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*Connections between the Genesis of Mathematics and Writing in Ancient Mesopotamia in 3100 B.C. and the Neuroscience of Learning Mathematics Today.* Preliminary report.

In 7500 B.C. farmers in ancient Mesopotamia began to use three-dimensional stylized clay counting tokens to keep track of goods. By 3100 B.C. these tokens had evolved into two-dimensional written numerical symbols inscribed onto clay tablets in which the base-10 system and other systems were used. By 2600 B.C. written language had evolved from exclusively numerical concerns to encompass a full range of literary topics. Through the conception and representation of numbers in written form in Mesopotamia, both long-term memory and working (short-term) memory of the human brain were substantially enhanced and extended. Crucially, the ability to effectively harness working memory in the prefrontal cortex of the human brain is a vital component of fluid intelligence, which is the cognitive ability to solve new problems and draw connections between seemingly unrelated concepts. By enlarging working memory through the writing of mathematics, fluid intelligence can be substantially enhanced and transformed. How can the learning of mathematics by students today be transformed through their writing of mathematics and consequent enlargement of their working memory? What lessons can we learn from the genesis of mathematics in 3100 B.C. that can be applied to the learning of mathematics now? (Received September 16, 2008)