

## Darwin and the Origin of Life: A historical perspective **James Strick**

### Post-Lecture Discussion

#### **Division among Darwinians**

**Participant 1:** Just a simple historical question. You mention phrases like “bothersome to his supporters.” It sounds as though his supporters were united in opposition to this sort of theistic interpretation. Surely that’s...many of his supporters were not...

**James Strick:** Well, I used Carpenter, for example, to show that many supporters of evolutionary science did not necessarily see it as in conflict with some sort of theism.

**Participant 1:** Many of Darwin’s supporters went one direction, many went the other--there isn’t a band of unified supporters who went in a non-theistic direction. Or would you think there is?

**James Strick:** I think that there’s extraordinary diversity among the people who have been labeled Darwinians by historians. There’s a wonderful article about ten years ago in the *Journal of the History of Biology* called “Deconstructing Darwinism.” It shows that the extent of diversity was so great that it must have taken an enormous amount of work on the part of at least some people in Darwin’s camp to construct an appearance of a public unified front that could be pointed to as a single Darwinian faction or views on any one of the ideas that the theory raised. So it’s remarkable how much divisiveness there was. But I think you can see that it’s not total chaos. I think, at least if you look at the evidence in the origin-of-life issue, it’s clear that there is some kind of strategizing going on, on Darwin’s part. I think it’s clear that at least some of his senior lieutenants, like Huxley, are in agreement with Darwin about the basic strategy and at least some of his younger supporters, like Bastian, didn’t get it. Didn’t see what they were up to in keeping silent on the issue, and therefore encountered a very rude surprise when after starting to publish on the subject and thinking they were giving tremendous support for the Darwinian theory, and found themselves officially excommunicated and declared non-Darwinians. I agree with you that there was a lot of diversity in the camp. But I don’t think it was so amorphous that there’s not some kind of position about some of the issues if you narrow your view to at least Darwin and his most senior lieutenants, the ones that he most confides to in his private correspondence: Huxley, Hooker, the senior people in the “X” club. There is usually a certain amount of unanimity among them about the strategy on various important issues.

**Participant 1:** You argued that Darwin’s view all along had been with them and that he was unwilling for religious, political or social reasons willing to acknowledge it, rather than another alternative, which would be that those very supporters pushed him into it ultimately, by the time of the third edition.

**James Strick:** It is possible. It's a fairly short amount of time and he pursues his own independent mind despite the fact that the bombardment of criticism from his supporters starts immediately upon its first issue as the book first comes out. He waits a good two years before he finally makes the change that satisfies his supporters. In the meantime the one tinkering that he did with it made them even more angry.

**Participant 1:** That's not significant?

**James Strick:** It says that he had something that he considered important at stake, that he was being pulled in the other direction even while he was writing to them privately that his point of view was the opposite. It's hard to tell, I'm a historian, I'm not claiming that I know Darwin's point of view. These passages that I presented to you are just about the extent of the evidence that exists in public or in private. There's more correspondence among the lieutenants. But Darwin said very little. One sentence that he changed once and then changed again and left for the rest of his life. His entire public corpus on the subject of the origin of life. Among the letters that he sent to his students over 10-12 years are varying kinds of opinions. But what was being expressed at least at the beginning was completely in conflict with the public position that he had taken. So there is clearly something interesting going on there.

**Participant 2:** Among the key advisors of the Darwin circle, two of the most senior and influential ones, Asa Grey in the U.S. and Charles Lyell, both of whom insisted on supernatural creation of life. You mentioned deconstruction of Darwinism. According to Jim Moore, the two purest Darwinians in America were Asa Gray and George Frederick Wright.

**James Strick:** If you make your main criterion: did they take natural selection out of the central part of the...

**Participant 2:** He's wrong. It plays into this point I'm making, but he's wrong.

**Participant 3:** Moore is pointing out that later on Darwin got tired of Gray.

**Participant 2:** But during this period both Gray and Wright made exceptions not only for the origins of life but for the origin of humans. And for Grey and Wright both, for the origin of the eye. These were the most orthodox Darwinists in America, according to Moore. So I think that among the senior advisors there was a lot of dissent over what one should do about the origin of life.

