Stewart Shapiro
Vagueness in Context
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REVIEW

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The "double slit" experiment is well-known from quantum physics. Very briefly, in the experiment electrons are fired from the back of a tube (e.g., a TV tube) whose front is phosphorized (so that a flash of light is seen when it is struck by an electron). Between the electron source and the screen in front is a vertical metal plate containing two slits. Observation of the light flashes on the screen reveals an interference pattern, behavior typical of waves. However, under certain conditions, observation of the paths of individual electrons shows that each electron that reaches the screen passed (exclusively) through either the top slit or the bottom slit, behavior typical of particles. Here is the "odd" part: when the screen is viewed *at the same time* that the electrons are observed passing through the slits the interference pattern disappears! So are the electrons particles or waves? Well, it depends. It depends on us—observers. In principle, there is no way to eliminate this observer-disturbance. At the quantum level things are oddly uncertain (as Heisenberg famously observed).

Most of us are willing to allow that uncertainty is the norm for the quantum world, but what about the ordinary world of normal-size objects that we inhabit, think and talk about? Since ancient times many thinkers have noted that our talk often reveals a high degree of uncertainty—vagueness. In particular, very (perhaps, very very) many predicate expressions that we normally use are vague. A pile of sand one meter high is clearly a heap of sand. A single grain of sand is clearly not a heap. But how many grains of sand have to be added to a single grain before we characterize the result with the term 'heap'? A man over seven feet tall is tall. I am not tall. What of a man just slightly under seven feet? What of a man just slightly shorter than that man? How many inches under seven feet does a man have to be before

we withhold the term 'tall'? Terms like 'heap' and 'tall' are vague. We can live with that (in fact, we do). But here is the "odd" part: when we reason about things to which we apply vague predicates we seem to end up in contradiction; our reasoning about vague predicates might be paradoxical!

In this fascinating, rich, provocative, often difficult book Stewart Shapiro finds the source of paradox here in our natural adherence to what he calls the *principle of tolerance*:

> Suppose that two objects a and a' in the field of P differ only marginally in the relevant respect (on which P is tolerant). Then if one competently judges a to have P, then she cannot competently judge a' in any other manner.[1]

According to this principle, if a thousand arrangements of sand are lined up in order such that each differs from the one to its left only by having in it one more grain of sand and the first has one grain and the last has a million grains, then if you judge the last to be a heap it follows that you cannot judge the one to its left otherwise. Moreover, since for any two adjacent aggregates the on on the left cannot be judged differently from its neighbor to the right, the single grain of sand at the far left cannot be judged other than a heap if the last (million-grain) one has been judged a heap. Given that we quite normally judge a single grain of sand to not be a heap and that we judge an aggregate of a million grains to be a heap, we appear to contradict ourselves. The fact is, however, that it is very difficult to say that our judgments involving such vague predicates *are* inconsistent.

Shapiro's thesis is that our talk is, indeed, not inconsistent. Our judgments in such cases are quite rational. This is so because our use of vague predicates is always determined by *context* (thus the book's title). Shapiro introduces the problem of vagueness and his philosophical theory for dealing with the phenomenon in Chapter 1. Chapter 2 offers a brief discussion of the role of formal logic in addressing questions concerning the nature of language and, in turn, the role of model theory in formal logic. The next two chapters present the formal model theory that Shapiro builds with the aim of modeling our reasoning with vagueness in natural language. Chapter 5 takes up the issue of "higher vagueness" and the final two chapters offer a number of responses to a wide range of issues that might generally be characterized as metaphysical. The book ends with a short appendix summarizing

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[1]P. 8.

F. Waismann's theory about open texture and analyticity (found in [1949, 1950, 1951a, 1951b, 1952, 1953, 1968]).

Shapiro's contextualism is intended as an alternative to: epistemicism (the thesis that, given a vague predicate V and an arrangements of objects differing only marginally from one another in the field of V, there are two objects such that one is V and the other is not V but we are simply ignorant about just where such a boundary is); indeterminism, including supervaluationism, (the view that there just is not such boundary to either know or be ignorant about); many-valuationism (the view that we are ignorant of where to draw such boundaries because there are sentences that have intermediate truth-values); incoherentism (the view that such ignorance is due to the fact of our language being itself inconsistent). Shapiro's version of contextualism holds, in part, that some judgments involving vague predicates are expressed by sentences that are *determinately true/false*. Such a sentence, used in a given context, is so by virtue of (1) its meaning and (2) such "external" contextual factors as "comparison class, paradigm cases, contrasting cases, etc."[2] This is fine, so far, though it is never very clear (it's vague?) what meaning amounts to here. At any rate, with the case of a vague predicate it is obviously not the case that every (sentence expressing a) judgment involving that predicate is determined—the rest are "borderline." 'This arrangement of three grains of sand is a heap' is determinately false. 'This arrangement of six-hundred thousand grains of sand is a heap' is determinately true. But 'This arrangement of (what?) six-hundred grains of sand is a heap' is neither determinately true or determinately false—it's borderline. How do we make our judgments for such borderline cases? For Shapiro[3], such judgments depend not only on (1) and (2) above but as well on (3) "internal" contextual factors, viz., the judgments already made in that context concerning other objects in the field of the predicate. Such judgments display "open texture" since judgments here are "unsettled" and thus "open": "The rules of language use, as they are fixed by what we say and do, allow someone to go either way."[4] We are free to judge an object in a series (relative to a vague predicate) V to be (determinately) V while withholding that judgment from another object in the series only marginally different from the first. And we can do so without inconsistency and without sinning against the principle of tolerance. Thus, let a and a' be two marginally different objects

