



Auckland Unitarian Church
Love beyond belief

Part of Nature, or separate from Nature? Charles Darwin and Evolutionary Biology.

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Charles Darwin, who lived through the middle years of the 1800s, is familiar to most of us as the man who laid the foundations of the modern theory of evolution. His ideas have had dramatic continuing effects on our view of ourselves and of the world of which we are part. The idea that living things shared a common evolutionary heritage was not new. What was new was the mechanism that Darwin, along with Alfred Wallace who came up with very similar ideas at the same time, proposed. Darwin worked his arguments into a book of almost 500 pages that was widely read and finally carried the day in the world of science. It is a careful assembly of evidence, from animal breeding, from geology, and from the way that different life forms are distributed across different continents and islands.

It was not, as had earlier been suggested, that giraffes stretched their necks to reach the high branches for food, with their offspring then inheriting their stretched necks. Instead, occasional newborn had long necks that allowed them to reach up to leaves on high branches, and were more likely to survive and pass on their long necks. Accidents of nature lead to changes in the offspring, and if they survive to have offspring, those changes will be inherited. The changes will be driven in different directions in different environments, in a process termed “adaptive radiation”. Or, to tell the story another way, some beetles have green offspring and some brown offspring. There’ll be some places where the green baby beetles are seen by birds and do not survive. In others, the green baby beetles will survive better. Finches with unusually long beaks that are adapted to eating the cactus plants on the islands where they are found are an interesting example.

Darwin had no knowledge of the mechanism by which variations — mutations as we call them today — occur. Starting in the 1950s, scientists have been able to tease out many of the chemical instruction sets. We have only a limited understanding of how the instruction set operates to generate a life form.

The fertilized egg from which I started, taking half its instructions from my mother, and half from my father, would have been the size of a largish speck of dust. In the crude way that such comparisons are commonly done, about a tenth of a percent varies between different humans. We share just under 99% of our instruction set with chimpanzees. With pigs, it is 98%. With bananas it is 60%. Small differences in the instruction set can make a huge difference in the living organism that results.

I find it absolutely amazing that a mother's reproductive apparatus can take a fertilized 'egg' that is the size of a speck of dust, and turn it into a living breathing human being. Francis Collins, who led an exercise that came up with a first draft of the human instruction set in 2003, wrote a book in which he described it as the "language of God". Whether or not you buy that, it is indeed the language that creates new life forms of every kind, and indeed humans. I was privileged to be part of a group at Australian National University that worked over the published paper that described the rough first draft of the human instruction set that appeared in 2003.

Darwin had a remarkable and very privileged family background. His two grandfathers were both remarkable people in their own right. On his mother's side was Josiah Wedgwood — technocrat, experimentalist, and businessman who took a cottage pottery industry and transformed it into an international business enterprise. Josiah's mother had brought her children up with values taught by her father, who held that "knowledge based on reason, experience, and experiment was preferable to dogma." Josiah and his family were prominent Unitarians. Josiah was prominent in the anti-slavery movement. He made and gave away large numbers of his famous anti-slavery medallion — where a kneeling African in chains asks "Am I not a man and a brother?".

Grandfather Erasmus Darwin was a doctor, a religious radical, an inventor, and a poet. His son Robert, who was Charles Darwin's father, was a well-to-do doctor. At least two of Erasmus's inventions were aids to Josiah in his pottery business. Among his inventions was a steering mechanism for his carriage that would be adapted for use in cars 130 years later.

On then to Charles Darwin. At an early age he developed a passion for collecting things, including insects and beetles. The education that he received at the Anglican boarding school in Shrewsbury where he was sent from ages 8 to 16 was too narrow and classical for his taste — the boys were not sup-

posed to waste their time on beetles. The experience did very likely shape the relatively orthodox religious views that he formed as a young man.

After school, what? Darwin's father sent him at age 16 to study as a medical student at Edinburgh University. The intellectual atmosphere was freethinking in a way that Oxford and Cambridge were not. Darwin took it all in his stride — it was all of a piece with the sort of discussions that went on among his family and their social circle. He spent a great deal of time in field trips with two mentors who were freethinkers, and learned a great deal of biology. But medicine was not to Darwin's taste.

Not suited to be a doctor. Then what? Charles' freethinking father was an accommodating man, and expected his son to be likewise accommodating. Perhaps he sensed that Charles was moving in a religiously orthodox direction. However it was, Robert proposed that Charles would go to Cambridge University and study to be a clergyman. Here is how Charles described his reaction:

[I] had scruples about declaring my belief in all the dogmas of the Church of England; though otherwise I liked the thought of being a country clergyman. Accordingly I read with care Pearson on the Creed and a few other books on divinity; and as I did not then in the least doubt the strict and literal truth of every word in the Bible, I soon persuaded myself that our Creed must be fully accepted. It never struck me how illogical it was to say that I believed in what I could not understand and what is in fact unintelligible."
(*The Autobiography of Charles Darwin 1876, p57*)

Anglican orthodoxy had won out over radical family influences. One of the texts that Charles was required to study at Cambridge was Paley's *Evidences of Christianity*. This made an analogy between a watch found on the beach and the intricate workings of Nature. A watch, even an imperfect watch, was evidence of a maker. Surely the same had to be true for the amazing works of Nature. Charles wrote:

The logic of this book and as I may add of his Natural Theology gave me as much delight as did Euclid. . . . I did not at that time trouble myself about Paley's premises; and taking these on trust I was charmed and convinced by the long line of argumentation.
(*Autobiography, p.59*)

Charles Darwin's major focus of attention was once again on the study of Nature, a sideline to his B.A. studies. Lectures and field trips with the botany Professor John Henslow were his joy and delight. He made himself into a research and teaching assistant to Henslow. Darwin's skills as a budding researcher clearly impressed Henslow. Just as Darwin was about to leave Cambridge, Henslow was offered the role of naturalist and companion to Captain Robert Fitzroy on the Beagle, whose job would be to chart out sea channels and sea routes along the South American coast. Henslow's response was to recommend Darwin.

