

Dharma and Darwin

Introduction

My talk today follows in the tracks of fellow sangha members who've given us presentations on the convergence of scientific inquiry and the insights of traditional Buddhist precepts in the area of neurobiology and brain science. I want to explore the ways the theory of evolution that has provided a framework for all biological research during the last 150 years *illuminates and is illuminated* by my experience of meditation and my rudimentary understanding of Buddhist doctrine.

My interest in this topic has two origins. Eighteen years ago, while I was working on a book on the relationship between Shakespeare and the Bible, I noticed in passing that Shakespeare's last complete and most mysterious play, *The Tempest*, could make sense when juxtaposed with the Book of Genesis. Both of them told a story roughly resembling that of Darwin's theory of evolution. Ten years later, I came across a new academic specialty known as Darwinian literary criticism. That goaded me to take up my earlier inquiry, which issued in an essay I called "[Genes in Genesis](#)." In it, I argued that the Creator God of the Hebrew Bible personified Darwin's principle of natural selection. Once I started attending this Sangha and got exposed to Buddhist teachings, I found that they too reverberated with what I'd absorbed about evolution.

A second stimulus came last Spring when I was helping my grandson prepare for his seventh grade science tests on cell biology. I learned for the first time about the molecular processes of replication and protein synthesis that humans share with one-celled organisms that came into existence 500 million years ago. Understanding how these processes account for the origin, persistence and transformation of all life forms made a number of puzzling Buddhist ideas easier for me to comprehend.

When I typed "Buddhism and Evolution" into Google, it opened into a jungle of websites, articles and books. They included the brilliant and funny essay, "Evolution Sutra"¹(2011) by Wes Nisker and two books that I read, *Dismantling Discontent: Buddha's Way Through Darwin's World*² by Charles Fisher(2007), and *Buddhist Biology: Ancient Eastern Wisdom Meets Modern Western Science*³ by David Barasch(2016).

A few months later, I came across an article in an obscure journal entitled "The Unity of All Life: Ananda Metteya's view of Nature."⁴ Metteya was the name adopted by "the first Englishman ever to become a Buddhist monastic and return to England...[who] founded the International Buddhist Society" in 1903. A scientifically trained chemist, he wrote numerous essays presenting "...Buddhism as a religious system completely in harmony with science and in particular Darwin's Theory of Evolution."⁵

Metteya was one of a number of late 19th century thinkers who engaged in what was called the "Discourse of Scientific Buddhism." While he saw Dharma as the fundamental truth that modern science was confirming, for others at the time, like Paul Carus, "science takes the predominant role, and Buddhism is understood through its filter..."⁶ It turned out that what I'd thought was my own original idea has been of wide concern for well over a hundred years.

The Theory of Evolution

The theory of Evolution states that all living beings have in common certain characteristics and conditions. 1.They are prone to replicate or reproduce themselves. 2.They require resources of energy to survive which are limited by changing environmental circumstances. 3.Reproduction creates competition for resources among individuals and groups. 4. Reproduction is subject to relatively rare variation. 5.Those variants better fit to survive under prevailing circumstances reproduce more, while those less fit die out in the process known as natural selection. 6. Over time, natural selection produces changes in life forms, emergence of new ones and extinction of old ones.

The Unity of All Life

The vision of the unity of all life informs fundamental Buddhist ethical imperatives, including *ahimsa*, the prohibition of causing harm to all living beings, and *metta*, the mandate to cultivate compassion for all living beings.

Darwin's *The Origin of Species* concludes with an eloquent passage that derives this vision of unity from his discoveries of life's common ancestry and governing principle:

There is a simple grandeur in this view of life with its powers of growth, assimilation, and reproduction, being originally breathed into matter under one or a few forms, and that while this, our planet has gone circling on according to fixed laws, and land and water, in a cycle of changes, have gone on replacing each other, so that from so simple an origin, through the process of gradual selection of infinitesimal changes, endless forms most beautiful and wonderful have been evolved.⁷

Citing Darwin, Wes Nisker says,

One of the most important lessons we can learn from evolution is that we are related to all that lives, and to all that has ever lived. Once we begin to include ourselves in the story we are no longer on an individual journey, but have joined that grand procession of *endless forms most beautiful and wonderful*. Instead of being the singular focus of all creation we are now at one with all creation.⁸

The idea of the unity of all life is reinforced by discoveries in molecular biology, which reveal that our personal DNA is 99.99% identical to the DNA of every other human being and that “we share nearly 60% of our living instructions with worms...”⁹

According to Darwinian ecological theory, each species evolves through a co-evolutionary process with other species, never discreetly from its surrounding environment—in communities, food webs, trophic levels and ecosystems, another affirmation of the unity of all life.

