

THE ECOLOGICAL APPROACH TO VISUAL PERCEPTION

Classic Edition

James J. Gibson

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INTRODUCTION TO THE CLASSIC EDITION

William M. Mace

The Ecological Approach to Visual Perception has been available in English for 35 years (as of this writing in 2014). It has captured a substantial audience, including those reading it in German and Japanese. A Polish translation currently is being planned. As befits a classic, it is still possible to promise new readers that they will find “something completely different” here and to assure those who have read it before that it’s worth reading again.

This book marked the culmination of the development of James J. Gibson’s thought, not because his thoughts were completed but because he died of pancreatic cancer at the end of 1979, the same year the book was published. See Neisser (1981), Pick, Pick, Jones and Reed (1982), and Hochberg (1994) for memorial remarks. Officially, this was Gibson’s third book. Unofficially it could be called the fourth because his 1950 book included much from a book length Army Air Corps report (Gibson, 1947). Gibson’s first reformulation of the main topics in visual perception was in *The Perception of the Visual World* (Gibson, 1950). This book was followed by a reconceptualization of all the “senses” in *The Senses Considered as Perceptual Systems* (Gibson, 1966) and then finally, *The Ecological Approach to Visual Perception*, which started out as a revision of the 1950 book but became much more than that.

Gibson’s publishing career began in 1929. He was an honored (for his experimental work) senior figure in experimental psychology by the time the first book appeared. It was 16 years until the publication of the second book [although his chapter for the Koch series (Gibson, 1959) was a major statement], and another 13 years to the last one. Gibson was continuously at work throughout his career, and he stayed remarkably focused on the same issues

from his work in World War II until his death. His books are like progress reports summarizing his thinking up to the final editing. By the time a book was published, he had already started to extend and revise the work until it crystallized into the next book.

Gibson developed his thinking through relentless revisions of his own published work. His personal copies of the first two books were densely marked with annotations beginning with phrases like “Egads! How could I have believed this?” or, more temperately, “Here is what I should have said” followed by a positive statement. Preliminary versions of his ideas began as short memos prepared for this perpetual Thursday afternoon seminar at Cornell. At these meetings, Gibson would distribute a one-page document (sometimes longer). These papers might state a thesis and outline an argument. Sometimes they were a list of provocative questions, sometimes a tentative classification. Copies of these short pieces also were sent to colleagues on his mailing list. Because they were reproduced in a “ditto” process that printed in aromatic purple, students came to call these “purple perils.”¹

The chapters in his second two books developed in this stepwise fashion—from notes in book margins to “purple perils” to published papers or lectures to more formal statements. Chapter 8 in this 1979 book, “The Theory of Affordances,” is one example of this method of work. There were multiple “purple perils” on affordances and a small section on affordances in the 1966 book. Gibson gave lectures on affordances, including one lecture at a 1973 conference that was revised and published in 1977 (Shaw & Bransford, 1977). Chapter 8 here is a further revision of that 1977 chapter. Gibson had completed drafts of nearly all of the chapters for this final book by the spring of 1977 and circulated them to colleagues. Therefore final versions of most chapters in this book are the product of multiple revisions based on Gibson’s own self-criticism and his reflections on remarks from colleagues.

The Perception of the Visual World — 1950

Gibson’s 1950 book was his “airplane landing” book, the legacy of his World War II research on the use of film to teach flying to pilots (Gibson, 1947). This featured the role of the ground, the surface of the earth. When a pilot is in the clouds there is nothing to see outside the plane, and it can be very disorienting. When the pilot comes out of the clouds and sees the ground and sky meeting at the horizon, the pilot can orient. Vision is clear and useful again. Gibson proposed that the extended earth, something real that can be seen, played the role of “space” in vision. Rather than positing an empty, mental coordinate space as a framework for vision, Gibson was advocating a “filled” space—which really was not a “space” at all but a plenum. He called this “ground” theory and contrasted it with “air” theory, which is what he called the traditional ideas about space from Newton, Berkeley, and Kant. Gibson recognized that the

patterning of surfaces, beginning with the ground, was a gradient of surface textures. A texture gradient, Gibson showed, could specify the slant of a surface. Gibson then reformulated classic topics in vision around these texture gradients, such as size constancy. This problem of size constancy arises from the fact that the projected size of an object on the retina changes as the object's distance from the perceiver changes. With the notion of texture gradients in hand, he pointed out that the projective geometry of the receding ground to the eye is the same as that of objects on the ground as they recede into the distance. As a consequence, an object resting on the ground hides or occludes the same number of ground texture units regardless of its distance from the observer. This relation of object to supporting ground surface then remains the same from near to far. Gibson proposed that perceiving other constant object properties, such as shape, would make more sense if, in a case like this, something detectable actually was constant. In the present case, even though the projective size of an object gets smaller with increasing distance from a point of observation, there is a visible relation that is invariant and hence can be the basis for size constancy.

