

How to Bash Pseudoscience

I personally am proud to have what many would call a classic engineering background. Real degrees from real schools and a breadth of hard earned real experiences. Industrial, aerospace, self-directed, and educational. As a result, I very genuinely and very strongly believe that...

- **The scientific method works.** In which you propose a falsifiable theory, test that theory, then invite others to independently attack it.
- **Those laws of thermodynamics reverify themselves** on countless occasions each and every day. These laws are (1) you can't win; (2) you can't break even, and (3) if you play the game, you are sure to lose.
- **Each field has its secret insider gotchas.** These are certain to cause major grief to the casual inquirer. Accurately measuring rms power or doing low Δt calorimetry are two obvious examples.
- **Most labwork ends up dead wrong.** Either by not measuring what you think it does. Or easily getting misinterpreted, leading to wrong conclusions.
- **An hour in the library is worth a month in the lab.** Science and engineering progress by building upon the collective results of what has gone before.
- **Intelligent life elsewhere in the universe does seem extremely likely.** But the odds that they are here or have recently visited is vanishingly small.
- **A single source for any theory or claim will always be highly suspect.** Always seek major backup.
- **"Too good to be true" results always are.** Should they occur, you must spend monumental time and effort in conclusively *proving yourself wrong*.
- **Extraordinary claims demand extraordinary proof.** Such evidence is always an obligation upon those making the claims, not on those challenging.

And most especially that...

- **Finding a source of "Unlimited free energy" would be the most unimaginably heinous crime possible against humanity.** For it would inevitably turn the planet into a cinder. Hastening an isoentropic heat death. If you find a free energy source, you damn well better find a new free energy sink as well. Even then, the relative flux rates will *still* nail you.

Pseudoscience

Obviously, there are a lot of others who disagree. The web is full of people who are out there mightily striving towards developing perpetual motion machines, building "overunity" generators, running cars on water, abducting themselves to Alderon, traveling or communicating faster than light, performing miracles with magnets, expressing psychic powers, or extracting "zero point energy".

I quite strongly believe that these *pseudoscience* subjects certainly do serve as useful adjuncts to porcine whole body cleanliness. But otherwise are total hogwash.

The usual causes of pseudoscience fantasies include...

- **labwork so mesmerizingly awful that it is not even wrong.** This one gets them nearly every time.
 - **not having even the faintest clue** as to what a true scientific experiment, correct measurement, decent documentation, and realistic interpretation is.
 - **A failure to think cyclically or to look at whole systems.** The "power stroke" from repelling magnets is obvious, but the extra energy it took to get the magnets there in the first place might not be.
 - **A lack of appreciation for engineering economics.** Economics that must take into account efficiencies, alternatives, infrastructure, and *total* costs.
 - **Dragging along unrelated excess baggage.** In the way of paranoia, odd religions, conspiracies, obtuse verbosity, suppression fears, or nonstandard terms.
 - **Giving vastly more credibility to a Keelynet file** or an anonymous newsgroup post than a mainstream textbook or a properly peer reviewed article in a respected scientific journal.
 - **The failure to thoroughly research** what has gone before and then to carefully build upon it.
 - **Extreme hubris that fails to recognize the lifetime commitments** that untold thousands of scientists and engineers have made. Like it or not, at least some of these people are rocket scientists. They are a lot smarter than you are.
- And, of course...
- **Sleeping through all those Physics 101 lectures.** Or skipping the course entirely.

On the other hand, pseudoscience reading makes for wondrously bizarre fiction. Even if you believe that a well executed scam is a joy to behold, you do have to end up feeling sorry for those unfortunates who continually get sucked in to all these fantasies. One certain way to sharpen your real engineering skills is to find out exactly how and where they made their gruesomely stupid mistakes.

My Guidelines

Here are a few of the tools that I've found useful to apply critical thought to pseudoscience topics...

Shine Some Light on it– Most pseudoscience quickly falls apart if you simply take an objective enough and a close enough look at it. What really happened? What is really claimed? What does traditional physics and engineering have to say about this? Simply removing the mystique and aura and replacing them with hard observations goes a long way at finding out what is really coming down.

I guess one of my goals is to take all of pseudoscience, stack it all up on a big stage somewhere, and shine a bright light on it. Then get you to personally and independently conclude "Yup–That sure is a big pile alright".

Do a Meta Study– With a meta study, you *objectively* and *without bias* gather together everything you can find on the topic. Both pro and con. Only after everything is gathered do you judge both sides for relevance, scientific rigor, for hidden agendas, vested interest, and overall credibility.