Impermanence—*Anitya*

Darwin held off publishing his findings in the *Origin* for decades because it challenged beliefs in the permanence of the species—theological beliefs based on the Bible and scientific beliefs based on taxonomic classification. The term Evolution itself conveys the idea of *Impermanence*.

Anagarika Dharmapala “stunned the audience” at the World’s Parliament of Religions in Chicago in 1893 “when he claimed that Buddha himself had expounded on the doctrine of evolution two and a half millennia before Darwin...”¹⁰ He was alluding to the fact that Impermanence, also called Anicca or Anitya, is considered “one of the essential doctrines and a part of three marks of existence in Buddhism. The doctrine asserts that all of conditioned existence, without exception, is ‘transient, evanescent, inconstant’.”¹¹

According to evolutionary history, the earth is 4.5 billion years old and biological life emerged as single-celled organisms about 3.8 billion years ago. Multicellular life forms are 1 billion years old. Our “anatomically modern” human species is a quarter of a million years old. The primitive life forms that evolved from non-living compounds transformed planetary conditions which in turn made for the evolution of more complex forms, for instance by adding enough oxygen to the atmosphere to allow for the emergence of animal life. Hence, not only life forms, but their surrounding environmental conditions are fundamentally impermanent.

Buddhist cosmology measures natural time spans in kalpas, the largest of which last 1.28 trillion years. Over spans of this scale, the puzzling idea stated by the Buddhist sage, Dogen, seems obvious: “If one doubts the walking of the mountains, one doesn’t even yet know one’s own walking.”¹²

But we don’t need aeons to experience the impermanence of species. Evolution in the present Anthropocene era is speeding up. Many kinds of birds have undergone transformation of shape and behavior within the last hundred years as the result of living in cities.¹³ Ninety-four year old astrophysicist, Freeman Dyson speculates that “Sometime in the next few hundred years, biotechnology will have advanced to the point where we can design and breed entire ecologies of living creatures adapted to survive in remote places away from Earth.”¹⁴

Not-self–Anatman

The Buddhist doctrine of not self or *anatman* applies impermanence to our subjective consciousness. It states that the first person “I,” the apparent host of our experiences and the controller of our actions, is actually an illusion, no more real than the self of a ventriloquist’s dummy. This denial of the actual existence of a self or soul distinguishes Buddhism from major religions of the world such as Christianity and Hinduism.

Anatman is confirmed by some evolutionary biologists’ claim that the unit of selection, survival and replication is not the individual organism but the gene. Individuals are merely impermanent vehicles for the coded replication of molecules of DNA which persist in future generations. Even the DNA in genes is impermanent, since it is sometimes subject to mutation during the copying process.

The issue of self vs. not self is currently a hot topic among evolutionary *psychologists*, for whom the question of whether there exists a mind apart from the body is known as “The Hard Problem.” *The Hard Problem* is the title of a new play by Sir Tom Stoppard now being performed in London, New York and San Francisco.¹⁵ Most of the characters in it agree that “The scientific and philosophical consensus is that there is no nonphysical soul or ego, or at least no evidence for that,”¹⁶ but both the protagonist and the playwright question that consensus.

