

## Evolution Debate from Philosophy Forum Nov, 2004

All quotations are in red. All responses to quotations by John Donovan unless otherwise noted.

Quote:

Originally Posted by **megashawn**

and damnnit, there is nothing in evolutionary theory which states god couldn't have very well created the first form of life. For all we know this is exactly what happened.

And he could have created the whole damn universe 10 minutes ago, with our memories intact, fossils already in the rocks and distant stars with their light already on the way.

Science can't disprove that God created the universe 10,000 years ago or 10 minutes ago. All science can do is, based on the available empirical evidence, derive well supported, documented, testable and falsifiable theories that explain various aspects of the natural world. At this, science has been enormously successful. For example, the theory of aerodynamics has given us flight.

The theory of evolution by natural selection is one such theory. Another is the germ theory of disease and for that matter the heliocentric theory (that the Earth goes around the sun). All that and more in a few hundred years. Not bad.

By Probeman (John Donovan)

Quote:

Originally Posted by **RandomPrecision**

How can there be an intermediate form between gender-neutral asexual reproduction and full-fledged sexuality?

We "evolutionist-types" begin by acknowledging that there is no necessary connection between *exchange of genetic information* and *multiplication of individuals*; bacteria exchange genetic information amongst themselves (even across species) in a process unrelated to cell division.

Protozoans (like for example *Paramecium*), too, exchange genetic information in a step divorced from cell division. One can say that when two paramecia meet and exchange genetic information, they are "having sex".

(Just some preliminary remarks).

The scenario changes with multi-cellular organisms. For the most part, they don't reproduce by division; (when reproducing asexually) they shed "tiny copies" around. Both primitive plants and primitive animals do this kind of thing. But, like paramecia and bacteria, they still "want" (i.e., it is advantageous for them, therefore natural selection will favor it) to exchange genetic information. Their ancestors did it, so there is no need for a selection pressure to develop it; the only thing necessary is a mechanism that ensures that this will take place.

This mechanism is the coupling of sex with reproduction; with the invention of the *gamete*. Instead of shedding "tiny copies", the organisms shed "tiny half-copies"; this ensures exchange of information and reproduction at the same time.

The first step in the "development of gametes" is called "isogametry" -- gametes with equal size. It seems obvious, doesn't it? Each organism sends, along with its "half-copy", half the necessary material to sustain the "tiny copy" both before it meets its "other half" and during establishment of the new individual. Two equal gametes meet and create a new individual; none of the gametes is "male" or "female", they are both equal.

The problem with this scenario is that it is inherently unstable. There are two opposing pressures against it:

1) It is in the interest of the "parent" to invest as much as possible in each "half-copy". Both for nutritive reserves and in protection against enemies, a big investment is useful. If one can create a number X of gametes, each of them having a chance M of surviving on its own until it meets its other half, it is "useful" (i.e. selection will favor it) to decrease the number X if the chance M increases enough.

2) It is in the interest of the "parent" to spread as many copies as possible. This is basically the definition of natural selection, so there is no need to explain it in detail. It suffices to note the result of it in this particular matter of gamete formation -- it is in the interest of the "parent" to *act as a parasite* of the individuals who follow strategy (1).

These two strategies, being *both* favored by natural selection, will quickly eliminate, in most cases, the isogametic scenario. There is thus a strong pressure towards *anisogametry* -- different gametes. While isogametic reproduction means that each gamete will have roughly half of everything needed for a viable individual, the new scenario means that there will be two main kinds of gametes -- (1) big, bulky gametes with basically everything needed for survival; scarce in number, but with great odds in their favor, and (2) small, sleek gametes with *only* half of the genetic material and basically nothing else, in great numbers, with great odds against them.

Females and males.

The evolution of genders is then almost forced by natural selection. As soon as reproduction by gametes is achieved (and it is necessary for multicellular organisms, as long as they want to exchange genetic material), genders will develop.

The other characteristics of sexual dimorphism are *all* related to the difference in reproductive strategies. As the sketch above shows, females have a lot of investment in their gametes, males have almost none. So they'll want to spread their gametes, while females will want to ensure that only the best gametes get in touch with their own.

The evolution of sex is not only an interesting story, it is also a good example of how natural selection, with no frills, can account for the weirdest things.

