**Science as a Way of Life**

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By Abraham Loeb on July 15, 2019

Most events in real life stem from a confluence of multiple causes. Just as it is challenging to infer the recipe for a rich soup based on its appearance, these complex events evade a straightforward explanation. Their common occurrence led people to develop mystical or religious interpretations for elements of life whose origin cannot be easily understood.

Science attempts to clear this fog of daily life by isolating sub-systems which are simpler. Once these are understood and explained in terms of universal laws of Nature, these laws can be combined to account for related parts of the complex soup of real life.

Despite its celebrated accomplishments, science still remains sketchy on many biological, psychological and social phenomena that dominate our daily life. The scientific explanation is clearly work in progress, representing an island of knowledge in an ocean of ignorance. There are major aspects of our life that remain unexplained, leaving professional scientists with the choice of whether to accept the general notion that they will also be resolved one day by the scientific method. Scientists could instead resort to mysticism or religion in dealing with these unexplained portions of reality. This ambiguous state of affairs explains why some of the best scientists are religious.

But there is another option, namely a secular adaptation to reality without seeking an explanation. This is socially accepted as “behaving like a mature adult” and learning from experience that “this is the way some things are” and that “there is no point in trying to figure them out”. It is the feeling that pervades Franz Kafka’s book “The Trial”, where Joseph K. cannot figure out what he is guilty for. Things happen to us without an explanation and we better get used to them. The weather was considered to be such a phenomenon for millennia. Early in human history, there was no way of forecasting it reliably due to the absence of scientific data from weather satellites. Even when such data was assembled, early computers were not advanced enough to extrapolate it significantly into the future. By now, we understand not only that weather patterns can be forecasted but also that the atmospheric conditions on our planet could be affected by our own actions as a civilization. With this new perspective on our collective responsibility, the common argument that “there is nothing we can do about some facet of reality, since it is just like the weather” should be turned on its head and replaced by the realization that we could dare to shape every aspect of reality just as we affect the atmospheric conditions on Earth.

This updated frame of mind enables us to be bold enough and create synthetic life in the laboratory without limiting our imagination to the biological recipe selected by the specific geological conditions on the early Earth that made the familiar soup of life-as-we-know-it.

As a physicist, I resist a fatalistic attitude towards life. The practice of science encourages me to create a model for everything I see. Being a physicist is not merely my day job; it is my way of life. I cannot perceive the naked reality without dressing it up with possible
explanations. My family members sometimes joke about my hopeless attempts to explain complex situations that are enshrouded in a fog of uncertainty. But just as in physics - the advantage of having models for any aspect of our daily life is that they can be compared to new evidence and improved over time. Without a model to compare with, new evidence may not mean much and just appear as arbitrary as the original phenomenon. Constructing a model and steadily refining it based on new evidence educates us about the world. It also forces us to stay humble and tolerate mistakes as we improve our limited understanding. Just as in the example of the weather, having a model about any aspect of life has the great benefit of allowing us to forecast the future. Comparing this forecast to what actually happens could imply that our model is wrong, but this is as important to our intellectual growth as when the model succeeds.

The proper definition of “adulthood” is gathering enough experience so that our resulting models have a high success rate in forecasting reality. But to get there, we must allow ourselves to stumble and let go of our prejudice. Rather than softening our interpretation of a conflict between our models and new evidence, we should always seek the simplest explanation and be willing to abandon failed models. This is easy to say but difficult to do even for physicists who seek the simplest models that appear “natural” to them. When weakly-interacting-massive-particles are not detected well below the natural range for their parameters as dark matter, when supersymmetry is not found by the Large Hadron Collider, when the first reported interstellar comet does not look like a comet, or when the simplest models of cosmic inflation are ruled-out by data from the Planck satellite, physicists should move on to consider alternatives and admit that our original concepts of “naturalness” might have been wrong. Impartial attention to evidence should get priority over inertia or social pressure in dictating the mainstream agenda. An honest response of scientists to failed models would set an exemplar for intellectual leadership on how to “walk this walk” and not just “talk the talk” about revising notions of reality based on evidence, with implications to all aspects of life - including public policy.

The ability to refresh our models of reality over time is the trademark of wisdom. The talent of using our best models of reality to navigate forward is the trademark of outstanding leadership.

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