In the course of reviewing a new book by a prominent brain scientist, Michael Graziano, the author of the blog, *Science and NonDuality*, states, “This may be the most fundamental human question there is, because... it asks... ,” “What are we?” It’s not, “What’s the body made out of?” or “What’s the brain made out of?” but “What is the essence of our experience?”¹⁷

In his Attention Schema Theory, Graziano hypothesizes that

... Consciousness is a kind of con game the brain plays with itself. The brain is a computer that evolved to simulate the outside world. Among its internal models is a simulation of itself — a crude approximation of its own neurological processes. The result is an illusion. Instead of neurons and synapses, we sense a ghostly presence—a self—inside the head. But it’s all just data processing.¹⁸

Graziano maintains that the time is coming when we will be able to upload some version of the mapped neuronal circuitry of the brain into a computer, including its byproduct of self or awareness, to be preserved after the body’s death, copied, or merged with other selves.¹⁹

Though this prophecy sounds outlandish, so would a prophecy of the cell phone and of cloud computing have sounded only 35 years ago. When I consider the changes in my own mind since I first started writing on a Macintosh in 1984, it seems a real possibility. By now my little laptop has taken up a substantial portion of my personal memory, provides with me with instant access to much of humanity’s memory and engages me in a worldwide and self-correcting collaborative thinking process, called Wikipedia.

Graziano surmises that even mental states of *jhana* can be explained by evolution as a product of adaptive survival mechanisms.

It may be possible outside of attention, at the fringes of attention, or close to sleep, to be aware, simply aware, without being aware of something, and without processing that you are the being who is aware. (One is reminded of some of the goal states of Buddhist meditation. Clear your mind of all thought. Achieve a pure awareness.) ... , in the absence of actual focused attention occurring in your brain, in theory the relevant circuitry should be able to construct a model of you directing a focused attention, and in theory that model is awareness, just awareness, unbound, unattached to a subject or an object, without a spatial or a temporal structure, without a location. Pure essence. Pure experienceness.²⁰

Causality—*Pratityasamutpada*

A Buddhist teaching with the broadest relevance to the theory of evolution is *Pratityasamutpada*, translated as: Interdependent Origination, (Inter)dependent Arising, Co-Arising, Conditioned Genesis or Causal Nexus. This doctrine is expressed in the Pali text:

The Buddha explained,

When this is, that is.

This arising, that arises.

When this is not, that is not.

This ceasing, that ceases.²¹

Pratityasamutpada has been subject to a variety of interpretations

Everything is interconnected. Everything affects everything else. Everything that is, *is* because other things *are*.

Things and beings perpetually arise and perpetually cease because other things and beings perpetually arise and perpetually cease. All this arising and being and ceasing go on in one vast field or nexus of beingness.²² The causal-connectedness and interdependence of all things is referred to by Thich Nhat Han as “interbeing.” For him it has the positive implication of focusing awareness on the Unity of all life and on the dangers of separating ourselves from others and from the world around us.²³

This modern positive outlook needs to be distinguished from the traditional emphasis of the doctrine of *pratityasamutpada*, which designated such interbeing as entrapment in a futile cycle of becoming that obscures the ultimate reality of a non-phenomenal world apprehensible only through Enlightenment.

In the universe of dependent co-arising, the causality which connects phenomena is material and efficient not formal or final. Exploring material and efficient causality and abandoning explanations based on formal and final causes of phenomena is the methodology of modern science, a methodology associated with the 18th Century European worldview known as “*the Enlightenment*.”²⁴ Although that scientific worldview is sometimes disparaged as “mechanical” or “reductionist,” the causal nexus and conditioned generation it studies fits Buddha’s characterization of the natural world.

This is the framework for evolution. Biological life, including human consciousness, is determined by the same physical and chemical laws that determine non-living systems. All forms of life are conditional and changing. And although the adaptations created by natural selection may appear in retrospect to our minds as inevitable and purposeful for survival, in reality they are only the unpredictable and purposeless outcomes of the struggle for existence.

Buddha’s utterances on *pratityasamutpada* are consistent with what’s become known as the “Astonishing Hypothesis” of Francis Crick, the codiscoverer of the double helix of DNA—“you’re nothing but a pack of neurons.”²⁵

Inheritance–*Karma*

Another central Buddhist teaching is associated with *pratityasamutpada* or causality: *Karma*.

Karma applies efficient causality to personal life, focusing on the links between choices made by individuals in past lives—skilful or unskillful, advantageous or disadvantageous— and their consequences upon their present and future lives. This teaching is problematic for many modern Buddhists. In addition to the absence of any evidence for it, it seems to contradict the idea of non-self or *Anatman*, postulating a self that persists not only for the span of one life but throughout many.

