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Kelly C. Smith

Clemson University, kcs@clemson.edu

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FEATURE

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Kelly C Smith

IT WAS A DARK AND STORMY NIGHT

When I was an undergraduate many years ago at Georgia State University, I had a biology class with Fred Parrish. I vividly remember him relating the tale of his harrowing experience debating a creationist, about which he later wrote a classic cautionary article (Parrish 1988). I went on to become a philosopher of science and evolutionary biologist myself, and I make it a point to teach my students all about the dangers of debating creationists (see, for example, Bartelt 2004; Naff and Bechtel 2003; Edwards 1982). So when I accepted the latest evolution debate invitation to come my way, I thought I knew what I was doing.

In May 2011, I received an email from Clemson's media relations department notifying me that someone needed an evolution expert to call in and debate evolution for an internet radio program out of Pittsburgh called The Total Education Network. The notice had come to the media people through ReporterConnection.com, a service that helps connect reporters on a deadline with relevant experts. I am sufficiently passionate about the need to educate the public that I try to participate in these sorts of things when time allows, and since I was basking in the warm afterglow of having completed spring grading, I decided I would look into it.

The debate was to be the following evening, so time was very short. Keeping in mind all those pitfalls I teach my students about, I first did an internet search on my opponent, a Rob Roselli. Roselli, it turns out, is an engineer who has written on a variety of right-wing and conspiracy themes and seems to be the crudest type of young-earth creationist. As far as a debating adversary goes, he's definitely a lightweight. Indeed, the engagement promised to be the sort of blowout PZ Myers wrote about so amusingly four years ago (Myers 2008). The trick, I thought, was going to be not giving free rein to the kind of rhetorical acid Myers wields so effectively in his article. It's not that I have any objection to acid, mind you—I was delighted when my recent piece in *Synthese* received “first prize” for “condescension and sneers” (Luskin 2011). But there's a place to be brutally honest and a place to be diplomatic. In this situation, my target was the audience of the show, not Roselli. I had to be sensitive to the fact that many of the listeners would likely be put off by too “direct” an approach. So it seemed my problem would be trying to make my points clearly and forcefully without coming across as a condescending, pointy-headed intellectual.

I e-mailed the host, Neil Haley, that I would be willing to help out if the format seemed okay. I heard back the next morning that he would like to have me come on and that I

should call in at 10:38 PM that evening. He didn't say anything about the format, and he didn't answer a follow-up e-mail along these lines, but he did mention that he was having e-mail problems, so I decided to let it slide. The extremely precise timing was a little weird, but I assumed that he just wanted me to call in about twenty minutes before the show began at 11 to make sure we had an opportunity to go over the rules, check phone lines, and so on (this is not unusual for phone interviews).

That evening I finally had an hour free to listen to an earlier show with Roselli on the same radio station (Total Education Network 2011a). This just increased my level of confidence, because it was clear Roselli didn't really know much of anything about science in general, much less evolution. The tactic he repeated over and over was to put his opponents on the defensive while avoiding saying anything specific himself—in particular, he kept coming back to the supposed inconsistency of the laws of motion with the elliptical orbit of the planets. The pro-evolution callers on that show were well-intentioned, but none of them had either the science background or the rhetorical skills to deal with this very effectively. So I was confident, but to be sure, I took some time to think about how I would respond to Roselli's favorite issue.

At 10:35 PM, I called in. I was expecting to meet the host and Roselli, go over the rules, and so on. Instead, it immediately became clear that the show has been going on for some time, and I was on the air, like, *now*. Not only was this totally unexpected, but since I was on the air from the very first second, I couldn't really ask questions about the format or take time to collect my thoughts. It also didn't seem a good sign that, instead of being introduced as an expert, I had to remind my host who I am and why I am there. After I regained my footing a bit, I thought to myself, "Well, I have 25 minutes and I am familiar with Roselli's arguments, so there is still enough time for the relative weight of broadsides to register tellingly."

I did make a few good, if extremely elementary, points. For example, I explained how evolution's status as a "theory" is not a bad thing if you consider what a scientist means by that term. You can listen to the performance for yourselves (Total Education Network 2011b, beginning about 35 minutes in) but to give you some idea of how very elementary it was, here is a paraphrasing of one exchange:

ROSELLI: I'd like someone to tell me where we can find one transitional fossil.

ME: Well, pick any natural history museum in the country—there are hundreds of museums with thousands of such fossils on display.

