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<Lecture Note>

Applications of the Pareto Distribution (II)

—An Exercise in Mathematical Theology—
(with an Apology to Spinoza)

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A statistician asks a priest: "Father, when will Armageddon take place?" The priest answers: "It will certainly not come before 2102. It will come most likely in 2102. But I don't know how long we have to wait for its coming after that. Providence is totally unfathomable." The statistician acts mundanely and does not hesitate to commit blasphemy. He defiantly says: "Anyway, we ate the Apple, and were expelled from the Garden. Why shouldn't we probe Providence? I would like to calculate the probability that Armageddon will take place up to 2202."

Later, faintly remembering the priest's frown, the statistician engages in a monologue.

"Armageddon occurs most likely in 2102. But after that we may have to wait indefinitely even *on average*. Vilfred Pareto serves me. The appropriate Pareto distribution is:

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$$f(x) = 100x^{-2}, \quad x > 100$$
$$= 0, \qquad \textit{otherwise}$$
$$\textit{mean} = \mu_X = E(X) = \infty.$$

The probability is $\int_{100}^{200} \frac{100}{x^2}\,dx = 0.5$."