

ArtScience: The Essential Connection

If the pages of *Leonardo* are any indication, technological bridges to and between the arts are flourishing while scientific-artistic connections are fading. Is this trend a result of natural selection for the most interesting developments, or is it a symptom of a real and troubling disconnection growing between the arts and sciences? The purpose of this column is to explore the possibilities.

My personal view is that the arts and sciences are just as connected to each other, and the connections just as vibrant, as at any time in history, but that, for reasons that are not entirely clear, these connections are increasingly invisible. One possibility is that C.P. Snow did the world a disservice by proclaiming in his "Two Cultures" essay that artists and scientists were members of non-communicating, antithetical endeavors [1]. The fact that Snow felt that this situation was both intolerable and inexcusable seems to have had less impact than his point that there were two distinct cultures. People raised to believe his thesis may fail to perceive connections that do exist.

Ignorance is certainly a problem. A few years ago I was dismayed to find that Freeman Dyson and Nobel laureates William Lipscomb and C.N. Yang believed that the arts had not contributed anything of value to science since the Renaissance. Their statement appears in the proceedings of the Sixteenth Nobel Conference in 1980, entitled "The Aesthetic Dimension of Science" [2]. Goethe and Escher were the only artists any of the participants could name who they thought had any claim to influencing science in modern times. Buckminster Fuller, Kenneth Snelson, Wallace Walker, Jonathan Kingdon, Abbott Thayer and other artists who have had real impact on science [3] were not mentioned; neither was the scientific use of artistic techniques such as anamorphic distortion, false coloring and pixelization, which were pioneered by the artists who invented anamorphic painting, fauvism and pointillism, respectively. Did the participants really not know? Had they simply not thought carefully about the subject? Or do scientists, wittingly or unwittingly, dismiss artistic contributions in order to objectify their results?

Kenneth Clark places blame for the schism elsewhere. In his view, the sciences and arts are so similar that both draw from the same pool of talented individuals. As funding and jobs for scientists have grown and funding and jobs for artists correspondingly shrunk, an imbalance has developed:

Art and science are not . . . two contrary activities, but in fact draw on many of the same capabilities of the human mind. . . . The development of science . . . has touched that part of the human spirit from which art springs, and has drained away a great deal of what once contributed to art. . . . We must . . . wait patiently for our faculties to be reunited [4].

I do not think our faculties have ever really been split. I believe that Clark has observed an epiphenomenon that hides the continued synergy of the arts with the sciences. I suspect that the majority of *successful* scientists have been amateur—and sometimes even professional—artists, musicians, composers, poets, playwrights and novelists who have understood the value of arts for scientific education, thinking and creativity [5,6]. Examples include Desmond Morris, the Oxford zoologist who is also a professional surrealist painter; Roger Penrose, the Cambridge physicist whose tessellations have transcended even Escher's; paleontologist Mary Leakey and Nobel Prize-winning chemist Dorothy Hodgkin, who both began as professional illustrators; and Nobelist Roger Sperry, who complemented his studies of brain function by

creating high-quality ceramics and sculpture. The *average* scientist, in contrast, is unlikely to have artistic hobbies and far more likely to dismiss the arts as uninteresting or even antithetical to science [7]. Because the scientific enterprise has been growing so rapidly, the philistines dominate the culture of science.

The question is whether science itself can survive the increasing marginalization of the arts both within society and within science itself, especially if the best science is done by polymath individuals who integrate the two. Conversely, we must consider what the impact on art may be if scientific inputs become increasingly rare. So much great art has come from artists interacting with scientists—perspective, color theory, dynamism, constructivism come quickly to mind—that one wonders what increased interaction might bring. The purpose of this column will be to explore the past, present and future of arts-sciences intersections with the aim of stimulating broader discussion of, and participation in, this essential connection.

ROBERT ROOT-BERNSTEIN
 Leonardo *Guest Editor*
 2201 Biomedical Physical Sciences Building
 Michigan State University
 East Lansing, MI 48824-3320, U.S.A.
 E-mail: <rootbern@msu.edu>

References and Notes

1. C.P. Snow, *The Two Cultures* (Cambridge, U.K.: Cambridge Univ. Press, 1959).
2. K. Clark, *Moments of Vision* (London: Murray, 1981) pp. 25–29.
3. R.S. Root-Bernstein, "Art Advances Science," *Nature* **407** (2000) p. 134.
4. D.W. Curtin, ed., *The Aesthetic Dimension of Science* (New York: Philosophical Library, 1982) pp. 109–111.
5. R.S. Root-Bernstein et al., "Correlations between Avocations, Scientific Style and Professional Impact of Thirty-Eight Scientists of the Eiduson Study," *Creativity Research Journal* **8** (1995) pp. 115–137.
6. R.S. Root-Bernstein, "Music, Creativity and Scientific Thinking," *Leonardo* **34**, No. 1, 63–68 (2001).
7. In Root-Bernstein et al. [5], we carried out interviews with 40 scientists about art, science and the two-cultures problem and correlated their responses to their impact as scientists. All the scientists having the most professional influence (which included 11 members of the US National Academy of Sciences—among them four Nobel Prize winners) believed that the two-culture divide did not exist and that all good scientists are also artistic and literary. All of the dozen least-successful scientists stated that artistic and literary avocations were a waste of time that interfered with scientific success.