What was of lasting importance in this work was Gibson's showing, first, that what counted as the "stimulus" for vision could be an object of research and, second, that it was feasible to find a correspondence between optical patterns and properties of the world if one matched the right optical pattern with the right environmental property. Questioning what could count as a unit for vision was commonplace for Gestalt psychologists, and Gibson was explicit about the debt he owed to Kurt Koffka, with whom he shared a seminar in their years together at Smith College. The Gestalt psychologists, however, thought of the organization in experience as resulting from brain processes. Gibson argued that organization, such as the object-background invariant, was in the world and that the program of trying to find characterizations of pattern that corresponded to aspects of the world was both feasible and necessary.

Between the 1950 book and the 1966 book, Gibson moved from thinking about what patterns could act as stimuli to rethinking the concept of the stimulus itself, ultimately rejecting "stimulus" in favor of his version of "information." In a paper that is a classic in its own right, Gibson (1960) carefully surveyed the patchwork of meanings of the term "stimulus" that could be found in the literature. He concluded that the optical (or acoustic, or haptic etc.) patterning that would best correspond to actual perceiving in the world no longer seemed like a "stimulus" at all in any proper sense. Instead, he proposed a common-sense usage of the term "information" (as opposed to the technical usage of Shannon) which was fairly well developed by the time he published his next book. By information, Gibson meant structured energy that was *information about* environmental sources, in contrast to *information as structure* in an information theoretical sense which implies a sender and a receiver. Gibson's information is specific to its environmental sources though not a replica or a copy. It certainly is not a stimulus in the sense of energy that triggers a response.

Gibson's information does not come to the animal. The animal goes to it, actively obtaining the information. Part 2 of this 1979 volume develops this concept of information and is at the heart of Gibson's theory.

The Senses Considered as Perceptual Systems — 1966

The 1966 book presented the results of Gibson's re-thinking of the concept of "stimulus" as applied not only to vision, but to each of the classic "senses." He showed that if one re-thinks what a stimulus is, and how stimulation (now information) is informative about the world, there are necessary consequences for how a scientist conceptualizes the systems that are sensitive to this information. From this starting point, he offered his thoroughly functional view of how physiology would be conceived in light of his new ideas about the stimulus. What was featured was Gibson's novel notion of a perceptual system. He contrasted "imposed" with "obtained" information, emphasizing the latter. With "obtained" information, the animal goes to it, as it were, rather than the stimulation coming to or being merely impressed on the animal's receptors. Sensing was not simply whatever was delivered by the anatomical structure of sense organs. Sense organs did not deliver sensations to the brain or mind, subsequently to be made meaningful perception by cognitive processes. For Gibson, perception was not constructed from the building blocks of sensations. Rather, there were perceptual functions, activities of an intentional animal for the purpose of detecting information specific to itself and to the environment. In a reciprocal loop, action leads to the detection of information, and information plays a vital role in controlling action.

Perceptual systems, in contrast to the senses as channels of sensation, are whole body activities devoted to actively extracting, isolating, or clarifying informative structure in the world. For Gibson, there is structure specific to both an animal's own movements and properties of the environment in every system. Besides the "basic orienting system", Gibson examined the auditory, haptic-somatic, tasting and smelling, and visual systems from the perceptual systems point of view. The "basic orienting" system is where Gibson treats the vestibular system and its evolution. His unique and consistent treatment of animal "sensory" systems in animal physiology is well illustrated here, emphasizing the role of the system in detecting environmental information used for the active control of behavior. Orienting, of course, is a broad functional activity supported by *all* of the perceptual systems, separately and together. Thus the controlled environmental adjustments Gibson associates with this "basic orienting" system are elaborated in his treatment of the other perceptual systems. As I have noted elsewhere (Mace, 1977), a good illustration of the contrast between a perceptual system and a traditional sense is what happens when an animal wants to get a close look at something far away. A Gibsonian perceptual system, here the visual system, involves the eyes moving relative to

the head, the head moving relative to the body, and the body moving in the environment in the activity of clarifying structure specific to the object. The animal has to get closer, and to do that might locomote. That is, it uses its legs in the interest of seeing more clearly. The legs are operating as part of the visual perceptual system. The activity of the visual system does not begin at the moment of being “stimulated” by the distant object. Rather, it is operating continuously in the service of detecting information in the reflected light that specifies the object. Gibson stressed the capacity of animals to actively control what they can see, hear, smell, and feel in their normal habitat. That level of controlled activity in the environment surely must involve the whole body in these perceptual activities.

