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Carl E. Behrens* (cbehrens@crs.loc.gov), 5107 Cedar Rd., Alexandria, VA 22309. *John Stuart Mill's "Pebble Arithmetic" and the Nature of Mathematical Objects.*

The empiricist claim that all human knowledge rests on observation of physical events has always stumbled over phenomenon of abstract thought. David Hume tried to avoid the problem by defining two types of knowledge, which he called "matters of fact" and "relations of ideas," which latter he accepted as true in themselves. John Stuart Mill, however, insisted that even statements of abstract thought, including mathematical laws, were assumed to be true in general because they were observed to be true in single instances. To make this claim plausible Mill declared that "all numbers are numbers of something." This "pebble arithmetic," as his critics termed it, led to the disparagement of empiricism in the 20th Century, but it is no longer necessary to tie abstract mathematical objects to the external world. Whatever else they are, mathematical thoughts, along with all other thoughts, may be viewed as physical states of the brains of human beings, and thus as physical objects that may be observed as sources of empirical knowledge. (Received September 14, 2009)