



IEEE New Hampshire Section, Life Members Meeting
Wednesday, 3 December 2008, 2:00 – 4:00 PM
Bedford NH Public Library, 3 Meetinghouse Rd.
The McAllaster Room, Downstairs



BEAUTY & CREATIVITY in SCIENCE & TECHNOLOGY

Paul H. Carr

Air Force Research Laboratory Emeritus

www.MirrorOfNature.org

Light refreshments will be provided. **Please register by Monday, December 1**
at: james-w-anderson@ieee.org so that we know how much to prepare.

The May/June 2007 issue of the MIT Technology Review is a design issue entitled "Beautiful Machines." This raises the questions: "What is beauty?" And "What is the nature of the creative process?"

"If everyone were cast in the same mold, there would be no such thing as beauty," according to Charles Darwin. This leads us to mathematician-philosopher A. N. Whitehead's assertion: "Beauty is the harmony of contrasts." Physicist Steven Weinberg believes that beauty is more than a personal experience of aesthetic beauty. Scientific beauty is much closer to a horse trainer's enthusiasm for a beautiful racehorse. Such beauty can be measured. Can it win a race? Beauty thus resides in the interplay between the structure of its body (form) and its ability to run (function.) (1)

Physicist Murray Gell-Mann observed that the creative process has three steps:

- (1) **immersion** and total involvement in a problem,
- (2) **incubation** logical impasse, in which conscious thought is useless, &
- (3) **illumination**, "aha," "eureka," when we are relaxed, contemplating the beautiful.

MIT physics Professor Victor Weisskopf expressed "illumination" in his book "The Joy of Insight." Nobel laureate Karl A. Muller had the idea leading to the discovery of the cuprate high temperature superconductors while contemplating a mandala, which is a symmetrical visual symbol of the universe. "Positive emotions are critical to learning, curiosity, and creative thinking," according to Don Newman,

former VP of Apple (2).

Hopefully our present information overload can lead to a new age of creativity and beauty, which integrates and harmonizes diverse cultures and ideas. The scientific story transcends national and cultural differences.

References:

- (1) Paul H. Carr, 2006, Beauty in Science and Spirit, www.BeechRiverBooks.com/id08, Center Ossipee, NH
- (2) Don Newman, 2005, Emotional Design: Why We Love (or Hate) Everyday Things, Basic Books.

Book Signing:

Dr. Carr's presentation is based on his book "Beauty in Science and Spirit". After the talk he will have copies of his book available for purchase and he will be glad to autograph them for you.

Biography:

Paul H. Carr has had a long and distinguished career as a research scientist. He earned his Ph.D. in Physics at Brandeis University after receiving the B.S. and M.S. degrees from MIT. From 1958 through 1961 he was on the staff of Lincoln Lab; he then served in the Army and joined Air Force Cambridge Research Labs (AFCRL) in 1962. From 1967 to 1995, he led the Component Technology Branch at AFCRL, later Rome Laboratory and presently the Air Force Research Laboratory at Hanscom AFB where he is presently emeritus. His Branch's basic research on surface acoustic waves (SAW) resulted in signal processing filters used in radar, communication, cellular phones, and TV. The Air Force Office of Scientific Research selected his Branch as a STAR Research Team in 1990. His 80 research papers and 10 patents include contributions to microwave ultrasonics, SAW, superconductivity, and laser-activated antennas.

He has received many awards, among which are the O'Day Memorial Award for best AFCRL paper published in 1967, the 1973 AFCRL Loeser Memorial Award Lecture for sustained scientific achievement, and the 1976 Air Force Systems Command Outstanding Technical Achievement Award for a low-spurious SAW delay line, which solved "false target" problem in operational radar. In 1991 he was named the Rome Laboratory Engineer of the Year.

He was Guest Editor, of the September, 1991 Transactions on Microwave Theory and Techniques (MTT) Special Issue on Microwave Applications of Superconductors. He served as Chairman of the IEEE Boston Chapter of Microwave Theory and Techniques, MTT, from 1994 to 1995 and from 1989-1990. He is a Life Fellow of the IEEE and a Life Member of the American Physical Society. The John Templeton Foundation awarded him a grant for his philosophy course at U Mass Lowell. His home page is www.MirrorOfNature.org

Directions to the Bedford NH Public Library:

From I93 or I293, the Everett Turnpike, take the exit for Rt. 101 West. Take a left at the 1st light towards Bedford and Milford. After going through the 2nd light, take a right at the 3rd light onto Meetinghouse Rd. The Bedford Public Library is on the left at the top of the hill. The McAllaster Room is downstairs on the ground floor.