A meta study is rather similar to a civil jury trial, where "preponderance of evidence" is carefully sought out. Along with suitable "motive, means, and opportunity".

Looks like a duck, Quacks like a duck– If you carefully look at patterns and the big picture, most pseudoscience is quickly grouped with itself and separated from real science.

Most often it isn't even remotely close. Is the proponent peer review published in *Science*, or are they an *Art Bell* show favorite? Are those same murky videos and verbose tracts still being sold after all these years?

Do the proponents have the needed skills and tools to even be able to remotely qualify to deal with their claims? Do the words "suppression", "oil company buyout", "God", "paid debunker", "conspiracy", "Tesla", "disinformation" or "patent refusal" litter their turf? Are polite and legitimate questions always met with vitriolic personal attacks?

Ask why they are still paying a monthly power bill. If their overunity device is so great, where is *one net watt*?

Ockham's Razor– William of Ockham was a fourteenth century British scholar who observed that "the simplest explanation is usually the correct one." This concept has long been a devastatingly effective scientific tool. Einstein modified it with his quote of "Always seek out the simplest possible solution–but none simpler."

Follow the Cash– Always ask exactly who is profiting and why. While remembering that personal attention, media presence, and ego reinforcement count as much.

Explore a Binary Consequence Tree.– Take the claims and split them down the middle. Their claims are true or they are not. Split again. If true, they are or are not real and known physics. If false, there is or is not intentional fraud. If false and unintentional, there is or is not a simple

and obvious explanation. Keep dividing down.

Some of these consequences will self contradict. Others quickly become highly unlikely. Those that remain should point to the most likely causes and explanations.

Avoid Negative Vibes–It is logically impossible to prove a negative, so there's no point in even trying. Instead, you concentrate upon showing more probable reasons for the claimed or observed effects. Bad labwork is, of course, your overwhelming first choice.

Never directly confront individuals. Especially when they seem to be a few chips shy of a full board. Or any of their "investors" who may be in a terminal denial stage.

Never use a personal or ad-hominum attack. If the other side starts calling you names and using similar playground tactics, you have won. Simply walk away.

And, above all, *never* attack pseudoscience with excessive manic religious fervor. Stay rational and reasoned. Or you will quickly become what you think you are destroying.

Some Happenings

Here are a few of the apparent conclusions to date from my own pseudoscientific wanderings...

Dowsing– There have been surprisingly few double blind dowsing studies, and some of these are arguably faulted. But what solid research does exist totally fails to leave any credibility whatsoever for dowsers and dowsing.

Careful and long term Australian records clearly show 46% more dry holes when dowsing is used, and insider's lore has it that well drillers aggressively encourage dowsers because they get paid to drill twice as many holes.

I am a caver and the ultimate lifetime achievement of many cavers is finding virgin cave passage. Going where no one has ever gone before. Sure, most cavers can tell you some armchair story about a grotto three states over a few years back that *may* have found a minor cave by dowsing. Sort of. Rest assured, if dowsing had a snowballs chance in hell of consistently finding virgin cave, it *certainly* would be aggressively used. It does not, and is not.

Finally, there is well over one million dollars in reward money now available for *anyone* who can convincingly demonstrate dowsing under controlled circumstances.

Roswell– Once upon a time long ago and far away, at least some UFO researchers seemed at least somewhat credible. If anything actually ever happened anywhere, the Holy Grail had to be a place called Roswell. To me, it was utterly and totally obvious that the 1947 "Marcel Balloon" photo was a blatant military coverup for *something*.

The bounds on that something could reasonably have been a low limit base commander hiding the fact that he had just moved his living room furniture in a B-29 bomber at taxpayer expense. Or an unreasonable high limit actual recovery of live aliens.

Since that time, an awful lot of heat and a little light has been shed upon the population center of Southeast New Mexico and home of the world's largest Mozzarella cheese factory. The feds have cleaned up their act and now claim that a then top secret *Project Mogul* Russky snooper balloon train was what was actually recovered. The launcher of the balloon is apparently alive and well in Albuquerque.

To me, this is the Ockham's Razor answer and a "good

enough" explanation. It is just the right size and right fit for what probably really came down.

The Magic Lamp– Take two lamp dimmers. Put a 110 volt incandescent bulb on one and a 32 volt bulb on the other. Adjust them to equal high brightness. Use a cheap meter, and you will measure *one-third* the voltage and *one-third the current* on the 32 volt bulb. Conclude that your 32 volt bulb is only drawing one-ninth the power.

