Legal probabilism – Week #1

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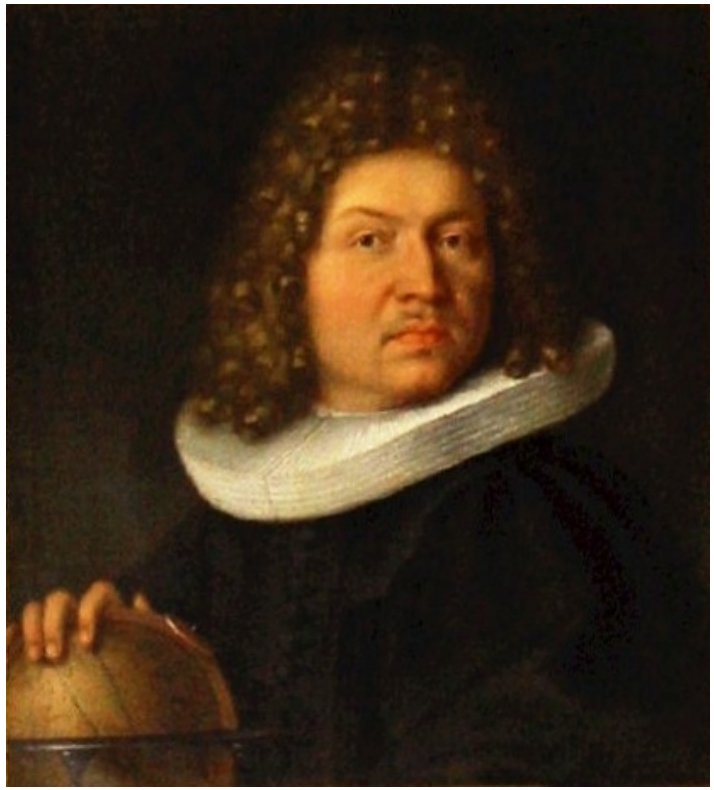
What is proof beyond a reasonable doubt?

"[R]easonable doubt . . . is that state of the case which after the entire comparison and consideration of all the evidence, leaves the minds of the jurors in that condition that they cannot say they feel an **abiding conviction**, *to a* **moral certainty**, *of the truth of the charge."*

Justice Shawn, Sup. Ct. of Massachusetts, 1850

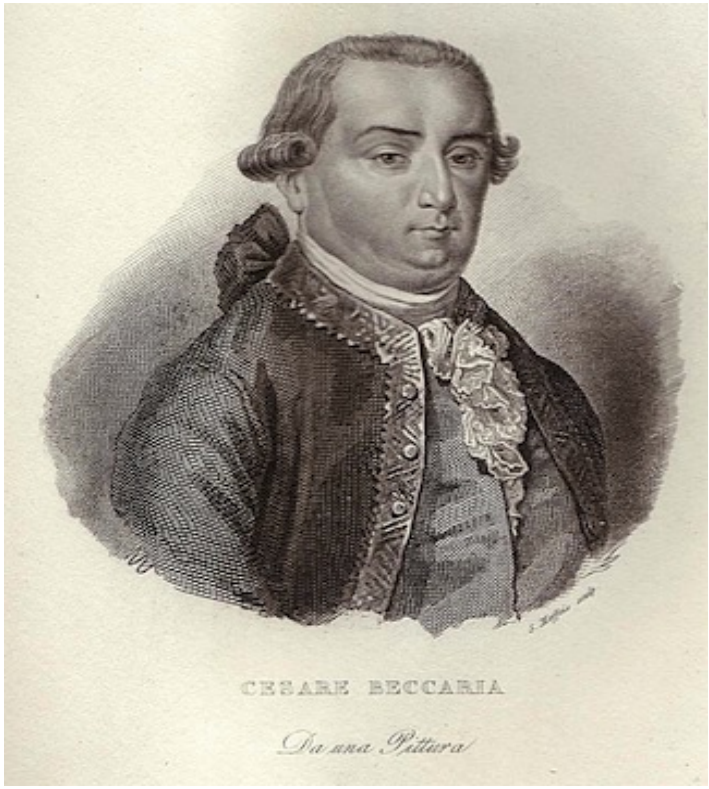
High probability of guilt?

"It would be useful, accordingly, if definite limits for moral certainty were established by the authority of the magistracy. For instance, it might be determined whether 99/100 of probability suffices or whether 999/1000 is required." (*Bernoulli, The Art of Conjecture*, 1713, pt. IV.)



Cesare Beccaria's Certain Probability

"It may seem odd that I talk of probability in relation to crime . . . [b]ut . . . moral certainty is, strictly speaking, nothing but a probability, **though a probability of such a sort to be called certainty**." (Crimes and Punishments, 1764, cp. 14)



What did nurse Lucia B. do?

Number of deaths in a children hospital in Amsterdam (2000-2001)

shifts	with no incident	with incident
with Lucia B.	134	8
without Lucia B.	887	0

Probability

You toss a coin 9 times and it lands heads 9 times:

H-H-H-H-H-H-H-H-H

What is the probability that, in the next toss, the coin will still land heads?

H-H-H-H-H-H-H-H-H-?

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Would your answer change if you tossed the coin one million times and always got heads?

An exercise

Three cards are in a hat. One is red on both sides (RED-RED), one is white on both sides (WHITE-WHITE), and one is red on one side and white on the other (RED-WHITE). A single card is drawn at random and tossed into the air and lands red-side up. What is the probability that it is the RED-RED card?