21st CENTURY
SCIENCE & TECHNOLOGY

21st Century Science & Technology (ISSN 0895-6820) is published 4 times a year by 21st Century Science Associates, 60 Sycolin Road, Suite 203, Leesburg, Va. 20175. Tel. (703) 777-6943.

Address all correspondence to **21st Century**, P.O. Box 16285, Washington, D.C. 20041.

21st Century is dedicated to the promotion of unending scientific progress, all directed to serve the proper common aims of mankind.

Opinions expressed in articles are not necessarily those of 21st Century Science Associates or the scientific advisory board.

We are not responsible for unsolicited manuscripts.

www.21stcenturysciencetech.com
Electronic subscriptions are $35 for 4 issues, $60 for 8 issues, and $80 for 12 issues. Back issues (1988-2005) are $10 each ($20 foreign). Electronic issues from 2006 on are $10 each.
Payments must be in U.S. currency.

EDITORIAL

The Fight Over Knowledge

by Jason Ross

In the wake of the over $50 billion in damages caused by superstorm Sandy, and the very lengthy reconstruction and rebuilding process, many media outlets and government figures have blamed climate change for this damaging storm. As only one example, Al Gore wrote on October 30th that "Hurricane Sandy is a disturbing sign of things to come. We must heed this warning and act quickly to solve the climate crisis. Dirty energy makes dirty weather." Leaving aside the fact that the inflation-adjusted damage due to Sandy was far surpassed by hurricanes in the first few decades of the last century, we must ask: which advancements in our understanding of the global climate and weather system have made it possible to determine with total certainty that man-made emissions of CO_2, accounting for a portion of one out of every 10,000 molecules in the atmosphere, were the reason that hurricane Sandy struck with the force that it did?

Among all the uncertainties in life and science, such as the inability to reliably forecast the weather more than a week in advance or figure out what we really ought and ought not to eat, it is nothing short of remarkable that such a complicated process as global climate and weather is claimed to be within our ken! The many factors involved in the behavior of Sandy—such as the early mid-west winter storm, and the high pressure zone over the north Atlantic which prevented the storm from moving out to sea—apparently these were caused by carbon dioxide emissions as well? Al Gore's statement about "dirty energy" fits well with self-styled religious groups who blame various natural catastrophes on God's wrath at our national moral turpitude.

Yet, questioning the science underlying the climate change forecasts of such groups as the IPCC, leads to being branded a heretic, a "climate denier" (the resemblance to "Holocaust denier" is not accidental), and being compared to those who continue to insist that the Earth is flat. "The science is settled," we are told; but, when is science ever settled?[1]

Now let's look at another field of science, where the prevailing official view is that knowledge is not possible: quantum mechanics. In the field of climate science, we are told, *ex cathedra*, that the science is settled on what causes changes in climate, while in the field of quantum mechanics, we are told that our standard idea of causality does not exist.

After Max Planck's hypothesis of the emission and absorption of heat energy in discrete "quanta," Einstein demonstrated, in his work on the

1. The practice of science is political. The multi-trillion dollar pricetag of the proposed policy changes occasioned by climate researchers is obviously a political matter, as are the billions of dollars allocated every year for grants and studies. See, for example, Steve Goreham's delightful new book on the world of climate change hysteria: *The Mad, Mad, Mad World of Climatism*, New Lenox Books, 2012.

photoelectric effect, that all radiative energy exists in such quanta. As quantum science progressed, very eerie aspects of the behavior of the physical universe in the very small began to emerge. One behavior of physics at the quantum level reopened the dispute between the wave and particle views of light, considered definitively decided on the side of waves after the interference experiments of Thomas Young at the turn of the 19th century.

With the work of Einstein, the quantization of light was beyond dispute, but how quantized energy units could then act as waves produced quite a bit of trouble. Later experiments, such as that performed at Hitachi in 1989, demonstrated that even individual photons, sent one at a time through a double-slit apparatus apparently interfered with themselves, as though they went through both slits. With Heisenberg's interpretation, as codified in the wake of the Fifth Solvay International Conference of 1927, the accepted view was that the quanta did not have such physical parameters as location or momentum, but had a variety of locations and dispositions they could take, when called upon to do so by a suitable experimental interaction that forced the particle nature of the quantum to the fore. The older view, that particles and waves propagated through space gave way, as a statistical view, which stated that the probability of finding a particle in a certain location was itself propagating, became hegemonic. Probability was reality, and phenomena in the small were considered inherently random in their nature.

In 1964, John Stewart Bell proposed an experiment that he thought would conclusively demonstrate whether it were possible for such particles to have local "hidden variables," as-yet-unknown (or potentially unknowable) characteristics that would determine their later behavior, which only seemed random. Many experimental tests of Bell's hypothesis have been performed (with a few assumptions), generating the apparent result that among two entangled particles, one affected the other in a way that precluded their future behaviors having been pre-determined at the time of the particles' formation.

Some take this to indicate that indeterminateness is essential, and that Einstein's view of causality was wrong – there is no cause in the very small, in the typical sense of cause, meaning predetermination of the future based on present conditions. Yet, this is to put words into Einstein's (and Planck's) mouths. In a discussion printed in Planck's *Where is Science Going*, Einstein expresses himself:

> I believe that events in nature are controlled by a much stricter and closely binding law than we suspect today, when we speak of one event being the cause of another. Our concept here is confined to one happening within one time section. It is dissected from the whole process. Our present rough way of applying the causal principle is quite superficial. We are like a child who judges a poem by its rhyme, and not by its rhythm. Or, we are like juvenile learner at the piano just relating one note to that which immediately precedes or follows. To an extent, this may be very well when one is dealing with simple compositions, but it will not do, for the interpretation of a Bach fugue. Quantum physics has presented us with very complex processes, and to meet them, we must further enlarge and refine our concept of causality.

Planck, similarly, states that:

> Where the discrepancy comes in today, is not between nature and the principle of causality, but rather, between the picture which we have made of nature, and the realities in nature itself. Our picture is not in perfect accord with the observational results, and, as I have pointed out, over and over again, it is the advancing business of science to bring about a finer accord here. I am convinced that the bringing about of that accord must take place, not in the rejection of causality, but in greater enlargement of the formula and a refinement of it, so as to meet modern discoveries.

Surely this refinement must take, as a *sine qua non*, Vernadsky's concepts of the biosphere and noösphere. The quantum experiments described here have all been performed with abiotic experimental apparatus (and not without reason), but the concepts of time required in such biological processes as evolution, and in human thought and art, can serve to dramatically enrich our notions of "causality," and make possible the refinements that the scientists (and musicians!) Planck and Einstein believed to exist.

For example: free will, which undoubtedly exists in the universe, is neither indeterminate, nor random; and national economic policy looks to the future which is to be, when setting current policies. Let us develop our minds in other fields, continuing to expand our presence as an active force of nature, and return to quantum phenomena with a reservoir of refinements to the nature of causality.