**James Strick:** In the way that I tell the story in my book, the American advisors are less privy to the internal workings of Darwin's strategy, partly because they simply have less access to him. There's no public engagement at all, it's all by correspondence. Partly also because the lieutenants on the British scene meet regularly as a coordinated group to talk about strategy about new science education, and forwarding the Darwinian science agenda in an organized way. I'm sure that does not escape Darwin's notice and that it has

a lot to due with the increased traffic between him and them and their letters about strategy. My own argument would be that there is at least some more confiding in the people in the British scene you might think somewhat more seriously that he was being more straightforward. Usually if he'd gotten an important supporter, like Wallace, whom he knows differs with him about some crucial point, he steps pretty lightly around the topic. He doesn't want to alienate people who support him on other important issues, like natural selection. Wallace is really a funny picture in this regard, because Wallace really took issue with Darwin about supernatural intervention being needed for human origins. Darwin's reply to him was something like, "when you publish that I hope you haven't too thoroughly killed your own and my child," namely the theory of natural selection. There are some pretty serious disagreements between them. And it's very interesting that Wallace, who is usually accounted as someone who clings to supernatural explanations whenever it comes to something people at the gut level have a hard time letting go of, like human origins, Wallace is one of the first and most enthusiastic, to write an absolutely fabulous review of Bastian's work in Nature and say, he's absolutely right, we do need a naturalistic account of origins of life for our underpinnings, it looks like he's done it experimentally. This is one of the most important breakthroughs for Darwin since Darwin. Many of the other Darwinians were shaking their heads about this, but I bet that what they were really shaking their heads about is, how does Wallace make this compatible in his mind? What for many of them seemed like a straight materialistic account of the origin of life--life itself, not man--yet in the same mind he wants to have supernatural intervention required for the creation of the human mind. Wallace is a peculiar character. If you want to see something about deconstructing Darwinism, look at Wallace alone and his positions on different things.

There is coherence about many things, and the system does not look quite as disjointed if you understand some of his underlying assumptions, but that's a real striking one, to me. By the time Wallace was an old man he was looking back and saying--I can't believe I took Bastian's work seriously, or thought that was really important or even true. At some point in his life he realized that his spiritualism was not going to be able to sit comfortably in the same bathtub with a materialistic origin of life. But at the beginning when Bastian is real trouble for the Darwinians, one of the reasons why he was real trouble was Wallace, the publicly celebrated co-discoverer of natural selection is the first person to come out and trumpet that this is the most important contribution to Darwin since Darwin.

**Participant 1:** Question about semantics that you had alluded to, the question of spontaneous generation. Lots of us in this room are working toward an understanding of the materialistic origin of life, which implies that at least once in the universe, life arose spontaneously. There are other people who would argue that life is inevitable in any wet carbon-rich planet, and that life arose countless times. Then there are people who would say that life arose thousands of times on earth alone. You've got a range of opinions but all are in some way descriptions of a spontaneous process. What nomenclature should we be using? What...

**James Strick:** As a historian I wouldn't say my job description is to give prescriptive accounts on this. I hope what I did was sketch out how much of the fact that people could not realize that they disagreed with each other or think that they disagreed with each other, but actually be somewhat more in agreement than they were had to do with the fact that these terms were used in different ways by different people at different times.

Spontaneous generation has a long and chequered history as a term. It usually meant to most of the people using it for most of the history of its use, the sudden rapid appearance of living organisms out of nonliving starting materials meaning literally within hours, or at most, days. That was the most widely understood public connotation of it, though as I said, Bastian specifically rejected that connotation, but he like Huxley realized that the language had such associations from the past that he tried to jettison it and create his own terminology. To Bastian's dismay, Huxley hijacked some of his own terms, redefined them to mean what Huxley wanted them to mean and that was a big part of how Huxley got some rhetorical leverage in the debate over Bastian, by succeeding in redefining some of Bastian's own terms. Bastian was using "biogenesis" up until the time of Huxley's address to mean "spontaneous generation," or "naturalistic origin of life." Huxley defined it to mean exactly the opposite and presented it with the implication that it was his own coinage. And now in all the biology books it says that Huxley coined the term "biogenesis." So both conscious manipulation of the terminology for rhetorical purposes and eliding of differences, because people didn't realize that they were using fuzzy terminology in different ways, both contributed to different parts of the story. People misunderstanding one another both thinking that they agreed and not actually agreeing--and in the other direction.

