*, p. 116.

228. R. Leakey, The Origin of Humankind (London: Weidenfeld & Nicolson,

 1994).

229. Haeckel (*Über den Ursprung des Menschen - Vortrag, gehalten auf dem 4.*

 *Internationalen Zoologen-Congress in Cambrigde, am 26*. August 1898, 12th

 edition [Leipzig: Kröner Verlag, 1916] p. 62) writes in the printed version of his

 talk given at the 4th International Congress on Zoology, August 20, 1898 in

 Cambridge: “Whereas recently some anthropologists assumed the existence of

 humanity on earth to be about one million years, most guess her duration to be

 half a million years or less; in any case, it is generally agreed upon that it took at

 least a hundred thousand years. However, this age is much larger than general-

 ly considered in the middle of the nineteenth century and still erroneously

 taught at schools today.” The fact that the time spans required for considerable

 evolution estimated in the middle of the nineteenth century were generally

 rather short compared to modern time tables can be inferred from one of

 Cuvier’s statements against evolution. He argued that the mummified humans

 and animals found in ancient Egypt do not show any signs of change compared

 to their modern relatives. He concluded from this fact that the modification of

 species predicted by evolution theory did not take place. Interestingly, Büchner

 (*Sechs Vorlesungen*, 2nd edition, p. 57) in his early rebuttal of Cuvier’s argu-

 ment did not argue that the time since the burial was too short for the evolution

 of obvious differences in the morphologies, as would be a modern response, but

 instead he claimed that the environment in Egypt must have been particularly

 stable, which prevented those expected changes.

230. J. D. Clark, et al, “African Homo erectus: old radiometric ages and young

 Oldowan assemblages in the Middle Awash Valley, Ethiopia,” *Science*, vol. 264,

 no. 5167 (1994) pp. 1907–1910; Howells, *Getting Here*; M. G. Leakey, et al,

 “New four-million-year-old hominid species from Kanapoi and Allia Bay,

 Kenya,” *Nature*, vol. 376, no. 6541 (1995) pp. 565–571; I. Tattersall, “Out Of

 Africa Again … and Again,” *Scientific American*, vol. 276, no. 4 (1997) pp. 46–

 53; T. D. White, G. Suwa, and B. Asfaw, “Australopithecus ramidus, a new

 species of early hominid from Aramis, Ethiopia,” *Nature*, vol. 371, no. 6495

 (1994) pp. 306–312; G. Wolde Gabriel, et al, “Ecological and temporal place-

 ment of early Pliocene hominids at Aramis, Ethiopia,” *Nature*, vol. 371, no.

 6495 (1994) pp. 330–333.

231. Mayr, *Growth of Biological Thought*, p. 263.

232. D. C. Dennett, *Darwin’s Dangerous Idea*, p. 36.

233. *SAQ*, pp. 195–196; provisional revised translation by Keven Brown.

234. *PUP*, p. 219.

235. Shoghi Effendi, *Unfolding Destiny*, p. 458.

236. Shoghi Effendi, *Arohanui: Letters from Shoghi Effendi to New Zealand* (Suva, Fiji Islands:

 Bahá’í Publishing Trust, 1982) p. 85.

237. R. Dawkins, *The Blind Watchmaker*, p. xvi.

### Section 6: Spiritual Dimensions of the Human OriginsDiscussion

238. Dennett, *Darwin’s Dangerous Idea*, p. 63.

239. Haeckel, *Die Welträtsel*, p. 507.

240. Büchner, *Kraft und Stoff*, p. 411.

241. Mayr, *Growth of Biological Thought*, pp. 80–81.

242. Ward, *God, Chance and Necessity*, p. 178.

243. Dennett, *Darwin’s Dangerous Idea*, p. 63.

244. Haeckel, *Die Welträtsel*, p. 325.

245. H. Albert, *Traktat über kritische Vernunft*, 5th edition (Tübingen: Paul

 Siebeck, 1991); E. von Kitzing, “Ist eine Einheit von Religion and Wissenschaft

 denkbar?,” *Tagungsband zur 10 Jahrestagung der Gesellschaft für Bahá’í*

 *Studien im deutschsprachigen Europa*, vol. 4 (1997) pp. 77–102.

