ENCYCLOPÉDIE OU *DICTIONNAIRE* RAISONNÉ DES SCIENCES, DES ARTS ET DES MÉTIERS

JEAN D'ALEMBERT

CARREAU

Franc–Carreau, a kind of game of which M. de Buffon has given the calculation in 1733, being before the Academy of the Sciences. Here is the excerpt that one finds of his memoir on this subject, in the volume of the Academy for that year.

In a tiled room of *tiles*, equal & assumed regular, one throws a louis or an ecu into the air, & one asks how much are the odds that the piece will fall only on a single tile, or *openly*[1].

Suppose that the given tile is square; we inscribe in this square another which is, let us say, everywhere distant from it by the length of the semi-diameter of the piece; it is apparent that all the times that the center of the piece will fall on the small square or on its circumference, the piece will fall openly; & that on the contrary it will not fall openly, if the center of the piece falls outside of the inscribed square: therefore the probability that the piece will fall openly, is to the contrary probability, as the area of small square is to the difference of the area of the two squares.

Therefore in order to play an equal game, it is necessary that the big square be double of small; that is to say, that the diameter of the piece being 1, & x the side of great square, one will have $x^2 : (x-1)^2 :: 2 : 1$, whence one easily draws the value of x, which will be incommensurate with the diameter of the piece.

If the piece, instead of being round, were square, &, for example, equal to the square inscribed in the circular piece of which we have just spoken; it jumps to the eyes that the probability of falling openly would become greater: for it could happen that the piece falls openly outside of the small square: the problem becomes then a little more difficult, because of the different positions that the piece can take; that which doesn't take place when the piece is circular, for all the positions are then indifferent. Here is in a simple problem an idea that one can form of these different positions.

On a single floor formed of equal & parallel boards, one throws a stick of a certain length, & assumed without width: one asks the probability that it will fall openly on a single board. Let one imagine the point of middle of the stick at any distance from the edge of the board, & that with this point as center one describes a semicircle of which the diameter is perpendicular to the sides of the board; the probability that the stick will fall openly, will be to the contrary probability, as the circular sector contained therein of the board is to the remainder of the area of semicircle; whence it is easy to draw the sought solution. For naming x the distance of the center of the stick to one of the sides of the board, X the corresponding sector, from which it is always easy to find the value of x, &

Date: Volume II, January 1752.

Translated by Richard J. Pulskamp, Department of Mathematics and Computer Science, Xavier University, Cincinnati, OH .

[1]*Francement*, that is not touching an edge of a tile

A the area of the semicircle; the sought probability will be to the contrary probability, as $\int X dx$ is to $\int dx(A - X)$. *See*. **Jeu**, **Pari**. (*M. d'Alembert*)