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Foiling the Black Knight: How to vanquish creationist knaves

by

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ABSTRACT

Why is the academy in general, and philosophy in particular, not more involved in the fight against the creationist threat? And why, when a response is offered, is it so curiously ineffective? I argue, by comparing the creationist debate to the battle against the Black Knight in movie *Monty Python and the Holy Grail*, that the difficulty lies largely in a failure to see the nature of the problem clearly. By modifying the analogy, it is possible to see both why large sections of the academy have remained unmoved and also why many of the reactions to the threat have been so unsuccessful. Finally, I offer some very broad suggestions as to how to modify our approach in light of this new perspective.

1. Introductory Musings

Careful, systematic thought is an unstable equilibrium which requires a great deal of energy to maintain. Even professional philosophers who teach logic for a living are subject to what I like to call *rational pathologies*: situations where their reasoning deviates from the ideal in interesting ways. When this happens, the cure is to step back from the details and specifics of the particular problem at hand and focus our energies on a very basic assessment of what's happening and why. Only then can we see where it is that we went astray and how best to get back on track.

It's my view that the creationism debate is fertile ground for the study of rational pathologies. I will take it as a given that the enormous weight of both evidence and argument support the truth of evolution over creationism. Despite this fact, creationists are slowly winning the battle for the hearts and minds of the American public (For my purposes, I take a creationist to be anyone who denies a robust macro-evolutionary process, but see Scott 2000 for an excellent treatment of different varieties.) We have all seen some of the recent polling revealing the shocking attitudes of the American public, but one of the most interesting is a recent Harris poll (2005) which compared American public opinion on creationism in 2005 to what it was in 1994. The poll found that 54% of Americans do not believe humans evolved from earlier species, up from 46% in 1994. Whatever else they might be, creationists are not some fringe group in the US – they are now actually in the majority!

These two disparate facts are curiously at odds. In fact, given the situation, two basic questions cry out for answers: 1) Why hasn't the academy responded in a united fashion to this development? and 2) Why have the paltry actions that have been taken,

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aside from their paltriness, been so ineffective? It's my view that the academy is suffering from its own rational pathology in the way we represent the nature of the problem. Of course, this doesn't mean there aren't a great many highly capable academics who see clearly what is going on and strive mightily to correct it. My critique is of the academy at large, not of individual academicians. For example, one might expect the profession of philosophy to have taken a lead in combating creationism. Philosophers style themselves, with real justification, as the guardians of the basic principles of rational discourse. Since so much of what happens within the creationist movement undercuts the very basis of that discourse, one might reasonably predict that the philosophical community would be in the vanguard of the fight against such a threat. Unfortunately, though there are certainly instances of brave action on the part of individual philosophers (e.g., Kitcher 1983, Pennock 2000 and 2001, Sober 2000, Ruse 2005), the philosophical community as a whole is strangely silent.

It's my view that what we need here is not the kind of extremely complex and subtle argument for which philosophy is famous. This is a job, rather, which calls for the kind of deceptively simple analysis that made Socrates famous – a line of reasoning which goes straight to the root of the problem and lays it bare. This paper is likely, therefore, to strike something of a discordant note in this collection, both by virtue of its target and its tone. However, I want to emphasize at the outset that my analysis is meant as constructive criticism, perhaps even tough love. There is certainly nothing wrong in general with carefully compiling mountains of scientific data or constructing elaborate philosophical arguments – it's just that they have little to do with winning the battle against creationism. Similarly, I do not want to imply that I am the only one who sees

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clearly what is going on, though it's a rare professional publication which raises this issue.

So my goal in this paper is to use what will hopefully be an amusing analogy, to show how academics, and especially philosophers, have gotten caught up in the details of their own areas of expertise and thereby failed to recognize clearly the nature of the creationist threat. Ultimately, this is why the academic community as a whole has either failed to act or acted in ways which do little to address the root causes of the dilemma.

2. The Problem: Perception and Reality

Anyone reading this article has probably many times found themselves patiently trying to explain to a "true believer" why their creationist views are neither necessary nor well-supported. There are few more frustrating situations, since it often seems that nothing you say, no matter how devastating to their arguments, has any cognitive impact whatsoever. The bottom line is that there isn't a single argument for creationism which has not been decisively and publicly refuted many times in many different ways, yet they still are taken seriously by those so inclined. Creationists, by and large, seem to be curiously impervious to any argumentative assault yet devised.

Philosophers dedicate their lives to propounding the virtues of careful argument and so such exchanges are both a professional challenge and a source of continual personal irritation. Why can't we make them see the light, given that the weight of argument and evidence in this case is so very one-sided? Rather than given in to the frustration openly in a counterproductive rant, I often use humorous analogies to convey to my students the frustration produced by such exchanges. My most popular analogy is

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with King Arthur's battle against the Black Knight in *Monty Python and the Holy Grail* (Forstater, 1975).

