Science Under Fire

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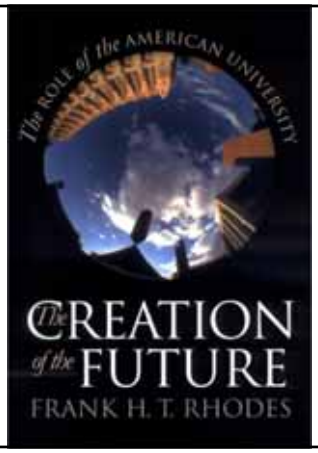
Outline

- Background
- Public Perception of Science
- Support of Science
- Who is Responsible for Most Scientific Publication?
- The Publication Process
- Tractable Recommendations/Testable Hypotheses

Public Perception of Science

National Science Foundation (NSF) studies have shown that by the time students enter high school, 80 percent are not interested in pursuing science, mathematics, or engineering (NSF, 2002).



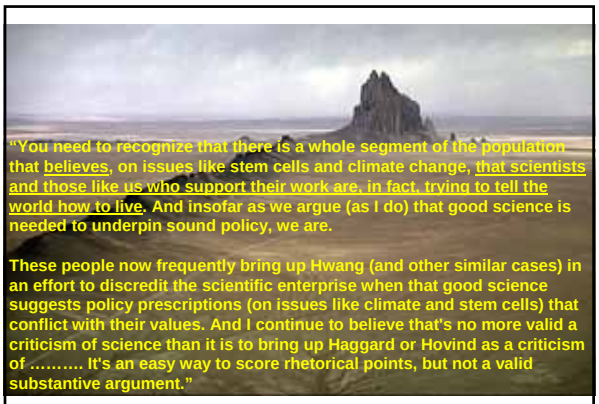
"One hallmark of intellect is the ability to simplify, to make the complex easy to understand. Anyone can be unclear."

Paula LaRocque, former writing coach, *Dallas Morning News*

Some typical (and very recent) email comments by members of "The Ducks", an ad hoc group of skeptics and, at least typically, agnostics, who belong to the New Mexicans for Science and Reason

"Scientists are self policing. The general public is unaware of that. But, the name of this game is politics - not substantive arguments. If substantive arguments were the winners, then we would not even be discussing this. Substantive arguments generally work well in science, but often poorly in politics. And, until we can educate the general public - a big if - we have to be aware of, understand, and play the politics."

Science & Math CESE Education



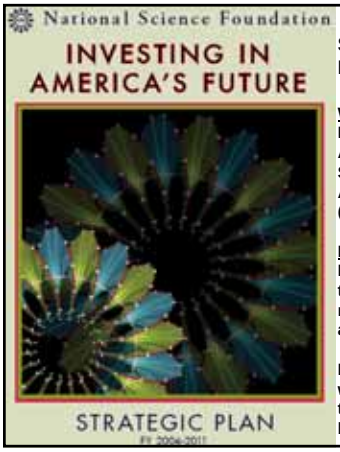
"You need to recognize that there is a whole segment of the population that believes, on issues like stem cells and climate change, that scientists and those like us who support their work are, in fact, trying to tell the world how to live. And insofar as we argue (as I do) that good science is needed to underpin sound policy, we are.

These people now frequently bring up Hwang (and other similar cases) in an effort to discredit the scientific enterprise when that good science suggests policy prescriptions (on issues like climate and stem cells) that conflict with their values. And I continue to believe that's no more valid a criticism of science than it is to bring up Haggard or Hovind as a criticism of ……. It's an easy way to score rhetorical points, but not a valid substantive argument."

"As to scientists falling off our perch, we are usually pushed off by another scientist. I would argue that ……are generally "found out" by someone external to the movement (yes - not always, e.g., the ……. circus, locally). In either case, there is a loss of general public trust. In the current political climate, Woo Suk Hwang's fiasco had a negative impact on the reputation of science, but not much, I suspect. Especially not much when it comes to political impact regarding who do we trust running the country. The …… and their supporters are coming off as crooks and hypocrites because there have a few highly placed, holier than thou, …… morality pushers caught breaking their own codes of conduct they would push on the rest of us. Woo Suk Hwang broke the code of conduct that science seeks to practice. He wasn't trying to tell the world how to live, nor was he forming a voting block to exercise political power. I believe there is a significant difference."

Forbes' Ranking of Professions

- 1) Firefighter
- 2) Doctor
- 3) Nurse
- 4) Scientist ("Perhaps no profession is seen as more important for the long-term common good. Though firefighters bumped them from this year's number-one spot, scientists are in the top ten year after year")
- 5) Teacher ("It took awhile, but teachers now get their due from the public. Some credit an effort toward more interaction with parents")



Support of (Geo)Science In Academia:

Where does it come from?
NSF/DOE/other Federal sources
ACS/PRF
State agencies
Alumni Contributions (seriously)

Bottom Line:
NSF and ACS/PRF support hold the greatest weight, but success rate is typically 10-20 percent, at best

If a professor is up for tenure without a single NSF Award, there would be cause for concern……

Higher Education Concerns/"Facts":

NO rewards for reviewing papers/proposals….

Complexity of the academic workload (for those who care) has increased

In the grand scheme of the things, the number of papers published remains a very important factor in overall productivity (regardless of where they are published)

High "impact" journals vs. "lesser" venues????

