Gibsonian "Affordances" and Ontology

John T. Sanders Department of Philosophy
Rochester Institute of Technology Rochester, NY 14623

11 July 1992

BITNET: JTSGSH@RITVAX.RIT.EDU
PHONE: (716)475-2465
FAX: (716)475-7120

To be considered for the

International Workshop on Formal Ontology in Conceptual Analysis and
Knowledge Representation
Padova, Italy

17-19 March 1993

Ontologies—maps of the metaphysical terrain—are usually formulated in terms of arrays of independent objects of some kind, fully separate—at least in some dimensions—from one another and from those who create or use the maps. Thus a fairly rigid subject/object distinction has been included in the traditional conception of ontology itself. It is no wonder, then, that rigid subject/object distinctions seem nearly impossible to avoid in substantive ontologies: the very project of mapping the metaphysical world has seemed to presuppose them.

Rigid subject/object distinctions are troublesome, however. In physics they have become questionable both in attempts to characterize what occurs in the quantum domain—and as a result of quantum phenomena in the macroscopic domain—as well as in attempts to characterize the laws of physics in as general a way as possible. In psychology, they have caused problems in attempts to understand both perception and conception. In cognitive science, they seem to be responsible for apparently intractable dilemmas concerning the seemingly disparate realms of the mental and the physical. In more generally philosophical areas, rigid subject/object distinctions have spawned radical idealism, radical behaviorism, doctrines of immortal souls, mechanical animals, magical pineal glands, and a great deal more that has, to put the matter modestly, been difficult to swallow. As many have noted from a variety of different philosophical and more practical traditions, it would be nice to be able to avoid rigid subject/object distinctions.
A reasonable place to look for remedies to this situation may be in the area of basic ontology. For however widespread the tendency has been to understand ontology in terms of arrays of independent objects at arms length from (when not in principle completely inaccessible to) observing subjects—and these latter as somehow non-material yet physically efficacious—there is nothing necessary about such an equation. Ontology need not be conceived in this way.

In this paper, I will offer the beginnings of an exploration of one possible alternative to the traditional understanding of ontology, one that makes use of J.J. Gibson’s notion of "affordances".

***  *  *

The term "affordance" evolved in the course of Gibson’s attempt over thirty years and more to reconceive perceptual psychology. 'Affordances' may be defined, for present purposes, as opportunities for action in the environment of an organism. For Gibson, affordances are what an organism perceives, rather than objects and events as such.[1] The latter come to be defined, when they are defined at all (as in the case of a language-using, conceptualizing organism), as shorthand notations of the former.

The basic idea is something like this: primitive organisms, whether they are destined to mature to less primitive developmental stages or not, react to their environments in terms of opportunities and dangers that are presented to them. When hungry, an organism explores its environment (to the extent that it is able to do this) and seeks out opportunities for relief of the hunger. When an organism is trying to evade a pursuer, it seeks a hiding place. When weary, an organism seeks a place to rest. In the case of human beings, for example, we may, if we have been standing too long, seek a place to sit. We may not be looking for a chair, in particular; a railing or table-top will do, for most of us. Such things afford sitting.

What aspects of an organism’s environment offer which affordances is very much a function of the organism’s needs, abilities, and general characteristics. Indeed, it is likely to change during the course of the organism’s life, as the organism undergoes developmental change. Thus affordances are deeply relativized to particular organisms. As is evident in the few examples mentioned above, some affordances may be functions of features that all organisms have in common, and some may be functions of features that only organisms of a given species have in common; some may vary from individual to individual. For the human species, further, some affordances may vary from culture to culture, or from society to society.

But affordances are not arbitrary. The question whether an organism really can conceal itself in a particular locale within its environment is something that is an objective fact. Where I can sit is similarly constrained by factors quite independent of me, as well as by factors involving my characteristics.
Thus affordances, while relativized to individual organisms, are not
fully "subjective". Indeed, they neatly bridge the distinction between subject
and object, being dependent on characteristics of both the organism and the
environment.

While the _concept_ of affordances has not caused people much
trouble, the way Gibson and his followers have deployed the concept has
been quite controversial. Most of Gibson's critics would probably grant that
the notion of affordances is an interesting and useful one. What has not
gone over so well is the idea that it is _these_ things (if, indeed, "things" is
an appropriate term to use for affordances), rather than rocks and tables
and chairs and the like, that are the primitive objects of perception.

Furthermore, Gibson claims that affordances are perceived
_directly_. While his critics have been able to swallow much of the rest of
this "ecological" approach to the study of visual perception, the claim that
the perception of affordances is not mediated by a more primitive perception
(or sensation) of objects (or sense data) has caused them to choke.