In the movie, King Arthur is seeking valiant knights to join his round table. In scene four, he meets up with a knight in black armor standing in front of a bridge. Arthur is impressed and asks him to join in his noble quest but is met only by a stony silence. Eventually, the King gives up and decides to just ride on, but the Black Knight refuses to let him cross the bridge. Arthur has no recourse but to fight and, after a short but sharp exchange, he lops off the Black Knight's sword arm. Then we have this curious dialog:

King Arthur: Now stand aside, worthy adversary.

Black Knight: 'Tis but a scratch.

King Arthur: A scratch? Your arm's off!

Black Knight: No it isn't.

King Arthur: (pointing to severed limb) What's that then?

Black Knight: I've had worse.

So the fight is on again and things quickly get truly silly. The Black Knight loses his other arm but continues to fight on, jumping about and kicking Arthur. Even when he loses a leg, he refuses to concede, but hops on one foot and head butts the king. In total disgust, Arthur finally cuts off his remaining leg, leaving the Black Knight immobile on the ground, unable to continue. Even then he remains defiant, screaming at the departing king to come back so he can bite his head off.

I have found that colleagues who deal with creationists regularly tend to embrace this analogy with great enthusiasm. It perfectly captures the sense of disbelief we all

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have felt when dealing with an especially stubborn creationist. Part of the reason people laugh when they watch the movie is because they know the situation is so completely unrealistic. Yet those who have dealt with creationists want to make the point that there really *are* such people and it's not so funny when you have to them on. The analogy strikes us as so apt that, with a bit of encouragement, we can make all sorts of extended comparisons. For example, why would a knight choose to defend a bridge out in the middle of nowhere in the first place? Why would a creationist choose to defend an incredibly dubious claim which is not even necessary for a religious believer to adopt? How could the knight refuse to admit initially that his arm was gone, then later admit it, but somehow still deny it was a problem? How could a creationist initially deny any sort of evolutionary process, only to later admit microevolution but deny it leads to macroevolution?

It can certainly be cathartic to play with this, but despite its attractions, I have come to realize that the analogy is in fact dangerously misleading. And, since I suspect most academics think of the situation in something like these terms, this constitutes a serious problem. Indeed, I think portraying the situation this way accounts for the curious combination of apathy and ineffectiveness that characterizes the response of academics in general, and the philosophical community in particular, to the problem.

Philosophers are trained to argue the way knights of old were trained to fight. In case of a disagreement, knights and philosophers take the same kind of approach: the opponents square off and fight it out with an agreed-upon set of rules. In most cases, it is not difficult for those who know what they are doing to determine the winner. Certainly in the case of creationism, the mountain of evidence for evolution is on an

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evidentiary par with multiple severed limbs in terms of decisiveness. If you think about the situation this way, then the Pythonesque analogy seems perfect: just like the Black Knight, the creationist has clearly lost. He should, according to the rules of the game, admit this and accept defeat. The only way to explain his recalcitrance is that he is monumentally daft, breathtakingly stupid, or both. The problem, therefore, is with our opponent.

Now in one sense this is quite correct. The ultimate problem is with our opponent, not with our approach. The rules of logic and evidence are not arbitrary conventions, after all. On the other hand, there is a real sense in which this conclusion misses the point in what can only be described as a stupendous show of obtuseness. To see why, I'd like to modify the analogy a bit to make it fit better with the actual situation we face battling the creationists.

First of all, the fight with the creationists is not like the scene from the movie in that it is not combat with edged weapons. Using real weapons makes the victor in a lopsided contest blindingly (even amusingly) obvious to the densest observer. If things were this easy, then we would have no problem with creationism. Yet not only do we have just such a problem, it seems to be growing. Therefore, things can't be this simple. So, we should think of the creationist contest as one where the interlocutors are using blunted or padded weapons. Since it rules out such convenient indications of martial superiority as the actual removal of limbs, this restriction forces us to devise some indirect means of *judging* a winner.

This complication would not really pose a problem as long as the judging system is a good one, meaning: 1) the judging system (points or whatever) accurately reflects

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what would have happened in a real combat and 2) the judges are knowledgeable and objective. When it comes to professional philosophers or biologists judging the creationist contest, this is actually the case. They know what they should be looking for, they look for it diligently and they see that evolution is clearly better supported. Case closed.

Sadly, though, the creationist contest is not judged this way. To the extent that there is a creationist movement at all, given the state of the evidence, it is not a movement amongst knowledgeable experts (recent efforts by the creationists to obscure this fact notwithstanding.) If we want to make the analogy accurate, therefore, we will have to allow the contest to be judged not by knights expert in real combat, but by the crowd watching the contest. Unfortunately, the crowd is not knowledgeable about combat – they have never even seen a real fight before and wouldn't know a morning star from a halberd. Worse still, they are not objective. Imagine Arthur gazing out at the crowd waiting to judge the fight and seeing a sea of black flags, signs saying “Go Blackie”, vendors selling dolls of the king impaled on a black sword, etc. As a final difficulty, let's imagine there are several extremely intimidating ruffians making their way through the crowd and threatening dire consequences for anyone who doesn't support Blackie. Now we have a proper analogy, though the added realism robs us of our previous sense of amusement.