But in some respects, the idea of *Karma* is compatible with that of Evolution. The reincarnated self is analogous to the genome, or at least to the mixture of two genomes, that persists from generation to generation through sexual reproduction. The karmic effect of personal choices manifests in the continuity of both conditioned and inherited behavior patterns between parents and children. And the long discredited Lamarckian idea that acquired characteristics are heritable has recently been revived, its material cause considered to be the transmission of *epigenetic* information that turns inherited genes on and off without any change in DNA.²⁶

Knowing and unknowing– *Prajnaparamita*

The mechanistic, materialistic view of phenomenal reality implied by the overlapping doctrines of karma, codependent arising, notself, impermanence and the unity of all life converge with Darwinism. But there's another teaching that seems to depart from these ideas. This is the passage from the Diamond Sutra referred to as *Prajnaparamita*.

...the Diamond sutra's central argument ... is that "all dharmas lack a self or essence, ..., they have no core ontologically, they only appear to exist separately and independently by the power of conventional language, even though they are in fact dependently originated." *Prajñāpāramitā* or 'perfection of insight' is then a mind free from fixed substantialist or 'self' concepts.²⁷

Section 26 of the Diamond Sutra ends with a four-line poem:

All conditioned phenomena
Are like a dream, an illusion, a bubble, a shadow,
Like dew or a flash of lightning;
Thus we shall perceive them.²⁸

This seems to be the opposite of a scientific outlook. It asserts that only from the perspective of a non-rational, non-discursive, non-temporal vision of the whole of reality is it possible to experience true understanding of any of its parts. Since our minds are themselves the outcome of conditioned temporal processes, they are capable of nothing but contingent and relative knowledge. This perspective makes truth the exclusive province of the mystical experience of Enlightenment claimed by Bodhisattvas, saints, poets, and people under the influence of near-death experiences or psychedelic drugs.²⁹

On the other hand, this poem can be read as an affirmation of the always tentative and evolving nature of scientific knowledge. Scientific truth is only what is known at the present moment, and it is continually qualified, modified, and falsified by new discoveries and proofs.

Suffering—*Dukkha*

It's been often stated that the Buddha's precepts are not intended to teach abstract philosophy so much as to offer practical help in reducing suffering, or *Dukkha*. Though the pains imposed by aging, illness and death are inescapable, the secondary pains of anxiety, sorrow, frustration, and discontent referred to as the second arrow, are superimposed upon those pains by the cravings of our minds. These pains can be alleviated by understanding the doctrines of impermanence, not-self, causality and karma. By controlling both desire and aversion, such understanding can strengthen Stoic equanimity and thereby minimize secondary suffering.

Charles Darwin encountered *Dukkha* in his confrontation with what he described as the “clumsy, blundering low and horribly cruel works of nature” that were manifested in the struggle for existence and natural selection. “There is no exception,” he wrote, “to the rule that every organic being naturally increases at so high a rate, that if not destroyed, the earth would soon be covered by the progeny of a single pair.”³⁰ It is likely that it was this awareness that brought on his extraordinary secondary suffering of psychosomatic illness.

From 1838 a mysterious affliction violently ate away at his strength. Weakness, depression, headaches, nausea, and fearsome bouts of vomiting would ravage Darwin for years, often limiting him to an hour or two of work a day, at worst leveling him altogether for weeks at a time.³¹

For many of his Victorian contemporaries, like Matthew Arnold, Darwin's revelations caused despair:

...the world, which seems
To lie before us like a land of dreams,
So various, so beautiful, so new,
Hath really neither joy, nor love, nor light,
Nor certitude, nor peace, nor help for pain;
And we are here as on a darkling plain
Swept with confused alarms of struggle and flight,
Where ignorant armies clash by night.³²

Throughout his culture, Darwin's work created *Dukkha* by undermining belief in the stability of nature and in a moral order that governed the universe.

