

then, that affirming that truth is in any way a primary object of the intellect would compromise this definition?

Like Scotus, Aquinas affirms that being (*ens*) is the primary object of the intellect. In his essay "Aquinas on the Object of the Intellect," Brendan Palla thoughtfully assesses Aquinas's dual assertion that "the proper object of the intellect is being embodied in material things, the *quod quid est* of a material substance" and, secondly, that "*ens or ens et verum universale* are the proper objects of the human intellect" as stated in *ST* I-II, q. 9, a. 1: "Now the first formal principle is universal being and truth, which is the object of the intellect." Due to the first assertion Pasnau, in his book *Thomas Aquinas on Human Nature*, claims that the second assertion is "mostly vacuous"—a criticism strikingly similar to one issued by Scotus. In response, the bulk of the essay shows that Aquinas's first assertion does not discredit the second, and explicates how the disagreement between Thomas and Scotus does not concern whether being is the primary object of the intellect but whether this is a confused knowledge (Thomists) or a direct knowledge (Scotists). Palla does not reflect further on Aquinas's *ens et verum universale* as the proper objects of the human intellect, but it certainly merits closer consideration especially in light of Aquinas's *reditio complete subjecti in seipsum* in the *Summa theologiae* I, q. 84–87 and *De veritate* q. 1, a. 9: "Truth is in the intellect as a consequence of the act of the intellect. . . . And truth is known by the intellect in view of the fact that the intellect reflects upon its own act—not merely as knowing its own act, but as knowing the proportion of this act to the thing."

This review has teased out and reflected on just one trajectory among many promising others presented in this volume. Experts in medieval philosophy will undoubtedly garner numerous insights from it, and contemporary philosophers interested in the history of philosophy will find profound insights for their philosophical projects.—Nathan R. Strunk, *McGill University*

KNAUFF, Marcus. *Space to Reason: A Spatial Theory of Human Thought*. Cambridge, Mass.: The MIT Press, 2013. xvii + 290pp. Cloth, \$40.00—Marcus Knauff clearly states his claims in the book's preface that

1. visual images are not the basis of reasoning;
2. visual images can even impede the process of inference;
3. supramodal spatial representations are the basis of reasoning.

He makes these claims as a rebuttal to those psychologists, led by Stephen Kosslyn (1994), that imagery plays a major role in reasoning. The strength of this book is that it provides substantial converging evidence for these claims in Knauff's particular domain of research—logical reasoning from premises that can be spatially represented. The

weakness of the book is its lack of coverage of other types of visual reasoning.

A simple problem is *Ann is better than Beth. Cathy is worse than Beth. Who is best?* Knauff proposes that people reason by using spatial layout models that are more concrete than words but more abstract than visual images. Spatial layout models are integrated nonmetric representations of spatial relations. A subway map that does not accurately depict distances is an example. It is important to keep in mind, however, that the spatial layout model applies to problems that lack metric information. Thus, classical demonstrations of visual imagery based on findings that mental scanning time increases as a linear function of distance and mental rotation increases as a linear function of the angle of rotation are outside the boundaries of the theory.

Much of the book summarizes the results of experiments (many from the author's lab) that support the claim that logical reasoning is based on spatial relations, not visual detail. The research examines how different variables influence both the accuracy and response time of inferences. Support for the spatial layout model comes from such findings as detailed visual images can impede the process of reasoning, concurrent spatial tasks—but not visual tasks—interfere with reasoning, and reasoning depends on abstract representations held in the parietal cortex.

I was particularly impressed with the computational model discussed in chapter seven, labeled PRISM (preferred inferences in reasoning with spatial mental models) developed with former doctoral student, Marco Ragni. A particular challenge for both people and models are indeterminate problems such as the following:

The Ferrari is parked to the left of the Porsche  
The Beetle is parked to the right of the Porsche  
The Porsche is parked to the left of the Hummer  
The Hummer is parked to the left of the Dodge

The problem is indeterminate because there are three possible spatial layout models for this set of premises: FPBHD, FPHBD, and FPHDB in which the letters represent the initial letter of each car.

PRISM proposes that the first of these is the preferred model because it is the easiest to construct. It also predicts the ordering of the nonpreferred models based on the ease of transforming the preferred model. The second model should be the next one generated because it only requires changing the order of the Beetle and Hummer. The third model differs from the preferred model in the order of the Beetle, Hummer, and Dodge. PRISM has been quite successful in predicting results for a variety of spatial reasoning problems, including two-dimensional ones in which one car is in front of another car.

One surprising omission from Knauff's research program is that he has apparently not included research on reasoning from constructed diagrams. His conclusion that people find these problems difficult because of the limitations of working memory raises the question of how

would people do if allowed to construct diagrams. How many alternative diagrams would they construct for indeterminate problems? Would they construct them in the predicted order? Would the diagrams contain unnecessary visual detail?

Knauff discusses at the end of the book the boundary constraints of the spatial layout model and is cautious in making generalizations to others areas of visual/spatial reasoning.

He proposes that people use an abstract spatial strategy to solve Hegarty's pulley problem but it seems conceivable that a visual representation of the particular objects might be important, at least initially. Schwartz and Black argued that, even for simpler objects, students initially simulated the details of gears, then abstracted them to form circles, and finally induced rules. The problems used by the Gestalt psychologists should be good candidates for abstract spatial representations although metric relations are required for some and the solution is often suddenly found after rejecting incorrect arrangements.

I discuss these and many other types of problems in my book *Thinking Visually*. I hope that Markus Knauff eventually writes a sequel to *Space to Reason* that applies his theory to these other types of problems.—Stephen K. Reed, *San Diego State University*

KREEFT, PETER. *Summa Philosophica*. South Bend: St. Augustine's Press, 2012. xviii + 254pp. Cloth, \$30.00—Having tried his hand at several Socratic dialogues, Peter Kreeft now turns to the form of dialogical writing employed by the Scholastics of the late Middle Ages, namely, the question-article, objection-answer-reply format that can be found in the great *summae*. Hence the title of the work: *Summa Philosophica*. Kreeft's book, however, lacks the scientific coherence of these medieval *magna opera* that inspire his endeavor. Instead, he opts for a more inelastic and "arbitrary" (as Kreeft himself admits) division of philosophical inquiry into ten questions with ten articles each. This fact alone may make one question the degree to which this work should be likened to the medieval *summae*. Given the wide range of topics that Kreeft covers and the arbitrary order in which he covers them, *Summa Philosophica* resembles more the *quaestiones quodlibeta* ("whatever questions") or perhaps the *quaestiones disputatae* ("disputed questions") that the medieval masters undertook during the penitential seasons of the year. In reading this book, one can easily imagine Kreeft standing before a group of undergraduates, suggesting a topic of philosophical inquiry, and then responding to his students' questions within that topic. Indeed, the colloquial mode of expression found throughout the book makes it easy to envision such a scenario, and I imagine that some readers—perhaps especially younger ones with little experience in philosophy—will find Kreeft's approach appealing.