3. How *Not* to Achieve Victory

At least we now can see clearly just what it is we are up against. I want to examine, in the context of this analogy, some of the more common responses to

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creationism one hears from fellow academics to see why creationism is still alive and well. So imagine the King has just fought the Black Knight for the first time in this toned-down fashion and, despite the fact that he clearly prevailed and would have chopped the Black Knight to bits had they been using real weapons, the crowd judges Blackie the victor (This is essentially where things now stand in the creationist movement.) The question now is this: Should Arthur answer another challenge and, if so, how can he ensure victory this time around?

3.1) Run Away!:

Suppose Sir Robin, one of the Kings most trusted advisors, speaks up at this time, saying, “Sire, this is not a fair fight, so what’s the point? Cut your losses and leave as quickly as possible” What should the king do? Sir Robin is clearly right to say it’s not a fair fight. All the knights (except Blackie, of course, and perhaps a few hack knights he has managed to suborn) agree that this is not the way fights *should* be conducted. However, no matter how true this analysis is, it does nothing at all to change the fact that this is how fights *are* being conducted. Still, if you can’t win the fight the way it’s set up, it’s natural to come to the conclusion that you shouldn’t fight at all – best to just walk away and ignore these silly people.

To be fair, Sir Robin’s implicit hope is presumably that the knight and his minions will eventually give up and go home. The problem with this is that it fails to consider the peculiar strength of the Black Knight – namely, that he is unwilling *ever* to admit defeat. If he won’t admit defeat even when chopped into little pieces, why in the world should we expect him to go away when he doesn’t have a single challenger to take the field against him?

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Still, perhaps if the knight had no strong popular support, we might reasonably expect the crowd to eventually lose interest and go their separate ways. Thus, even if much later the Black Knight could still be found all by himself on the field of honor in rusting armor, what would it matter? It is not that simple, however. After all, the knight's supporters have been growing in number every year and already constitute a *majority* of the audience. If they require martial spectacle to keep them entertained, no doubt the Black Knight will arrange to fight a series of straw men in King Arthur costumes – we already know the crowd is not picky about realism. The result will be an ever larger fan base with each passing year, which will just insure a more and more lopsided contest should Arthur ever regain his fortitude and accept another challenge.

Just imagine how things are likely to unfold: Despite your studied indifference, the Black Knight's support grows steadily. Not only does the crowd of supporters multiply, but he now has a small army of Black Knights in training, all espousing the same bizarre fighting philosophy. Sooner or later, you will begin to hear calls from the throngs of Black groupies that one of their own should be made king and the followers of Arthur locked up in a dismal tower somewhere (an ivory one, no doubt.) In these circumstances, though a certain amount of complaint about the injustice of the system is understandable, refusal to take on the threat seems incredibly silly.

People who follow the creationist controversy often argue that it's a mistake to engage the creationists because doing so only lends credence to their position. To be sure, there are serious tactical considerations about how and when to engage the creationists. For example, public debates are something to be done only in special circumstances and then with the greatest caution. However, being savvy about *how* to

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fight is not the same as refusing to fight *at all*. We must keep in mind that, from the point of view of the creationists, their position is *already* respectable. They are not waiting to see if the scientists rise to the challenge before deciding if this is something they should believe. Rather, they already believe it and are rapturously waiting for their champion to best all comers. If they were truly concerned with what the scientific community thought, they wouldn't be creationists in the first place. Therefore, if the intellectual community refuses to fight, the ranks of the creationists will only grow, not shrink.

Unfortunately, this is the most common approach taken by the philosophical community. Not only do most philosophers consider creationism beneath their professional notice, they tend to look down upon those of their brethren who try to deal with the threat. It is not uncommon to hear professional colleagues saying things like, "There aren't any interesting issues there, so it's not real philosophy," or "Ed needs to spend more time on real issues, not that silly creationism stuff." Perhaps dealing with creationism is not real philosophy, if real philosophy means dealing with questions about which the experts still disagree. On the other hand, if the situation is truly as I portray it, who cares what kind of philosophy it is? If it's an issue about which philosophers care (or should care) deeply and to which philosophers can make useful contributions, why quibble semantics?

The problem is that philosophers have two different skill sets. The first tends to be emphasized in their research and the other in their teaching. When it comes to research, the sorts of problems philosophers deal with have been tossed around for a very, very long time. Thus, in order to make any progress at all, it's necessary to be exquisitely subtle. You have to master an enormous literature, be able to make screamingly fine

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distinctions between positions, etc. We are not talking about the forest, but a single tree – indeed, much of the time we are not even talking about a particular tree so much as an intriguing section of bark on a particular tree at a particular time under particular lighting conditions. This approach can be a powerful tool for solving certain kinds of problems, to be sure, but there are also times when it is positively counter-productive – for example, when trying to instruct someone who lacks the interest and patience required for such an exercise.

