***Ars Conjectandi* (1713). Jacob Bernoulli and the Emergence of Mathematical Probability.**

Edith Dudley Sylla, Department of History, North Carolina State University, Raleigh, North Carolina 27695. Email: Edith_Sylla@ncsu.edu.

Jacob Bernoulli worked for many years on the manuscript of his book *Ars Conjectandi*, but it was incomplete when he died in 1705 at age 50. Only in 1713 was it published, as he had left it. By then Pierre Rémond de Montmort had published his *Essay d'analyse sur les jeux de hazard* (1708), Jacob's nephew, Nicholas Bernoulli, had written a master's thesis based on Jacob's unpublished work on the use of the art of conjecture in law (1709), and Abraham DeMoivre had published "De Mensura Sortis, seu de Probabilitate Eventuum in Ludis a Casu Fortuito Pendentibus" (1712).

The most important original contribution of *Ars Conjectandi* was its last section containing Bernoulli's proof of a theorem that later came to be called the weak law of large numbers. Before Bernoulli all that existed of what later became part of probability mathematics was the mathematics of expectations in games of chance. By the "art of conjecturing" Bernoulli had in mind a methodical approach to decision making especially in civil, moral, and economic matters. In his mind, the proof of the weak law of large numbers showed that it would be possible to extend the mathematics of games of chance to a much wider range of naturally occurring situations beyond those expressly designed to have a range of predicatable outcomes, such as games using cards or dice. Although others at the end of the seventeenth century were beginning to work on such problems as life expectancies or the pricing of insurance, Bernoulli was not able to find a suitable range of problems with associated data that he could use to exemplify the application of his new art of conjecturing to civil, moral, or economic cases. Hence his failure to finish the book.

Jacob Bernoulli is well worth studying as an exemplary seventeenth-century mathematician, both for what he did as a mathematician and for his place within the society and mathematical community of his day. The talk will include attention to his correspondence with Gottfried Wilhelm Leibniz, who later boasted that Bernoulli had taken up the mathematics of probability at his urging, as well as his relations to other mathematicians in his family including his brother Johann Bernoulli and his nephew Nicolas Bernoulli.

Key words: weak law of large numbers, games of chance, DeMoive, Leibniz