Book Reviews
Don Fredericksen, Editor

Joseph D. Anderson. The Reality of Illusion: An Ecological Approach to Cognitive Film Theory. Carbondale: Southern Illinois UP, 1996. 200 pp. $29.95.

Recently there has been growth of scientific interest in film and video. This interest has coalesced into cognitive film theory. Unlike psychoanalytic, Marxist, and feminist approaches, cognitive film theory neither offers nor seeks any analysis of cultural, historical, or political influences on film or on viewers. Instead, the central idea is that film succeeds because it meshes with our perceptual and cognitive endowment. From this view follows interest in such things as why flicker and flickerless images occur, how form and motion are perceived stripped of their meaning, how color and lighting work stripped of their effects on mood, how lens effects and shot angles affect perceived space, and how continuity and the juxtaposition of shots and cuts imply narrative structure. These topics and more are addressed with considerable clarity in Joseph Anderson's *The Reality of Illusion*. But Anderson's book is not simply about cognitive film theory. Its subtitle, *An Ecological Approach to Cognitive Film Theory*, allies it with a particular approach within the cognitive sciences, that of James J. Gibson.[1] Gibson looked to match the constraints of evolutionary biology to everyday human tasks and activities. Thus, Anderson's book is about the evolutionary constraints on human eyes and minds and how these have shaped film. Before Anderson's book, there was no systematic ecological approach to film.[2]

Anderson begins (1) with two questions: "Why [in a film] do the spokes of a wheel turn backward?" and "Why does a movie seem so real?" The answer to the first is straightforward, and is typical of the focus of his first five chapters. Backward wagon wheels refer to two phenomena, stroboscopic motion and structure-from-motion. The discrete presentation of frames in film (at 72 frames per second) is generally above the temporal resolving capacity of the human visual system. Thus, most motion is seen as smooth and correct. But these discrete frames also make separate images of adjacent spokes closer together than those of the same spoke. The visual system then assigns identity to these adjacent spokes, and the wheel looks as if it

turns, often smoothly, backward.[3]

Attempts at partial answers to the second question—about the "reality" of film—run throughout Anderson's book. The question runs deep. Part of an answer, not addressed by Anderson, concerns projected size—the larger (in terms of visual angle) and the better the resolution, the more a viewer feels like he or she is "in" the display.[4] The effect of wide screens is that, while we focus more locally on characters and content, the layout and motion presented to our peripheral visual systems surrounding that focus very much control our visceral responses.

Anderson's introductory chapter outlines differences between cognitive film theory and other approaches, and the second builds an understanding of the ecology of cinema—that is, the manner in which film has adapted to the auditory and visual systems of humans. It also contains a theoretical aside on the places of illusion (a term Anderson uses a bit more broadly than in the cognitive sciences) and computation in perceptual and cognitive theory. The third chapter concerns capacities and strategies of the cognitive system, with particular attention to the resolution of ambiguity and the categorization of natural objects around us. Traditionally and currently, these are well-researched topics in cognitive science about the mental activity of building coherence from the world around us.

The fourth chapter is the lengthiest and dives into specifics of flicker, motion, form, color, and depth perception. Anderson reviews the evidence for the generally separable parts of the human visual system that process form, color, and motion and depth. That is, the form system cares little about color or motion, the color system cares little about location and motion, and the motion and depth system cares little about form or color. The separability of these systems is one reason why black-and-white films work so well.[5]

The fifth chapter explores the combination of sound and image, with short sections on the use of sound effects and music. The latter are unfortunately short, but their brevity is due to the relative paucity of cognitive research in the area.[6] The sixth

chapter is the perhaps the meatiest and considers the most perplexing aspect of film from the point of view of cognitive science—continuity. How does film succeed in telling a story, jumping from one point of view to another and one scene to another, presenting the human eye with discontinuities that it never evolved to see?[7] Anderson reviews the evidence for what constitutes acceptable cuts—emphasizing Hollywood style more than, say, that of MTV. In this context he discusses the psychological assumptions underlying point-of-view editing in a detailed analysis of a scene from *Casablanca*.