So, when philosophers teach, we have to back off a bit on the level of magnification. Indeed, when we teach elementary classes like introduction to logic, we have to really get down to basics. You typically have to drag your students away from debates over details and force them to first think clearly about the basic structure of their positions. Before you can make any progress, you often have to identify and clarify the premises, throw out irrelevant details, force them to give a structured argument, etc. Only then can you put your finger precisely on the spot where the controversy lies. It's this ability to locate where you are in the forest that is most useful in fighting creationism. At present, however, the philosophical community tends to look down upon this sort of skill as not worthy of publication or professional reward. If we are serious about turning the tables on the creationists, this must change.

The biological community has gotten much better in recent years about engaging as a community in the fight. However, they are prone to the same sort of mistake here as the philosophers. Biologists make their professional reputation by examining open questions which seem susceptible to solution through the application of empirical data. It often strikes them as positively unprofessional to even discuss creationism, since it's a

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question which has already been settled about as decisively as anything in science is every decided. Anything a scientist adds would be essentially repeating what has long been known, which does little to establish her reputation as an original researcher. I have heard many a biologist say something like this: “I deal with *facts* in this class. Evolution is a fact and creationism is just wrong - end of story.” Except it’s *not* the end of the story, since the problem is not going to go away just because we ignore it. Not only has the scientist declined to join battle on terms favorable to her, but she has done nothing at all to change her students’ minds. Of course, she has made it quite clear what kind of answer should appear on the exam, thereby insuring a set of responses which will reinforce her view that this is not an issue worth further discussion in class.

3.2) The Counsel of Despair:

Perhaps Sir Robin’s advice to refuse to fight is based on a different kind of reason. It might be he feels that, not only is the contest rigged, but that there is no realistic hope for improvement. If he believes the unwashed wretches judging the fight are just too ignorant and/or stupid *ever* to get the point, then he would be giving up not because he hopes his opponents will change, but precisely because he already knows they never will. Arthur may thus decide that victory is simply impossible and walk away.

Now, if we are honest with ourselves, we will all admit to feeling this way at least sometimes. But many of our colleagues feel this way all the time. What we have to realize is that this attitude ultimately amounts to complete surrender. Since there is just no practical alternative to the involvement of the public in a democratic society, if it’s true that they can’t be reached, then we might as well not even try. It’s a self-fulfilling prophesy, really, since you certainly are not going to convince your opponents that a

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change in process is needed if you won't talk to them. When it comes to creationism, we all might prefer to leave matters biological to the professionals and not involve the public at all. But, like it or not, the public ultimately makes the calls about what should be taught and what should be funded. If enough of them become creationists, the good guys lose. It's small consolation to know that, despite our loss, we were "in the right", just as it's small consolation to those who purchased Betamax video recorders in the 70's to know that theirs was truly the superior technology.

Besides, to indulge in this attitude is to abandon our responsibility as educators. Anyone who teaches for any length of time knows well the frustration that comes when you can't seem to convey to your students what strikes you as an elementary concept. Blaming the students is perfectly understandable (and sometimes perfectly justified.) However, if we are to remain teachers, we have to be careful not to become too jaded. It's certainly true that you can't reach everyone no matter what you do, so one of the first lessons a teacher learns is that this can not be her goal. However, a teacher can only teach if she believes it is *possible* to get *most* of her students to learn. In particular, she must believe in *rational convergence* – that is, that her students are (by and large) rational people who will, if provided with the appropriate guidance, eventually converge on something close to the truth. Not everyone will converge, of course, and the convergence often follows a tortuous and frustrating trajectory. Nevertheless, the teacher's task is to facilitate the convergence and, whatever the challenges, she therefore must always nurture that optimistic part of her psyche that believes it is possible.

We are not allowed the option of cutting the public entirely out of the process, so if we think it's important that evolution win the debate, we simply *must* talk to the public.

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That is, we have to take on the role of *teachers*, since we are talking to the public about things we are expert in and they are not. And we can only do this if we continue to believe, despite many frustrations and examples to the contrary, most of them are ultimately teachable.

3.3) Bash Harder:

Many of Arthur's advisors would probably tell him to accept future challenges only after working hard on his technique to make doubly sure he wins this time around. If he can learn to strike faster and hit harder, maybe he will win over the judges. The great advantage of this is that you are telling Arthur to continue to do what he loves to do (bash away) only suggesting that he perfect his technique a bit. This is appealing in part because it does not take Arthur too far out of his comfort zone – indeed, it “challenges” him to do something he is already committed to doing (perfecting his fighting skills.) But surely this is a classic example of preparing for the last war. Such tactics worked well when we fought real battles with real knights using real weapons. But now, like it or not, the days of honest combat where the loser is manifest to all (by virtue of, say, being dead) are over and done with. Now we have this circus atmosphere where the crowd is in charge and are impressed by moves worthy of professional wrestling. What reason could you possibly give under these circumstances for thinking that what didn't work last time is going to work this time if only we do it more of it?

Arthur might be convinced not only to practice his skills, but to try his hand at *explaining* their superiority to the crowd. Imagine the king attempting to prime the audience for the upcoming bout by lecturing them on the finer points of martial arts, becoming especially enthused when lecturing on the importance of weapon balance for

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spinning moves (a fine point he finds especially interesting.) His goal is to convince the audience, before they assess the performance, that the kinds of moves the Black Knight employs are entirely unrealistic and possible only because of altered nature of the non-lethal weapons. What he achieves is convincing the audience that he's even more boring when he talks than when he fights.