Patent, publish, and retire. Uh, you first may want to touch the 32 volt bulb to see if it is any cooler.

The binary consequence tree quickly led to classic E.E. student lab blunder #01-A. That of confusing average and rms measurements. Average values for the key waveform were exactly three times lower than rms.

Amazingly, the "patent" was granted on what to me sure looks like a *half wave thyatron phase control* waveform that had been a mainstay chapter in most every 1937 power electronics textbook. On a waveform that now is *illegal* in Europe (per IEC 555-2) and shortly will be in the U.S..

The Switch Flippers– There's folks out there that assume if you connect an open circuited wire to a battery that no current results. They further assume that if the wire is long enough and if you flip switches fast enough, then power can get to the load without coming from the battery. Being instead "extracted from the fabric of space", or whatever.

By using "Supraluminal" communications.

Uh, sorry, but a *transient* current results the instant you connect a battery to *any* wire. Every time. Regardless of how long the wire is or what is connected to the other end. That initial current is set by Maxwell's Equations, Ohm's Law, and the line's *characteristic impedance*. The ultimate current gets decided by slower-than-light reflections and what happens to be at the far end of the line.

Way too much of electronics *simply would not work* if anything else was the case. This one is best ignored. Their fundamental premise clearly is not even wrong.

Brown's Gas– The classic stoichiometric mix of nearly two parts of hydrogen to one part of oxygen by volume has many unusual and easily misinterpreted properties. The colorless flame burns quite hot but has amazingly low heat energy. Actual flame temperature is extremely difficult to measure. An illusion of tungsten melting can be created by reversible sublimation side reactions. An illusion of an implosion can be created by post-condensation effects.

Electrolysis generation is up to one sixth endothermic, creating apparent "stays cool" heat anomalies. The current waveforms can be deceptively nonlinear, leading to severe power measurement difficulties.

Brown's gas proponents claim that "something different" is created by minor waveform modifications. This new gas is claimed to burn at exceptionally high temperatures, has huge quantities of long term monatomic gases, offers an "overunity" efficiency and eliminates radioactivity.

Sadly, in the three decade history of Brown's gas, neither the temperature nor its composition has ever been properly measured. Neither have any demonstrable "double blind" differences ever been shown from plain old stoke gas with regard to properties or generation. At least not to standards that would get you a C- in ChemLab 101.

Hydrogen generation by electrolysis is inherently an

integration. Integrations tend to go well out of their way to *reduce* or *eliminate* minor waveform differences, rather than elaborating upon them. Finally, not one single peer reviewed paper has ever appeared on what would certainly be a fundamental breakthrough in physical chemistry.

Homopolar Generators– Uh, this one almost got away. It turns out I did not research quite deep enough and had published some misinformation. But hey, that is what the scientific method is all about. A dozen real scientists were quick to politely and solidly point exactly how and where I screwed up. And the web makes for instant corrections.

At any rate, a homopolar generator is the only known true dc generator. You build one by placing a rotating conducting disk in a uniform magnetic field and collecting the radial current. Homopolar generators feature extremely high currents at quite low voltages. They tend to be rather inefficient due to the current collection problems.

The nonobvious part comes from the fact that general relativity demands that *you cannot tell if a perfectly uniform magnetic field is rotating or translating*. It took us over a century to straighten out the weird behavior of the *Faraday Disk* version of the homopolar machine. The generation of a homopolar disk depends only upon the strength of the magnetic field and the relative speeds of the machine's stator and rotor. It does not matter in the least whether the magnets themselves are rotating or not.

While not at all obvious, counter torques and counter emf's very definitely do exist in all homopolar machines, just as they must in all electrical generators. No "overunity" operation of any homopolar device has ever been shown. Such claims are most often caused by improper ac power measurement and misunderstanding reaction torques.

For More Help

More details on pseudoscience explorations appear in my *PseudoScience Library* at www.tinaja.com/pseudo01.html. Links to the full spectrum of pseudoscience can be found at www.tinaja.com/scweb01.html.

The two most interesting proponents are Jerry Decker's *Keelynet* site at www.keelynet.com and Bill Beaty's *Science Hobbist* at www.eskimo.com/~billb

Keely himself was a scam artist from the last century. A free energy forum is at www.eskimo.com/~billb/freenrgl/fnrg

Skeptics include the *Skeptical Inquirer* at www.csicop.org and James Randi's www.randi.org/jr/pigasus.html. You'll also find links to lots of free energy, mind control, Tesla, UFO, weird scholarship, and wondrous sites.

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