Un Million Faits

Léon Lalanne[*]

4th Edition, 1846, Columns 262-263.

SINGULAR PROCESS IN ORDER TO FIND, BY SOME REPEATED TRIALS, THE RATIO OF THE CIRCUMFERENCE TO THE DIAMETER. — Let one trace on a plane surface a sequence of parallel and equally separated straight lines; let one take a quite cylindrical needle, of a length less than the constant interval which separates the parallels, and let one project it at random a great number of times onto the part of the surface which is covered by the lines. If we count the total number of times when the needle has been projected, and if we note the number of its encounters with any one of the parallels, the ratio of these two numbers, multiplied by the double of the ratio of the length of the needle to the interval of the equidistant lines, will express the ratio of the circumference to the diameter with so much more approximation as the trials will have been multiplied.

By designating by d the interval of two near parallels, by a the length of the needle, by p the number of encounters, and by q the total number of casts, q being very great, we will have the formula

$$\pi = \frac{2aq}{pd}$$

The error will be the least possible for a given number of trials, when the length a of the needle will be equal to the fourth of the product of the interval d of the divisions by the ratio π of which the value is known. (See GEOMETRY, col 121.)

Thus one will be able to make the experience with a needle of 50 millimeters of length by projecting it on some parallels of which the interval will be of 63 millimeters and $\frac{6}{10}$, or on some given proportionals to them.

[*]Translated by Richard J. Pulskamp, Department of Mathematics & Computer Science, Xavier University, Cincinnati, OH. September 4, 2010