246. S. J. Gould, *Rocks of Ages* (New York: Ballantine, 1999).

247. *SAQ*, p. 181.

248. See ‘Abdu’l-Bahá, *Paris Talks*, pp. 136–137, 146.

249. Haeckel, *Die Welträtsel*, p. 331.

250. Büchner, *Kraft und Stoff*, p. 178.

251. Haeckel, *Die Welträtsel*, p. 369.

252. Ibid, p. 429.

253. Büchner, *Kraft und Stoff*, p. 411.

254. R. Dawkins, *River Out of Eden* (London: Weidenfeld & Nicolson, 1995).

255. Haeckel, *Die Welträtsel*, pp. 446–447, and Büchner, *Kraft und Stoff*, p. 407.

256. P. Feyerabend, *Erkenntnis für freie Menschen*, vol. 1011 (Frankfurt a.M.:

 Suhrkamp, 1980).

257. The Universal House of Justice, *The Promise of World Peace* (1985).

258. J. Derrida, “Structure, sign, and play in the discourse of the human sciences,”

 in *The languages of criticism and the sciences of man: The structuralist con-*

 *troversy*, ed. by Richard Macksey and Eugenio Donato (Baltimore: John

 Hopkins University Press, 1970).

259. A. Sokal, “Transgressing the Boundaries: Toward a transformative hermeneu-

 tics of quantum gravity,” *Social Text*, vol. 14, no. 1–2 (1996) pp. 46–47.

260. In the *The Promise of World Peace*, published during the UN year of peace,

 the Universal House of Justice stressed the importance of considering religious

 value systems as the solution to the burning problems of our world: “No serious

 attempt to set human affairs aright, to achieve world peace, can ignore religion.”

261. Bahá’u’lláh, *Gleanings*, p. 206.

262. Bahá’u’lláh, *Hidden Words*, numbers 3–4.

263. Monod, *Le Hazard et la necessité*, pp. 187–188.

264. S. Kauffman, *At Home in the Universe* (New York: Oxford University Press,

 1995).

265. Dawkins, in *The Selfish Gene*, proposes “memes” as entities which corre-

 spond to genes. Memes are the ideas which form our culture and which, simi-

 larly to genes, struggle selfishly for their own replication and survival.

266. Bahá’u’lláh, *Gleanings*, p. 215.

Bibliography

‘Abdu’l-Bahá. *Má’idiy-i Ásmání* (The Heavenly Bread). Part 2.

 Comp. ‘Abdu’l-Ḥamíd-i Ishráq Khávarí. New Delhi: Bahá’í

 Publishing Trust, 1984 (Reprint of vols 2, 5, and 9 formerly pub-

 lished in Tehran).

———. *The Promulgation of Universal Peace*. Talks Delivered

 by ‘Abdu’l-Bahá during His visit to the United States and Canada

 in 1912. Comp. Howard MacNutt. Wilmette: Bahá’í Publishing

Trust, 1982.

———. *Some Answered Questions*. [=SAQ] Trans. Laura

 Clifford Barney. Wilmette: Bahá’í Publishing Trust, 1981.

———. “Tablet from ‘Abdu’l-Bahá to August Forel,” John Paul

Vader. *For the Good of Mankind, August Forel and the Bahá’í*

 *Faith*. Oxford: George Ronald, 1984.

———. *Paris Talks*. London: Bahá’í Publishing Trust, 1972.

Abizadeh, A. “Commentary to Craig Loehle’s Article.” *The Journal*

 *of Bahá’í Studies*. Vol. 3, No. 1 (1990) pp. 45–58.

Albert, Hans. *Traktat über kritische Vernunft*. 5th ed. Tübingen:

 Paul Siebeck, 1991.

Alberts, Bruce, et al. *Molecular Biology of the Cell*. 2nd ed. London:

 Garland Publishing, 1989.

Anfinsen, C. B. “Principles that Govern the Folding of Protein

 Chains.” *Science*. 181.49096 (1973) pp. 223–230.

Atkins, P. W. *The Creation*. Oxford: Freeman & Company, 1981.