His father was initially opposed. But Uncle Josiah (this is Josiah II, whose daughter Darwin would marry) persuaded Robert that this was a great opportunity for this young man of "enlarged curiosity". Thus started a journey that would have world-shattering consequences. Here at last was a challenge for which Darwin was an ideal fit.

Darwin was a relatively orthodox Christian believer when, at age 22 in 1831, he joined the Admiralty ship the Beagle as its naturalist. What was supposed to be two-year journey extended to five years. The journey would take him, among other places, to South America, to Australia and New Zealand. Darwin spent ten days over Christmas 1836 in the Bay of Islands, finding New Zealand "not a very pleasant place".

Papers and articles on Darwin's investigations into geology, plants and animals had already been widely circulated before he arrived back in England in 1836. Ahead of him was the task of completing the writing up. But how did these varied life forms so often come to be fitted in their different ways for the places where they were found?

By 1838, Darwin had convinced himself that evolution was real, and that it proceeded by a process of "natural selection". It would be another 20 years before he presented his "one long argument", as he put it, to the general public. In the meantime, he discussed his ideas with a few trusted scientific friends. He worried about how his ideas would be received. Eight years after returning on the Beagle, Darwin wrote to fellow scientist Joseph Hooker:

At last gleams of light have come, & I am almost convinced (quite contrary to opinion I started with) that species are not (it is like confessing a murder) immutable. . . . I think I have found out (here's presumption!) the simple way by which species become

exquisitely adapted to various ends. - You will now groan, & think to yourself 'on what a man have I been wasting my time in writing to.' - I sh^d, five years ago, have thought so. - "
(<https://www.pbs.org/wgbh/evolution/darwin/diary/1842.html>)

As he assembled the evidence from his researches into the fossils and plants and animals that he'd found, and the way that they were distributed, Darwin felt that an evolutionary explanation was forced on him. Hooker was interested, and wanted to hear more. Hooker became one of a small circle of scientific colleagues with whom Darwin discussed his evolving understanding.

In 1859, Darwin's "Origin of Species" presented his carefully argued conclusions to the general public. It created great controversy. But, slowly, the scientific community, the general public, and even most of the clergy, were won over. It helped that Darwin was careful to hide his own religious views—more about that in three weeks' time.

When he died in 1882, the death of "this great Christian gentleman" was mourned in pulpits up and down the land. He was buried in Westminster Abbey, next to Isaac Newton and astronomer John Herschel.

Alfred Russel Wallace commented that Darwin had

"given us a new conception of the world of life, and a theory which is itself a powerful instrument of research; has shown us how to combine into one consistent whole the facts accumulated by all the separate classes of workers, and has thereby revolutionised the whole study of nature."

(Wallace, A. R. 1895. Natural selection and tropical nature: Essays on descriptive and theoretical biology, page 455.)

Physiologist and Unitarian William Carpenter wrote:

"Not only was he the Philosopher who has wrought a greater revolution in human thought within a quarter of a century than any man of our time—or perhaps of any time . . . but as a Man he exemplified in his own life that true religion, which is deeper, wider, and loftier than any Theology"

(W B Carpenter Charles Darwin: his life and work. Modern Review 1882 3: page 523.)

In a book published in 1871, Darwin wrote:

"that man with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men but to the humblest living creature, with his god-like intellect which has penetrated into the movements and constitution of the solar system—with all these exalted powers—Man still bears in his bodily frame the indelible stamp of his lowly origin."

(The Descent of Man Vol II, p.405)

Unfortunately humans have, as a race, also some very ignoble qualities. What then lies ahead? Human knowledge has advanced to a point where we are to an unprecedented degree in charge of our own destiny. We, today, have been and are creating the environment in which the generations that follow will grow up. There has been much that is good. In most parts of the world, family sizes have reduced dramatically. Public health measures and modern medicine ensure that most children survive beyond childbearing age.

It is a temporary respite. A warming and increasingly stormy planet is already upon us. It is bringing ever-increasing numbers of forest fires, increasingly severe storms, floods, heat waves, and widespread displacement of the large part of the world's population that lives in low-lying areas. Add widespread pollution from plastic and other refuse, and wars that are waged with ever more ferocious weaponry. "When will we ever learn?"

Hymn 138 in "Singing the Living Tradition" has the verses:

These things shall be ! A loftier race
Than e'er the world hath known shall rise
With flame of freedom in their souls
And light of science in their eyes.

. . .

They shall be gentle, brave, and strong,
To spill no drop of blood, but dare
All that may plant man's lordship firm
On earth and fire and sea and air.

Nation with nation, land with land,
Inarmed shall live as comrades free;
In every heart and brain shall throb

The pulse of one fraternity.

Those are noble thoughts. But they do appear to envisage “a loftier race” replacing the present race of humans. If that is indeed what is intended, it is not of much help in the here and now. The challenge is to do better with humans as we are now.

Meditation / Discussion questions.

What gives you hope for the human future?

What fills you with foreboding?

What can we do to help create a better world for our children and grand-children?

Web links that may be of interest:

How Darwin’s Theory of Evolution Evolved:

<https://www.smithsonianmag.com/smithsonian-institution/how-darwins-theory-evolution-evolved-180968981/>

What Darwin Didn’t Know:

<https://www.smithsonianmag.com/science-nature/what-darwin-didnt-know-45637001/>

A Timeline of the Life of Charles Darwin:

<https://www.christs.cam.ac.uk/timeline-life-charles-darwin>