**Participant 2:** I just wanted to get those terms straight. Huxley's term was abiogenesis.

**James Strick:** Huxley said, the origin of the first living thing from nonliving materials although he was arguing that it could only happen on the primitive Earth, was called "abiogenesis"--life from nonlife.

**Participant 2:** And how is that different from spontaneous generation?

**James Strick:** Namely in the fact that it doesn't have all the radical political connotations that spontaneous generation had and it expressly, because Huxley defined it, says this can only have happened on the primitive earth. So it expressly excludes the possibility of spontaneous generation under any present-day conditions. And Bastian believed that abiogenesis could happen under present-day conditions, not because he had some prominent theoretical reasons for it, but he thought that's what the experiments were showing him. He thought that microorganisms were coming out of his test tubes, and they were hermetically sealed, and they were sterilized to the greatest standard of the day. That was the issue that Huxley happened to get wrong, that he thought Bastian was getting these organisms in his tubes because Bastian was a poor experimenter. He was probably the best of the experimenters among them. The reason they were all getting organisms in their tubes was some of the time that people hadn't yet discovered heat-resistant bacterial endospores. And that was the experimental was the experimental nail in the coffin for Bastian and his position. But the remarkable and interesting thing

strategically is that the Darwinians have an enormous stake in this. They are convinced he is wrong, and that he is an incompetent experimentalist before they have any evidence to suggest that, and in fact from a historical perspective we can see that they were making exactly the same mistake that he was. If anything, they were not sterilizing as well as he was. He was the one that the onus was on to demonstrate that the sterilization was adequate, so he was really going to great lengths.

### **The Popularity of Theistic Interpretation of the Origin of Life**

**Participant 1:** I think you've described quite eloquently the evolution of the scientists on these Darwinian ideas. But I am interested to know about the religious communities. Most of the modern religious communities have come to some accommodation with Darwinist ideas. I just wonder if you can fill in a bit about how we have reached this point where critical thinking about the development of life from one phase to another in accordance with Darwinist ideas. Most practicing religionists would not contest at this point.

**James Strick:** I would like to see the latest numbers from Newsweek. The last time I saw a poll in the New York Times, it said more than 50 percent of Americans don't believe that living things diversify by Darwinian evolution.

**Participant 1:** I would suggest that these are mostly typical of fundamentalist . . .

**James Strick:** This was a nationwide, statistically balanced survey.

**Participant 2:** For a number of years the Gallup poll has been asking the same question: Do you believe that the first humans were created in the last ten thousand years? And the last poll, I believe in 2002, was that 45 percent, and it has varied from 44 to 47, it's been very stable. But what was more interesting was, in this last poll they asked people, if you had to choose a label that would best describe your views, Creationist or evolutionist, a considerable majority would say Creationist. It was up in the sixty percent who would prefer that as a description.

**James Strick:** When I noticed the discrepancies between Darwin's public and private accounts on this subject I assumed some historian accounted for this, and went looking for it and could never find it. And while I was thinking about this and starting to work on it I started asking students about it. And when I would ask them if there is some part of Darwinian theory that for you would be the sticking point--you can go along with an analogical or metaphorical reading of the six days, the seven days, you can go along with the creation of the species by some kind of naturalistic process--for a great many people there was a really significant getting-off-the-boat point at the origin of life. I would argue that Darwin had a pretty sophisticated sense that out there in his audience whether they were clear lucid philosophical thinkers or not, at some gut level for an awful lot of people what mattered to them most about a Creator God, was that a Creator God had to create life. Because if you took that away, then it began to look to them like it wasn't much of a Creator God. And what did a Creator God have to do? Create the universe and create life.

Those are the two most fundamental propositions that define the species. And if you take away one of the two most fundamental propositions defining people's most common-sense notions about what God had to do to be this power over things, that's when it gets uncomfortable. I've definitely gotten the sense from a lot of people that they believe in general in the Darwinian hypothesis (I'm talking about undergraduate science majors), but I found it remarkably common to have people say, "But I'm not really sure about the origin of life."

