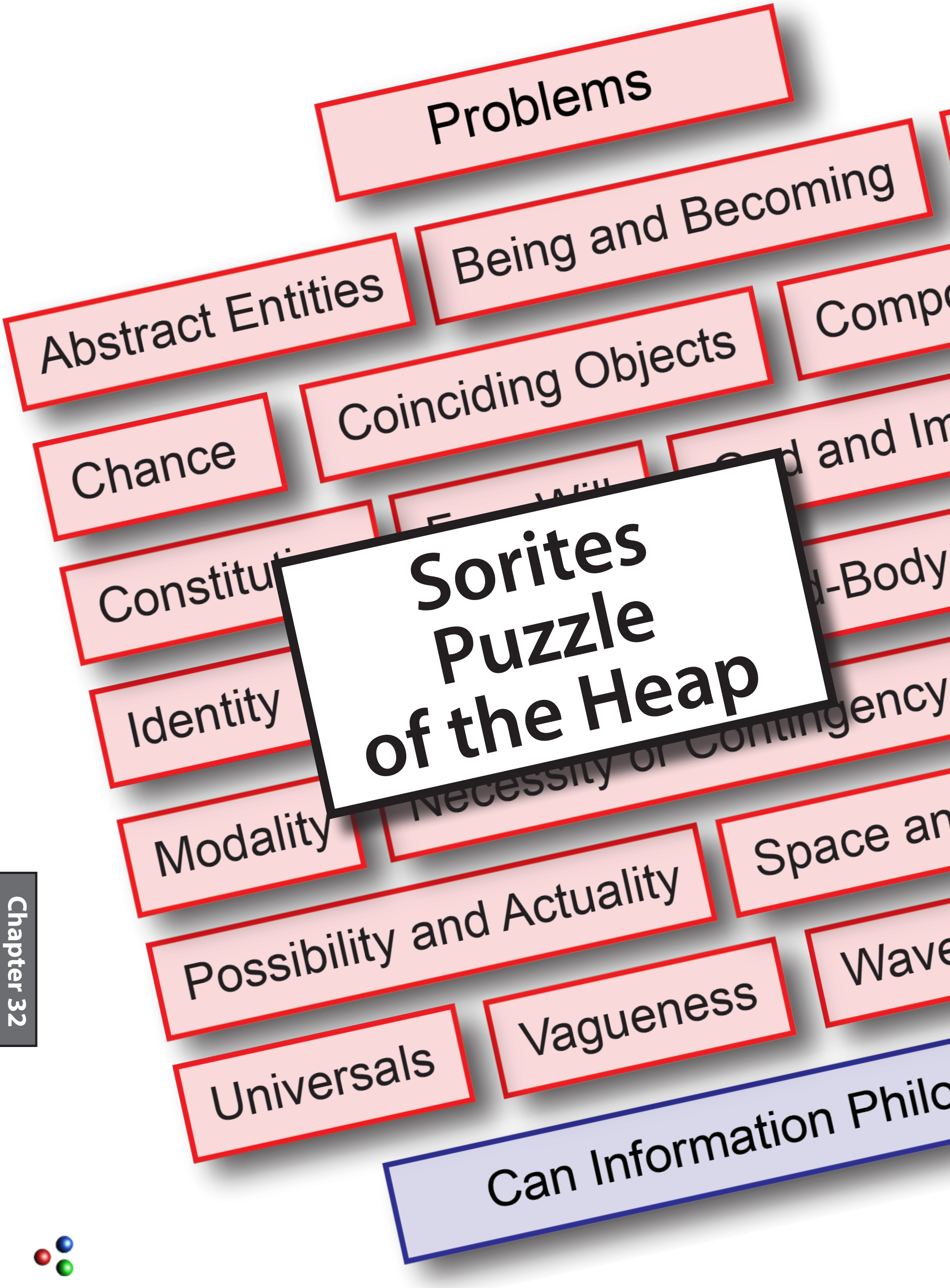
Problems
Abstract Entities
Being and Becoming
Coinciding Objects
Chance
Sorites Puzzle of the Heap
Identity
Modality
Possibility and Actuality
Vagueness
Universals
Can Information Philo

Sorites Puzzle

The Sorites problem was one of a number of paradoxes created by the 4th century BCE Megarian philosopher Eubulides, who was a pupil of Euclid.