Yet this kind of response captures the attitude of the majority of professional philosophers and biologists toward creationism today. To the extent that they try to correct public misperceptions, they do so using the tools with which they are most comfortable and familiar. Biologists tend to gather together imposing mountains of facts, complete with technical jargon. Philosophers construct ever more complex arguments designed to show some subtle inconsistency in the creationist's approach using their own technical jargon. Then when they present the fruits of their efforts to the lay public, they tend to delight in the complex details and linger lovingly over each and every one, making for a presentation which impresses their colleagues but confuses everyone else.

It's not that there is anything wrong with constructing complex arguments per se – indeed, I find them perfectly decisive myself. But then I am a scientist and philosopher and don't represent the kinds of people who find creationism compelling in the first place. Your average creationist, however, neither understands nor cares to understand such minutia. From his perspective, you are just trying to beat him down with technical jargon. So if we want to turn things around, we have to find a way to talk to such people in terms *they* find persuasive, rather than according to the professional rules *we* love so much.

4. Sidestepping the knight

Unfortunately, since this piece is meant as a Socratic analysis, I shall have to end as Socrates always did: by admitting that I don't really know how to solve the problem either. If I have contributed a clearer picture of what the problem really is and how we should *not* attempt to solve it, I am content with that alone. However, I do think the preceding analysis leads to some general positive suggestions as well, so I'd like to very briefly discuss some of them here in this last section.

4.1) Dealing with Creationism is a specialized job

Dealing effectively with the creationists is not evolutionary biology and it's not philosophy, at least not the way these are conceived by most professional academics. Rather, it's a public outreach effort which *involves*, but goes significantly beyond, academic biology and philosophy. We need to keep this firmly in mind lest we make the mistake of thinking that anyone with the right academic background can easily vanquish the foe. Such a person is certainly capable of giving a presentation his fellow members of the round table will applaud, but this will likely have no appreciable impact on the audience and thus make no difference in the ultimate outcome. It may be true that the kind of philosophy needed to counter the creationists' arguments is very *simple* (indeed, I often refer to it as "philosophy in first gear"), but it certainly is not true that it's *easy*. Anyone who has spent time watching videos of evolutionary experts debating creationists or observed brilliant colleagues boring undergraduates in class knows exactly what I mean.

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The simplest way to think of it is that creationism is a teaching task rather than a research task. The problem in putting it this way is that academics do not typically reward their fellows for investing large amounts of their time and energy in teaching. In philosophy, and to a lesser extent in biology too, we are not rewarded for investing ourselves in this particular fight (unless, perhaps, we agree to do it on terms that appeal only to our fellow professionals). Most of us who have been doing this for a while know of people who made the mistake of taking on the good fight only to have difficulty with tenure and promotion at some point. If we really want to deal with this problem, the academic professions will need to take a hard look at what they consider important and change their attitudes about what counts as good work accordingly.

4.2) IAAS: It's About the Audience, Stupid

If we can't give up and we can't win the fight the way it's currently structured, we have to find a creative way to alter the venue. The key element in the equation is the audience, in this case the general public, since they are ultimately the ones who judge who is winning and who is losing. Therefore, whether we like it or not, we have to keep in mind that our only job in combating creationism is to find ways to get the general public to see why evolution is a better choice. Anything else is an unneeded distraction.

For example, one of the reasons the original analogy from the movie is dangerous is because it reinforces our natural tendency to focus on the most obvious obstacle – the knight himself. But it's really not about the knight at all. Indeed, supporters of creationism are perfectly happy to have their opponents wear themselves out trying to defeat their highly visible knights. Why? Because they know the knights are true believers and will never, ever admit defeat. They also know that the crowd will react

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more favorably to gutsy shows of confidence and indomitable spirit on the part of the knights than to tedious displays of sword technique, no matter how well executed, on the part of the king. Thus, the knights will always be judged to have won.

No doubt some of the philosophers reading this are uncomfortable with an approach so akin to marketing. “Isn’t it about having good arguments,” they might ask, “not about winning over one’s audience? If we worry too much about what pleases the crowd, then surely we risk a fall down the slippery slope to naked sophistry.” This is a traditional concern of philosophers, but there are two reasons to think the slope is not so slippery under these particular circumstances.

First, I am not advocating an emphasis on rhetorical flourish as a *substitute* for good arguments. The problem we face with the creationism case is that we already have excellent arguments for evolution – indeed, knock-down, drag-out good arguments. The problem is not that there is real debate among objective experts about whether our arguments are good. In short, the problem is not with the quality of the arguments, but with the *public perception* of the quality of the arguments, which is a very different thing. Thus the traditional philosophical focus on the quality of arguments to the exclusion of other considerations is, if not exactly misplaced, at least much less important in this context. Here we simply do not have the luxury of ignoring uninformed opinion as we are typically content to do with more abstract philosophical puzzles. Our only practical recourse then is to begin to focus serious attention on how we *present* our ideas.