HOST: Wow! You are the first of our guests to say you can find a transition-type fossil!

With some effort, I avoided channeling Myers with a snarky comment about the level of the "debate" or the provenance of the previous guests. Then Roselli asked me his favorite stumper about the laws of motion, and I responded with a thought experiment showing the inconsistency he makes much of just is not there. The preliminary sparring out of the way, I was then ready to ask Roselli a few questions of my own. For example, why do we not find any fossil birds below a certain geological layer? Why do so many different dating methods indicate a very old earth? Why are there so many examples of seemingly poor design? I wanted to show the audience that, even if modern evolutionary theory is not per-

fect, it's far better than anything the creationists can come up with. However, just at this point, the host thanked me and politely shepherded me off the air!

The abrupt end of my involvement was even more surprising than my entrance had been. I was prepared for complex creationist arguments (though I didn't really expect them from this particular opponent). I was on watch for rhetorical sleight of hand. I knew to be careful to present myself as studied and reasonable. But it simply never occurred to me that I would only be on the air for about six minutes, which is not enough time to make a concerted argument of any description. As I listened (muted in the wings) to Roselli blather on about my counterexample being "too philosophical", it gradually dawned on me that, for the purposes of this "debate", I had been granted the exact same status as a Pittsburgh housewife with time on her hands and a pet theory about evolution.

THE PERILS OF AN INFORMATION DEMOCRACY

I admit that my first reaction was anger—it take enormous chutzpah to use the Reporter-Connection system to get professors to fill the ranks of your call-in show! It also seemed a colossal waste of my time, since I didn't really get to land a telling blow (though fortunately the very next caller was an articulate MD who made many of the points I had planned to make, making me feel much better). But the more I thought about it, the more I became convinced that what had happened to me was important to discuss within the evolutionary science community. I had prepared for the last war, but things have changed and we need to shift tactics accordingly.

What we take for granted is what usually gets us in trouble. As experts, we are used to having center stage and receiving a certain amount of deference from the lay public. Our methods of presentation assume that we will be given the time to make involved arguments and that the audience is at least somewhat interested in hearing them. We understand that we need to pitch our material at a level non-experts can appreciate, but other than that we usually don't change our tactics much from what we would do in a classroom setting. Even someone like me, who has written on the critical need to target the average Joe or Jane in one's evolution presentations (see Smith 2011), was caught completely off guard when these implicit expectations failed to be met. Whether we like it or not, more and more of the public engagement with creationism will be in these kinds of venues, where the audience's commitment to anything like a serious discussion cannot be assumed.

Now, one obvious lesson to be learned from this experience is never to assume that "debate" means actual debate. The problem was that this wasn't a debate in any sense of the word, even the "traditional" creationism/evolution format with rules tilted toward creationists. Indeed, though the listeners of Total Education Network were exposed to fully two hours of talk about evolution, very little of it even rose to the level of intelligent discussion. If the host, Neil Haley, is a creationist with an agenda, he is an exceptionally inept one, because it's hard to imagine picking a less capable champion for your cause than Roselli. My guess (and it's hard to know, since subsequent attempts to communicate by e-mail have failed) is that Haley is sincerely interested in exploring the topic. It's just that he himself is so profoundly ignorant concerning science in general and evolution in particular that he honestly considers Roselli to be well informed; and his intuitive notion of an intellectual exchange is having lots of people say lots of interesting things, whether they have any deep understanding or not.

As this style of media presentation becomes more and more common, the American public is increasingly assuming an implicit, unquestioned attitude towards information exchange which differs importantly from what experts expect. I call this attitude “democracy of information”. More and more information is easily available with modern technology, and that information represents an increasingly diverse sampling of the opinions of other people. As a consequence, these attributes—ease of information flow and diversity of content—are coming to be seen as good in and of themselves. Of course, there is much good that comes from having both free flow of information and high diversity. But they are certainly not good without qualification, as my own experience shows.

In the old days, if you wanted to learn about something, you had to visit an expert. If you lived in ancient Athens and you wanted to learn a little trigonometry, you had to walk down to the agora and invest some time hanging with, say, Aristotle. Things were certainly democratic in the sense that you were free to disagree with the old man, but he was also free to point out the error of your ways. Moreover, the exchange between you would be publicly judged by others who cared enough to show up and listen. For thousands of years, this is how information was disseminated—from the experts to the learners in a more or less direct fashion.