The Greek word soros means 'heap' and gave its name to this "Heap Puzzle," which goes like this:

- Is a single grain of wheat a heap? Not at all.
- Would you describe two grains of wheat as a heap? No.
- How about three grains of wheat ? No.
- How about four, five, six? No.
- Surely several? Maybe...

Another variation is to start with a genuinely large heap, claim that the following two premises are true, then remove grains of sand.

- A million grains of sand is a heap of sand
- A heap of sand minus one grain is still a heap.

After removing enough grains, we get to the *borderline* cases of the paradox. The second premise shows that one grain is absolutely not a heap, because removing one grain leaves nothing, let alone a heap.

Sorites problems are also called "little by little" because small changes may be indiscernible in large objects but they become obvious when applied long enough and the object becomes small.

A characteristic of all Sorites puzzles is the breakdown of truth conditions at some point along the soritical chain of steps from one end to the other. This is often considered a logical paradox, but it seems to be created by our ambiguous language..

Sorites paradoxes appear to resemble proofs by mathematical induction. If $F_n \Rightarrow F_n+1$, and given any n where F_n is true, then it is true for all n.

The Stoics are said to have backed away from the strong conditional A implies B to a weaker material implication where $A \rightarrow B$ is true just in the case that either A is false or B is true, or not (¬A ∨ B) . But this did not help them.

Viewed from the point of the infinite series of mathematical induction, the problem can be found in the fact that for some n, F_n is false (in most Sorites examples - grains of sand, hairs on a bald head, poor or rich, small or large, few or many, - n is small), while for other values of n, F_n is true.

$\forall n(F_n \rightarrow F_n+1)$

But there is no particular point n along the chain where the failure is obvious, since each step seems too small to make the difference. Put another way, there is no transitivity of truth back and forth somewhere along the chain of steps in the argument. But exactly where the truth condition fails is vague.

Some philosophers regard this failure at some point midway between n = 1 and n very large as a full-blown paradox that might be soluble by a new metatheory, perhaps with non-bivalent logic or with declared gaps in truth values to cover the vague segments where the soritical chain has broken links. From the standpoint of information philosophy, one might say the sorites paradoxes are all consequences of the ambiguous nature of language. Or maybe it just be an overambitious attempt to "precisify" vague concepts with bivalent logic.

One semi-formal way out might be say that either/or soritical terms need a third option or even a "dialectical" acceptance of "both." This is similar but not identical to the failure of bivalence in statements about the future that are neither true nor false. We are often somewhere in the middle between extremes, neither rich nor poor, but middle class, neither hot nor cold, but the "just right" of Goldilocks' porridge. Accepting "both" might include statements like, "He's bald but he's not that bald."

Another workaround for sorites paradoxes might be to notice that neither/nor can be said of the truth value for situations in the *vagueness* gap. For example, somewhere between small and large, we might say it's neither small nor large. Then if we say that small = "not large," we can say that in the gap we have neither small nor not small is true. Since it is always true that everything is either small or not small, without knowing which, some metatheorists imagine a "supervaluation" condition $(P \vee \neg P)$ is needed to describe the vague middle terms, but this seems like logic and language games, since "He's bald but he's not that bald" might also describe the dialectical *both* $(P \wedge \neg P)$.

The fact that large objects appear not to change when small, indiscernible changes are made is also called a *vagueness* .[1] A classic example is PETER UNGER's observation that a few water molecules at the edge of a cloud may be removed with no obvious change in the cloud.

See also DAVID WIGGINS's version of Tibbles the Cat as really 1,001 cats by selectively excluding one of Tibbles' 1,000 hairs.[2] Unger's conclusion was that the water molecules may compose many clouds by selectively excluding or including just a few molecules. This is known as the *Problem of the Many*,[3] but Unger's first response was to say that the ambiguity meant that there are no clouds at all, a position known as *mereological nihilism* that was also endorsed by PETER VAN INWAGEN.

Liar Paradox

Eubulides also created a variation on Sorites with the number of hairs on a bald man's head as well as the much more famous Liar's Paradox

A man says that he is lying. Is what he says true or false?

A modern self-referential variation is Russell's Paradox

This statement is false.

1 See chapter 22.
2 Chapter 34.
3 Chapter 30.