Anderson's last four chapters are different. The previous six show how film is accepted as a reality; the remainder are addressed to what viewers stand ready to impose on that reality. Here Anderson departs from a typical ecological approach and borrows from social psychology and cognitive anthropology. His seventh chapter deals with our building of a fictional world, which he calls diegesis,[8] through play. This play is a voluntary exercise, for no utilitarian purpose, in which we stretch our cognitive processes to figure out film structure and meaning and to delimit it from the rest of the world. The eighth and ninth chapters, on the development of a character in film and on narrative structure, develop this idea. Anderson suggests filmgoers seek to figure out characters and story line. Every shot, every camera angle, every gesture as composed, purposefully or accidentally, by the filmmakers will be interpreted reflexively by us. Why? Because that is what we do everyday; it is part of our biological endowment.[9]

In Anderson's concluding chapter he succinctly summarizes his views about the reality of film (166):

> A film functions as a surrogate for reality at several levels [. . .]. The danger in a thriller is not real; the fear we feel for the character in danger is. The tragedy in a movie's narrative is not real; the empathy and sorrow we feel are.

Anderson's book is a well-written, well-composed argument that should be enjoyable to both the scientific audience tantalized by film and the film audience seeking some scientific basis for the structure and force of their craft.

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Notes

[1] For more information about the ecological approach see J.J. Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Mifflin, 1979), which has a chapter on the perception of film. For an assessment of the ecological approach, see J. Cutting, "Perceptual artifacts and phenomena: The role of Gibson in the 20th century," in S. Masin (ed.) *Foundations of Perceptual Theory* (Amsterdam:] North-Holland, 1993; 231-260). For a critique of Anderson's book in light of Gibson's work, see T.A. Stoffregen, "Filming the world: An essay review of Anderson's *The Reality of Illusion*," *Ecological Psychology* 9 (1997): 161-177.

[2] Approaches from the perspective of cognitive psychology have appeared. See J.M. Carroll, *Toward a Structural Psychology of Cinema* (The Hague: Mouton, 1980); J. Hochberg and V. Brooks, "The Perception of Motion Pictures," in M. Friedman and E. Carterette (eds.), *Cognitive Ecology* (San Diego, CA: Academic Press, 1996; 151-203); R.N. Kraft, "Rules and Strategies of Visual Narratives," *Perceptual and Motor Skills* 64 (1987): 3-14; D.J. Simons & D.T. Levin, "Change Blindness," *Trends in Cognitive Sciences* 1 (1997): 261-267.

[3] House flies have a much faster temporal resolving capacity and do not fly when the only light available is that of film (see J.N. Lythgoe, *The Ecology of Vision* (Oxford: Oxford UP, 1979; 69). The phenomenon of backwards-turning rotary systems cannot occur in natural light, but can occasionally be seen in fans under incandescent light at night. It occurs in video presentations of Westerns because these have been transferred from film, but it generally will not occur when the original medium is video. A detailed review and analysis of the phenomenon is given in P. Burt and G. Sperling, "Time, Distance, and Feature Trade-offs in Visual Apparent Motion," *Psychological Review* 88 (1981): 171-195.

[4] This effect is well-known to IMAX and OMNIMAX filmmakers and filmgoers. See T. Hatada, H. Sakata and H. Kusaka, "Psychophysical Analysis of the 'Sensation of Reality' Induced by a Visual Wide-field Display," *Journal of the Society for Motion Picture and Television Engineers* 89 (1980): 560-569.

[5] This may also explain why in painters like Pierre Bonnard (1867-1947) could "flatten" a canvas but retain its presentation of form and color.

[6]From the point of view of a filmmaker, S. Lumet *(Making Movies* [New York: Vintage, 1995]) gives a particularly good account of music and film.

[7]One beginning, acknowledged by P. Messaris *(Visual Literacy: Image, Mind, & Reality* [Boulder: Westview Press, 1994]) and W. Murch *(In the Blink of an Eye* [Los Angeles: Silman-James Press, 1995]) but not by Anderson, follows a comment by director John Huston on parallels with natural vision. In normal viewing we alternate fixations (gazes directly at objects) with saccades (quick eye movements) and often during saccades we blink. Huston claimed that a film shot is like a fixation and a blink/saccade is like a cut. Normal viewing consists of two to three such sequences per second; MTV, but not standard film and video, can approximate this rate.

[8]Here and throughout, Anderson's emphasis is on the contribution of the active perceiver, not on the composition and structure given by the cinematographer, editor, and director. This somewhat contrasts with the spirit of Gibson, who emphasized the analysis of what is presented to the senses, in this case the structure of film.

[9]It is too bad that Anderson does not discuss the "Kuleshov effect" (see Messaris, *Visual Literacy*), where it was claimed that mere juxtapositions of shots will cause viewers to interpret meaning across any possible cuts. This is clearly not the case, and I think Anderson would agree. There would be "ecological constraints" on what would be acceptable content juxtaposition, just as there are such constraints on camera angles in point-of-view editing.