

What's in a Hole?

By Steven A. Gross

Argle and Bargle — the protagonists of David and Stephanie Lewis' philosophical dialogue "Holes"¹ ("in many ways, the inspiration"² for the book under review) — worry themselves over the following inconsistent triad:

- (I) There exist no immaterial, abstract objects;
- (II) Holes exist; and
- (III) Holes are immaterial objects (since they involve the absence of matter).

"Measuring th[e] price"³ of retaining (I), they consider ways of rejecting (II) and (III). If holes don't exist, it would seem that our apparent reference to and quantification over holes requires reinterpretation.⁴ Perhaps, for instance, the underlying logical form of such statements as "There are three holes in that piece of cheese" is something like that of "That piece of cheese is trebly-perforated." Such attempts at reinterpretation, however, seem to founder rather quickly. Argle and Bargle get stuck on "There are as many holes in my cheese as crackers on my plate,"⁵ and so turn to (III). But if holes are material, what is their matter? Not, it would seem, the matter occupying the space where the hole is located, if vacuums are possible. Argle argues rather that the *lining* of a hole — itself a material object — is the hole, so that the hole's matter is just that of the lining. But the price of this view, given the many candidate linings (how thick should the lining be?), includes *inter alia* admitting that for all holes, there is an x and a y such that x is the same hole as y , but x is not identical to y . (Oh — but when one is speaking of holes, 'same,' it is suggested, means 'co-perforated.')⁶

Casati and Varzi wish to resist such ways of rejecting (II) and (III), the former as not sufficiently realist about holes, the latter as counter-intuitive.⁷ They argue rather that holes are immaterial bodies, a claim they introduce in terms of the following analogy: holes are composed of — but not identical to regions of — space, as material bodies are composed of — but not identical to particular quantities of — matter.⁸ Space is thus, Casati and Varzi

BOOK REVIEWED

Holes and Other Superficialities
by Roberto Casati and Achille
C. Varzi, MIT Press:
Cambridge, 1994.

suggest, the matter of holes; although, whereas holes are composed of space only, material objects are composed both of space and “ordinary matter.” I say that this is how Casati and Varzi *introduce* their claim, because within a page they suggest that there is but one matter — which can be *bare* or *qualified* — out of which all bodies (whether “immaterial,” like holes, or material) are composed. On this presumably distinct conception, bare matter would correspond to space on the first account, and qualified matter to ordinary matter. Whether we still have, on this second conception, a mere analogy is unclear to me. Nor is it clear to me which conception Casati and Varzi favor. Their initial discussion of space as bare, unqualified matter is somewhat circumspect (“common sense does not forbid us,” “according to some theorists it would be reasonable,” “If one accepts this piece of metaphysics”), but whatever qualms they have seem to vanish within a page: “Holes are spacious; they are made of space; they consist of ‘bare,’ unqualified matter.”⁹

Since Casati and Varzi do not at all develop the key concepts involved, I shall leave to one side whatever may be at stake between these two conceptions.

I remain confused about what work is done — on either conception — by the claim that holes are composed of space. As far as I can tell, the remainder of Casati and Varzi’s claims are equally consistent with

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the thesis that holes, although *located* in space (and although, if you like, they are *bodies*, albeit immaterial), are not composed of anything at all.¹⁰ This talk of being composed of space, in addition to its unclarity, seems an idle wheel.¹¹

And Casati and Varzi do have much more to say about holes, more indeed than can receive mention in this brief note. Prominent among their claims are the following. Holes are always in something; they are “ontologically dependent” upon material hosts.¹² A hole is connected (in the topological sense) to a surface of a host, but only when the surface contains discontinuities and concavities. Holes are fillable. These claims — along with remarks concerning the identity conditions of holes, the ways holes are created and destroyed (including the ways various kinds of holes can be made from other kinds of holes), and the ways holes are perceived — are elaborated in some detail, so as to provide a sort of taxonomy and natural history of holes and their kinds. Hollows, cavities, and tunnels are distinguished, for instance, in terms of concepts drawn from mereology and topology.

