

## No Mystery in the NCSE

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In 2002 a video entitled “Unlocking the Mystery of Life” (“UML”) was released by Illustra Media. Following this release, the National Center for Science Education (“NCSE”), which is dedicated to “defending the teaching of evolution in the public schools,” dedicated a portion of its website to a critique of UML.

This critique enjoys a prominent link on NCSE’s homepage and currently consists of (i) an exposition of the relationship between Illustra Media and Discovery Media entitled “Unlocking the Mystery of Illustra Media,” (ii) a page indicating that UML has been enthusiastically received and is being promoted by a number of Christian/creationist organizations, (iii) a short disclaimer issued by WNYE upon airing UML, (iv) a short statement issued by Bob Park of the American Physical Society, and (v) letters by Andrea Bottaro to WNYE and by Daryl Domning to Maryland Public Television.

The NCSE’s critique of UML is an interesting bit of investigative work and provides a nice smorgasbord of ad hominem attacks and genetic fallacies. However, other than a couple of points raised in Domning’s June 11, 2003 letter and Bottaro’s June 30, 2003 letter, I had trouble finding any substantive critique of the documentary.

As a result, in July 2003 I wrote to both Domning and Bottaro, and they both responded with very kind email letters that confirmed the substance of their letters posted on the NCSE site. I am appreciative of Domning and Bottaro taking time to respond to my inquiries and to clarify their positions. I also wrote to the NCSE and inquired whether any substantive scientific critique of UML would be forthcoming, and was advised that a critique of the science contained in UML would be posted “in the very near future.” I realize that everyone is busy and that the ensuing silence may be occasioned by a lack of time, but it is now mid November and there has been no further scientific critique posted.

Given the reactions generated by UML, I was intrigued to finally run across a copy in the local library last week and promptly watched it. I assume that I viewed the same version critiqued by the NCSE, and having read the NCSE postings, as well as the further correspondence from Domning and Bottaro, I was prepared to be disappointed with UML. On the contrary, however, I found UML to be a quality production that provided a good introduction to intelligent design and some of the problems with traditional evolutionary theory. As a result, I felt it might be appropriate to respond to some of the criticisms of UML posted on the NCSE website.

I will ignore for present purposes the numerous ad hominem attacks and genetic fallacies that constitute the bulk of the NCSE’s critique, and will limit my remarks to the few substantive issues raised by Domning and Bottaro.

### Domning’s Letter

Domning charges that UML was “subtly designed to mislead,” and cites 5 specific examples. For ease of discussion, I will quote Domning’s statements and then provide my take on each.

“The first person presented onscreen was Philip Johnson, a key figure in the ID movement. The rest of the program featured ID advocates with scientific credentials, and Johnson reappeared toward the end to state his own definition of ‘science,’ as though he were himself a leading scientist. Viewers were never told that he is, in fact, a professor of law.”

In fact, Johnson appears a few times in UML, and is quoted twice. The first time he is quoted, he is

clearly listed as “Professor of Law, UC Berkeley.” The second time, he is listed as “Author, Darwin on Trial.” Thus, there is no deception in the references to Johnson’s credentials.

Johnson’s statement regarding science is: “Now that’s my definition of good science – it’s observation of the facts.” While admittedly this definition may be incomplete, the context of Johnson’s statement, as well as Johnson’s point in making the statement, is that scientists should be willing to look at data objectively, without preconceived assumptions, and go where the data leads them. It is unclear to me how a call for “observation of the facts” might be objectionable to scientists.

“The animation sequence of the voyage of HMS ‘Beagle’ gave the clear impression that the expedition touched only at the Galapagos Islands – ignoring the fact that it spent most of its time exploring the coasts of South America and other Pacific and Indian Ocean islands. This inaccuracy planted the subtle and false impression that Darwin’s evolutionary views were derived from only a few observations made in only one locale, when in fact they were based on widely-gathered data of many kinds.”

I agree with Domning that the animation sequence creates an inaccurate impression. Domning and I have corresponded about the brief program time allotted for UML, the need to edit material and keep things short, and so on. Certainly the purpose of the animation sequence is not to provide an exposition of the Beagle’s voyage, but to provide a bit of background on Darwin’s theory. In addition, UML does discuss some of Darwin’s other endeavors, such as his observations of domestic breeding, in particular pigeon breeding, which formed an important part of his Origin of Species. Thus, on balance, I do not think there is any reason to believe that the animation sequence is part of a subtle plot to mislead. I do agree with Domning, however, that UML should have taken a few extra moments to mention the greater voyage, as well as some of Darwin’s other observations during the journey.

