

Cloud-Castle Astrophysics

by Clark M. Thomas

© August 30, 2015

ABSTRACT

The ghost in modern astrophysics is its cloud castles. Inside each theoretical cloud castle all appears well; but then “looking down” reveals there is no quality causative foundation. This essay explores how and why astrophysicists built their cloud castles from correlation, not causation, and how good science can return theory to a solid foundation.

Einstein wrote to a friend one year before his death that he feared his continuous structures would soon be overthrown: *"In that case, nothing remains of my entire **castle in the air**, gravitation theory included, and of the rest of modern physics."* Albert Einstein. (Pais, A. 1982. *Subtle is the Lord: The Science and the Life of Albert Einstein*, Oxford U. Press, Oxford, UK, p. 467.)¹

I

Astronomy has for centuries sold itself as the anti-astrology. Astrophysicists have been successful because their paradigms

¹ <http://astronomy-links.net/SeeingUnseeable.html>

operate within what seems to be verifiable frameworks. Based on what we increasingly learn from our astronomical observations, it looks like a general victory of physics over metaphysics, or is it?

Astrology comes to us from early human civilizations, an era of magic and weak verification. Today's astrology is still closely related to ancient, pre-scientific ideas. *Modern astrophysics* comes to us mostly from the modern era, with Copernicus, Newton, and others. However, mainstream science even today is hardly "hard," with competing theories being equally speculative.

Experimental science presents itself as the ONLY verifiable way to find truth. Basically, an hypothesis is our best guess based upon sequential experiments and models. Scientific progress ideally proceeds by testing each hypothesis, often with math models, to arrive at superior hypotheses, rejecting inferior hypotheses along the way. The goal is to approach Knowledge step-by-step.

The final goal of attaining full Knowledge is never possible. The best we can attain is an *as-if understanding*, where we can operate as if we actually know something. Otherwise, we would be frozen by indecision, which is not existentially viable.²

The elegant foundation of both logical philosophy and science is easy to understand:³

Take this basic algebraic equation: $A \times B \times C \times D = X$. Let us have $A = 1$, $B = 2$, $C = 3$, and D unknown. What then is the value of X ?

We already know that any equation with two unknowns cannot be solved. However, it is *psychologically tempting* to assume that D is "likely" 4, even when formulating hypotheses. The human

² https://en.wikipedia.org/wiki/Hans_Vaihinger

³ <http://astronomy-links.net/HandC.html> (Chapter 2)

brain likes to close almost-completed circles, or carry forward with what looks like a linear progression. Thus if D actually is 4, then $X = 24$. Problem solved, but only if D actually is 4.

II

The truth is brutal and inconvenient: D could be any number at all, ranging from negative infinity, to zero, to infinity. That means X could also be any number, based on what D turns out to be. What looks like an easy equation, or an OK hypothesis, becomes a *Zen koan*.

When a Zen Buddhist master asks his pupil what is the sound of one hand clapping, he is not looking for the answer. He is helping his beginner achieve the enlightened understanding that there can be no definitive answer at all to that question. This satori event frees the pupil to look elsewhere in other ways for truth.

That "elsewhere" is the realm of the as-if, where the limits of logic and experiments meet up with existential life. In the *honest world of as-if* it is OK to perform standard scientific experiments, and even to come to tentative hypotheses. However, it is also necessary to say that any result, however precise and coherent with other experiments, is only an as-if guess with no knowable probability.

In the history of philosophy precious little discussion has been devoted to *the relationship between possibility and probability*.⁴ Starting from an honest perspective of not absolutely knowing anything, and that all our theses are like *castles in clouds*, we must admit that things either are, or they are not. We have no way to answer this basic question as a probability percentage; but we can guess and go from there to maybe better guesses, or maybe coherently worse guesses.

⁴ Ibid.

We cannot fall back on the *supposed superiority of deduction over induction*. Ever since Aristotle cast his vote for deduction, induction has been considered inferior. However, they are both equal in the real world of Knowledge. Deduction is not a way to do an end run around the possibility/probability dilemma.⁵

In the world of pure maths we postulate clean possibilities and probabilities. However, *Kurt Gödel's Incompleteness Theorems*⁶ put an end to that fantasy. No mathematical system is complete unto itself. In other words, all maths are incomplete both on their own, and in existential context. We are cast back to the one-hand-clapping dilemma. Where is our enlightenment, our satori?⁷

The only "way out," is to admit there is no way out. Things we postulate either exist or not; but the absolute truth of their existence we never know with certainty. There is no verifiable probability if we cannot measure *all* possibilities. Without all possibilities, and a factual base to determine percentages of probability, there can be no honest probabilities. Even relying on the "honesty" of God is questionable, as is revealed in the possibility of an Omnipotent Deceiver.⁸ This cold limit to our intellectual powers is an elegant but hard truth that nearly all serious thinkers of the highest level have emotionally avoided.

III

In the history of political science there are many examples of established intellectual hubris bullying those who would go against the socially structural-functional paradigms. A study of

⁵ Ibid.

⁶ <http://plato.stanford.edu/entries/goedel/>

⁷ <http://sped2work.tripod.com/satori.html>

⁸ <http://astronomy-links.net/deception.html>

systems theory explains what is going on, but that discussion is beyond this essay. For now, here are a very few examples:

Practitioners of ancient religions have, and still do, bully their opponents, when given the opportunity. The *Bible* and *Koran* have examples of one group or another slaughtering opponents who do not embrace their vision of God's Truth. In most wars, then and now, God is the first conscript for both opposing sides. Today, for example, we see the faux-Muslims of ISIS burning or decapitating intellectual opponents in the name of Allah.