By Mariner

Quote:

Originally Posted by **dreamweaver**

Roobarb, I think the point that RP is making is that a non-evolutionist is not *prima facie* a Creationist.

Dream, I'm not aware of any other well supported scientific theories of evolution other than evolution by natural selection. Lamarckism has been out of the picture for a while. Were you considering differentiating non-evolutionists into various categories, such as fundamentalist Christian, Zuni Indians and Hindu for example?

What I find more interesting (and more useful for teaching students) is the fact that there is an impressive spectrum of beliefs that covers creationism. This spectrum ranges from Flat-Earthers to Young Earthers, to Theistic Evolutionists to Atheistic Evolution and many more gradations in between. Of course there is no scientific evidence for any of these BELIEFS, just as there is no scientific evidence for the existence or non-existence of god.

This continuum of creationist beliefs is described very nicely here:

[http://www.ncseweb.org/resources/ar...u\\_12\\_7\\_2000.asp](http://www.ncseweb.org/resources/ar...u_12_7_2000.asp)

By Probeman (John Donovan)

Quote:

Originally Posted by **dreamweaver**

Probeman, you are forgetting that there is another position: that of no particular position. If RP feels that there's a lack of evidence for evolutionary theory (and therefore cannot accept it), and also disagrees with Creationism, it would be -- logically -- right for him to stay in that position.

It should be quite obvious, though, that whenever the theory of "Creationism" is mentioned, that it is the one which is (i) contra-evolution, and (ii) generally proposes a younger date of the earth; and of course, (iii) that there is a Supreme Being who created the Earth, instead. "Creationism" in the common-use of the word, doesn't encompass theistic evolutionists.

If he really has no position, then it sounds more like a case of him "forgetting" the overwhelming evidence supporting evolution by natural selection. In any case, I think it is still useful for you and him to appreciate that not all creationists are of the same stripe. It may be helpful for him to see that it is not necessary to paint a strict evolution/creation dichotomy within a single person. Here is a web site of Christian scientists that have various ways of dealing with evolution while trying to adhere to "sound" science practices:

<http://www.asa3.org/>

Also, don't fall into the trap of using the word "theory" as a guess or hunch, as the general public often assumes. Creationism is NOT a theory in the scientific sense of the word, meaning an explanation well substantiated by the evidence. If someone wants to ignore or forget that evidence, they do so at their peril.

Yes, creationism, at least fundamentalist Christian creationism, generally asserts a younger age of the earth that was created by God, but many religious scientists, especially Catholics, that hold to a creative god, can live with evolution because they can see God as a creative guiding force or at least setting the process into motion by creating natural laws.

However, all forms of religious creation(ism), from flat-earthers to theistic evolutionists (and we could include atheistic evolutionists as well) share a very important trait- belief without, or even in spite of, the evidence.  
By Probeman (John Donovan)

Quote:

Originally Posted by **RandomPrecision**

My, that seems a bit biased. Do you truly believe that it is impossible to not believe in two separate things? What have you to say to agnostics?

It depends. I would truly have trouble believing in two contradictory things. As for agnostics, I have no special problem with them since they tend to have NO beliefs. In a way, scientists without evidence tend to be agnostic in that they will often say "I don't know". Of course, they haven't been agnostic with regard to evolution for about 100 years because of the overwhelming evidence in evolution's favor. After all, being agnostic doesn't mean one assigns equal probabilities to all possibilities.

Don't forget evolution is both a fact in that it occurred without a reasonable doubt, but also a scientific theory in that it's a well supported and widely accepted explanation. Just like germ theory or atomic theory. If you are interested, the cover story for this month's National Geographic is "Was Darwin Wrong?" I think you might find it interesting reading.

Quote:

Originally Posted by **RandomPrecision**

I think dreamweaver mentioned this before, but I don't see what it has to do with the subject at hand.

I have found that once students see creationism as a spectrum of belief, they can more easily decide for themselves on which peg they want to hang their "theistic hat."

Quote:

Originally Posted by **RandomPrecision**

No, of course it's unnecessary. I prefer to argue from the perspective of the negative synthesis. If I oppose evolution, I won't accept arguments against creation as proof of evolution. And if I oppose creation, I won't accept arguments against evolution as proof of creation. Theoretically, people should stick to the issues at hand more than the meta-arguments that arise.