“The lengthy discussion of molecular biology made reference to ‘a feature of molecular machines known as irreducible complexity’ – as though this concept were a standard one accepted by all molecular biologists as a ‘feature’ of the real world. In fact, the term ‘irreducible complexity’ is used only by the handful of ID proponents (Michael Behe in particular), and its validity has been refuted, repeatedly and in detail. It is not used at all in the mainstream scientific literature. No contrary views were noted, however.”

There is a bit of equivocation going on here. The fact that certain biological systems need all parts to function and that removal of a part from such systems jeopardizes function is a true feature of the real world, and is in fact accepted by most biologists. The question is not whether such systems exist, but whether a Darwinian mechanism can explain their existence. This distinction was made quite fairly in UML.

Specifically, Behe argues that a Darwinian mechanism cannot explain the existence of these systems, and therefore coined the term “irreducible complexity” to indicate that successive slight variations, which are what Darwinian theory requires, could not account for the existence of these systems. It was clear from Behe and others quoted in UML that this represents a minority viewpoint in contrast to the standard evolutionary paradigm presented throughout the educational system at large. UML acknowledged that the standard evolutionary paradigm is “generally assumed” in biology and is “widely accepted.”

Domning charges that irreducible complexity has been “refuted, repeatedly and in detail.” I assume this is a reference to weak attempts, like those by Kenneth Miller, to explain the existence of these systems on evolutionary grounds. I should admit here that my use of the word “weak” is from the viewpoint of an outsider looking at the facts. However, if one is committed to a materialistic

philosophy that a priori excludes the most likely explanation, and if one must explain the existence of these systems by reference to a purely naturalistic evolutionary mechanism, then Miller's efforts might even look like a "valiant" attempt. In either case, Miller's efforts fall far short.

Darwin acknowledged that if an irreducibly complex system could be found, his theory would "absolutely break down." However, despite the widespread existence of these systems, keepers of the evolutionary faith are reluctant to admit that the theory has broken down, and instead prefer to deny the existence of the systems themselves. It's the old rule of blame the data, not the theory.

"A major contention of the program was that without DNA there can be no self-replication of molecules, and hence no natural selection. No mention was made of the widely-discussed possibilities that self-replication of RNA or even simpler organic molecules could have preceded the synthesis of DNA."

This discussion of the self-replication problem Domning refers to is in the context of origins of life ("OoL") research. True, there are widely-discussed possibilities in scientific literature about things that could have preceded the synthesis of DNA. OoL possibilities have been discussed for decades, from Darwin's "warm little pond," to Oparin's chemical evolution, to the Miller-Urey experiment, to Kenyon's and Steinman's biochemical predestination, to more recent fashionable ideas like Stuart Kauffman's self-organization or the hypothesis of an "RNA World."

What evolutionists fail to see, however, is that none of these theories accounts in any way for the information content in DNA. To address Domning's specific complaint, it makes no difference whether RNA preceded DNA. The RNA World hypothesis is a mildly-interesting idea, borne out of frustration with other OoL ideas and an effort to avoid the DNA problem, but it is completely impotent to explain the existence of genetic information.

The point of the OoL segment on UML is to give a general background on OoL, from Darwin to Oparin to self organizational theories, and to give some personal background on Dean Kenyon and his growing frustrations with OoL research carried out under purely materialistic assumptions. I agree with Domning that UML purposely fails to discuss the RNA World hypothesis. However, I do not agree that it is the result of an intent to deceive, but rather an editorial decision to not waste time on all the various and sundry OoL ideas that do not resolve any of the fundamental origins questions anyway, particularly not the existence of genetic information.

"A telling contrast between ID and real science was inadvertently revealed in the quotes from Darwin in which he emphasized testable predictions of his theory – e.g., that no complex organs would be identified that could not have been formed by successive slight modifications of simpler ones. (In fact, no such complex organs have been identified, including the much-ballyhooed bacterial flagellum, whose simpler origins have been outlined by Kenneth Miller and other molecular biologists.) ID, in contrast, has made no testable predictions, on this program or elsewhere, and for this reason it is disregarded by most scientists."

