

The Vinod Wadhawan Blog

Celebrating the Spirit of Science and the Scientific Method

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Wednesday, December 3, 2014

A SUGGESTION FOR ALL SCIENTIFICALLY MINDED INDIAN SCIENTISTS

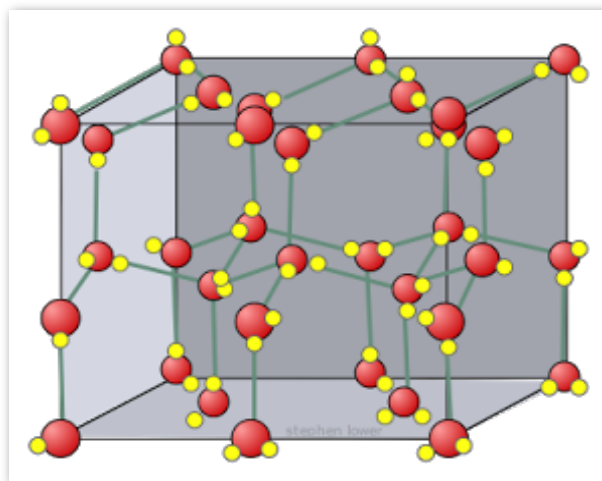
I am a staunch nationalist and would feel truly happy and proud if the achievements of ancient Indians turn out to be even 20% of what is being claimed these days by the enthusiasts. But there is no substitute for truth, and our credibility as a nation rests on how close we can stay to the truth in such matters.

It appears to me that our achievements in science were substantially more than what the history books have been saying. But our approach should be to provide credible and verifiable evidence for our claims.

A danger to our credibility as a nation comes from what I may call, for want of a better phrase, the 'Deepak Chopra cultists'. To the lay public such people appear to be well-informed about modern science. They are the Indian version of the Creationists in the West. Some of them use the language of quantum field theory and string theory etc., but a close scrutiny reveals that they are ignorant even about elementary physics and chemistry. And they do not have even a vague idea about the sanctity of the scientific method of interpreting data and evidence. I give an example. That of water.

Scientists are well aware of the challenges posed by the physics and chemistry of water. Even a nonergodic energy landscape in phase space has been invoked to address certain observations. There is informed debate among experts. Cutting-edge science often involves different (even conflicting) explanations and theories, and consensus emerges in due course. Unfortunately, cutting-edge science problems (be it water, or string theory, or the nature of intelligence) are the ideal hunting ground for pseudo-scientists and charlatans. They quote only the theories that suit their ideologies. So the 'mystical' properties of water are already on the net, and in print. But sometimes there

is a give-away statement which exposes the level of ignorance of the person using the sophisticated-looking jargon of science. For example, recently somebody said something to the effect that ‘water is special (read mystical); **‘it is the only element (sic) which expands when cooled and contracts when heated . . .’**. This is travesty of truth. The fact is that liquid water contracts when cooled and expands when heated.



http://chemwiki.ucdavis.edu/Wikitexts/Simon_Fraser_Chem1%3A_Lower/06._States_of_Matter/Hydrogen-Bonding_and_Water

In a crystal of ice the water molecules have tetrahedral bonding, which is far from being a close-packed structure. So when you take ice at 0°C and heat it, the tetrahedral bonding is broken and water acquires a more closely packed structure on entering the liquid state. Thus ice at 0 degree is lighter than liquid water at 0 degree; that is why ice floats on liquid water. It is only for a small range of temperatures that ‘water contracts on heating’. Outside that range, liquid water expands on heating and contracts on cooling, and any high-school student of science knows that. Nothing profound or mystical there.

All over the world there are two types of scientists: scientifically minded or true-blood scientists; and the rest. All true-blood scientists of India can play an important role here. In your area of specialization, please debunk unsound claims, the way I have done above for the water example. If a large number of us do this consistently and repeatedly, there is bound to be a palpable effect when it comes to countering the pseudo-scientific or unscientific statements and claims. That would a great service to humanity.

For another similar example of what I have done today on my Facebook page, please visit <https://www.facebook.com/vinod.wadhawan>. It is about the old hat called SOC (self-organized criticality). The mystics and the idealists are interpreting the reported correlated behaviour of insects in swarms as

something indicating 'quantum consciousness' or some such stuff.

Vinod Wadhawan at 4:27 PM

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About me



 **Vinod Wadhawan**

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I am a condensed-matter physicist. For the last few years I have been active spreading the message of science and the scientific method. In this context I have written over 30 articles at [Nirmukta.com](#). I am listed as an 'Enthusiastic Bright' at the Brights Net.

Books written

1. [Introduction to Ferroic Materials](#) (2000)
2. [Smart Structures](#) (2007)
3. [Complexity Science](#) (2010)
- 3a. [Nauka złożoności. Trudne pytania, które zadajemy o sobie i o naszym Wszechświecie](#) (2010)
(Polish version of Book No. 3. Translation by Malgorzata Koraszewska.)

4. Latent, Manifest, and Broken Symmetry (2011)

I did editing work for the journal *Phase Transitions* (Taylor & Francis, U.K.) for 25 years, and took voluntary retirement from the task of **Associate Editor** in 2010.

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