Second, although sophistry is indeed a danger we must be careful to avoid, it need not follow from a heightened sensitivity to presentation alone. I freely grant that it is absolutely vital for the evolutionary community to maintain the intellectual high ground

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and not resort to some of the dirty tricks of rhetoric our opponents use (e.g., as discussed in Smith 2001a). As long as we are careful to work on *how best to present* arguments and evidence we have independently decided are good, as opposed to deciding *what arguments are good* based on what our audience wishes to hear, we will not be compromising important intellectual standards.

Finally, under this heading let me revisit the assumption of rational convergence. We must make the assumption that reaching the public is in fact something that can be accomplished if we can only find the right combination of approaches. On the other hand, however, we also need to guard against overly optimistic assumptions of competence. There's a real tendency to view the creationists as some kind of alien *other* and assume, often mistakenly, that those we respect in various ways could not be like that. Yet people who do not think much about evolutionary issues, even if they are extremely capable and intelligent, may have quite naïve positions. I have seen this myself when teaching non-philosophy faculty about ethics. Certainly, they are much smarter and better motivated than the average undergraduate and there are many things they "get" that my students don't. However, they don't think about ethics in the sustained and systematic way philosophers do, and thus their views are in many ways no more sophisticated than that of an undergraduate. I initially found this surprising precisely because I was assuming a level of competence I had no good reason to expect.

To bring this back to creationism, we have to be careful about where we choose *not* to address creationism. For example, we can't simply infer from the fact that a class is full of gifted biology majors that it's unnecessary to talk to them about creationism. To be sure, we have good reason to believe such students will be able to lay out the basic

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tenets of evolution on an exam, but we must be careful concluding from this either that they either really grasp what these tenets mean or agree they are correct. Thus, when I teach a Philosophy of Science class that deals with creationism, it is quite common for biology majors to carefully regurgitate all the details of some creationist argument and all its various problems, only to admit at the end that they still think creationism is true.

They often realize the dissonance between the evidence they have just discussed and their conclusion, but simply refuse to follow the evidence in this case. Typically, they say something like, “This is just my personal opinion,” which implies that they don’t really understand how scientists reason, even though they understand all the facts involved.

These same students presumably would never admit this in a biology class, but that just makes the problem more insidious.

4.3) Critical Thinking and Bad Ideas

It is often observed that the growth of creationism reveals a shocking inability of the average American to evaluate competing claims. As a remedy, we certainly need to do a better job teaching young students to think critically. One of the biggest problems we encounter here is that those entrusted with teaching critical thinking are often shockingly clueless about how to do this.

While it’s true that many of the texts which pass for teaching critical thinking at the pre-college level are horrible, this is not primarily what I have in mind. The people who often do the poorest job teaching something are those who know the most about it. What tends to happen when you know a lot about something and it’s second nature to you is that you teach the bits you still find interesting, not necessarily what will convey the

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necessary information best. When it comes to critical thinking, we tend to assume a high level of competence and spend little time on the truly basic material.

I will illustrate the problem with an example from my own experience. I have taught logic for several years now and there is a pretty typical pattern one sees in such classes. About a quarter of the students find the material incredibly easy, about a quarter find it virtually impossible and about half manage to master it, but only after much painful struggle. It's quite common for me to go over what I take to be truly simple concepts in class (e.g., common informal fallacies, the definition of validity) only to find out when I grade the exams that most of the class didn't truly understand. It's often not that they didn't try – for example, they might be able to correctly regurgitate the definition of validity but then have no clue how to actually *apply* it. It occurred to me recently that perhaps the rational pathology lay at a deeper, more fundamental level. In particular, I suspected that some of the students didn't quite understand the importance of *consistency* when it comes to deciding what propositions are true. So, as an experiment, I devoted an entire day in class to talk about consistency – what it is and why we should value it. I structured this as a discussion rather than a lecture and, much to my surprise, discovered that what I had always taken to be blindingly obvious was in fact nothing of the kind to my students. “So what if X and Y are inconsistent,” students asked, “why does that make it so bad to believe them both?”

I learned two important lessons from this. First, you have to keep it simple. It's absolutely critical that you teach students what they need to know, however obvious it seems to you. If you don't, then they simply will not be able to master more complex concepts later on. Second, it can be surprisingly difficult to explain such elementary

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concepts unless you prepare carefully in advance. The fact that they are elementary and “obvious” does not mean they are easily conveyed to someone who does not already understand them.