The upshot is this: the critic argues that Gibson is right that
organisms perceive affordances in the environment, and that this is an
important feature of perception. He is held to be wrong in his
characterization of how this works. Organisms don't perceive affordances
directly (i.e., unmediated by either neutral sense data or neutral object
recognition). Instead, an organism first is barraged with data, some of
which it can pick up with its perceptual organs. Some of this data is
converted to images and patterns of various kinds... more or less coherent
patches of color, noises, etc. These sensations, then, are themselves
processed and sorted into objects, thus providing the organism with a
minimal perceptual perspective on its world. Finally, the organism
focuses attention on portions of that world as it recognizes the
opportunities and dangers presented by the several objects it perceives. Far
from being "direct", the critic would argue, the recognition of an affordance
is the result of a fairly high-level perceptual process, requiring recognition
and evaluation mechanisms that work with data provided by sensory
mechanisms.

While Gibson and his followers have written volumes in response to
this criticism, that response finally comes down to a few rather simple
theses.

First, they argue that this "internal processing" model is circular. It
requires that the internal processors be able to do the very things that are
supposedly being explained. For example, the internal processing model
suggests that an organism is able to recognize that certain things in its
environment are important to it because it has an internal processor that
recognizes this.[2]

Second, Gibsonians have argued that there is no neurophysio-logical
evidence (i.e., no non-question-begging evidence) that supports the notion.
that the human brain is functionally arranged into "processors" of the relevant kind.[3] Thus the internal processing model can be evaluated only in the same _systematic_ way as the direct perception model, and the "internal processors" must be regarded as nothing more than theoretical constructs like egos, ids, and superegos.[4]

Third, those who favor the idea of direct perception argue that such an approach highlights the active involvement of the organism with its environment even in perception, has much in common with lines of research that have proven illuminating in other areas of research (e.g., evolutionary biology, philosophy of science, quantum mechanics, more general work in perceptual and developmental psychology), and does not require the postulation of internal processors for which there is little or no neurophysiological evidence.

Whatever the merits of Gibson's approach to perceptual psychology, however, the _style_ of his argument makes it extraordinarily interesting in connection with metaphysics and epistemology. Thus I now turn to an examination of the bearing that "affordances" have on first philosophy.

* * * * *

I want to explore the possibility that affordances can be taken as fundamental ontological entities; that they may be taken, indeed, as being _ontologically_ prior to objects and events. Attention to affordances as fundamental ontological "objects" seems to me to direct attention away (in a manner that is useful) from consideration of such things as quarks and electrons and fields of force as being ontologically fundamental. Thus it is not just rocks and chairs and tables--and sense-data--that are at risk of being deposed, if this approach to ontology is favored.

Affordances also bridge gaps that would otherwise leave room for questions of relative priority between epistemology and metaphysics to pop up. One can't talk about affordances without talking about _both_ metaphysics and epistemology at the same time. Indeed, where affordances are the things being discussed, metaphysics and epistemology turn out to be disciplines that address the same basic array of issues from two different partially abstracted points of view: to use the contrast often discussed in connection with certain results of contemporary quantum mechanics, the points of view are those of the observer and of the observed.[5] Within ecological psychology, the contrast would be between the organism and its environment. For _any_ way of characterizing the contrast, the important feature to be noted is that neither contrasted pole (or "point of view") can be characterized independently of the other. "Environments" just _are_ organism-indexed parts of the world. "Organisms" are just parts of the world distinguished, for present purposes (whatever they may be), from what they are embedded in. "Observers" and the "things" or "processes" or "systems" that they observe are just portions of the world that are set apart or distinguished from one another for particular investigative or narrative (or other) purposes. Different purposes may very well require different
parsings of the world.[6] What is real is an infinitely complex array of potential, which can be spoken about in terms of "relationships" only once we've crystallized some of the potential into objects (or other entities) that can stand in relations to other similarly constituted "things".

It has been argued that all observation is theory-laden. This theme has had an important role to play in efforts to understand the ways theory and observation interact in science, but it has considerably broader application than just this. Most commenters have agreed that there is considerable truth to the claim that observation is often, anyway, affected by antecedent belief.[7] What a scientist sees in an experimental setting will be affected, to some extent, by what is expected (i.e., in particular, by what the scientist is led to expect by theory).

The broader application extends to all of us in our perception of our environments. The argument goes that we see what we expect to see. The unexpected is often suppressed, in perception.

