A mathematical look to the world

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Every culture modifies the view we have of the world. We don't portray what we see through the lens of our camera; we don't snap a photo in the same way if we are a poet, a mathematician or both. The mathematician will pay attention to forms, structures that others will not notice, being sensible to other aesthetics. He (or she) will see mathematics acting in the world. This article gives some examples of this process.

Sequences of numbers

Sequences can appear in nature, due to chance or to a hidden structure. More than others, a person fond of mathematics will notice these flowers forming a triangle 1 + 2 + 3 in the Namib Desert. Who else could have shot this photo?

Straight lines and curves

Amazing straight lines and curves appear in the landscape or in the sky. Is it chance or scientific phenomena? Both are possible. The answer is rarely certain or obvious but the question is there and leads to a study or a dream involving mathematics. These straight lines, parallel or secant, these circles or parabolas: where are they coming from? Work of man or of the wind?

These parallels and angles have a meaning linked to air traffic lanes that will intrigue persons loving mathematics.

A point, circles and straight lines above Sydney Opera House.

The wind creates strange parabolas in the Namib Desert.

It is easy to understand why this tuft of grass has grown in circle, but why has it perish on one side of a straight line?

Theorems

Some theorems of geometry appear naturally before the eyes of the expert, as the intercept theorem on Saint-Malo sea front (Brittany).

Apparition of the intersect theorem on Saint-Malo sea front.

Balance

Gabor Domokos and Peter Varkonyi, two Hungarians mathematicians, have created one homogenous body which always returns to the same resting position. It has two points of equilibrium, one stable and one unstable. Nature is full of such bodies, like a turtle shell, or some rocks that seemingly defy the laws of gravity. Even if they are just approximations of the gömböc of the two Hungarians, how can we help but thinking about it when we see them?

Balanced rock in the Valley of the Gods (USA), Mexican hat for the poet, gömböc placed upside down for the mathematician?

Contour lines

Close to balanced rocks, saddles evoke non-Euclidean geometries. If the straight lines drawn on a surface are the lines realizing the shortest distance, a straight line on one side never meet a straight line on the other side.

That would contradict Euclid's postulate!

A saddle in the Rocky Mountain. If a line is drawn on the right side, can it intersect a line drawn on the other side?

Unexpected bodies

For one who's got a mathematical eye, the world is full of mathematical bodies, bridges and cooling towers of course but also stools like the one on which this young washerwoman is sitting.
This surface, which bears the poetic name of hyperboloid of revolution of one sheet, is built with two families of pieces of bamboo of the same length.

Young Sherpa woman sat on a stool shaped like a hyperboloid of one sheet

Detail of the Nepalese stool where the two families of pieces of bamboos can be seen.

Natural forms

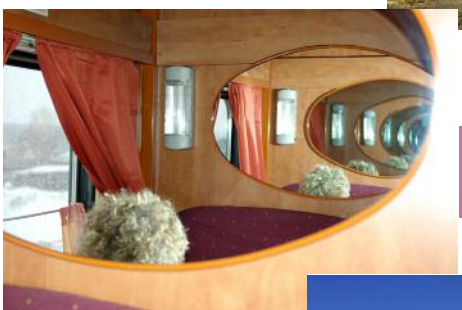
Forms encountered in nature often evoke mathematics, as this ice rock melting on a beach of Greenland, a true topological body.

Ice rock melting on a beach of Greenland, evoking topological questions.

Symmetries

All symmetries, transformations, anamorphoses will attract the eyes of mathematicians.

Zebras in symmetry.
Their coat is also of mathematical interest. Is there any algorithm generating it? The question was studied by Alan Turing, a precursor of theoretical computer science.



Imagining infinite along the trans-Siberian railway.

Reflections on Gokyo Lake in the Himalaya.

Beyond aesthetic

The aesthetic side suffices to explain the look mathematics allow on the world… but this look goes far beyond. It allows questions to emerge and to better understand the hidden reasons of facts, from coats of animals to erosion, passing through sand movements. It is the basis of mathematical models which we create to better understand nature.

H.L.