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Rationality, Science & the Human Mind

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In pursuit of knowledge, the sciences depend on a wide variety of instruments suited for study of different fields, but there is one instrument of supreme importance to all science – the instrument of rationality. Given its the central importance, it is remarkable that greater attention is not focused on defining the criteria that distinguish rational thought from other forms of cognition which attempt to mimic it as well as on the inherent limitations in reliance on the faculty of rationality as an instrument of knowledge. It is also surprising the more the scientific community and public-at-large have not given greater attention to the various ways in which the claim or appearance of rationality is applied to promote personal convictions or present postulates and suppositions as though they were scientifically validated facts. The World Academy is pre-eminently qualified to examine this issue in its broadest and most profound terms and to evolve guidelines that may be relevant to all fields of science.

Is rationality born on earth? If so, where is it clearly evidenced? Certainly not in politics where democracy is based on competition and compromise between different interest groups for power and benefit, rather than on any rational principle of what is best for all. The UN, which was founded to establish democracy in the world, has been used as a means to preserve the privileges of the victorious powers in World War II. The Nuclear Non-proliferation Treaty has been used by the nuclear weapon states to preserve a position of nuclear apartheid rather than to fulfill the goal of a nuclear-weapons free world.

The current international financial crisis is evidence enough that rationality is not prevalent in the field of economics and finance. Had rationality prevailed, this crisis never would have occurred. Rather it is the result of the persistent argument of bankers, economists and other experts that deregulated national financial markets and unregulated

international markets is optimal. In the 1980s, two Nobel Prizes were awarded for work supporting the Efficient Market Theory, which seeks to anticipate price changes based on the assumption that fluctuations in the market are random and unpredictable. The crash of 1987 completely discredited the theory, yet it remained in vogue among academics. Over the past few decades, investment practitioners of EMT have fared no better than they would have by selecting a random assortment of 20 stocks. Warren Buffet, a practitioner of an alternative theory known as value-based investing, multiplied his capital 137-fold during the same period, while the DOW only doubled. EMT theorists attribute Buffet's success to chance. Current thinking regarding inflation, employment, money and world currencies fare no better.

In reality it is power that governs human affairs in all fields, not rationality. What we sometimes mistake for rationality is the *limits to power* which compel people to behave with a semblance of rational consideration. Yet, all work is based on the assumption that people will behave rationally. Great accomplishments, such as Prime Minister Churchill's defense of Britain in World War II and President Roosevelt's successful halt of the banking panic in 1932, are the result of idealism and determination, force of personality and commitment. Being rational, most of the problems humanity faces today will simply disappear.

The world's great intellectuals are commonly considered the last bastion of rationality. But a careful study of their lives, like the one by British historian Paul Johnson, casts myriad aspersions on that illusion. Rousseau, Shelley, Marx, Tolstoy, Sartre, and their like were great indeed, but rational they were not. Bertrand Russell was a confirmed pacifist who went to jail during WWI for his convictions. Yet after WWII, he actively campaigned for a preventative attack against USSR to stop communism and end all wars. Five years later he denied that he had ever advocated a preventative war, until a BBC correspondent confronted him with his published statements, prompting him to respond that he had forgotten what he said and never really meant it.

Is Science Scientific

If not intellectuality, than surely science deserves recognition as a bastion of rationality, for science prides itself on the power of reason as opposed to the claims to knowledge of faith-based religion. Yet public confidence in science is largely based on faith in the experts who proclaim scientific truths, even in cases where other scientists know better than to accept their statements at face value. Regardless of whether scientists are rational or not, there is no doubt that public acceptance of the truths of science is largely based on superstition. In fact, science has simply replaced religion as the basis for faith. No doubt it is true that science has remarkable accomplishments to its credit, most especially the technological wonders of the modern age that have been generated as a product of scientific endeavor. But capacity to accomplish does not necessarily signify truth of knowledge. That is to confuse practical utility with theoretical validity. Ptolemy proposed that heavenly bodies moved on circles that moved on circles. His theory of epicycles enabled him to predict the eclipses and motions of the planets to within an accuracy of 1 part in 1000, yet the underlying premise was entirely wrong. Kepler's first theory of the solar system based on platonic solids was also remarkably accurate but based on entirely false premises. In the social sciences, even a semblance to accuracy is often taken for proven fact.