Clearly, this is only part of the story. We cannot arrange to see what we want, simply by arranging our expectations appropriately. Our expectations are often disappointed, and our observations often yield, much to our chagrin, puzzles that we do not understand. As Abner Shimony has pointed out, while it is true that one can document the effects of perceptual readiness in experimental tests of human observation of controlled scenes, it is equally plain in such perceptual research that perception resists the influence of beliefs, on occasion.[8]

Nevertheless, there can be no doubt that there is an interesting relation between conception (especially the beliefs we have about how the world works, about what sorts of things are to be found in the world, etc.) and perception. The literature concerning the "theory-ladenness of observation" has led fairly conclusively to the abandonment of the once-popular view that observation can provide a neutral, objective test of theory (or, more broadly again, of antecedent belief in general). While there has been considerable argument about the extent of the theory-ladenness of observation, few who have involved themselves in this discussion would deny, by now, that observation is fallible as a test. What we perceive—or observe—is, to some extent at least, infected by our beliefs, by the category schemes that we are accustomed to deploying, by our expectations. While such factors may not be decisive in observation, they cannot be ignored.

The idea that observation or perception is at least influenced by beliefs and "category schemes" seems uncontroversial, once we see what is meant in this suggestion. The problem has been to understand the extent to which there is anything uninfluenced in this way. Kant's well-known solution already noted that there was little to nothing that could be said about the noumenon (whatever there was in the world that was independent of the experient) that was not infected by the categories that were brought to experience by the observer. But Kant thought that the pure forms of intuition and the categories of judgment were fixed in advance, by
the necessary nature of knowledge and experience as such, for all potential observers. Thus there was something "given" about certain _forms_, such that they could be counted on to inform all possible experience.

So what _is_ experience? What is the "world" that is supposed to be the object of experience? If there is no experience that is uninfluenced by thought, then there is nothing that is "purely" given. What _do_ we experience?

In _any_ experience, there are elements which at least _appear_ to be given to us independent of our own thought. The contribution made by thought to what appears as given is tacit, largely because it has been made, in a way, prior to the experience itself. Thought has made its contribution by _framing_ or _formatting_ the experience. Every experience must have its "structure", as it were, and no experience can involve a selfexamination of its own structure. The structuring principles of experience _A_ can, of course, be examined; but this can take place only within the framework of a separate experience, _B_, which is the experience of examining the structure of _A_, and which has its _own_ structuring principles. All of these things are examinable, revisable, etc., but such examination and revision require framing principles of their own.[9]

All this is familiar. But it is in connection with this set of issues that it is easiest to understand the felicitous role that affordances play in metaphysics.

Whatever past experience we have had—whether it is rich or impoverished, long or short—sets us up, as it were, for present and future experience. So do facts about our physical constitution. And so do facts about the social and historical circumstances we find ourselves in. We cannot experience the world in some neutral way. It must be _cast_ in some way or another. We do not escape this fact when we appeal to modes of description characteristic of the physical sciences, for these are themselves just modes of portraying the world that have been adopted because of their fruitfulness for one purpose or another. Even to say that what is experienced is "the world" casts it in a role: it is cast as standing apart from us, as an _object_ of experience (albeit an as yet undifferentiated object of experience). We are already set apart from the rest of the world to some extent, as observers, in such a formulation.

No implication should be drawn that there is anything _false_ in the view that we are separated to some degree from the world as observed. What I mean to point to is not some _false_ implication of our mode of thinking or speaking about such things, but, rather, the fact that our notion that we _are_ separated in this way is not itself a "datum" of pure experience; it is, instead, a consequence of our usual way of thinking and speaking about such things. This usual way of speaking about the world may be the best way to talk about the matters before us; or it may not. It is important that we keep in mind, though, that our understanding of ourselves as separated from the world is an artifact of one broad way of
characterizing our situation.

Not only must there be no implication that this picture of our situation is false: it must be insisted that we have no access to the world, or to our situation in the world, that would be free of all such artifactual implications.

We are not committed, of course, to some static set of presuppositions and expectations that doom us forever to some one way of looking at things. We learn, and we change. What are perceived are affordances, best understood in terms of significance to us. Learning about the opportunities and dangers offered by various parts of our environments leads us to change our appreciation of these parts of our environment. We adjust, in other words, the expectations we have of our environment, in light of experience. Becoming an expert in some area is mostly a matter of learning to make increasingly fine discriminations concerning the significances—i.e., the affordances—within that area.[10] How "objects" are individuated in the environment is similarly a job that involves, first and foremost, discrimination of affordances. That parts of the environment get crystallized into "things" and "events" is itself a function of the opportunities and dangers—the affordances—that are presented within the environment; we "parse" our environments as a function of affordances, in other words.

The upshot, then, is that the array of distinct objects experienced by an arbitrary observer cannot be taken as ontologically primitive. Such arrays are too dependent upon characteristics of the observer. Worlds (in the plural) are made, to a large extent.