Diversity of the professoriate???
"One way for UNM to get more minority faculty would be to have more minority students who want to be professors, Ibarra said. He said the University should make careers in academia more appealing to its students."

The Publication Process

- Overall, the system is by no means broken
- How is the Peer Review system maintained and monitored?
- For authors, the question of where to publish one's science is a key issue—heart might be in the right place, but…..
- Effects of the digital revolution…
- Editors, Associate Editors, Reviewers must be appropriately rewarded

Recommendations/Testable Hypotheses

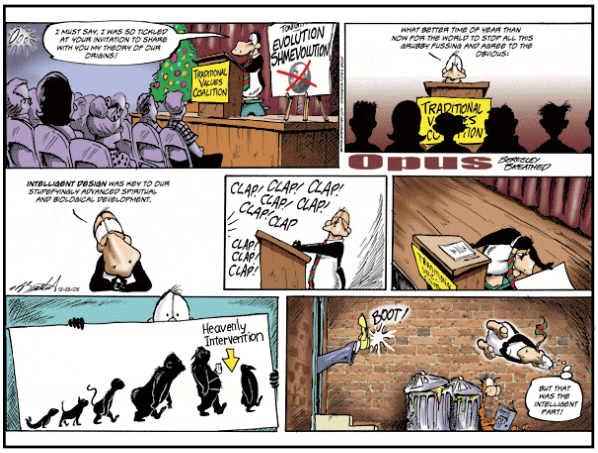
- **K-12 Education: Have scientists actually teach prospective science teachers how to teach science! I predict that interest in and appreciation of science would hugely increase**
- **Higher Education: Future members of the professoriate must be better prepared, and those who are are desperately needed; all too many new faculty are on an entitlement kick.**

JG, ranting, continued..

- **Professional Societies: Have played an enormous, and beneficial role in science and public awareness of science; will they be allowed to continue to do so?**
- **Federal Support of Science: As of 7 November, 2006, I think there is reason for optimism; NSF has tried to get its budget doubled numerous times. Federal support for science education, at a range of levels (e.g., the On the Cutting Edge program in the geosciences) needs to continue.**

Continued…

- **Science Publication: The peer review process must be taken more seriously; journals of professional societies must survive, if not flourish (!), but they will "look" different. The consequences of open access remain less well known than we would like…..**



—SO MUCH FOR TODAY'S BIOLOGY LESSON ON "INTELLIGENT DESIGN." TURNING NOW TO THE SUBJECT OF "INTELLIGENT GEOGRAPHY..."

No business sense in creationism

Don't expect to see business leaders take to the streets anytime soon demanding that "intelligent design" be prohibited from being taught in science classrooms with evolutionary theory. But don't assume many of them are not talking about it, albeit in private venues.

Last math, science and reading standards have been a personnel focus of business-driven education reform initiatives, and the recent move by creationists to incorporate their beliefs into the school curriculum runs counter to the agenda of many business people calling for the state's science and math bar to be raised to tandem with greater measures of accountability.

Science often encounters political and social resistance when it presents discoveries and posits the corresponding theories about their meaning that challenge traditional ways of thinking. The subject of stem cell research comes to mind. So does Pluto.

Based on the latest research, Pluto isn't a planet after all. Pluto is, in fact, an asteroid, like objects circling the sun with thousands of other similar objects in a remote region known as the Kuiper Belt. It has nothing in common with the five four terrestrial planets of our system or the other four gaseous ones. Pluto is just a cold, small, dark, icy rock. When Pat Hayden Planetarium in New York recently revised its solar display (minus Pluto), the public outrage was overwhelming. Pluto, it turns out, is the most "popular" planet. Bags of hate mail from third-graders landed on the desk of the planetarium's director. The effort to downgrade Pluto, based on empirical, scientific evidence, has failed — by popular demand.

It would appear Galileo's heavy correction for daring to proclaim Earth revolved around the sun, and not vice versa (religious leaders took offense in 1633 to the notion that God's creation was not the center of the universe), is not that far removed from our current religious, social and scientific discourse.

I could write extensively about the profound, evolutionary meaning of the ancient fossils discovered in Canada's Burgess Shale with regard to species development, and I could elaborate on why certain crabs in Japan bear the face of a man on their back because centuries of superstitious fishermen insisted on returning those creatures with that coincidental physical trait back to the sea out of spiritual respect.

But why bother? Those who debate evolution's validity start in two different places. In my view, there's no point in arguing who's right or wrong: Pat Robertson or Stephen Jay Gould; Genesis or Darwin.

Requiring "intelligent design" to be given equal status in a textbook has nothing to do with the study of science. This is about evening a political score that has become lopsided because of court decisions effecting the promulgation of the Ten Commandments, referencing God in the Pledge of Allegiance and prohibiting prayer in public schools. Any advocate for any cause who is continuously denied success will try to salvage a victory where he or she can.

Here is my advice to people who want to make the teaching of "intelligent design" in the classroom a business issue: Drop it.

From a scientific standpoint, there's no evidence that shows a causal relation exists between the teaching of "intelligent design" and the number of companies that either locate or expand their business in Albuquerque. You could enact more effective change if you got the Legislature to adopt a memorial in the next session heralding New Mexico as the first state to officially recognize Pluto is not a planet.

That would be a traumatic enough step up the ladder for third-graders and teachers as you continue your effort to raise the bar.

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Breakthrough of the Year

Esquire