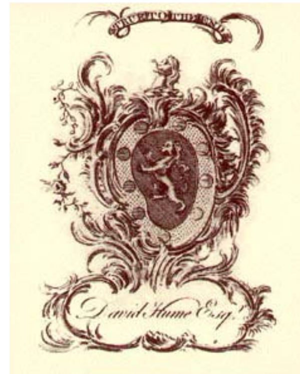

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Hume's Finite Geometry: A Reply to Mark Pressman

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In "Hume on Geometry and Infinite Divisibility in the *Treatise*" (*Hume Studies* 23.2 [1997]: 227–244), H. Mark Pressman charges that "the geometry Hume presents in the *Treatise* faces a serious set of problems" (241). This may well be; however, at least one of the charges Pressman levels against Hume invokes a false dichotomy, and a second rests on a non sequitur.

Pressman charges that Hume is inconsistent to hold that space is only finitely divisible while simultaneously endorsing geometrical theorems such as the Pythagorean theorem and the theorem that the internal angles of a triangle are equal to two right angles. Pressman writes:

> Consider what happens to the Pythagorean theorem if each side of a right triangle "consists of a finite number" of point-parts "and these simple and indivisible" (T 39). The hypotenuse of a right triangle with 100-point sides must, in Hume's system, consist of some whole number of indivisible points, perhaps 140 or 141. . . . Consequently, either the Pythagorean theorem . . . fail[s], or Hume's thesis that segments contain finitely many points fails. (239)

This is a false dichotomy. Pressman ignores that there is a third alternative. This is the alternative that, in a finitely divisible space, it is only possible for certain kinds of triangles to exist (3–4–5 right-angle triangles, for instance, which have the hypotenuse commensurable with the sides). All other appar-

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ently triangular figures would prove, upon closer inspection, to have one of their angles knocked off (i.e., to be really quadrilateral) or to have sides that are not really straight. Similarly, not all rectangles would have diagonals, though all would contain step-shaped lines that approximate the path of a diagonal, and there would be no perfectly smooth curves, so the diameter of approximately circular figures would always be commensurable with their circumferences. The Pythagorean theorem would nonetheless be true of those triangles that really can be drawn in a finitely divisible space.

Pressman also charges that Hume "overlooks calculation" when he claims at T 45 that "the points, which enter into the composition of any line or surface . . . are so minute and so confounded with each other, that 'tis utterly impossible for the mind to compute their number." Pressman writes:

> Retire from an ink spot until it appears indivisible to the eye. A black spot an inch in diameter appears indivisible to one with good sight and in good conditions once she has retired 500 feet from it. Since there is 1 visible point to the (tangible) inch when seen from 500 feet, there are 500 visible points to the inch when it is seen from a distance of 1 foot. (236)

This is a non sequitur. Why should one suppose that the number of visible points in the tangible inch increases at the rate of 1 point per foot as opposed to any other arbitrary measure, say, 1 point per inch or one point per millimeter? There are 6,000 inches and 152,400 millimeters in 500 feet. By those measures there should be 5,988 visible points in the "square" at a one foot distance or 152,095 points (give or take a point) in the "square" at a distance of 304.8 millimeters = 1 foot.[1] And whichever arbitrary measures one adopts, would we not be obliged to suppose that the number of visible points in the square increases as the *square* of decreases in the distance? Indeed, should we not consider that it might be possible that the number of points might increase logarithmically or in quantum jumps as the distance decreases? Pressman's supposition that the number of points must increase at a rate of 1 visible point per foot could only be justified by measures at both ends—not just a measure of how far away the square must be for it to appear as a point, but of how many points there are in it at a one foot distance.[2] The latter, however, is precisely what Hume denies we are in a position to do, and this means that Pressman's subsequent attempt to charge that Hume's visible *minima* must actually be divisible is based on a false premise.

Hume's finitistic geometry may be incoherent, but H. Mark Pressman has not succeeded at saying why.

NOTES

1. Of course, in all of these cases the "square" will actually have to be a rectangle or a polygon, since none of these sums are square numbers.

2. Indeed, if we take the possibility of logarithmic increase seriously, measures all along the distance would be required.