

The show is well conceived and organized, stressing the idea that animals and insects (even amoeba) build naturally and genetically, in a hypothesis Richard Dawkins has labeled *extended phenotypes*. The exhibition displays such construction with animal/insect houses and housing colonies, accompanied by detailed bilingual wall texts in Catalan and Spanish and an accurate translation available in English.

The tiny, woven, patched, compiled or secreted buildings not only present a world of related structures, they also demonstrate building as a genetic occupation—different but perhaps not totally unrelated to human building, which is generally discussed in cultural terms that should be revised in order to consider human architecture as *extended phenotypes*.

Els Altres Arquitectes considers materials—twigs, grasses, silk, mud, paper pulp—and relates them both to the natural world and to their counterparts in human architecture. An unnarrated video is set approximately in the middle of the exhibition and projects close-up views of insects and animals in the process of building. Showing a wasp secreting paper pulp and then fashioning it along a nest's edge goes a long way toward stimulating and developing one's thinking about material strengths and secretions in biomimesis—considerations only now beginning to be studied for nanotechnology projects, only now sharpening the cutting edge of architectural theory.

This didactic exhibition is also fun. An excellent, unexpected production, *Els Altres Arquitectes* is an all-too-rare model—general enough for children and specialized enough for adults, including professionals. After leaving the exhibition I e-mailed friends with children, saying that here's an event where parents and children can unite in the joy of watching birds tie knots and insects plaster walls, as well as experience, whether knowingly or not, an introduction to genetic architecture.

LECTURE

AMBIGUITY IN ART AND IN THE BRAIN

Public lecture by Semir Zeki, Centre for the History of Science, Technology and

Medicine, Manchester University, Manchester, U.K., 30 October 2003.

Reviewed by Robert Pepperell. E-mail: <pepperell@ntlworld.com>.

Commercial Ambiguity

"Use Dr. _____ Sachets de Toilette, and mothers and daughters will look like sisters."

—Gentlewoman

(cited in *Punch*, October 1907)

With new art historical work being published on ambiguous "potential images" [1], and the hybrid discipline of neuroaesthetics becoming more widely recognized as a specific strand in the larger debates about art and consciousness [2], I was intrigued to learn what one of the leading proponents of neuroaesthetics, Semir Zeki, had to say about the neurological basis of ambiguity. The exploitation of ambiguity has been a deliberate artistic strategy not only amongst modern and contemporary practitioners but throughout the pre-modern world and across many different cultures. Ambiguities have been presented sometimes as a kind of amusement or curiosity (as in certain optical devices, or the quote above) and sometimes as a way of profoundly affecting the viewer, resisting stasis and multiplying perceptual and conceptual possibilities (as in analytic cubist paintings or Vermeer's enigmatic domestic interiors).

Zeki's contribution is to attempt an account of artistic ambiguity from a neurological standpoint, drawing on his own extensive research into color constancy and the nature of visual perception. He is keen from the outset to situate his analysis within the context of consciousness studies, and in particular to stress his theory of "microconsciousness." In contrast to those who regard conscious experience as singular and unified, Zeki proposes a model in which the various functionally specialized areas of the brain (such as those responsible for color perception or motion perception) in themselves constitute regions of conscious activity needing no higher interpretation. The impression we have of an immediate holistic conscious experience is in fact illusory, given that, as Zeki has shown experimentally, we see color a fraction of a second before we see motion, even though a moving red bus seems to form a perceptual unity. Over longer time frames (greater than one millisecond),

such temporally distributed events form a "macroconscious" state, which might further be modulated by those higher conscious states conditioned by culture and language, ultimately generating the kind of conscious awareness we associate with our everyday general activity. Even though these higher conscious processes are prone to error, by misconstruing the reality of what is present in the world, the functionally specialized areas cannot in themselves be fooled into seeing what is not there. The perception of color, for example, can never be ambiguous because color is nothing but a product of functionally specialized brain regions. As Newton had already pointed out, there is no color "out there" in the world for us to see, only variations in the frequency of electromagnetic radiation, which we experience in a chromatic register.

Although many perceptual processes result in visual experiences that we cannot consciously influence (such as color), there are other kinds of visual phenomena that are subject to cognitive contingencies—ambiguous images being prime examples. In the familiar Necker cube or Schroeder staircase (examples from Zeki's lecture can be found at <http://turner.stanford.edu/art/zeki_images/>), we are able to some extent to determine the apparent orientation of the object, which lies in one of two directions. (I would also suggest it is possible to see other kinds of orientations, but for the purposes of this review I will accept the convention that there are two.) In such cases, Zeki argues, the functionally specialized visual areas (those responsible for recognizing lines and angles) draw upon other brain processes, notably those concerned with memory and experience, to produce a cognitive interpretation containing spatial information that is actually absent in the image. This cognitive interpretation is prone to vacillate between the ambiguous readings, but is also subject to some degree of conscious control, insofar as we can force ourselves to see one orientation or the other.

For Zeki, this way of understanding ambiguity differs markedly from its dictionary definition as "doubtful" or "uncertain." On the contrary, each of the possible interpretations is, for the viewer, an utter certainty, albeit a certainty that can change from one moment to the next. The microconscious brain region associated with any particular perceptual state gains a kind of sover-

eighty over the moment of experience; if only for a given time, it dominates or occupies the cognitive high ground. This, then, is what Zeki terms the “neurological definition of ambiguity,” the evolutionary rationale for which, he claims, is the inherent survival advantage in flexibility of interpretation.