But worlds aren't made at whim. Something independent of the observer places severe limits upon what can be included in any world "constructed" by an observer. But to refer to the world (in the singular)—i.e., whatever it is that places these limits on world-construction and adequate characterization—as some as-yet-undifferentiated environment (as I have been doing thus far) is only partly successful. It can succeed in making sense only up to the point where such reference is itself recognized as one more characterization, useful only for certain purposes, cast from a certain frame of reference. In talking about the (singular) Ding-an-sich, or the as-yet-undifferentiated environment, one tries to speak about the in-principle-unspeakable; one tries to characterize the uncharacterizable. If this isn't a straightforward contradiction, it comes perilously close.

The key to this business is to be found in the observation that we are not mistaken, when we offer a perspective-bound, observer-relative portrayal of the world, simply in virtue of the fact that the portrayal is observer-relative. All portrayal is observer-relative. Whether a portrayal is mistaken or not will depend, not upon some comparison of it with a supposedly neutral and objective way that the world is in and of itself, but rather upon whether it is apt from some evaluative perspective.[11] Comparisons of portrayals cast from
different perspectives, where they appear to disagree, can be made on the
basis of evaluations of the comparative fruitfulness, for specific purposes
(or arrays of purposes), of taking one perspective or another. This
comparison, of course, would require a different perspective of its own,
which in turn can be evaluated only from some other, etc.[12]

Thus there are no objective things, existing out there somehow
utterly independent of their own environments and of us. But, on the other
hand, we do not create objects at whim, unconstrained by environments.
There _are_ affordances, though. There are real opportunities and
dangers for organisms within their environments. These affordances,
when recognized, might or might not be subjectively understood as "things"
or isolated "events". What matters, though, is that they be perceived.
Whatever is perceived is already _a_ world. To some extent or another,
depending upon the sophistication of the organism, it is already a parsed,
individuated, categorized _portrayal_ or _version_ of what is out there to be
interacted with. Some or all of such "parsing" might be done at a
physiological level, some or none may be done "cognitively", depending
(again) upon the sophistication of the organism.

It might be contended that one could speakmeaningfully about the
independent existence of some undifferentiated "potential for world-
making". That is perfectly fine, for some purposes. But, of course, it is but
one more characterization, suitable for some purposes but not so suitable
for others. As part of the case _against_ talking in this way, it must be
mentioned that this kind of description is really too inchoate to provide much
information. There is nothing to _say_ about an undifferentiated potential
for world-making. To say something about it is, inevitably, to cast it as this
or that. And even if one avoids the temptation so to cast it, one has not gone
beyond affordances. To speak of the world as an "undifferentiated potential
for world-making" is to make explicit reference to what it affords.

Since we must deal with affordances no matter what we do, it is best
for our metaphysical and epistemological purposes to focus our attention
just this side of the inchoate potential that might be offered as a
characterization of _the_ world that underlies the multiple worlds
fashioned by our varying modes of portrayal.

Focussing on potential for _organisms_, in particular, directs
attention to facts about living that not only make the building of worlds
possible, but inevitable. For it is because organisms need to _suppress_
information that worlds are cast. This fact accounts at the same time for
both the differences and the similarities of the worlds that are made from
different perspectives. Organisms need to suppress information because
they need to act, and they need to be able to perceive the opportunities for
action in their environment without having to sort through limitless arrays
of insignificant data. What is significant, in turn, depends as much upon
features of the organism in question as it does upon features of the
organism's environment.
The elements that determine how any organism's world will be structured are the opportunities and dangers to that organism that are present in the world; that is, each organism's world—as well as the variety of worlds constructed for varying purposes by especially versatile organisms like ourselves—is determined by the _affordances_ that are present within the environment. Thus affordances provide a mode of mapping the metaphysical terrain that may be a useful alternative to ontologies of organism-independent events, objects, and the like. And such an alternative, given its ability to avoid any rigid subject/object distinction, may offer an attractive way of framing a metaphysical perspective that is at home in and responsive to the problems of the late twentieth and early twenty-first century that demand reconsideration of ontology.[13]

NOTES

1. It is not that objects and events are _not_ perceived, on Gibson's view; it is just that they are perceived only in so far as they present opportunities for action (i.e., just to the extent that they represent affordances). The "opportunities" in question, of course, must be understood to include dangers as well as more felicitous opportunities.

2. For a criticism of such an argument as used in explanations of memory, see John T. Sanders, "Experience, Memory and Intelligence", _The Monist_, October 1985.