“Why this obsession with holes?” a female colleague slyly asked. The Lewises defended — or had Argle and Bargle defend — their seven-page dialogue by adverting, beyond the intrinsic interest of holes, to their illustrative

value: their consideration of holes provides a neat, self-contained display of the standard structure of many ontological disputes. Casati and Varzi defend their book-length study — again, in addition to pointing to the intrinsic interest of holes — by suggesting that it might contribute to an area of artificial intelligence research sometimes called “naive physics — the science of ordinary things, space, time and motions at the ordinary man’s disposal in his everyday actions.”¹³ However, their unrefreshing insouciance concerning matters methodological and criteria of adequacy, in particular, leaves the upshot of this seemingly scientific backing unclear. What one encounters is more or less standard conceptual analysis enlisted to motivate a formalism, with appeals to intuition serving throughout to reject alternative accounts. (This, even though among the many surprising consequences of Casati and Varzi’s own account are (1) that when one sticks a solid object in water, one creates a hole in the water which the body completely fills (reedy swamps may thus have hundreds of tunnels in them), and (2) that there are no holes in aggregates, even if there are *mock* holes (“although the modifier ‘mock’ contains too much understatement”).)¹⁴ But even allowing for vagueness, as Casati and Varzi do, ought we to expect or desire a complete formalization of our concept of a hole and related concepts, adequate to all the ways we employ these concepts in everyday reasoning?¹⁵ Even a formalization that includes, as does that contained in their semi-technical appendix “*Outline of a Theory*” (my emphasis), five non-logical primitives, 24 definitions, and seventeen axioms?¹⁶ Perhaps for the purpose of building a robot that can follow such instructions as “Put this rod in that hole,” some formalism regimenting our ordinary concepts might prove quite useful, even if it doesn’t agree with ordinary usage in all cases. I doubt, however, we are yet in a position to know.¹⁷

Exercising the reviewer’s prerogative, I have raised some questions concerning, first, an aspect of Casati and Varzi’s answer to the question ‘What are holes?’ and second, a lack of clarity regarding the nature of their project. I should like to conclude, however, by emphasizing how much of interest is nevertheless contained in the details of their discussions. φ

ENDNOTES

¹David Lewis and Stephanie Lewis, “Holes,” *Australasian Journal of Philosophy* 48 (1970), pp. 206-212. Reprinted in David Lewis, *Philosophical Papers, Volume I* (Oxford University Press, 1983), pp. 3-9, which I will cite.

²Casati and Varzi, p. 236.

³Lewis, p. 9.

⁴Perhaps not. Perhaps one could reject (II), and yet continue taking statements such as “There are three holes in that piece of cheese” at face value, by providing an account that warrants the assertion of such falsehoods.

⁵Lewis, p. 4. Note, by the way, that a successful scheme of reinterpretation could equally well serve as a basis for arguing that (I)-(III) do not, despite appearances, form an inconsistent triad, since once the apparent quantification over holes in (II) is reinterpreted, (II) and (III)

no longer imply the negation of (I).

⁶Lewis, pp. 6-7. Frank Jackson, incidentally, has proposed deploying hole-linings in support of rejecting (II). Perhaps we ought not identify holes and hole-linings — the thought runs — but we can instead reinterpret putative reference to holes as in fact to hole-linings. See his *Perception: A Representative Theory* (Cambridge University Press, 1977), p. 132.

⁷Casati and Varzi, pp. 3 and 37. They also consider and reject (as too reductionist) views according to which holes are identical to parts of the surfaces of their hosts, where surfaces — as far as I can make it out — are two-dimensional “geometrical” (p. 12) abstractions that, unlike hole-linings, are not material objects.