There is no scientific argument against creation. There is no scientific evidence against creation. There never can be and never will simply because you can't put "god" in a test tube. God could have created the Earth 6,000 years ago with fossils already in the rock strata. Science cannot prove this wrong. God could have created the Earth last Thursday. Science cannot prove this wrong either.

Science is merely a process of discovering explanations of natural phenomena that are well substantiated by the evidence.

Quote:

Originally Posted by **RandomPrecision**

To be sincere, I don't care about your perception of creationism. No matter how irreputable you think it is, and no matter how sinful you think it is to believe in something without proof, that doesn't concern me.

I don't think it "sinful" or "irreputable" (sic), just unreasonable.

Quote:

Originally Posted by **RandomPrecision**

Have you anything to say about my question concerning the evolution of sexual reproduction? Do you believe the exchange of genetic material is an evolutionary adaptation, or has it been part of organisms since the beginning of life?

I don't have much to say. I agree, as Mariner pointed out, that exchange of genetic material likely preceded the development of sexual reproduction. I will say that one thing the fossil record (and evolutionary mathematics) does indicate is that inheritable variation is much greater with sexual reproduction, allowing for much faster rates of evolutionary adaptation.

I'm only a chemist, but did you have a specific question?

By Probeman (John Donovan)

Quote:

Originally Posted by **dreamweaver**

If Evolution is the best theory out there to explain the progression of species over the ages, then it will speak for itself; and answering questions that are proffered, will speak for itself. Side comments such as the ones I mentioned would only dissuade a lot of people; though, not everyone.

Unfortunately, no theory "speaks for itself". Theories are defended and attacked by scientists on the basis of evidence, explanatory power and usefulness. Science is a very human process. But there is no scientific controversy with evolution- it is as well accepted as the heliocentric theory that the Earth goes around the Sun (and almost as equally unintuitive I might add for the general public).

I agree that heated words are exchanged by some (including myself)- but it might be helpful to consider that from the scientists's point of view this is an argument that ended over 100 years ago. It gets frustrating from the scientist's perspective when many creationist leaders knowingly make erroneous, emotional and misleading statements to persuade those less educated on the subject.

In science, anyone that falsifies their data or uses fallacies to promote their argument eventually becomes marginalized and ignored. There are plenty of nutballs in science. But these creationist non-scientists, by playing to people's intuitive and emotional responses, can always manage to keep this non-scientific non-controversy ongoing. The vast majority of scientists ignore the popular debate altogether and simply continue to patiently go about their successful work using evolutionary theory everyday.

I suspect you haven't had time to read Darwin's Dangerous Idea, but this month's (November) issue of National Geographic's cover article "Was Darwin Wrong?" is an easy read and several students of mine that were having trouble with evolution said it was very helpful for them. Grab a copy and tell me what you think.

By Probeman (John Donovan)

Quote:

Originally Posted by **dreamweaver**

Probeman, you misunderstand. A theory does "speak for itself", in that the theory proposed (which requires evidence, just as you suggested), and people note that. Of course, I don't mean "speak for itself" literally; the theory is a concept, a proposition backed up by scientific evidence, not a person capable of speech.

You misunderstand me! I am speaking of the manner in which scientific ideas are debated. And that is by scientists well educated on both the concepts and evidence. Not by religious fundamentalists whose faith trumps evidence. The fact that this topic was debated 100 years ago to the satisfaction of scientists then and now, ought to mean something to you. You trust your doctor's theory of germs more than a witch doctor's superstitions of evil spirits. Why? For the same reason- one is educated based on scientific evidence and data the other is not.

Quote:

Originally Posted by **dreamweaver**

And now, I'll hope you'll see that it's not a very efficient way, to go about propounding a scientific theory by telling the non-evolutionist that "everyone believes it" -- particularly when you certainly have the capability, probeman, to substantiate Evolution's validity, as a theory of science.

If someone is really interested in what scientists already know, then they can more efficiently read any number of the popular expositions on the subject that I have constantly referred to in my posts, than have me type it out here and now.

However, I am more than happy to answer specific questions on scientific subjects to the best of my ability.

By Probeman (John Donovan)