Ayman, I. “Response to Commentary on ‘On Human Origins’.” *The*

 *Journal of Bahá’í Studies*. Vol. 5, No. 2 (1992) pp. 67–71.

Bahá’u’lláh. *The Hidden Words*. London: Bahá’í Publishing Trust,

 1932.

———. *Gleanings from the Writings of Bahá’u’lláh*. Wilmette:

 Bahá’í Publishing Trust, 1971.

———. *Tablets of Bahá’u’lláh Revealed after the Kitáb-i-Aqdas*.

 Haifa: Bahá’í World Centre, 1982.

Baldwin, R. L. “Pieces of the folding puzzle.” *Nature*. Vol. 346

 (1990) pp. 409–410.

Beardsley, T. “Darwin Denied: Opponents of Evolution Make Gains

 in Schools.” *Scientific American*. Vol. 273, No. 1 (1995) pp. 12–

 14.

Bloch, Ernst. *Das Materialismusproblem, seine Geschichte und*

 *Substanz*. Vol. 7. Frankfurt a.M., 1972.

Brown, Keven. “Response to Commentary on ‘On Human

 Origins’.” *The Journal of Bahá’í Studies*. Vol. 5. No. 4 (1994) pp.

 59–62.

Büchner, Ludwig. *Sechs Vorlesungen über die Darwin’sche Theorie*

 *von der Verwandlung der Arten und die erste Enstehung der*

 *Organismenwelt*. 2nd ed. Leipzig: Theodor Thomas, 1868.

———. *Kraft und Stoff*. 21st ed. Leipzig: Theodor Thomas, 1904.

de Chardin, T. *Le Phénomène humain*. Paris: Edition du Leuil, 1947.

Clark, J. D. et al. “African Homo erectus: Old Radiometric Ages and

 Young Oldowan Assemblages in the Middle Awash Valley,

 Ethiopia.” *Science*. 264.5167 (1994) pp. 1907–1910.

Conow, B. H. *The Bahá’í Teachings: A Resurgent Model of the*

 *Universe*. Oxford: George Ronald, 1990.

Darwin, Charles. *The Origin of Species*. London: Penguin Books,

 1985.

Dawkins, Richard. *The Blind Watchmaker*. London: Longmans,

 1986.

———. *The Selfish Gene*. Oxford: Oxford University Press,

 1989.

———. *River Out of Eden*. London: Weidenfeld & Nicolson,

 1995.

Dayhoff, “Computer Analysis of Protein Evolution.” *Scientific*

 *American* (July 1969) pp. 86–95.

Dennett, Daniel C. *Darwin’s Dangerous Idea*. New York: Simon &

 Schuster, 1995.

Derrida, J. “Structure, Sign, and Play in the Discourse of the Human

 Sciences.” *The Languages of Criticism and the Sciences of Man:*

 *The Structuralist Controversy*. Ed. Richard Macksey and Eugenio

 Donato. Baltimore: John Hopkins University Press, 1970.

Dicks, G. “Comment on ‘A Scientific Proof of the Existence of

 God’.” *The Journal of Bahá’í Studies*. Vol. 6, No. 3 (1994) pp. 75–80.

Dirac, Paul. “Quantum Mechanics of Many-Electron Systems.”

 *Proc. Roy. Soc.* *London, series* A 123 (1929) pp. 714–733.

Dobzhansky, T., F. J. Ayala, G. L. Stebbins, and J. W. Valentine.

 *Evolution*. San Francisco: 1977.

Dopazo, J., A. Dress, and A. von Haeseler. “Split decomposition: a

 technique to analyze viral evolution.” *Proceedings of the National*

 *Academy of Sciences of the USA*. Vol. 90, No. 21 (1993) pp.

 10320–10324.

de Duve, C. “The birth of complex cells.” *Scientific American*. Vol.

 274, No. 4 (1996) pp. 50–57.

Eigen, Manfred. *Steps towards Life: A perspective of evolution*.

 Oxford: Oxford University Press, 1992.

———. “The origin of genetic information: viruses as models.”

 *Gene*. Vol. 135, No. 1–2 (1993) pp. 37–47.

———. “Viral quasispecies.” *Scientific American*. Vol. 269, No. 1

 (1993) pp. 42–49.