The Ecological Approach to Visual Perception – 1979

The overall structure of *The Ecological Approach* is in 4 parts – Significantly, Part I is about what the environment consists of and Part IV is about the perceiving of representations of the environment, such as still pictures. This order inverts the standard analysis of vision. Standard analyses flow from the presumption that what is “given” is a pair of flat retinal images. With this starting point, the analysis of visual perception is akin to considering how one perceives pictures. But this seemingly innocent step introduces difficulties from the outset. When we perceive the world visually, the world is not flat. Nor is the visual world doubled and nor is there a hole at the blind spot. Gibson avoided these dilemmas by beginning with an analysis of the environment that an animal sees (Part I) and the way that environment structures light (Part II). In other words, he begins by considering “what is there to be perceived.” After all, perceiving processes have emerged over phylogenesis in relation to organisms’ *ecologie*. An analysis of vision must begin with the task at hand, that of guiding action and detecting environmental properties. We should bear in mind that different “solutions” have been arrived at over time, chambered mammalian eyes with retinal images, being but one. Framing the analysis of perceiving in this way brings to the forefront a concern for the nature of the perceived environment (“what is perceived”) before considering the anatomical structure of the eye. What ensues is Gibson’s treatment of the structure of reflected light in the ambient optical array. Part III examines the process of picking up the informative structure carried in the ambient array and here the notion of perceptual systems is reintroduced. Also presented in this part of the book is a summary of empirical research that revealed some of the information that can be detected by a moving perceiver. Placing the topics of depiction (pictures and film) at the end of the book (Part IV) highlights Gibson’s view that these are higher order phenomena that depend first on how perceiving in the real environment works. Pictures, especially for Gibson, are derivative, not foundational. Hence the topic goes at the end of the book, not the beginning.

An especially noteworthy chapter in Part III concerns Gibson's and his student George Kaplan's "discovery of the occluding edge." When surface texture is gradually revealed (accretion) or occluded (deletion) *over time* at the edge of another surface, there is unambiguous evidence that the former surface is farther away from the perceiver than the latter surface. Typically, occluding edges are revealed with movements of the perceiver, and relative movements of environmental features. There are several significant implications of this phenomenon. First, the occluding edge of closer surface is only visible over time. Second, for this reason, the occluding edge is a relational property of the environment-organism processes. In the absence of movement, the occluding edge is not present. Gibson is pointing to the often overlooked ontology of relational properties, which comes to play a foundational role in the proposed ecological approach. Third, perceiving an occluding edge includes an awareness of the now-hidden surface and to-be-revealed surface of the farther object. In other words, perceiving has both retrospectivity and prospectivity; it is past-oriented and future-oriented. As William James pointed out, the notion of the present is "specious" from the stance of an active organism—which constitutes yet another challenge to the "picture theory of vision."

After presenting the major features of his theory and the supporting evidence in the first 13 chapters, Gibson lists the highlights of his position in Chapter 14, "The Theory of Information Pickup and its Consequences." He states that "The theory of information pickup differs radically from the traditional theories of perception" and follows with several distinctive features of the theory. These features include: "a new notion of perception, not just a new theory of the process;" "a new assumption about what there is to be perceived;" "a new conception of the information for perception, with two kinds always available, one about the environment and another about the self;" "the new assumption of perceptual systems;" and optical information pickup [that] entails an activity of the system not heretofore imagined by any visual scientist, the concurrent registering of both persistence and change in the flow of structured stimulation." With respect to the later, he notes that "this is the crux of the theory."

Each of these distinctive qualities of Gibson's theory is discussed extensively in the book. I will stress the first point here and leave the others for the reader. I stress the first one because, in my experience, it has not been as widely appreciated as some of the others.