I am not sure Domning's last statement qualifies as a substantive critique, but I will briefly address it anyway. The humorous thing about citing Darwin's emphasis of "testable predictions" is that Darwin's theory, which by its very nature deals with historical events, is itself not subject to empirical testing in any meaningful sense. Further, in contrast to Domning's assertion, numerous organs and systems have been identified that cannot be adequately explained by Darwin's theory. However, rather than showing how these can actually be created, evolutionists follow Darwin's example of hand waving and misdirection, coupled with cute bedtime stories of how organism x might have evolved over time to organism y, just don't ask for any details, please.

Finally, Domning is wrong to assert that intelligent design is not testable. Intelligent design would

die a quick death if it could be shown that information content could be produced by random, naturalistic factors. Thus far, no-one has offered any evidence on that score.

### Bottaro's Letter

Bottaro's letter and its related attachment are much longer than Domning's letter, but contain only three substantive scientific points. Two of these – OoL hypotheses and irreducible complexity are similar to Domning's critiques, but I will address Bottaro's wording as well.

“The most glaring omission deals with UML's discussion of Origins of Life (OoL) science. The only non ID-based views on OoL discussed in the video are those proposed, in the late '60s, by one of the current ID proponents, Dr. Dean Kenyon. According to UML, those models have been later shown by Kenyon and colleagues to be insufficient to explain key aspects of early molecular and cellular evolution. In fact, most of Kenyon's original views have long been superseded by more thorough, and better empirically supported, scientific hypotheses – indeed, it was those hypotheses and evidence that led to the demise of Kenyon's ideas in scientific circles long before ID Creationism appeared on the scene. Alas, what is arguably the current (and has been for more than a decade now) favored hypothesis about OoL, the so-called “RNA World” model, finds no mention whatsoever in UML. This is not surprising, perhaps, since the objections raised in UML by ID proponents to Kenyon's original theory would not stand against this new model. Thus, the viewer is given the false impression that the current scientific choice is between ID Creationism and its outright miraculous Origin of Life, or Dr. Kenyon's outdated 1960's theory. Of course, our understanding of OoL is still very limited, and highly speculative. Nevertheless, it is far more advanced and scientifically solid than the UML parody would want its audience to believe.”

Actually, UML does discuss Darwin's “warm little pond” musings, and Oparin's chemical evolution, as well as Kenyon's biochemical predestination. It is appropriate that chemical theories should have received most of the discussion, as Oparin's theory and the subsequent Miller-Urey experiment are still standard OoL fare in biology textbooks.

Bottaro makes much of the fact that Kenyon's ideas were superceded before intelligent design came along. This is true, and is frankly acknowledged in UML: “As Kenyon re-evaluated his theory, new biochemical discoveries further weakened his conviction that amino acids could have organized themselves into proteins.” Kenyon himself states: “The more I thought about the alternative that was being presented in the criticism, and the enormous problem that all of us who worked on this field had neglected to address – the problem of the origin of genetic information itself – then I really had to re-assess my whole position regarding origins.”

The whole point of this segment is that science has no explanation for life without genetic information. As Stephen Meyer asked in UML: “What do we make of the fact that there is information in life? . . . That's the fundamental mystery – where does that information come from?” And Scott Minnich pointed out: “This problem is never addressed by opponents of the irreducible complexity argument.” Miller certainly does not address it in his co-option musings, and Domning and Bottaro do not address it either.

Indeed, Bottaro seems to miss this point altogether, and conveniently ignores the fact that none of the currently-vogue hypotheses regarding OoL – whether panspermia, volcanic pools, hydrothermal vents, mud globules, or an RNA World – provide any answer at all to the source of the genetic information contained in DNA. Thus Bottaro is simply incorrect to suggest that the RNA hypothesis would respond adequately to the concerns raised about Kenyon's theory.

Ultimately, Bottaro acknowledges that “our understanding of OoL is still very limited, and highly

speculative.” I couldn’t agree more, and thus find it neither surprising nor offensive that UML did not waste additional time talking about the latest “highly speculative” OoL fashions, each of which is impotent against the real question of information content.

“Other mistakes in UML include an equally superficial, almost mockingly simplified discussion of cooption, a crucial evolutionary mechanism for which in fact significant evidence exists in the biological world. UML’s ‘experts’ even commit a basic error regarding the role of nucleic acids in the cell, which are presented as uniquely involved in genetic information storage and transfer, while it is now well known that they are directly active in crucial molecular processes functionally comparable to those carried out by protein enzymes – a key piece of evidence in favor of the ‘RNA World’ hypothesis mentioned above (and the possible reason why it also went unmentioned).”

