

## *Diabologic: ...and Eight Quantum Reindeer*

by Frank Dolinar

One of Albert Einstein's most famous quotes is "*Imagination is more important than knowledge.*" A few days ago, I saw an article from the November 4, 2005 issue of the Manchester Guardian (<http://www.guardian.co.uk/science/story/0,3605,1627424,00.html>) that it takes some imagination to believe. It says: "Randell Mills, a Harvard University medic who also studied electrical engineering at Massachusetts Institute of Technology, claims to have built a prototype power source that generates up to 1,000 times more heat than conventional fuel."

The article notes that several scientists -- from such institutions as University of North Carolina, NASA's Institute of Advanced Concepts, and some US power companies -- have verified Dr. Mills experiments, but there's a problem. "The problem is that according to the rules of quantum mechanics, the physics that governs the behaviour of atoms, the idea is theoretically impossible." And further, "What has much of the physics world up in arms is Dr. Mill's claim that he has produced a new form of hydrogen..."

If true, such an achievement would be valued by much of the world as a cheap, efficient, source of energy. But unverified claims like this typically cause a furor in the scientific community and claiming to have a new form of matter is usually a recipe for ridicule.

The article continues with, "While the theoretical tangle is unlikely to resolve itself soon, those wanting to exploit the technology are pushing ahead."

We've seen similar, sometimes controversial, announcements over the years. Some have proven to be legitimate discoveries, for many others, the jury is still out. For example:

1. Cold fusion -- 16 years after chemists' claims were decried by the physics community, the US Navy took a second look. The results were inconclusive.
2. Methane hydrates -- The US and Japan are looking into tapping a source of fossil fuel buried under the seabed and the Arctic permafrost. Hydrates are believed to contain more carbon than existing reserves of oil, coal and gas put together. Insufficient data as yet.
3. Solar chimneys -- The concept here is that sunlight heats trapped air, which rises through a giant chimney and drives turbines. The original design came from Leonardo da Vinci. Today the Australian company Enviromission plans to build a 700 meter tall chimney for testing.
4. Nuclear fusion -- Fusion combines atoms (rather than splitting them) to release energy, it's the reaction that powers the stars. To date, no one has been able to build a fusion system that generates a sustainable reaction to produce power. It takes enormous power input to get it started, extreme care in the engineering, and always seems to be about ten years away.
5. Wave generators -- The British company Trident Energy recently unveiled a design that uses a linear generator to create electricity from wave motion on the sea. This one looks like it's going to work and could power thousands of homes from a moderately small installation.

For me, all of these possibilities bring up some old questions.

I wonder whether the results we get from our experiments actually prove anything about the theory and the way the world works or whether they are just providing data of a kind that the experiments were devised to produce. It's a question from the heart of the philosophy of science.

This is one of the reasons I like string theory. At the moment and for the foreseeable future, string theory is not an experimental science. But String Theorists are following in the footsteps of Einstein, thinking through a mathematical maze that can at best be described as esoteric and attempting to plumb the profound depths of meaning in the concepts that String theory is unleashing on the world of physics.

Nobel Laureate Sheldon Glashow asserts that since String Theory is not subject to experiment, it cannot be physics and must be categorized as philosophy. I think that while Glashow has a point about physics being a fundamentally experimental science, he is wrong about String Theory being only a philosophy.

You have to start somewhere. Within the realm of physics, the first step on the path to understanding goes through the statement "I don't know". This then leads us to attempt to state the problem, perhaps repeatedly, until we have something we can describe in mathematical terms. Later, perhaps, we get to the point that the mathematics provides insight into some experiment.

Finally, returning to the original question, is Randell Mills right? Will his company (Blacklight Power) provide us with a new energy source that turns quantum physics on its ear? It's certainly too early to tell. But the idea is worth watching.