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[2]P. 33.
[3]Pp. 37–38.
[4]P. 10.

with respect to V, then we can judge that a is V and also not judge that a' is V (but, of course, we cannot judge that a' is not V). In the borderlands we are free to change judgments depending on other judgments we have made at the border (i.e., depending on internal context). Thus, in a sorites series, such as the row of sand-heaps, the extension of the vague predicate will change as the observer looks to the left or right in the series.[5] The dependence on so-called internal contextual factors for determining (even if only temporarily) the extension of a vague predicate means that, in Shapiro's theory, our language displays "open texture." What we say, think (and do) determines, in part, the rules of language.[6] "[T]he correct use of vague terms is bound up with psychology and pragmatics."[7]

Since vagueness is a feature of natural language, and since logic (at least according to one well-accepted view) is an attempt to give a descriptive account of language (or at least to those features of language that are involved in reasoning), one can expect that logicians, whether they like it or not (and many do not), should be interested in accounting for the nature of vagueness. Shapiro takes the view that language is best described by taking a model-theoretic, "logic-as-model approach."[8] In Chapters 3 and 4 he builds, carefully and patiently, just such a model theory for a language with vague predicates. Most of the features of this theory are fairly uncontroversial. Roughly, it makes use of a three-valued semantics of *true*, *false* and *indeterminate* (strictly speaking, this is not a third value but indicates the lack of either of the two classic values). Again Shapiro's aim is to build a model theory that models the salient features of a language containing vague predicates. So he provides a formal analogue of those principles (especially tolerance) that have been seen to apply in natural language. Ultimately, the theory revolves around the notion of a *frame*.

> Define a *frame* to be a structure $\langle W, M \rangle$ in which W is a collection of partial interpretations, $M \in W$, and for every partial interpretation N in W, $M \preceq N$ (so that all of the partial interpretations in W have the same domain). The designated partial interpretation M is the *base* of the frame F.[9]

(Here N is said to be a *sharpening* of M.)

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[5]P. 35.

[6]P. 10.

[7]P. 37.

[8]P. 49.

[9]P. 75.

In a natural language speakers take some judgments to be determined (true or false) depending upon term-meanings and external contextual factors and deal with the borderline cases by modifying their judgments on the basis of internal contextual factors. The determined judgments constitute a kind of *base*. Judgments concerning borderline cases are made, subject to tolerance, and can be added to (or later deleted from) the base. Such judgments, then, would amount to sharpenings. Depending on context, a statement can be true at one time and false at another (or it can be left in the no-man's-land, indeterminate). All this is reflected in the formal theory Shapiro provides.

Of course, all this assumes that the field of a vague predicate can be divided, in principle, into three subsets (say, things that are V, things that are not V, and things in the border between them). But this just raises a new question: How do we draw, then, the borders between each of the first two of these sets and the third? This is the problem of higher-order vagueness. Shapiro's way with this problem is less than satisfactory. His general claim is that the language community relies on the judgments of "competent users" in determining where such borders are to be drawn. Moreover, since the notion of competent user is itself vague, it follows that these new borders a simply vague. Higher-order vagueness is, ultimately, dismissed as just another case of ordinary vagueness. Shapiro never makes it satisfyingly clear how this solution is meant to shed light on higher-order vagueness, since, in the long run, he seems to view it as not a genuinely serious problem.

In his final two chapters Shapiro addresses a number of important and interesting metaphysical issues. There are some who would argue that vagueness in our language simply reflects the fact that some objects in the world are themselves vague. Consider Mt. Everest. Some patches of ground are determinately on the mountain, others are determinately not. But there are some that can be judged either way. So the claim is that 'part of Mt. Everest' is vague only because the mountain itself is a vague object—has no clearly determined borders. Shapiro has a number of interesting things to say about this and closely related issues, and shows how the model theory he has developed can be used to account for each of the various kinds of vagueness in terms of vague predicates. Finally, he takes up the question whether one might argue that the world itself is vague. Perhaps our language is vague for the simple reason that we are trying to say things about an inherently vague world. Shapiro, once again, offers a number of intriguing philosophical insights here. In the end he opts for what I would take to be

the right (and most tolerant) response: "Vagueness is due to language *and* to the way the world is."[10]

Shapiro has produced a rich book, packed with ideas that are always interesting and stimulating, often profound, and sometimes provocative. In the growing literature on vagueness it will surely become standard reading. His philosophical understanding of the issues involved and his skill in building a formal theory to model them represent major advancements in the field.

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[10]P. 196.