Let Sleeping Dogmas Lie?

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The adage says, “Let sleeping dogs lie”. If the territorial defense or the competition does not see you, it won’t attack you. It is best for your career to not stir-up old animosity or foment new controversy.

On the other hand, challenging the established way is how we advance.

Scientists used to believe in the aether, a massless viscous-less something that pervaded all space, which permitted the propagation of electromagnetic waves (light), in a similar way that air conveys sound waves. Maybe it was not massless and inviscid, but the density and viscosity were too small for instruments to detect. Nevertheless, based on this magical hypothesized substance, Maxwell derived his equations for propagation of electromagnetic waves, which were fully functional for designing radio transmitters and receivers, generators and motors, and many more. In the early 20th century, Einstein saw an alternate mechanism when he interpreted the Michaelson-Morley experiments, and many years later the scientific community widely accepted Einstein’s interpretation. For a while Einstein was persecuted for subverting the minds of the world with his hoax. It is not that Maxwell’s peers were inept or in error. They were trying to understand Nature, and the aether model seemed to work. Maxwell’s equations remain fully functional today for many engineering purposes.

The caloric theory of heat is also about a magical fluid-like substance that flowed from hot material into cold material when bodies are contacted. With this concept, one can model the flow of “caloric” with partial differential equations. However, we now consider heat to be thermal energy, vibrations of molecules, and that the energy is diffused because hot molecules (wildly vibrating molecules) bump into less hot neighbor molecules giving them energy (making them hotter), but themselves becoming cooler due to the loss of energy. There is no substance that flows. However, the differential equations for caloric flow are still the fundamental way we model the diffusion of heat. It is not that the great scientists of the 1700’s were inept, our understanding of the details about Nature have progressed.

Even in Galileo’s time the most learned thought the Sun revolved around the Earth and that the Earth was flat. He was convicted for being "vehemently suspect of heresy” because he claimed the Earth rotated about the Sun. About a century earlier (~1540) Copernicus revealed his defense for the heliocentric universe. Columbus’ bold spherical Earth concept was tested in 1492. Until the scientific revolution, both the elite and the populous knew the flat Earth and geocentric models were true.

Human history has many such stories. Prior to understanding molecules, experts thought that matter (such as water) was a continuum. Up until the Renaissance period, they though garbage piles spontaneously generated rats. Before Pasteur’s discovery of microbes, they thought that disease of the body was due to spirits.

We have held many strong views that came out of primitive understandings. Dogmas are creeds, beliefs, canons, which are accepted as truths. And, the established folks have grounded their reputations and careers in that dogma. My industrial and academic career encountered several instances.

In one, the accepted practice was to arithmetically average a particular quality metric when fluids are blended. However, using a simple material balance, I calculated that they should be using a harmonic mean (adding reciprocals like resistors in parallel). They told me, “It is the way you average, and all the experts have accepted it. Who do you think you are, junior.” Notice it is not a question they asked me! In trying to change that legacy to the right way, I did not make friends.

In another project, our statistical folks showed us how to model using a power series. Data indicated we needed up to cubic powers of about 5 variables, leading to a model that had about 40 coefficients. The managers several levels above me all agreed we needed to do the expensive trials to generate the data, to reveal the knowledge needed to improve our products. I saw an opportunity to combine variables into dimensionless groups and created a model with only 4 coefficients. It fit the data very well, showing that we did not need the extensive trials. This, of course, embarrassed many experts who had their career invested in the traditional power series. They did not become my friends.

Finally, the academic experts, of much higher stature than me, told me in a public forum that nonlinear models cannot be used for control. And, when I showed the data that demonstrated they were wrong, I did not make friends. Then, when it became their turn to review my proposals for funding, they remained not my friends.

The experts’ opinions are shaped by their background, their particular skills, the data that they see, and their environment (religious, political, and economic). Often what was accepted as best practices in the pre-computer past, is so entrenched that it continues to be accepted as best practice. If an erroneous cause-and-effect mechanism or model seems to be functional, use it. Why should a company suffer the costs of management-of-change for a different model? Why should you suffer the consequences offending the experts? Why “rock the boat”?

Well, I think that we should use our best understanding of legitimate techniques. If you see it, others will also. And the organization that makes the transition will have the competitive advantage.

I’d suggest a twist on the sleeping-dogs adage: “Don’t let sleeping dogmas lie”. The new generation of technologists will have new data, better precision, and new analysis techniques. Likely the new employee seeking to understand, will realize that the old way was not exactly right. When you discover something better, or more valid, or more appropriate, pursue it. Better models, understanding, and methods improve our decision-making functionality.

But then again, if you wake up sleeping dogmas they tend to bite you. Don’t undermine your career by telling all the company experts that they are wrong. Perhaps find one expert who has the political clout, who can understand and agree with your idea, then let them tell the others in a way that the others can accept.

Live up to your potential, but don’t undermine your career. Let the bigs help you wake up the sleeping dogmas.

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