In his writings, philosopher of science Karl Popper enumerated many common logical inconsistencies that are still prevalent in scientific practice today. He argues that the inference of theoretic truth from empirical facts by induction is logically inadmissible, yet the practice is widely accepted in most scientific disciplines. His insistence on falsifiability and not merely verifiability is relevant to scientific practice. But beyond these logical inconsistencies, science is prone to more mundane human errors emphasized by the social constructionists. Former WAAS President Carl-Goren Heden expressed this fact succinctly when he said, "Scientists will not accept a new idea unless it is pronounced by one who has already been highly recognized for his accomplishments." Then it is the person that is being accepted, not the theoretical conception.

As Popper argues, rationality requires above all an impartial, disinterested, objective assessment undistorted by personal motives, past conceptions or preconceived ways of thinking. Can science be rational as long as scientists

- Want to convince others of their views?
- Want to be recognized for their discoveries?
- Selectively search for data that confirms their theories?
- Hesitate to express views that are contrary to current belief or the views of their peers?
- Accept a statement as true simply on the strength of the person who speaks it or the journal that publishes it?
- Accept a statement as true because spoken by a distinguished scientist, even when he is speaking outside his own field of proven expertise and accomplishment?

The term *limits to rationality* can be approached at two levels:

- Identification of the most common ways in practice science fails to meet the minimum criteria for rationality.
- Identification of the inherent limits of rationality as an instrument of knowledge.

Common Errors

1. *Sensation:* Rationality requires the ability to factor out the distorting influence of the senses, as in the apparent movement of the sun around the earth.
2. *Logic:* Rationality requires the ability to comply with principles of logical analysis.
3. *History:* Rationality requires the ability to refrain from interpreting earlier theories or viewpoints in a manner other than their original author's may have intended.
4. *Data selection:* Rationality requires the ability for impartiality in the selection and measurement of data.
5. *Falsification:* Rationality requires the capacity to falsify alternative interpretations of data before drawing conclusions.
6. *Ego:* Rationality requires the ability to remove the influence of self-interest, prejudice and vested interest in the formulation of hypotheses and conclusions.

7. *Physicality:* Rationality requires the ability to dispassionately examine conceptions and conclusions that may be at variance with one's own past experience, e.g. the mental attitude of saying 'its never been done before'.
8. *Conformity:* Rationality requires the ability to dispassionately examine conceptions and conclusions that are at variance with established beliefs within or outside the scientific community, including those that might meet with extreme skepticism or even ridicule.
9. *Psychological:* Rationality requires the ability to dispassionately examine conceptions and conclusions that may be at variance with one's own opinions, preconceived notions and fundamental conceptions.
10. *Motive:* Rationality requires the ability to dispassionately examine issues with complete disregard to the personal gain or loss that may accrue from validation of a hypothesis.

Inherent Limits of the Rational Faculty

The rationality of scientific discovery is questionable on other grounds as well. Philosophers of science in the 20th century have distinguished between the logic of discovery and the logic of justification. Popper concluded that there is no logic to the process of scientific discovery and, moreover, that a rational model of discovery is impossible. Scientific discovery is irrational, there is no reasoning to hypotheses. "My view may be expressed by saying that every discovery contains 'an irrational element or 'a creative intuition', in Bergson's sense." And we have the testimony of many distinguished scientists to support this view. Jules Henri Poincaré, one of the greatest mathematicians and mathematical physicists at the end of 19th century, made a series of profound innovations in geometry, the theory of differential equations, electromagnetism, topology, and the philosophy of mathematics. He said, "It is through science that we prove, but through intuition that we discover." Einstein spoke of the search for those highly universal laws ... from which a picture of the world can be obtained by pure deduction. There is no logical path leading to these laws. They can only be reached by intuition, based upon something like an intellectual love of the objects of experience. "Intuition does the work. Reason comes to

harvest." Carlo Rubbia, Nobelist and CERN director, said "Science for me is very close to art. Scientific discovery is an irrational act. It's an intuition which turns out to be reality at the end of it--and I see no difference between a scientist developing a marvelous discovery and an artist making a painting." It is ironic, that although intuition is widely recognized as essential to science, there is no organized effort to study, teach or cultivate this faculty by the scientific community.

