Sur une question de probabilités.*

Jules Bienaymé

Bull. Soc. Math. France, 2, (1874) pp. 153–154

Let n consecutive observations be given in numerical magnitude; if one represents them by some straight lines placed to the side the ones to the others, and let one join the extremities of these straight lines by a broken line, the number of the *maxima* and of the *minima* will be probably equal to

$$\frac{2n-1}{3} \pm t\sqrt{\frac{16n-29}{45}},$$

the probability corresponding to t being given approximately by the well known integral

$$\frac{2}{\sqrt{\pi}} \int_0^t e^{-x^2} dx.$$

It is well known that this result is referred to the very general case which comprehends only the possible values in probability infinitely small, or some values in probability finite, not susceptible of repetition. The number of the maxima will be different in the case of repetition. Thus, for two values reproduced indefinitely, the mean result will be only $\frac{n+1}{2}$.

*Translated by Richard J. Pulskamp, Department of Mathematics & Computer Science, Xavier University, Cincinnati, OH. January 9, 2010