According to Charles Fisher, the secondary suffering of *Dukkha* is itself an artifact of natural selection:

Our superior communicative and social skills and our capacity to analyze the present and plan for the future have endowed our species with unique tools for survival, but they have

also created a new set of physical and mental problems. The most pervasive of these is the compulsive mental chatter that beset humans at all times and the discontent it generates.³³

Known as *antagonistic pleiotropy*, it occurs at the level of DNA “when one gene controls for more than one trait where at least one of these traits is beneficial to the organism’s fitness and at least one is detrimental to the organism’s fitness.”³⁴ Just as Buddha’s teachings of not-clinging, mindfulness and meditation can offer a release from these mental traps, so can recognizing our brain’s genetically inherited self-punishing tendencies.

I’ve been suffering the *Dukkha* of sorrow for the last 50 years as a result of witnessing the degradation of our planet’s environmental systems. There are times when I find solace in taking the long view offered by evolution—we are living through not the first but the sixth great extinction. An even longer view is offered by *Annica*: we are living through accelerated, but inevitable impermanence.

Modern Buddhism offers another approach to the *Dukkha* of grief for the planet: activism. Though it seems contrary to the traditional stance of detachment, teachers like the Dalai Lama, Thich Nhat Hahn and Johanna Macy urge vigorous effort to bring about change in the world to reduce primary suffering of others as well as the secondary *Dukkha* of guilt and despair. But promoting such effort comes with a caution: activism can produce cravings for successful outcomes that need to be offset by personal equanimity and political resilience.

Accompanying this teaching is another evolutionary perspective. All of these writers see a possibility that during this era of crisis, the nature of our species is evolving from the crude materialistic individualism of industrial society to a to a mutually-supportive human community based on the principles of sharing and sustainability consistent with Buddhist ethics. This they refer to as “The Great Turning.” Evidence is provided by enlarging brain size in babies, the growth of the internet, and recent reputable studies arguing that despite appearances, worldwide, violence and the primary suffering of humanity have steadily decreased.³⁵

Conclusion

At the conclusion of this trek through the “Scientific Discourse of Buddhism,” I return to the question of why—why have I spent several months exploring the territory, and why have I asked you to spend the last 35 minutes on such a twisting and arduous trail?

First, teasing out the parallels between Dharma and Darwin helps me in my thinking. It enables me to reconcile the ancient mental contraries of Faith and Reason. Seeing those parallels supports my *Faith* that the continuing practice of meditation and the study of Buddhist traditions *can* lead to moments when “the burden of the mystery/in which the heavy and the weary weight/of all this unintelligible world/is lightened.”³⁶

And observing those parallels supports my *Reason* in contemplation of the scientific fact that I’m both an incredibly small part of the universe and that I’m also an incredibly large galaxy of cells and molecules constituting a temporary configuration of matter and energy, soon to be

dissipated. Faith and Reason thus reconciled buttress my intuition that even in the face of vast ignorance, understanding is possible.

The convergence of Dharma and Darwin also offers some chilly *emotional* comfort. It can dampen the tempestuous fear of the many threats coming at us from the future—my future at age 74, the future of my children and grandchildren, of my City, my country, my planet. It offers the consolation of a lullaby, like the one uttered by Shakespeare’s autobiographical character, Prospero at the conclusion of his play within a play:

the baseless fabric of this vision,
The cloud-capp’d towers, the gorgeous palaces,
The solemn temples, the great globe itself,
Ye all which it inherit, shall dissolve
And, like this insubstantial pageant faded,
Leave not a rack behind. We are such stuff
As dreams are made on, and our little life
Is rounded with a sleep.³⁷

[1] http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

[2] <http://dismantlingdiscontent.com/>

[3] <https://www.amazon.com/Buddhist-Biology-Ancient-Eastern-Western/dp/0199985561>

[4] John L. Crow, “[The Unity of All Life: Ananda Metteyya’s View of Nature](#),” in *The Middle Way: The Journal of the Buddhist Society*. Serialized in 83.3 (November 2008), 131-137, & 83.4 (February 2009), 195-202.