Succinct expressions of the "new notion of perception" can be found in the next subsection of Chapter 14, "A redefinition of perception," and later in the same chapter in the Section called "A new approach to nonperceptual awareness" where he again characterizes what he means by perception in order to show that it forces a re-thinking of other putative processes like memory, thinking, and imagining. Under "A redefinition of perception" he writes, "Perceiving is an achievement of the individual, not an experience in the theatre

of consciousness. It is a keeping-in-touch with the world, an experiencing of things rather than a having of experiences . . . “The act of picking up information, moreover, is a continuous act, an activity that is ceaseless and unbroken . . . “The continuous act of perceiving involves the coperceiving of the self.”

Then, later in the chapter, he writes, “To perceive is to be aware of the surfaces of the environment and of oneself in it. The interchange between hidden and unhidden surfaces is essential to this awareness: These are existing surfaces; they are specified at some points of observation. Perceiving gets wider and finer and longer and richer and fuller as the observer explores the environment. The full awareness of surfaces includes their layout, their substances, their events, and their affordances. Note how this definition includes within perception a part of memory, expectation, knowledge, and meaning—some part but not all of those mental processes in each case.”

Being in direct perceptual contact with the environment is contrasted with being in direct perceptual contact with something that mediates *between* the animal and environment. As Gibson says at the beginning of Chapter 9, “Direct perception is what one gets from seeing Niagara Falls, say, as distinguished from seeing a picture of it.” Sometimes it is asserted that in Gibson’s sense of direct perception, perceiving is accurate. While true in a sense, it also can be misleading. The environment is indefinitely rich. No animal can perceive beyond a small fraction of it, so “perceiving the environment” cannot possibly mean perceiving *all* of it. Thus Gibson said that “Perceiving gets wider and finer and longer and richer and fuller as the observer explores the environment.” Being “in touch with” or “aware of” means being able to guide one’s activity to formulate goals and accomplish them.

In the section, “The relationship between imagining and perceiving” in Chapter 14, Gibson lists perceptual tests for reality. These are crucial to understanding Gibson’s claims for the fidelity of optical structure. He illustrates by showing the difference between the optical structure of an image and the optical structure of substantial, persisting, surfaces in the world. First, consider accommodation of the lens in a mammalian eye. Accommodation clarifies texture on real surfaces, not images. Second, surfaces become clearer with fixation. Third, a surface can be scanned (as opposed to an image). Fourth, an object can be scrutinized. Indeed, Gibson says, “The most decisive test for reality is whether you can discover new features and details by the act of scrutiny. Can you obtain new stimulation and extract new information from it? Is the information inexhaustible? Is there more to be seen? The imaginary scrutiny of an imaginary entity cannot pass the test.” He adds, “A related criterion for the existence of a thing is reversible occlusion. Whatever goes out of sight as you move your head and comes into sight as you move back is a *persisting* surface.”

Thus, perception of the environment consisting of substantial surfaces, as opposed to any surrogate, can be direct because the change and associated non-change is distinct from anything non-real.

The last point I want to make about this book is the persistent contact with research findings. Chapters 9, 10, and 11 are set aside to review relevant research findings. Because Gibson offered a broad, comprehensive theory, commentators have sometimes neglected the degree to which Gibson was concerned with accounting for research results. He often claimed to have formulated or changed an idea because of findings he was trying to understand. A good example comes from prism studies. He was always challenged to interpret the results of people like Stratton and Ivo Kohler whose observers adjusted to extraordinary optical transformations over periods of hours, days, and weeks. Stratton's apparatus had people looking at the world "upside down." Where many psychologists draw the lesson of brain plasticity from such studies, Gibson asked *what* it was that prism wearers (for example) were adjusting to. He realized at some level of abstraction that there had to be information for the stability of the environment there all along. Thus, instead of emphasizing the plasticity of the eye-brain-body system, Gibson emphasized what had to be true about the world for the perceptual system to arrive at an equilibrium. I urge the reader to appreciate the importance to Gibson of those chapters about experiments.

What happened after the 1979 book was published?

First Reviews

Even though there were groups of people studying Gibson's ideas seriously by 1979, there were not all that many. That did not affect Gibson very much, of course. Serious perception scholars knew about him and his work, but even in his area, few examined his work carefully, and professional journals were as likely as not to ask that authors remove the theory discussion when Gibson-inspired research was submitted for publication. Given that, the first major review of the book, by Frank Restle, was rather surprising because Restle had no special connection to Gibson's ideas or research. Nevertheless, he seemed to appreciate the promise that was there and dubbed Gibson the "Seer of Ithaca."

