

The edge of reason

The far-out world of fringe physics will never win any Nobel prizes but it still tells us something important, says **Margaret Wertheim**

IN OCTOBER 1991, astrophysicists observed something incredible in the skies above Dugway Proving Ground, a former weapons-testing facility in a remote corner of Utah. It was a cosmic ray with an enormous amount of energy – equivalent to the kinetic energy of a baseball travelling at 100 kilometres per hour, but compressed into a subatomic particle. It came to be known as the oh-my-god-particle, and though similar events have been recorded at least 15 times since, mainstream physicists remain baffled by them.

To Jim Carter, a trailer-park owner in Enumclaw, Washington, ultra-high-energy cosmic rays pose no problem. They offer proof of a radical theory of the universe he has been developing for 50 years.

In Carter's theory, these rays are photons left over from the earliest stage of cosmic evolution. He calls them "apocalyptic photons" and believes that one of them was responsible for the Tunguska event in 1908, in which a mysterious something from outer space flattened 2100 square kilometres of Siberian forest.

Carter's ideas are not taken seriously by the physics mainstream. He does not have a PhD and has never had any of his work published in a scientific journal. He has just a single semester of university education, which was enough to convince him that what was being taught in physics departments was an offense to common sense.

In response, Carter went off and developed his own ideas. Five decades on he has his very own



theory of everything, an idiosyncratic alternative to quantum mechanics and general relativity, based on the idea that all matter is composed of doughnut-shaped particles called circlons. Since the 1970s he has articulated his ideas in a series of self-published books, including his magnum opus, *The Other Theory of Physics*.

For the past 18 years I have been collecting the works of what I have come to call "outsider physicists". I now have more than 100 such theories on my shelves. Most of them are single papers, but a number are fully fledged books, often filled with equations and technical diagrams (though I do

have one that is couched as a series of poems and another that is written as a fairy tale). Carter's is by far the most elaborate work I have encountered.

The mainstream science world has a way of dealing with people like this – dismiss them as cranks and dump their letters in the bin. While I do not believe any outsider I have encountered has done any work that challenges mainstream physics, I have come to believe that they should not be so summarily ignored.

"The mainstream science world has a way of dealing with people like this - dismiss them as cranks"

Consider the sheer numbers. Outsider physicists have their own organisation, the Natural Philosophy Alliance, whose database lists more than 2100 theorists, 5800 papers and over 1300 books worldwide. They have annual conferences, with this year's proceedings running to 735 pages. In the time I have been observing the organisation, the NPA has grown from a tiny seed whose founder photocopied his newsletter onto pastel-coloured paper to a thriving international association with video-streamed events.

The NPA's website tells us that the group is devoted "to broad-ranging, fully open-minded criticism, at the most fundamental levels, of the often irrational and unrealistic doctrines of modern physics and cosmology; and to the ultimate replacement of these doctrines by much sounder ideas".

Very little unites this disparate group of amateurs – there are as many theories as members – except for a common belief that "something is drastically wrong in contemporary physics and cosmology, and that a new spirit of open-mindedness is desperately needed". They are unanimous in the view that mainstream physics has been hijacked by a kind of priestly cast who speak a secret language – in other words, mathematics – that is incomprehensible to most human beings. They claim that the natural world speaks a language which all of us can, or should be able, to understand. Rather than having their dialogue

with the world mediated by “experts”, NPA members insist that they can commune with it directly and describe its patterns in accessible terms.

Regardless of the credibility of this claim, it is sociologically significant. In their militantly egalitarian opposition to the what they see as a physics elite, NPA members mirror the stance of Martin Luther and other pioneers of the Protestant Reformation. Luther was rebelling against the abstractions of the Latin-writing Catholic priesthood, and one of his most revolutionary moves was to translate the Bible into vernacular German. Just as Luther declared that all people could read the book of God for themselves, so the NPA today asserts that all of us ought to be able to read the book of nature for ourselves.

And just as Luther didn't reject the basic tenets of Christianity, outsider theorists do not reject science: they believe that it provides the right tools to reveal the majesty of our world. But they insist that the wonders of science be available to everyone.

It is here that we can find common ground with them. Many of us who love science would probably agree that one of its functions is to enable us to feel “at home in the cosmos”, as theoretical biologist Stuart Kauffman of the University of Vermont in Burlington famously put it. Outsider physicists don't feel at home in a universe described by the tensor equations of general relativity or the gauge symmetries of string theory. They feel alienated by it.

While we may not agree with the answers outsiders give, none of us should be sanguine when some of the greatest fruits of science are unavailable to most of humankind. n

Margaret Wertheim is a science writer based in Los Angeles. Her new book *Physics on the Fringe: Smoke rings, circlons and alternative theories of everything* is published by Walker

One minute with... Joe Hutto

To lift the lid on the lives of turkeys, the naturalist became a full-time “mother” to a brood of poults. What did he learn?

You lived with wild turkeys in rural Florida for over a year. How did it all begin?

I had been experimenting with the imprinting phenomenon – in which young animals become attached to the first moving object they encounter – for years, with many types of birds and mammals. Wild turkeys are difficult to come by, so when I lucked upon some wild turkey eggs I decided: OK, this is a once in a lifetime opportunity.

These turkeys regarded you as their mother. Was that a lot of responsibility?

It was, because wild turkeys are precocial – they are born fully alert and ambulatory and don't stay in the nest. They have to imprint at birth so they know who mum is, and they can't be left alone at all. I realised that if I was going to do this project then it was going to be a 24-hour a day commitment, which I was willing to do.

What did being their mother mean in practice?

I had to be with them before daylight so that when they flew down from the roost their “mother” was there waiting, and I had to remain with them until after dark. If I tried to leave before it was completely dark they would fly down and try to follow me, and then they were left on the ground, where they were vulnerable to snakes or weasels.

Was your research scientific?

It started out as a science project but it became more than that to me. I found it impossible to avoid a very personal involvement so a certain scientific empiricism and detachment was immediately lost in the process of becoming a parent to these birds.

Were there any specific skills you had to teach the turkey chicks?

Not at all. Their innate understanding of the ecology was complete. They knew everything from birth, and the knowledge is not general, it is very specific. That was one of the most surprising things about the study. From birth they knew exactly which insect they could eat and which was dangerous. There was no ambiguity. I didn't have



PROFILE

Joe Hutto is an ethologist. As well as turkeys, he has studied Rocky Mountain bighorn sheep and has spent the past six years living with mule deer. *My life as a turkey*, a documentary on his time with turkeys, came out on DVD last month

to intervene and say: “No, no, no, don't try to eat that wasp.” They knew not to eat the wasp.

Did you learn to talk “turkey”?

They sort of taught me their language. Researchers had identified 25 to 30 calls in wild turkeys that I was familiar with. But I learned that wild turkey vocabulary was much more complex than I had realised – within each of their calls were different inflexions that had specific meanings. For example, they had an alarm call for dangerous reptiles. But what I learned was that in that call there were specific inflexions that would identify a species of snake. Eventually when I heard a certain vocalisation I knew without question they had found a rattlesnake.

So turkeys are not as stupid as their reputation suggests?

No. But I think the first thing we do when we domesticate an animal is breed the fine evolutionary edge out of them. They lose that well honed razor's edge of survival that causes them to