To be sure, the democratization of information has been underway for some time—at least since Gutenberg. However, until very recently, the activation energy needed to disseminate one’s ideas was still relatively high. Books have been (relatively) easy and cheap to print for the last hundred years, but not so easy and cheap that publishers would print anything from anyone. If you view this process as a kind of natural selection of ideas, the fitness function determining which ideas thrived and which withered was defined by truth. And truth was judged by the collective opinion of experts (scientists, publishers, and so on.). That’s because the experts decided when and where they would present ideas and learners had to accept that if they wished to learn. Experts have thus become used to a seller’s market, if you will.

For some time, however, the situation has been changing. It is no longer necessary to visit an expert at all, even indirectly through his books. Instead, learners can get their information from a wide variety of sources with trivially small amounts of effort and all manner of people have taken advantage of the new technologies to post their pet theories and claims for the world to see. The result is a stupendously huge mass of “information” which has not been tested, vetted or critiqued in any way. To make matters worse, there is evidence that people respond to such diversity by selectively accessing information which confirms their existing opinions (see Knobloch-Westerwick and Meng 2009). The information market is now very clearly a buyer’s market to which the sellers—experts like us—have yet to adapt.

In one sense, this is a golden opportunity for the experts. After all, what we are good at is evaluating information. A scientist, for example, will examine all sorts of evidence and apply the tools of scientific method to try to determine, as objectively as possible, which ideas seem best supported by the evidence. Almost any idea can claim some evidence in support of it—the question is how good that evidence is, both in absolute terms and relative to the evidence for competing ideas. So there is clearly lots of work in this new democratic information system for the experts. The problem is that we now have to compete for

the job. The lay public decides who they will listen to and they have to be convinced of our value, and on their terms, since we no longer have a monopoly on information access.

Even if the public is convinced of the need to talk to an expert, it's not at all clear they will choose the right expert. One effect of democratic information flow is to increase the number of people claiming to be experts, so how does the public figure out who really knows what they are talking about? The Dunning-Kruger effect (Dunning and Kruger 1999), for example, suggests that people who know least about evolution will probably feel more confident of their ability to detect accurate evolutionary information compared to someone who actually knows more about the subject. If the public is not even exposed to information from genuine experts in venues they frequent—for example, on a call-in radio show—then the problem of detecting pseudo-experts becomes more difficult still.

While there is nothing specifically creationist about the democratization of information, it is nevertheless a trend which plays to the creationists' advantage. In many fields of science, including evolution, the scientist has the challenge of explaining something which is both complex and counterintuitive. To the average layperson surfing creationist websites, the information found there seems as authoritative as what the evolutionary experts say, fits well with their own preconceptions, and flatters them by making it clear they are intelligent enough to make up their own minds about this. Contrast that with the nasty scientist, who has the unenviable task of pointing out to interested but clueless parties that they really don't know what they are talking about. Then she must try to explain complex evidence that doesn't make a lot of sense without a fair amount of effort. Listeners are left with the choice of believing that the scientist is right and thus they have been making fools of themselves, or that the nasty scientist is trying to trick them and they were right to believe the other "experts" all along. We are all loath to confront our own foolishness, even when presented with the evidence.

This dynamic helps explain a puzzling situation most of us have probably encountered where people with little background in biology spend just a few hours on the internet studying creationist sites and somehow manage to convince themselves that they have found basic errors of logic or scientific method in evolution. These errors are always blindingly obvious, yet they have somehow escaped the notice of thousands of actual scientists. In my experience, it is extremely difficult to talk to such a person without coming across as condescending.

LESSONS LEARNED

Getting back to the "debate", we should perhaps all be aware that being asked to weigh in for just five minutes in some passing way is going to be increasingly common in a culture of short podcasts, tweets, and internet blogs. Even we "experts" make use of increasingly short presentations—for my part, I am addicted to *Scientific American's* 60-Second Science podcast because it allows me to productively mine very small blocks of time in my busy schedule. But this shift forces us to reconsider our tactics as well.

In this case, for example, I would have been well advised not to use my carefully prepared thought experiment about the Big Bang. It certainly did address Roselli's favorite argument, but it was also too complicated to use in a situation where I could not be sure either that I would be allowed follow-up to deal with confusions or that the audience was

listening with sufficient care to follow all the intricacies of a hypothetical analogy. Instead, I should have simply deflected discussion of the Big Bang by pointing out (quite correctly) that this is only tangentially related to evolution. I also should have opened with questions of my own to put my adversary on the defensive—even just five minutes of listening to Roselli stumble for answers would probably have been very effective.