In 1600, Giordano Bruno, a priest in Europe, was burned at the stake by Biblically literal Christians who objected to his heretically proclaiming that the stars above us are not revolving around Earth, and are also far away – *and* that many stars may be hosting planets with intelligent life forms.

Bruno was logically speculative, and got this harsh sanction because he couldn't four centuries ago put forth any verifiable scientific evidence for his heresy. In contrast, the Ptolemaic⁹ geocentric view of cosmology had prospered for a thousand years because its seemingly correlating model with circular orbits was mathematically so elegant, *and* it did not conflict with the antique biblical view of the cosmos.

It took Galileo's observation of Venus' phases to shift the sky model toward that of Copernicus and Kepler. Galileo's primitive telescope was able to show Venus as it really appears to us. Others could use their own telescopes to test and verify his findings. Their observations confirmed Galileo; and so the cosmic paradigm was generally updated. Nevertheless, heretical Galileo was forced to recant his cosmology, and still kept by the pope under permanent house arrest.

⁹ http://www.polaris.iastate.edu/EveningStar/Unit2/unit2_sub1.htm

IV

The logarithmic dimensionality of our Universe of universes ranges from negative 39th power meters among the *YY (Yin/Yang)* particles,¹⁰ to about plus 27th power meters to reach the possible edge of the multiverse, if such an edge exists. Our puny human understanding, and where much of our clever laboratory experiments occur, remains close to our own logarithmic scale of about two meters on either side of human bodies.

Even atoms are at the relatively large negative 14th power meters below us; and the smallest detected particles, neutrinos, are about negative 22nd power. Quarks, the darlings of quantum theory, are about negative 18th power. Electron microscopes employing photon waves can only hope to detect atomic cores at negative 15th meters power. (Note that when we talk about subatomic size, we are talking mostly about dynamic quantum mass and energy units.)

Between *the real YY foundation of particle physics*, and the relatively large scale of our smallest measurable objects, there may be a gap between 15 and 22 magnitudes of size. Here is a dimensional span we cannot directly measure that boggles the everyday imagination, and experimental scientists. Remember that we live around the first magnitude of size, and that the full multiverse may be about 27 magnitudes larger than us.

Roughly, ***our human size relative to the Universe of universes (multiverse) is as individual YY particles are to atomic nuclei.*** Those who logically speculate about energy/matter particles below the Planck limit of 10^{-35} m are easily branded as speculative theorists by supporters of the standard model of astrophysics. Dissonance threatens their cozy castles in the sky, as well as their six-figure paychecks. Since burning dissidents is no longer in fashion, merely denying the validity of

¹⁰ <http://astronomy-links.net/RealTOE.pdf>

coherent dissident models as speculation is enough to keep beginner eyes focused straight ahead, and uninformed.

It is likely that an apologist for the established set of theories would say, "OK, so we can't absolutely know everything; but we do know enough from our methodologies to create good models of reality." Ignoring the possibility/probability math dilemma for now, let us look at the real obstacles for these apologists:

The Standard Model of particle physics allows for "knowing" about 5% of what is going on in the photon-visible universe, and nothing about a multiverse – because GR astrophysics refuses to model it. Ignoring the overall multiverse, about 95% of our local universe is still unknown within popular physics. The largest unknown area involves so-called Dark Energy – followed by Dark Matter, which at least interacts with baryonic matter via poorly understood gravity.

These gigantic conceptual voids are all easily filled by a 21st century version of push/shadow gravity within the context of a yin/yang multiverse. However, the rare thinker who dares present this unified and elegantly comprehensive paradigm is marginalized as merely speculative by equally speculative defenders of the 5%. Ironies abound.

Things get more strange when the huge dimensions beyond experimental verification are factored in. We have discussed them above herein. Here is a formula for what is known and knowable by those who accuse dissidents of speculation:

5% of our universe is "known," divided by the many uncounted local universes in the multiverse, divided by the many small and large size dimensions beyond verification = in practical terms a "knowledge" percentage of virtually no astrophysical Knowledge at all.

V

More than two thousand years ago the Greek philosopher *Democritus* (and his mentor Leucippus¹¹) intellectually developed an atomic model of atoms moving around in the void. They figured it MAKES SENSE for things to be divisible down to a level where there can be no more division. Democritus offered no verifiable proof for this elegant idea, having no modern electron microscopes at his command. His ultimate particles moving in a void appealed to Aristotle, but the idealist Plato hated the idea.

If we substitute the dynamic world of fundamental Yin/Yang particles for Democritus' atoms (which could not have been the same as today's atoms), then he was a modern astrophysicist.

Today we still see *Platonic ideals of pure formal math at war with more sensible paradigms*. Mathematical fantasies, such as cosmic holograms¹² inside black hole event horizons,¹³ provide fodder for the mass media, but not a higher level of wisdom.

Fortunately, we are still early in the 21st century. Emerging AI computer life forms, which I call *comphumans*,¹⁴ will soon be deeply looking at astrophysics. Lacking a limbic system in their cybernetic brain, they will not be emotionally involved with the probability/possibility dilemma, nor will they be defending a paradigm that cannot be defended.

Comphuman philosophers will simply appreciate the value of an as-if consciousness in a seemingly infinite universe, most of which is forever beyond any powers of verification. Only then will absurd cloud-castle science be replaced by honest science.

¹¹ <https://en.wikipedia.org/wiki/Leucippus>

¹² <http://astronomy-links.net/RealTOE.pdf>

¹³ <http://www.latimes.com/science/sciencenow/la-sci-sn-stephen-hawking-black-hole-information-paradox-20150826-story.html>

¹⁴ <http://astronomy-links.net/comphumansinspace.pdf>