The practice of science points to certain inherent limitations in the capacity of the human thinking mind to perceive and comprehend truth. These are not merely limitations in science but in all human efforts to attain knowledge through rational processes. Although we may not be able to easily transcend the limit of rationality, except through evolution of consciousness, we can however be conscious of the limitations of the instrument we employ in our quest for knowledge and try to compensate for these limitations in our quest for and assertion of truth. These limitations include:

1. *Objectivity:* The very act of separating the subject from the object and attempting to study it purely by external means may limit the capacity of the subject to understand the object, especially in the social and psychological sciences. Objectivity in terms of impartiality is essential for knowledge, but objectivity that excludes impartial consideration of subjective experience is inherently deficient.
2. *Division:* The natural tendency of mind to divide reality into parts and view each part as a separate and independent whole may result in fragmentation, loss of perspective and distortion of knowledge.
3. *Contradictions:* Mind has a tendency to view reality in terms of contrasting or opposing viewpoints, as if they are mutually exclusive, rather than recognizing the partial truth that may be present in divergent formulations.
4. *Abstraction:* Mind tends to mistake words, concepts, theories and mental symbols for the reality they are intended to represent.
5. *Totality:* Mind has the tendency to view the whole as the sum of the parts rather than as a totality that exceeds in properties and character that sum, e.g. the concept of health.

6. *Integrality:* Mind struggles to comprehend complex interrelationships and interdependence between various elements of a totality.
7. *Intuition:* In spite of the fact that great scientists commonly attribute the origin of their discoveries to intuitive rather than logical processes, mind is unable to grasp the nature of intuitive processes or know how to consciously induce them.

Role of World Academy

The limits of rationality is relevant to all scientific disciplines, all fields of human activity and all humankind. WAAS is ideally positioned to address this issue because it is representative of the highest standards of intellectual attainment and values. Possible initiatives by the Academy could include:

1. *Limits of Knowledge:* Constitute working groups to impartially examine the evidence and impartially identify the unknowns, assumptions, implicit suppositions and speculative conclusions behind current state of the art thinking in each field. That would be immensely beneficial to the general public which is in the habit of confusing every new theoretical postulate with proven fact and would be a reminder to scientists as well.

2. *Lessons from the History of Science:* Compile lessons learned from the search for and quest for knowledge relevant to the practice of all science.

3. *Social Sciences:* The social sciences deserve special attention. For unlike the physical sciences, they do not even purport to establish themselves on a common foundation of physical laws and chemical properties. Each discipline constructs its own theories—hanging in mid air—without any definition of the field or laws that govern the social whole of which each discipline is merely an aspect. The current financial crisis illustrates the problem. Experts discuss various solutions based on banking, financial markets, economy, politics, business, consumer confidence, national concerns, social attitudes, psychological insecurity, yet there is no single theoretical model that even postulates the relationship between all these factors which span many academic

disciplines. The work undertaken by the Mother's Service Society on a theory of development seeks to establish definitions, premises, principles and processes common to all the social sciences. This is a field where WAAS can make an immense contribution.

4. *The Process of Scientific Discovery:* Exploration of the process of scientific discovery: The fact that great discoveries in science most often derive from intuitive perception rather than analysis of data. What implications does that have for the way we practice science and train scientists?

WAAS can focus on identifying and illustrating various aspects of the limits of rationality as they actually impact on the practice of the physical, life and social sciences and seek to evolve a set of guidelines applicable for dissemination to the scientific community.