Restle (1980) caught much of the significance of the book rather nicely here, "The main body of perceptual research bears little, if at all, on how a moving person or animal uses vision. If vision research were assigned the job of helping design a suitable prosthesis for the blind, or buildings that help visitors find their way, or highways and roads that lead drivers to their destinations and away from accidents, or machines that are easy to use, Gibson's thinking would at once be seen to be relevant, practical, and highly advanced. Vision research limited to perception of gratings, color patches, block letters, and bad line drawings would seem to be of little value" (p. 293).

Ralph Norman (1980) wrote the review of Gibson's book in *Science*. He praised the analysis of the environment and the real world emphasis in the book, but thought that the process of pickup is missing, claiming that Gibson

thinks optical structure is automatically picked up if it's there. This has been a common complaint. Gibson rarely did anything to ameliorate such misunderstandings (to the extent that they are misunderstandings). The question of psychological process has to be backed up more than Haber acknowledged, however. That is, a person asking for a psychological processing account needs to consider that goal such a process is meant to perform. Gibson thought that in the end, even though not always admitting it, what people wanted was a "mechanism" to convert a sensation to a perception, and for him, there was no such job to be done. This is so because perceiving involves the detection of information that specifies functionally meaningful properties of the environment (affordances), rather than the conversion of meaningless sensations into a meaningful percept.

Subsequent Ripples Through the Scholarly World

Cornell Ph.D.'s, Herbert and Anne Pick, had brought knowledge of Gibson to the University of Minnesota even before publication of Gibson's 1966 book. They invited both Gibsons for visits to Minnesota. This exposure led Robert Shaw to go to Cornell for a year in 1970, at the same time as David N. Lee was visiting. Shaw returned to Minnesota to develop his Gibson-inspired studies and Lee went to the University of Edinburgh. In 1975, Shaw joined Michael Turvey at the University of Connecticut. See Shaw (2002) for some autobiography, and Reed (1988) for a description of the spread of Gibson's influence. Alan Costall in the UK and Harry Heft in the U.S. were inspired by the implications of Gibson's work as it applied to the social, cultural and developmental spheres.

In 1980 and 1981, major critiques of Gibson's claims about direct perception appeared: Ullman (1980) and Fodor & Pylyshyn (1981). The Ullman critique appeared in *Behavioral and Brain Sciences* and therefore was answered by various commentators at the time. Turvey, Shaw, Reed & Mace (1981) answered Fodor and Pylyshyn in the following issue of *Cognition*. Claire Michaels and Claudia Carello (1981) gave the title, *Direct Perception* to their popular account of Gibson's ideas.

A decade, and then two, after 1979, enough time had passed for there to be several book length studies of Gibson's ideas—Lombardo (1987) described Gibson's ideas in the context of a comprehensive history of the study of vision, Reed (1988) provided an authoritative intellectual biography of Gibson, and Heft (2001) focused on understanding Gibson through the lens of the radical empiricism of William James.

There is an International Society for Ecological Psychology which has met every two years since 1981. It has fostered the development of a world-wide community of researchers who visit one another's labs and often share students. The professional journal, *Ecological Psychology*, has been publishing for more

than 25 years. Articles with Gibsonian concepts at their core are now published not only throughout experimental psychology, but also in social, developmental, and applied psychology as well as a wider range of fields to be mentioned below. This is not to say that Gibson's ideas dominate any part of mainstream psychology, but they seep in occasionally. See Szokolszky (2013) for Ulric Neisser's assessment in 1997.

Without question, Gibson's widest impact has been through his concept of "affordance." He had already identified relational properties, in the case of occluding edge phenomena, and he here explores a second class of such properties that are "neither objective nor subjective." For example, in order to locomote, animals need a stable supporting surface. Where such surfaces exist, they can be said to support locomotion by the appropriate animal. "Supportability" exists by virtue both of the material nature and arrangement of environmental surfaces as well as the size and capability of specific animals. That is, the surface affords locomotion relative to a specific animal. For example, the surface of water affords locomotion to spiders of the *Dolomedes* genus but not to humans. Likewise, "graspability" exists by virtue of animals with limbs that can grasp and environmental surfaces of a size, shape, and rigidity that allow grasping. These entities "point both ways"—to the "objective" environment and to the "subject" animal. They are real, well-defined, and not spooky in a subjective mentalistic sense; but not objective in the common sense view of the physical world either. Since 1979, the concept of affordance has "gone viral," to use internet jargon. This is largely attributable to the promotion of Donald Norman (1988) whose work has been influential in the interactive design (computers) community. Norman somewhat skewed the meaning of affordance, but he and other writers about design and human factors have offered clarifications and are quick to acknowledge Gibson's priority as well as their own departures from his original meaning.