Esslemont, J. E. *Bahá’u’lláh and the New Era*. Wilmette: Bahá’í

 Publishing Trust, 1980.

Feyerabend, Paul. *Erkenntnis für freie Menschen*. Vol. 1011.

 Frankfurt a.M.: Suhrkamp, 1980.

Gell-Mann, Murray. *The Quark and the Jaguar*. New York: WH

 Freeman, 1994.

Gould, S. J. “The Evolution of Life on the Earth.” *Scientific*

 *American*. Vol. 271, No. 4 (1994) pp. 85–91.

———. *Rocks of Ages*. New York: Ballantine, 1999.

Gulpáygání, Mírzá Abu’l-Faḍl. *Miracles and Metaphors*. Los

 Angeles: Kalimát Press, 1981.

Haeckel, Ernst. *Anthropogenie oder Entwicklungsgeschichte des*

 *Menschen*. Vol. 2. Leipzig: Wilhelm Engelmann, 1891.

———. *Über den Ursprung des Menschen - Vortrag, gehalten*

 *auf dem 4. Internationalen Zoologen-Congress in Cambrigde, am*

 *26. August 1898*. 12th ed. Leipzig: Kröner Verlag, 1916.

———. *Die Welträtsel*. 11th ed. Stuttgart: Kröner, 1984.

Hatcher, John S. “Response to Commentary on ‘On Human

 Origins’.” *The Journal of Bahá’í Studies*. Vol. 5, No. 2 (1992) pp.

 60–66.

Hatcher, John and William. *The Law of Love Enshrined*. Oxford:

 George Ronald, 1996.

Hatcher, William S. *Logic and Logos*. Oxford: George Ronald,

 1990.

———. “A Scientific Proof of the Existence of God.” *The*

 *Journal of Bahá’í Studies*. Vol. 5, No. 4 (1993) pp. 1–16.

———. “Reply to Gordon Dicks’ Comment on ‘A Scientific

 Proof of the Existence of God’.” *The Journal of Bahá’í Studies*.

 Vol. 6, No. 3 (1994) pp. 81–85.

Heisenberg, Werner. Das Teil und das Ganze. München, Piper, 1969.

Hofstadter, D. *Gödel Escher Bach*. New York: Basic Books, 1979.

Holmes, P. “Poincaré, Celestial Mechanics, Dynamical-systems

 Theory and ‘Chaos’.” *Physics Reports*. Vol. 193, No. 3 (1990) pp.

 137–163.

Howells, W. *Getting Here: The Story of Human Evolution*.

 Washington: Compass Press, 1993.

Hund, Friedrich. *Geschichte der physikalischen Begriffe: Die*

 *Entstehung des mechanischen Naturbildes*. Vols 543, 544.

 Mannheim: Bibliographisches Institut, 1978.

Kauffman, S. *At Home in the Universe*. New York: Oxford

 University Press, 1995.

———. “Climbing Mount Improbable: Richard Dawkins.”

 *Nature*. Vol. 382, No. 6589 (1996) pp. 309–310.

Kerr, R. A. “Who Profits from Ecological Disaster?” *Science*. Vol.

 266 (1994) pp. 28–30.

Khursheed, Anjam. *Science and Religion: Towards the Restoration*

 *of an Ancient Harmony*. London: Oneworld Publications, 1987.

von Kitzing, Eberhard. “Ist eine Einheit von Religion and

 Wissenschaft denkbar?” *Tagungsband zur 10 Jahrestagung der*

 *Gesellschaft für Bahá’í Studien im deutschsprachigen Europa*.

 Vol. 4 (1997) pp. 77–102.

Kraft, Viktor. *Der Wiener Kreis: Der Ursprung des*

 *Neopositivismus*. Wien: Springer Verlag, 1968.

Land, G: “The Evolution of Reality.” *Journal of Bahá’í Studies*. Vol.

 3, No. 1 (1991) pp. 19–30.

Leakey, Richard. *The Origin of Humankind*. London: Weidenfeld &

 Nicolson, 1994.

Leakey, Richard et al. “New Four-million-year-old Hominid

 Species from Kanapoi and Allia Bay, Kenya.” *Nature*. Vol. 376,

 No. 6541 (1995) pp. 565–571.