After that, the lessons are harder to draw. Perhaps I should have taken the advice I give my own students about the necessity of having the ground rules for any debate spelled out clearly in advance. But would it have been better for me to refuse to talk on this show at all? In traditional debates, it may well be better to refuse to participate than be made to look the fool by a rhetorically skilled opponent. But, in fact, I made a few good points—just not as many or as effectively as I would have liked. To some listener who has never thought much about what “theory” means, my two sentences on that subject might have triggered an epiphany.

Besides, it is a zero-sum game—if people who know what they are talking about refuse to enter the fray, then others who do not know what they are talking about will try to defend science in their stead. Listening to the callers to these two shows, it seems that in some ways more harm was done to science by its defenders than by its detractors. Therefore, despite the difficulties, I don’t think it would have been better not to participate.

Perhaps I should have agreed to participate, but then been more vocal when I found myself being ushered off the air so quickly? I could have pointed out, for example, that I was the only actual expert they had gotten on either of the two shows and thus I deserved a bit more time to defend the honor of science. This might have bought me a few more minutes. On the other hand, since the producer has his finger on the button and there is a seven-second delay before anything I say gets on the air, I might just have been cut off (not uncommon in talk radio when the host is being seriously challenged). Moreover, it’s not clear how a more aggressive stance on my part would have affected the chance of my points being taken seriously by the audience. I honestly don’t know about this one, partly because I have no real data on the expectations of the audience.

CONCLUDING MUSINGS

Now I want to step way back from the individual trees and examine the contours of the forest. It seems science educators have three basic options to deal with this trend. First, we can refuse to engage in this new world at all. I suspect this is an echo of an archaic attitude, one where experts could be confident they would ultimately win the fight because they controlled the market of information. To persist in this attitude when circumstances are clearly changing is to bury your head in the sand and hope the threat leaves. As I have argued elsewhere (Smith 2011), although the impulse to refuse to engage is certainly psychologically understandable, it also ultimately leads to loss by default.

The second option is to try to work on the general public to help to ensure they can navigate the flow of information with more skill. We should definitely be teaching people better critical thinking skills and doing a better job of showing them how scientists think rather than merely what they think. I am certainly in favor of this, yet I do want to offer a note of caution here. This is, at best, an extremely complex project with a very long timeline. While we should certainly expend considerable effort in this, we have to accept that

positive results will be long in coming and likely relatively subtle when they do arrive. It is absolutely critical, then, that voicing support for this approach not be used as an excuse not to do something more immediate.

If we want to do something immediate, and I would argue that we must, it seems there is no option but to try to figure out how to play effectively on the field as it is right now. We can complain about this all we like and we can try to make changes in both the long and short term, but we can't stop engaging the public while we wait for the fruits of these efforts. As I hope my personal experience shows, traditional methods of presenting science are not always well suited to the world of modern media. It's my belief that we can win on this new battlefield, but it will require a new strategy for marketing scientific ideas—something the science community typically has not valued highly. What we need to do is spend some time thinking very seriously about how to meet this new challenge with new techniques. I don't pretend to have all the answers, but true to my philosophical training, I can identify some good questions. For example: How can we effectively convey a telling response to common creationist arguments in a 140-character tweet? How can we make our arguments in a public forum without coming across as condescending? Which of our common arguments and critiques are actually most telling with the lay public? How can we address the confirmation bias that seems to occur when people seek sources of information on the internet? Formulating answers to these sorts of questions will be critical to our success in the war against creationism and other forms of pseudoscience—and that's a war we simply can not afford to lose.

ADDENDUM

I was invited back to do another debate with Roselli on June 29, 2011. This time I was careful to extract a promise that I would be one of the main speakers and would be allowed thirty minutes of airtime to engage with Roselli. This gave me an opportunity to apply some of the strategies I discuss above, in particular adopting a much more aggressive stance. This seemed to work much better, though certainly not perfectly. Readers will have to listen and judge for themselves (Total Education Network 2011c).

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ABOUT THE AUTHOR

Kelly C Smith is Associate Professor of Philosophy and Biological Sciences at Clemson University. He teaches and lectures on all things evolutionary and is actively exploring, with his students, alternative approaches to science education in the K–12 and public realms.

AUTHOR'S ADDRESS

Kelly C Smith
Departments of Philosophy & Religion and Biological Sciences
Hardin Hall
Clemson University
Clemson SC 29634
kcs@clemson.edu



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