What kinds of elementary concepts do I have in mind when it comes to creationism? Well, here’s something really basic: we are not absolutely certain of much at all, therefore we have to settle for believing in things that we have good but not perfect reasons for believing. Philosophers can’t avoid this elementary truth, and most scientists realize it as well even if they sometimes make imprudently strong claims about “facts”. The average person, however, has a distressing tendency to segregate beliefs into two discrete piles. There are facts, about which they seem to think we are certain or very nearly so, and then there is “theory” or “mere opinion” or whatever you want to call it. The problem is that, as long as this is your view of the basic epistemic landscape, it is very difficult to make any nuanced judgments about what we should believe since there are vanishingly few things about which we actually have certitude. Everything else is lumped into one giant mass. This is the kind of thing which allows people to shrug and lump evolutionary biology in with astrology, since they are both, after all, “just theories”. The response that some theories are far better supported than others doesn’t fit their conceptual structure, which is bimodal rather than continuous. Until you fix this underlying structure, nothing much you say in response to the “just a theory” criticism is likely to stick.

Indeed, this is a good example of what I will call a *bad idea*. Bad ideas might be fundamental ways of organizing ones concepts, like the example above, but they can also be more simple beliefs which, until refuted, impede understanding. They are all bad in

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the sense that they are confused, flawed and/or false, which ironically ensures that few academics talk about them. For example, from the intellectual's point of view, it's incredibly obvious that there's a continuum of epistemic support for beliefs and they assume this is equally obvious to their audience. But it's not, and the audience never called to question these ideas will retain them. The result is that experts talking to creationists often talk past them in a way guaranteed to leave no intellectual trace.

When you are dealing with someone in the grip of a bad idea, the most important thing you must do is clearly identify just what the bad idea is. This is trickier than it might seem, since they aren't the sorts of things people typically say in any explicit fashion. Rather, one has to reverse-engineer someone else's thinking process, as it were, to see just what is wrong that could explain the continuing rejection of *good* ideas. Once you have a picture of the bad idea, then you must deal with it explicitly and in terms the average person can comprehend. Until the bad idea dies, or at least sickens a bit, nothing you say at the higher level of discourse we academics prefer will take hold. So to conclude this section I'd like to identify four additional bad ideas I think are deeply relevant to combating creationism and offer a few suggestions about how to counter them.

The most obvious one, of course, is the idea that people must choose between their religion and science – e.g., they can't be good Christians and also believe in evolution. This is not true, of course, but we have to take the time to point out both that it's not true. As long as the public believes that they are being asked to choose between their faith and science, it's hardly surprising that they choose the authorities with the white collars over the ones with the white lab coats. A complex theological dispute is

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not necessary either, since we can make enormous progress on this point simply by noting how many believers actually accept evolution without themselves seeing a conflict (this includes *most* Christians, for example, a fact which never ceases to surprise my South Carolina students.) This may not make the creationist fully receptive to evolutionary arguments, of course, but it at least unlocks the door.

A less obvious bad idea is the false dichotomy between randomness and design. People tend to think these are exhaustive categories such that a process is either one or the other. It does seem silly, as the creationists love to point out, to say that the natural world came to be through nothing more than random chance (Whatever your view on the ultimate adequacy of viewing order as the outcome of extremely low probability events, it's certainly at least deeply counter-intuitive.) Given that, anyone who accepts this dichotomy will immediately conclude that the natural world must be designed. What supporters of evolution have failed to convey adequately is how natural selection is something of a middle ground between pure chance and design. It is a process fueled by chance which produces extremely non-random outcomes. We need to find some simple ways to make the dynamics of this sort of process very clear to the average person, perhaps by discussing other, more familiar examples. Until we do this, however, the average person will continue to see opposing evolution as simply the rejection of an absurd extreme. His thinking doesn't get to the point of weighing competing lines of argument and evidence, no matter what the evolutionist says, because he can't get past this initial conceptual hurdle.

Another bad idea is due to a failure of imagination. What I have in mind is that the average person can't imagine any good evidence existing for events which took place

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millions of years ago before any human observers even existed. People fail to appreciate the scope of the evidence for macroevolution largely because they have a picture of the evidence for such claims as extremely poor and based almost entirely on a few fossil fragments. This might seem to be an easy problem to address, since the facts are clearly on the side of evolution, but in an extremely annoying ironic twist, it's difficult for supporters of evolution to respond effectively to this idea precisely because they have so very much evidence. The problem is not so much that the creationist has considered and rejected any particular bit of evolutionary evidence, though of course this does happen sometimes. Rather, they are typically woefully ignorant of even the various *types* of evidence that might be available, much less the kinds information which can be gleaned from different types of evidence, much less specific examples of evidence, etc. in short, they fail to see how the sorts of evidence they know of *could possibly* be convincing.

Unfortunately, attempting to convey the scope of the evidence for evolution to someone who is neither well-trained in science generally nor interested in evolutionary biology in particular is a bit like trying to give someone a drink of water from a fire hose.

I believe that what we need to do is develop a single example of macroevolution which presents a representative sample of the evidence behind the construction of the series in a very simple, user-friendly fashion. For example, an interactive web site which follows the evolution of some familiar organism (e.g., the horse) in a way that truly conveys the important classes of evidence we have for evolutionary connections, all in language the average person can understand. Constructing such a site would be a huge and interdisciplinary undertaking, but one detailed and accessible example would go far

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in defusing the idea that biologists are just waving the magic wand of natural selection over some isolated bone fragments.