[5] Crow 132

[6] Crow 132

[7] [https://en.wikisource.org/wiki/The_Origin_of_Species_\(1872\)/Chapter_XV,429](https://en.wikisource.org/wiki/The_Origin_of_Species_(1872)/Chapter_XV,429)

[8] http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

[9] http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

[10] Crow 132

[11] <https://en.wikipedia.org/wiki/Impermanence>

[12] cited by Nisker http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

[13] http://www.nytimes.com/2016/07/24/opinion/sunday/evolution-is-happening-faster-than-we-thought.html?_r=0

[14] <http://www.nybooks.com/articles/2016/10/13/green-universe-a-vision/>

[15] http://www.act-sf.org/home/box_office/1617_season/the_hard_problem.html

[16] <http://www.nytimes.com/2016/07/05/science/what-is-consciousness.html>

[17] <https://www.scienceandnonduality.com/the-caricature-of-consciousness/>

[18] <http://www.nytimes.com/2016/07/05/science/what-is-consciousness.html>

[19] <https://aeon.co/essays/the-virtual-afterlife-will-transform-humanity>

[20] Graziano, Michael S. A. (2013-08-01). *Consciousness and the Social Brain* (pp. 115-116). Oxford University Press. Kindle Edition.

[21] <http://buddhism.about.com/od/basicbuddhistteachings/a/genesis.htm>

[22] <http://buddhism.about.com/od/basicbuddhistteachings/a/genesis.htm>

[23] <https://bodhileaf.wordpress.com/2009/05/25/understanding-interbeing/>

[24] material and efficient causes were classified by Aristotle as first and third causes. Aristotle's second or formal causes are those determined by the "form" or essential nature of something, and his fourth or final or teleological causes are determined by the purpose of something. Medieval science and philosophy tended to search for second or fourth causes.

[25] https://www.amazon.com/Astonishing-Hypothesis-Scientific-Search-Soul/dp/0684801582/ref=sr_1_1?s=books&ie=UTF8&qid=1478225238&sr=1-1&keywords=9780684801582 and <https://www.edge.org/response-detail/11940>. Crick's expostulation alludes to Alice's at the end of *Alice in Wonderland*, as she starts to awaken from the dream of being under the domination of random and illusory creatures: "You're nothing but a pack of cards."

[26] <https://www.edge.org/response-detail/25502>

[27] https://en.wikipedia.org/wiki/Diamond_Sutra

[28] "The Diamond of Perfect Wisdom Sutra". Chung Tai Translation Committee. Retrieved April 16, 2015.

[29] Prajnaparamita resembles the separation between Being and Becoming formulated by the 6th century BCE pre-Socratic philosopher Parmenides. See <http://www.parmenides-of-elea.net/>

[30] <http://www.talkorigins.org/faqs/origin/chapter3.html>

[31] <http://www.thenewatlantis.com/publications/darwins-world-of-pain-and-wonder>

[32] <https://www.poetryfoundation.org/poems-and-poets/poems/detail/43588>

[33] <https://www.amazon.co.uk/Dismantling-Discontent-Buddhas-Through-Darwins/dp/1600700314>

[34] https://en.wikipedia.org/wiki/Antagonistic_pleiotropy_hypothesis

[35] See evolutionary psychologist Steven Pinker’s massive 2011 study, *The Better Angels of Our Nature*, <http://stevenpinker.com/publications/better-angels-our-nature> and this recent comment by the Dalai Lama: “...fewer among us are poor, fewer are hungry, fewer children are dying, and more men and women can read than ever before. In many countries, recognition of women’s and minority rights is now the norm. There is still much work to do, of course, but there is hope and there is progress.”

<http://www.nytimes.com/2016/11/04/opinion/dalai-lama-behind-our-anxiety-the-fear-of-being-unneeded.html?action=click&pgtype=Homepage&clickSource=story-heading&module=opinion-c-col-left-region®ion=opinion-c-col-left-region&WT.nav=opinion-c-col-lh>

[36] William Wordsworth, “Lines Written a few Miles above Tintern Abbey...”
<http://www.rc.umd.edu/sites/default/RCOldSite/www/rchs/reader/tabbey.html>

[37] William Shakespeare, *The Tempest*, IV,i.
<http://shakespeare.mit.edu/tempest/tempest.4.1.html>

¹ http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

² <http://dismantlingdiscontent.com/>

³ <https://www.amazon.com/Buddhist-Biology-Ancient-Eastern-Western/dp/0199985561>

⁴ John L. Crow, “[The Unity of All Life: Ananda Metteyya’s View of Nature](#),” in *The Middle Way: The Journal of the Buddhist Society*. Serialized in 83.3 (November 2008), 131-137, & 83.4 (February 2009), 195-202.