3. A good example involves the "storage model" of human memory. The storage model has been uncritically adopted by _most_ researchers, to the point where the location "memory storage" seems to be taken by many people to be simply _synonymous_ with "memory". Thus, for example, when discussing research that seems very promising in terms of explaining neurophysiological mechanisms that underlie memory in humans, Daniel L. Alkon consistently speaks of these mechanisms as comprising "storage" facilities (see Alkon, "Memory Storage and Neural Systems", _Scientific American_, July 1989). This does not follow at all. When I flick the wall switch for my overhead light with a movement of my hand, I change the state of the electrical system in a clear-cut way; there is a perfectly plain mechanical explanation for what has happened and why the system (in particular, the light-bulb) now behaves differently. But it is an extremely stretched metaphor that would have it that the movement of my hand is now "stored" in the electrical system. For all its prettiness as a metaphor, it is quite inapt for purposes of clear explanation of what is going on. It is the state of the system that has changed. This is most evident, in the case of the electrical system, in the fact that no mechanism need be postulated for the purpose of "retrieving" or "recovering" the information that is supposedly stored. That "information" is now implicit in the state of the system. The same story, I would argue, can be told of the "internal processor" or "indirect" model of perception generally.

4. This is not to say, of course, that there is anything wrong with theoretical constructs of this kind. Rather, the point is that competing sets
of theoretical constructs must be evaluated as such, using criteria that attempt to clarify both systematic advantages and disadvantages of each.

5. Although the terms "observer" and "observed" are the ones that have been standard in discussing some of the curiosities of quantum mechanics, these terms do not really capture the real sense of what is at issue. What's really at stake are boundaries that distinguish between what's inside and what's outside a system. In the now infamous "Schrödinger's Cat" saga, the suggestion is made that, on the Copenhagen interpretation of quantum mechanics, there is no fact of the matter about whether physical events have occurred or not (in so far as they are determined by events at the quantum level) until some observation is made of the system. This is inexact. Take your favorite system of cat-in-box-umbrella-death-ray (or whatever). Call this system "S". Whenever the events within S lead to effects outside of S, a new, larger "system" is invoked: the larger system includes S, but it also includes these effects that are external to S. Call this new, larger system "S'". The issue of whether the cat is alive or dead is closed with respect to S whenever the events within S have effects within S'. When this latter system includes an experimental physicist (or Humane Society investigator), we may rightly speak of "observation."

6. For a "nominalist" perspective on the matter of parsing the world in terms of "projectible predicates", and for a discussion of the relation of all this to "inductive inference", one simply must see Nelson Goodman, Fact, Fiction, and Forecast (Indianapolis: Bobbs-Merrill, 1965), pp. 59-83. For some moderating considerations regarding Goodman's claims, see Patrick Grim's unpublished essay "Tangled Up in Gruce". Since Patrick hasn't worked very hard at getting this paper published, it would be entirely appropriate for people to harass him for copies by mail. He can be contacted at the Department of Philosophy, SUNY at Stony Brook.

7. One very influential source for this view within mid-twentieth century philosophy of science has been N.R. Hanson, Patterns of Discovery (Cambridge: Cambridge University Press, 1958). Hanson's view has powerful traditional antecedents.


9. The metaphor of painting a floor seems helpful, somehow: when painting a floor, one needs a place to stand. One can't paint the place one is standing in at the moment, but this doesn't mean that any part of the floor is unpaintable. One moves.
10. Piaget's work may suggest that child development is best understood in these terms, as well. Learning is not so much a matter of adding new data to the pile that had been acquired earlier, but more like a matter of _altering_ or _transforming_ one's understanding of the world in light of experience. We refine and replace old conceptions with new ones that are better detailed, better at discriminating significances, better at suppressing insignificant detail. See especially _The Origins of Intelligence in Children_ (New York: Basic Books, 1952). For an account of expertise that seems quite consistent with the "affordance" account offered here, see Hubert L. Dreyfus and Stuart E. Dreyfus, _Mind Over Machine_ (New York: The Free Press, 1986), especially pp. 30-35.

11. The perspective from which a portrayal is evaluated must always be at least a bit different, it would seem, from the perspective of the portrayal itself. This is insured by the fact that the portrayal is taken as object while being evaluated, and is (typically) quite transparent when in use.

12. There need be nothing "regressive", let alone _infinitely_ regressive, about this. The situation is more like that of a dictionary for any natural language: no words are primitive, all are defined in terms of _other_ words which are, in turn, themselves defined. Just as the entire dictionary ultimately rests on usage (a matter external to the norms offered by the dictionary itself), so the question of adequacy or aptness of a portrayal of the world rests, finally, on practical efficiency in use.