The other data that might be relevant, I don't think that the intelligent design people, if you look at the strategy, a significant group of ID people are going after the unresolved parts of origin of life research as the place of the great weakness where they are going to drive in the opening wedge. And I think that they're not so unintelligent that they would be putting their resources in that direction if they didn't have some sense that there's a lot of people out there for whom that matters. And for whom that might be the thing that is the sticking point.

**Participant 3:** I can say that Darwinism works pretty well after you get life going. But Darwinism doesn't work very well to get life going. So I can see a set of problems there are different from the set of problems after you've got natural selection and adaptive fit.

**James Strick:** That's essentially what he was saying at the time that the book came out, right? We just don't know anything about this question, and I don't think everything I have to say about what happened after life originated hangs logically on whether I can give you the answer to that question.

### **Information for Replication versus Metabolism**

**Participant:** My question, though, is related to information for replication versus metabolism. It seems to me you need information both for replication and metabolism, at least the genes now are busy replicating and directing metabolism. Do you see that information is needed more intensively in one domain over the other?

**James Strick:** I was describing what Dyson said in his book, which was that he could easily imagine something that he could call a quasi-living system or proto-living system that is just a series of biochemical reactions, perhaps some kind of cycle, or at least a rudiment of a cycle enclosed within a membrane but that as yet is only replicating (Dyson says "reproducing," to distinguish this early inexact process from the later high-fidelity of nucleic acid replication) in the sense of the earliest experiments we heard about. Well, no, not even, because they are not even nucleic acid molecules in the membrane but relatively poor molecules at replicating anything including more of themselves. But in the beginning before there was any competition such a thing could exist for some amount of time. There are at least some people who are perfectly comfortable with calling it alive before it could replicate perfectly.

## **The Urey-Miller Experiment and Public Response to the Origin of Life**

**Participant 1:** Why are people responding to the origin of life so badly? I think the fault is ours because we are taking the silly Urey-Miller as the story of the origin of life, and it's not a story of the origin of life, it's a story about random free-radical chemistry and we have put it in textbooks and encyclopedias and so on, and the public out there realizes better than the scientific community how silly it is.

**James Strick:** Especially science majors, who can see that in the last 25 years, the consensus in the community has been that most of the conditions in the Urey-Miller experiment don't describe the prebiotic Earth.

**Participant 1:** I think by taking this one point of view and selling it so hard, we have done ourselves harm.

Strick: You can see from the point of view of textbook writers that it is such a tempting nugget to pick up. It lends itself to a discrete presentation in a textbook. You can almost say the whole thing with the picture.

**Participant 2:** I think it's something simpler than that because it goes longer, if you follow Darwin's argument it is very simple to follow. I have yet to meet a Creationist who doesn't agree that pigeons have been bred and we look more like our parents than someone else's parents and so on. It becomes a very easy transition to push a little further. But the origin of life is a very different question that's not nearly as accessible to our everyday experience and that's why I think there's a great divide.

**Participant 3:** Once we understand it, it won't be such a great divide.

**Participant 2:** It still will be because it's not common to everyone's experience.  
[several unintelligible voices]

**James Strick:** If some of the latest stuff turns out to be true, the origin of life is going to have some significant non-Darwinian features. Horizontal gene transfer is so promiscuous, etc.; it's going to look like there's what Woese calls a "Darwinian threshold," and by the time you get to the Darwinian threshold, you're already well past the point where most of us are going to say, the origin of life already happened. So there may be very significant non-Darwinian features.

If we teach it to our students as part and parcel of the neo-Darwinian view of life science today we need to go out of our way to make them understand that it is qualitatively different, and prior to the Darwinian system ever kicking in, if we're going to head this thing off at the pass and have those polls looking different twenty years from now.

**Participant 3:** Many of us define life, like Jack did, in terms of Darwinian processes, and you can't say Darwinian processes originate life if your definition of life is something that undergoes Darwinian processes. It's logically inconsistent.

**James Strick:** Before there is any part of the system that holds together coherently enough genetically for any kind of selection to act on it in any kind of meaningful way. When horizontal gene transfer is that promiscuous, it doesn't stay that way long enough to be selected on in that genetic combination.