Applying these principles directly to the analysis of art, one finds cases from across art history (and Zeki concentrates almost exclusively on the traditional European canon) in which artists leave open, or leave unresolved, certain parts of the work in order that the viewer (or indeed, listener) can more freely interpret, which although demanding greater cognitive resources rewards with greater semantic richness. The “unfinished” marble carvings of Michelangelo and the Belvedere Torso are exemplary cases.

Despite the fact that the thesis is not particularly ground-shifting, certainly to many aestheticians or psychologists of art, it does have the advantage of being supported by some robust physical data. It also raises some fascinating philosophical questions about the nature of reality as constituted by the brain. I raised some of these questions in a later discussion with Zeki, and in particular I asked him about the assertion he made during the course of the lecture to the effect that “ambiguity is a property of the brain and not of the external world.” This, I felt, not only presupposes an essential rupture between brain and world, but also might suggest a relegation of the role of the art object itself in the production of the ambiguous effect. He replied by stressing the evolutionary imperatives that must have formed our perceptual apparatus, especially the fact that the brain is so selective in what it chooses to recognize as it searches for what he calls “constancies,” i.e. patterns, regularities and invariant forms. In doing so it discards, or simply fails to register, mountains of other data that are not essential to the conduct of the organism. Part of this inherent efficiency lies in our very capacity for interpretation, which allows us to evaluate possible states of the world that may not easily be determined—at least before it is too late. So, for example, a wary smile from a potential adversary might be a benign invitation or a concealed threat. Thus it seems that the brain reflects the potential ambiguity of the world, but moreover allows us to negotiate it with the benefit of our acquired experience.

One further statement made in the lecture caught my attention, the claim

that the “brain can accommodate contradictions.” He was referring specifically to Johann Winkelmann’s description of classical sculpture as carrying an essentially contradictory meaning, at once violent, aggressive and turbulent and at the same time sublime, composed and static. This contradictory ambiguity, as Zeki claims, can be held by us as an aesthetic whole and is manifest in works like the Belvedere Torso. But this raised in my mind the equally intriguing possibility that, in contradiction of Aristotle’s principle of non-contradiction, Zeki’s neurological evidence might offer grounds for the naturalization of a dialectic approach, one in which contradictory states are accommodated simultaneously without the necessity for resolving them one way or the other. He responded by distinguishing between two modes of neurological time, the very short (less than one millisecond) in which possibilities are “collapsed” into one orientation or another, and longer time frames (over one millisecond) in which various and contradictory orientations might be accommodated as the possibilities “flip-flop” from one to another.

There is little doubt that Zeki’s work in this field could contribute to our scientific understanding of the nature of art and, indeed, of perception and consciousness. He is clear that art, science and philosophy are epistemologically convergent, but seems to have difficulty persuading his colleagues in the scientific community of the value of taking artists’ investigations into perceptual behavior seriously. Equally, from the artistic standpoint one is entitled to be critical of approaches that seek to reduce complex sensory and cultural phenomena to neurological processes, even though such processes are inordinately complex in themselves. But there is certainly an intrinsic value in sharing ideas and stretching methodological boundaries, even if that means both science and art have to examine their own working assumptions. One perceptive audience member in the lecture asked in response to Zeki’s claim that art and science were indistinguishable, “Does that mean science is ambiguous?” It was heartening that his reply was a cautious affirmation.

References

1. D. Giamoni, *Potential Images: Ambiguity and Indeterminacy in Modern Art* (London: Reaktion Books, 2002).

2. S. Zeki, *Inner Vision: An Exploration of Art and the Brain* (Oxford, U.K.: Oxford Univ. Press, 1999).

MATERIALS RECEIVED

Audio Compact Discs

Aaron Acosta: *Frequency, Amplitude and Time*

www.home.earthlink.net/~benkei

Ideatracker

Creative Disturbance + Straddle 3.
Straddle 3 Constructors, 2004.

***Kampec Dolores + Grencsó István
Koncert!***

ReR Megacorp, Thornton Heath, Surrey, U.K., 2004.

Momentum

Petri Kuljuntausta. Aureobel/Charm of Sound, Helsinki, Finland, 2004.

Red Edge

Frode Gjerstad and Lasse Marhaug.
Breathmint Records, Canada, recorded 2002.

Say “tin-tah-pee-mick”

Alex Keller and Meri von KleinSmid.
Mimeograph, Seattle, WA, U.S.A., 2004.

Searching for the Inverse Square

Alex Keller and Meri von KleinSmid.
Mimeograph, Seattle, WA, U.S.A., 2004.

Variety Orchestra

Brian Woodbury. Some Phil Records, U.S.A., and ReR Megacorp, Thornton Heath, Surrey, U.K., 2004.

Books

Activity-Centered Design: An Ecological Approach to Designing Smart Tools and Usable Systems

Geri Gay and Helene Hembrooke. MIT Press, Cambridge, MA, U.S.A., 2004. 135 pp., illus. Trade. ISBN: 0-262-07248-3.

Avatar Bodies: A Tantra for Posthumanism

Ann Weinstone. Univ. of Minnesota Press, Minneapolis, MN, U.S.A., 2004. 208 pp. Paper. ISBN: 0-8166-4147-1.

Bicycling Science

David Gordon Wilson. MIT Press, Cambridge, MA, U.S.A., 2004. 477 pp., illus. Paper. ISBN: 0-262-73154-1.