Soon after the publication of *The Ecological Approach*, it was common for people to wonder how one would do research on affordances. That question was answered with a steady stream of research. William H. Warren, Jr. (1984) conducted an elegant set of studies on stair climbing—the perception of "climbability" and the measurement of actual "climbability" by tall people compared to short people. Interestingly, the maximum step height that was judged to be climb-on-able 50% of the time for both groups corresponded to the same relational value (the ratio of leg length to step riser height). This finding points to a specifiable and perceivable relational property scaled relative to the individual perceiver. This research led to a very large number of studies in many labs. Karen Adolph, a student of Eleanor J. Gibson's, James Gibson's equally famous-wife, followed up her mentor's well known work with babies on a "visual cliff." Adolph has now made numerous important contributions to our understanding of the development of infant locomotion and the perception of affordances (e.g., Adolph & Kretch, 2012).

Another important contribution stemming from Gibson's earlier work is that of David N. Lee (see Pepping & Grealy, 2007) who used his mathematical quantities, tau and tau dot, to guide much research on the perceptual guidance of movement. Tau captures 'time-to-collision' by a moving perceiver, and it is another "higher order," relation originating in the Gibson program.

Given that Gibson began his core enterprise working on the practical problems of flying airplanes, it should not be surprising that his work frequently has been embraced by people working in "applied" areas. The division between pure science and applied science is pervasive. As pure theory about real settings, Gibson's work has proven to be uniquely situated to cut across both domains. Also, considering his writings on art, including exchanges with friend the art historian, E. H. Gombrich, it should not be surprising that many people in both the scholarship and practice of visual arts have shown an interest in Gibson. Gibson's student, John M. Kennedy, pursued research on pictures, and drawing in the blind, at Harvard (where he had contact with Rudolf Arnheim) and then Scarborough College at Toronto. Finally, given that perception is a staple of philosophy, and that Gibson claimed to have something to say about ontology as well as epistemology (and phenomenology), it is not surprising to find philosophers studying Gibson.

Some of the other influences and alliances were not as easy to foresee in 1979. Gibson's stress on the fundamental nature of motor activity in perceiving (one must perceive in order to act and act in order to perceive) has led to many connections to human movement researchers. The Russian researcher, Nikolai Bernstein (see Latash & Turvey, 1996), studied skilled movement in ways that were compatible with Gibson. The book series, *Resources for Ecological Psychology*, was dedicated jointly to Gibson and Bernstein. Accordingly, Gibson is studied in some quarters of kinesiology, physical therapy, and occupational therapy.

Also, over the past 15 years, significant alliances have been developed between ecological psychologists and dynamical systems theorists and researchers. Especially noteworthy here are the contributions of Esther Thelen and her colleagues to the development of perception, action, and cognition.

The following list mentions names in order to avoid being too vague. With internet search engines, information about any of them should be easy to find. While I think this is good for the sake of clarity, it is dangerous from the standpoint of omission. Important people will be left out. Here, then, are areas (with example people) that have found Gibson's work of interest: Within psychology, I've already mentioned the developmental psychology of Karen Adolph. Then there is social psychology (Reuben Baron, Leslie Zebrowitz, Kerry Marsh), psychology of language (Carol Fowler) organizational psychology (Fred and Merrelyn Emery), and environmental psychology (Harry Heft). Beyond psychology I can list anthropology (Tim Ingold), archeology (David L. Webster at Durham, UK), architecture (Arakawa, Madeline Gins, Michael Benedikt),

complex systems (Scott Kelso, Arthur Iberall), design (Naoto Fukasawa), ethology (Gilbert Gottlieb followers), film (Joe Anderson, Barbara Anderson, David Bordwell), musical performance (Marilyn Nonken), musical appreciation (Eric Clarke, Oxford, UK), philosophy (John Searle, Jack Sanders, Ruth Millikan), and sociology (Ian Hutchby, UK). See, I told you someone would be left out.

Gibson's work has stirred the pot in many scholarly disciplines. The mix has not even begun to settle. Hence this work should repay continued attention for years to come. Isn't that what a classic should do?

Note

- 1 A nearly complete collection of the "purple perils" is available online at <http://www.trincoll.edu/depts/ecopsyc/perils>. Gibson's invited lectures and published papers usually were expansions of one or another of these "purple perils."

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