The final bad idea I want to discuss is the idea that the logic of evolution is deeply flawed, and in a way laypeople can readily discern. For example, it is common practice with creationists of late to endorse microevolution, but argue that this does not in any way imply macroevolution. It is certainly possible to critique the specifics of a particular line of argument (see, for example, the discussion of micro and macroevolution in Smith 2001b.) However, it's often best not to get bogged down in a discussion of details, partly because of time and audience interest concerns and partly because there are many such arguments and dealing with them separately is not efficient. I find it's often most effective to ignore the putative logical flaw in question and instead ask the creationist to defend the more general implications of the conclusion that the logic of evolution is deeply flawed.

No matter the specifics of the particular claim being put forward, the basic idea is that 1) evolution is logically flawed in an essential way but also that 2) the flaw is such that it is easily recognized by a layperson. This raises an obvious question: What is it that accounts for the failure of the biological community to recognize or admit this problem? It is difficult for the creationist to somehow argue that this is not a legitimate or important question, yet any answer he gives can easily be shown to be truly absurd. Consider the two most obvious answers. First, a creationist might try to argue that the flaws are known to evolutionists but have been concealed in some kind of conspiracy. The rejoinder should be something like this: "So let me get this straight - for entirely mysterious reasons, the entire international biological community has perpetuated a

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cover-up of historical proportions for the last 150 years?” Alternately, it might be claimed that scientists don’t see the flaw at all. Here, one can reply, “So the idea is that this flaw is so obvious that anyone who spends a few minutes reading material online can perceive it clearly, but sincere and thoughtful people who spend decades of their lives studying evolution all somehow miss it?” This is the kind of response the evolutionary community needs to spend time perfecting – where we avoid a convoluted and technical discussion of the nature of logical implication and cut right to the chase in a way the audience can understand and appreciate.

4.4) Target Pre-college Education

Arguing with creationists is like weeding a garden, to switch similes – you can pull weeds all day and do a great job, but there will soon be more weeds, just like those you removed earlier. Thus, I can convince Billy that it’s silly to think the depth of dust on the moon argues for creationism, but that has no impact on the probability that I will have to deal with someone else making the exact same argument next week. All this shows is that we can’t focus our energies on isolated battles but need a truly comprehensive strategy for winning the war.

The most important element in the war is finding a venue in which we can engage the enemy on terms favorable to our side (or at least not rigged in favor of the bad guys.) For evolution, this has to be the pre-college science classroom. This is really the only place where the average person spends a significant amount of time thinking about science, so it’s the only battlefield which fits our purposes in addressing a mass audience. Now certainly it’s necessary to this strategy that we not let the other side take possession of the battleground, which is why it’s so important to fight attempts to inject creationism

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into the curriculum. Everyone realizes this, but what few put into practice is the need to go far beyond defending the status quo.

The bottom line is that we are not doing a very good job in pre-college science education, at least not with respect to teaching the kinds of thinking skills students will need to, as the creationists love to say, make up their own minds about evolution. It's far beyond the scope of this paper to give a comprehensive plan for reform, but there is one thing I can say with confidence: any meaningful reform will have to involve scientists, philosophers and pre-college educators. The biologists have already started to take the production of educational materials about evolution more seriously, but it's an extremely rare philosopher who has any interest at all in working with secondary school teachers to develop good critical thinking lessons. We must shift our focus toward pre-college education if we are to succeed over the long haul. Not only that, but we have got to find ways to improve the preparation of teachers across the board, not just produce materials that help the teachers who already get it. This is another example of a move which is outside the comfort zone of many academics, but it's necessary. Think of it this way: which will ultimately have the greatest impact, 1) giving a talk for a university audience, 2) publishing good materials some teachers will choose to use or 3) sponsoring a workshop where you help 20 teachers revamp the way they discuss evolution in their classes? I submit the answer is obvious to anyone who is honest with themselves, as is the responsibility which follows.

5. In Conclusion

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Those of us who have invested time in dealing with the creationists will understand the frustration felt, not only with the adversary, but so often with the complacency of our professional colleagues as well. Just like there are reasons the creationists think as they do, there are reasons our colleagues often don't get it. My main goal here is to offer an analysis of the true nature of the creationist threat as well as how professional academics (mis)represent it. Having a clearer picture of how both sides view the other helps explain why the response by the academic community to creationism has so far been largely ineffective and offers some insights about how to proceed in the future. The bottom line is that creationism is a movement which threatens all of academia because it undercuts the ability to clearly and objectively assess evidence. Dealing with it effectively will require a truly concerted effort and thus we simply can not afford the luxury of widespread academic apathy.

Of course, this sort of analysis invariably faces the self selection problem - those who have taken the initiative to read a special volume on creationism are likely to already "get it" and thus will profit less from this sort of analysis than those with their heads deep in the sand. At the very least, however, I hope to have offered my enlightened colleagues a useful tool they can use to work on some of their recalcitrant peers. Attempting to convince one's peers can be almost as frustrating as arguing with a creationist, but perhaps a touch of humor will prove an effective medicine for achieving rational convergence in academia.

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