⁸Casati and Varzi, p. 32. The objection to identifying holes and regions of space is that the former, but not the latter, can move. (Here, however, a familiar dialectic might ensue: (A) Why not go “four-dimensional” and identify holes — considered now as extended in *time* as well as space — with regions of space-time (to say a hole can move would then just be to say that a temporal part of a hole can be located in a different region of space than another temporal part of the same hole)? (B) Still, the hole and the region of space-time would possess different *modal* properties and so should not be identified. For example, the hole *could* have been elsewhere, not so the region of space-time. (A) But a counterpart-theoretic approach to modal discourse can explain away such differences. (Etc.) And (A) and (B) might further wonder whether regions of space or of space-time ought to be considered material. Cf. below.)

⁹p. 33, first three quotes; pp. 33-4, last quote. One might wonder, on either conception, why Casati and Varzi persist in calling holes *immaterial* objects. Presumably, the answer is that on the first conception, they would require of material objects that they be composed *both* of space and “ordinary matter,” and on the second account they would require that they be composed of *qualified* matter. I suppose whether one should nonetheless construe Casati and Varzi as in fact rejecting (III), not (I), is immaterial.

¹⁰But then I suppose they are also consistent with the thesis that holes are composed of (quantities of) Nothing. (I don’t claim that this idea is pellucid. That’s my point.)

¹¹The area of inquiry one might have thought most relevant to such matters (*viz.*, physics) does not make an appearance here. Perhaps Casati and Varzi’s interest in the project of “naive physics” (mentioned below) explains their seeming indifference to *real* physics.

¹²As Casati and Varzi make clear (pp. 18-19), they do not have in mind the mere *de dicto* claim that necessarily, all holes have hosts. But they do not distinguish the following *de re* claims: (1) For all *x*, necessarily, if *x* is a hole, then *x* has a host, and (2) For all *x*, if *x* is a hole, then necessarily *x* has a host. (1), but not (2), allows of course that a hole might not have been one. I believe they have (2) in mind. Casati and Varzi deny, by the way, that if *h* is the host of hole *x*, then necessarily, *h* is *x*’s host (in all worlds in which *x* exists). (One further note: it is of course just such facts pairing holes and material hosts that Argle attempts to exploit in identifying holes and their linings.)

¹³p. 3. (My female colleague will perhaps slyly wonder whether women should take comfort in this exclusion from the naive.) Cf. Patrick Hayes’ “The Naive Physics Manifesto” in *The Philosophy of Artificial Intelligence*, Margaret Boden, ed. (Oxford University Press, 1990). This collection also includes Drew McDermott’s apostasy “A Critique of Pure Reason.” In her “Introduction,” Margaret Boden more aptly describes the brief of naive physics as the formalization and axiomatization of commonsense knowledge (pp. 11-2).

¹⁴pp. 145-146 and 149-151, respectively. I would not *say*, when I stick my hand in the bath to test the temperature, that I have made a hole in the water, or even simply that there is a hole in the water. Is this just due to some sort of cancelable pragmatic restriction? I *would* say, in appropriate circumstances, that there is a hole (a *hole*, not a “mock” hole) in my shirt, aggregate though it is. Can this be explained away as just a bit of loose talk?

¹⁵cf. the conclusion Casati and Varzi draw having brought out various complexities in our use of the word ‘lake’(p. 171): “‘Lake’ is used with certain principal descriptive purposes in mind, which vary according to our changes of interest.” Why not say something similar about ‘hole’?

¹⁶Casati and Varzi also helpfully include sixty-six elementary consequences thereof.

¹⁷I suspect Casati and Varzi would agree. The last exercise in their nice set of puzzles and exercises reads: “**Exercise [very hard]**. Write a program that a robot could profitably use to put certain objects into certain holes” (p. 218). (I might mention also that in addition to this puzzle/exercise set and the semi-technical appendix, the book contains a wealth of helpful diagrams and a richly annotated bibliography.)