⁵ Crow 132

⁶ Crow 132

⁷ [https://en.wikisource.org/wiki/The_Origin_of_Species_\(1872\)/Chapter_XV,429](https://en.wikisource.org/wiki/The_Origin_of_Species_(1872)/Chapter_XV,429)

⁸ http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

⁹ http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

¹⁰ Crow 132

¹¹ <https://en.wikipedia.org/wiki/Impermanence>

¹² cited by Nisker http://www.ecobuddhism.org/wisdom/interviews/wes_nisker/

¹³ http://www.nytimes.com/2016/07/24/opinion/sunday/evolution-is-happening-faster-than-we-thought.html?_r=0

¹⁴ <http://www.nybooks.com/articles/2016/10/13/green-universe-a-vision/>

¹⁵ http://www.act-sf.org/home/box_office/1617_season/the_hard_problem.html

¹⁶ <http://www.nytimes.com/2016/07/05/science/what-is-consciousness.html>

¹⁷ <https://www.scienceandnonduality.com/the-caricature-of-consciousness/>

¹⁸ <http://www.nytimes.com/2016/07/05/science/what-is-consciousness.html>

¹⁹ <https://aeon.co/essays/the-virtual-afterlife-will-transform-humanity>

²⁰ Graziano, Michael S. A. (2013-08-01). *Consciousness and the Social Brain* (pp. 115-116). Oxford University Press. Kindle Edition.

²¹ <http://buddhism.about.com/od/basicbuddhistteachings/a/genesis.htm>

²² <http://buddhism.about.com/od/basicbuddhistteachings/a/genesis.htm>

²³ <https://bodhileaf.wordpress.com/2009/05/25/understanding-interbeing/>

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²⁵ https://www.amazon.com/Astonishing-Hypothesis-Scientific-Search-Soul/dp/0684801582/ref=sr_1_1?s=books&ie=UTF8&qid=1478225238&sr=1-1&keywords=9780684801582 and <https://www.edge.org/response-detail/11940>. Crick's expostulation alludes to Alice's at the end of *Alice in Wonderland*, as she starts to awaken from the dream of being under the domination of random and illusory creatures: "You're nothing but a pack of cards."

²⁶ <https://www.edge.org/response-detail/25502>

²⁷ https://en.wikipedia.org/wiki/Diamond_Sutra

²⁸ "[The Diamond of Perfect Wisdom Sutra](#)". Chung Tai Translation Committee. Retrieved April 16, 2015.

²⁹ Prajnaparamita resembles the separation between Being and Becoming formulated by the 6th century BCE pre-Socratic philosopher Parmenides. See <http://www.parmenides-of-elea.net/>

³⁰ <http://www.talkorigins.org/faqs/origin/chapter3.html>

³¹ <http://www.thenewatlantis.com/publications/darwins-world-of-pain-and-wonder>

³² <https://www.poetryfoundation.org/poems-and-poets/poems/detail/43588>

³³ <https://www.amazon.co.uk/Dismantling-Discontent-Buddhas-Through-Darwins/dp/1600700314>

³⁴ https://en.wikipedia.org/wiki/Antagonistic_pleiotropy_hypothesis

³⁵ See evolutionary psychologist Steven Pinker's massive 2011 study, *The Better Angels of Our Nature*, <http://stevenpinker.com/publications/better-angels-our-nature> and this recent comment by the Dalai Lama: "...fewer among us are poor, fewer are hungry, fewer children are dying, and more men and women can read than ever before. In many countries, recognition of women's and minority rights is now the norm. There is still much work to do, of course, but there is hope and there is progress."

³⁶ William Wordsworth, "Lines Written a few Miles above Tintern Abbey..." <http://www.rc.umd.edu/sites/default/RCOldSite/www/rchs/reader/tabbey.html>

³⁷ William Shakespeare, *The Tempest*, IV,i. <http://shakespeare.mit.edu/tempest/tempest.4.1.html>