I have to say I was actually surprised that UML even discusses co-option. I do agree with Bottaro that UML’s treatment of the subject seems a little patronizing, but it is difficult not to be cynical if co-option is the best that evolutionary theory can do. The basic idea of co-option is that an organism can take parts already in existence to construct a new system. (I use “construct” very vaguely here to be nice and to understate the enormity of the problem. “Construct” sounds like some kind of plan is in place, which of course evolutionary theory cannot have. In reality, the organism is left to, what shall we say, borrow, mutate into, morph into, miraculously adopt, whatever.) Co-option is a nice idea, but only works if all the parts are available – within the same organism and at the same time.

More important, as adequately addressed in UML, is the fact that genetic instructions are required to carry out the construction of the new complex system that is made up of the co-opted parts. Further, other molecular machines and processes are necessary to regulate the construction process itself. It is hard to take co-option very seriously when it doesn’t even address the essential questions.

Finally, I am not sure that UML gives the impression that the only function of the nucleic acids is information storage and transfer. Bottaro is no doubt referring to a statement by Jed Macosko that “all the day-to-day jobs – cleaning up the cell, making energy – it’s all proteins.” This statement may be an inaccurate over-generalization, and if so, Bottaro is correct to take Macosko to task. However, the point of the segment, and the context of Macosko’s statement, is that proteins are critical to life as we know it, and that genetic information is required to properly assemble these proteins. Again, despite Bottaro’s protestations, the RNA World hypothesis is not discussed because it is irrelevant to explaining how the genetic information required for the formation of proteins came into being in the first place.

“The crucial argument underlying the whole ID philosophy, widely discussed in the video, is the concept of ‘irreducibly complex’ systems, and the purported impossibility of conventional evolutionary mechanisms to generate them. Although it was quickly rejected by biologists on theoretical and empirical grounds, ‘irreducible complexity’ has remained the main staple of ID Creationism. Ironically, this argument was just recently delivered a fatal blow in the prestigious science journal *Nature*, where a computer simulation based entirely on evolutionary principles (undirected random mutation and selection) was shown to be able to generate ‘irreducibly complex’ outputs.”

Actually, a more fundamental question is that of specified complexity and information content. These points are regularly ignored by evolutionists, and are ignored by Bottaro as well. Nevertheless, the concept of irreducible complexity is an important challenge to evolutionary theory and deserves to be addressed.

Bottaro charges that irreducible complexity has been rejected on “empirical grounds.” This is simply false, as there is no empirical evidence whatsoever to indicate an evolutionary path to

complex systems. There may be some theoretical ideas and a few nice stories out there, but certainly no experimental empirical evidence. Bottaro's suggestion that a computer simulation delivered a "fatal blow" to the idea of irreducible complexity is also inaccurate. Invariably these simulations incorporate the very thing that they are trying to prove can arise through random natural processes: information content and a path to a complex system plan.

If Bottaro accepts co-option stories and inadequate computer simulations as a "refutation" of irreducible complexity, then Bottaro is willing to accept a much lower level of proof for evolutionary theory than the proponents of intelligent design have offered for their position.

## Conclusion

UML is a well-made introduction to intelligent design, with appropriate discussion of some of the key difficulties with traditional evolutionary theory. While the documentary could no doubt have been improved in some respects, like the animation of the HMS Beagle voyage or clarification of the expanded role of nucleic acids, it certainly was not "subtly designed to mislead" as Domning charges, or a "systematic distortion of mainstream science" as Bottaro charges.

The key points raised by UML are that (i) certain biological features exhibit a complexity and integrated functionality that cannot be explained by traditional evolutionary mechanisms, and (ii) information content cannot be generated by random materialistic processes and is best explained by reference to an intelligent source.

Notwithstanding Kenneth Miller's prolific imaginations on the first point, irreducible complexity remains a significant challenge to evolutionary theory, as it has from the day of Darwin. On the second point, there is not one iota of credible evidence that evolutionary processes can generate the information content stored in DNA. This is the fundamental issue raised by intelligent design, and is the point on which intelligent design must be engaged and refuted by the scientific community.

A moment's reflection by the objective observer would be sufficient to acknowledge that information content presents a very serious challenge to evolutionary theory that needs to be addressed. Unfortunately, Domning, Bottaro, and the NCSE reveal themselves as less than objective observers, as they try to deflect attention from this glaring problem through a series of lesser issues and editorial complaints.

I am still waiting for the further scientific critique of the key issues raised by UML as promised by the NCSE, but I am beginning to suspect that a detailed scientific critique will not be forthcoming any time soon.

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