Loehle, C. “On Human Origins: A Bahá’í Perspective.” *The Journal*

 *of Bahá’í Studies*. Vol. 2, No. 4 (1990) pp. 67–73.

———. “Response to Commentary on ‘On Human Origins’.”

 *The Journal of Bahá’í Studies*. Vol. 5, No. 2 (1992) pp. 72–76.

———. *On the Shoulders of Giants*. Oxford. Oxford: George

 Ronald, 1994.

Mayr, Ernst. “Evolution.” *Scientific American*. Vol. 239, No. 3

 (1978) pp. 46–55.

———. The Growth of Biological Thought. Cambridge: Harvard

 University Press, 1982.

———. *One Long Argument*. Cambridge: Harvard University

 Press, 1991.

Monod, Jaques. *Le Hasard et la Nécessité*. Paris: Edition du Leuil,

 1970.

Orgel, L. E. “The origin of life on the earth.” *Scientific American*.

 Vol. 271, No. 4 (1994) pp. 77–83.

Rabbani, Shoghi. Letter 19 March 1946 to an individual, cited from

 a Memorandum of the Research Department of the Universal

 House of Justice, dated 19 March 1995.

———. *Unfolding Destiny: The Messages from the Guardian of*

 *the Bahá’í Faith to the Bahá’í Community of the British Isles*.

 London: Bahá’í Publishing Trust, 1981.

———. *Arohanui: Letters from Shoghi Effendi to New Zealand*.

 Suva, Fiji Islands: Bahá’í Publishing Trust, 1982.

Popper, K. R. *Objective Knowledge*. Oxford: The Clarendon Press,

 1972.

Prigogine, I. *Vom Sein zum Werden*. München: Piper, 1979.

Prigogine, I. and I. Stengers. *Dialog mit der Natur*. München: Piper,

 1981.

Ruthen, R. “Trends in nonlinear dynamics. Adapting to complexi-

 ty.” *Scientific American*. Vol. 268, No. 1 (1993) pp. 110–117.

Savi, J. *The Eternal Quest for God*. Oxford: George Ronald, 1989.

Sibley, C. G., J. A. Comstock, and J. E. Ahlquist. “DNA

 Hybridization Evidence of Hominoid Phylogeny: A Reanalysis of

 the Data.” *Journal of Molecular Evolution*. Vol. 30, No. 3 (1990)

 pp. 202–236.

Spiegelman, S. “An in vitro analysis of a replicating molecule.”

 *American Scientist*. Vol. 55 (1967) pp. 63–68.

Sober, E. *Philosophy of Biology*. Oxford: Oxford University Press,

 1993.

Sokal, Allan. “Transgressing the Boundaries: Toward a transforma-

 tive hermeneutics of quantum gravity.” *Social Text*. Vol. 14, No. 1–

 2 (1996) pp. 46–47.

Tattersall, I. “Out Of Africa Again … and Again.” *Scientific*

 *American*. Vol. 276, No. 4 (1997) pp. 46–53.

Universal House of Justice. *The Promise of World Peace* (1985).

Ward, K. *God, Chance and Necessity*. Oxford: Oneworld, 1996.

Wheeler, J. A. “Information, Physics, Quantum: the Search for

 Links.” *Proceeding of the 3rd International Symposium on the*

 *Foundation of Quantum Mechanics*. Tokyo (1989) pp. 354–368.

von Weizsäcker, C. F. *Aufbau der Physik*. 2nd ed. München: Carl

 Hanser Verlag, 1986.

White, T. D., G. Suwa, and B. Asfaw. “*Australopithecus ramidus*, a

 new species of early hominid from Aramis, Ethiopia.” *Nature*

 371.6495 (1994) 306–312.

Wilson, A. C. and R. L. Cann. “The recent African genesis of

 humans.” *Scientific American*. Vol. 266, No. 4 (1992) pp. 68–73.

WoldeGabriel, G. et al. “Ecological and temporal placement of early

 Pliocene hominids at Aramis, Ethiopia.” *Nature*. Vol. 371, No.

 6495 (1994) pp. 330–333.