EVA LOOTZ. INTERWEAVE, WRINKLE AND FOLLOW THE THREAD,
Capi Corrales

A knot in mathematics is a basic closed curve that meanders in three-dimensional Euclidean space, and a chain of knots is made up of intertwining yet non-intersecting components. I will describe on these pages the chain of knots that the space generated by this exhibition by Eva Lootz led me to traverse.

> I'm greatly interested in space acting as something enveloping, as an environment in which the spectator is immersed, in which to knot together with the spectator; in the sense that language already knots us all together.[1]

I laid out on my table the material provided to me by the artist: three intertwining proposals and a plan on how to assemble them. The latter suggested a physical journey from front to back for the first three proposals, a wonderful way to proceed when studying something new. Starting from the origins runs the risk of not arriving at the present, whereas starting at the end means that we have to constantly refer to the origins and intermediate steps, ultimately covering everything. Given that it is unwise to venture into unknown territory without proper preparation, I approached the first proposal by searching for a fine first thread to intertwine, knot around my waist and continue.

First proposal: *Entre manos* [Between Hands] (2011), *Mostrar/Nombrar* [Show/Name] (2011).

Both pieces were part of the *Nudos* [Knots] exhibition, which resulted from the artist's research on the connections between matter and language, held at the Círculo de Bellas Artes in Madrid from 26 January to 4 April 2012.

> *Entre manos* is a video projected on two adjacent screens that revolves around the subject of knots

1. "Ecos del Círculo". Exhibition report of Eva Lootz's *Nudos*. Radio Círculo, 2012.

and the game of cat's cradle, both the one that has been preserved in our tradition as a game for girls and the one that has been played by almost all primitive peoples with an astonishing variety of figures. The video alternates reflections on subjectivity with a selection of poems by Cree Indians.[2]

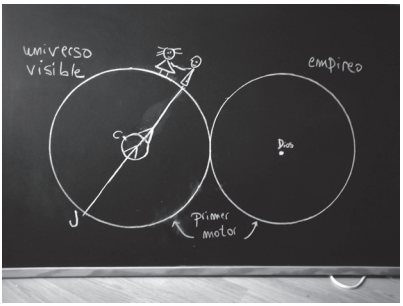
There is a glass piece in my *Nudos* exhibition entitled *Mostrar/Nombrar*. I have always emphasised that difference. To show is not the same as to name.

In the catalogue for *Nudos*,[3] Lootz explains that her exhibition reflects on the threads that connect us and the interweaving of thought with our bodies. She also recalls how it was through the Russian filmmaker Sergei Eisenstein that she learned of the knot linking the arts of poetry and music, as suggested by the poet Dante Alighieri in *Convivio* (1304-1307) as the etymological origin of the term *autor* [poetic author] (aueio). After personally reading Eisenstein,[4] I looked up Dante's original text, translated into Spanish by Cipriano Rivas Cheriff in 1919.[5] And it was there that I found the thread I was seeking: *Convivio* led me to *The Divine Comedy*, which in turn led me to Bernhard Riemann, (1826-1866) through whom I came to his teacher, J.C.F. Gauss (1777-1855), the first mathematician to precisely name the geometrical properties displayed by knots.

In *Comedy*, as its author called it, Dante describes a journey of the poet travelling first through Inferno and Purgatory accompanied by Virgil and then accompanied by Beatrice through Paradise, the sphere formed by the eight concentric heavens visible from the Earth. Dante opts for a beautiful poetic image to explain what he and Beatrice see once they reach the edge of the sphere containing the visible Universe (the Prime Mover): in the same way that by placing a mirror before our eyes can we see the fire of a lit candle behind

2. Eva Lootz: http://evalootz.net/entre-manos/
3. Eva Lootz. *Nudos* (Madrid: Editorial Círculo de Bellas Artes de Madrid, 2012).
4. Sergei Eisenstein. *Non-Indifferent Nature: Film and the Structure of Things*. (Cambridge: Cambridge University Press, 1987), p. 142.
5. Dante Alighieri & Cipriano Rivas Cherif (trans.). *Convivio* (Madrid: Tipografía Renovación, 2019), Treatise IV-VI, paragraph 2.

us, so the poet sees a bright point reflected in the eyes of his beloved. He curiously turns to look for the source of this light and sees God at the centre of a second sphere, the Empyrean, surrounded by angelic circles.

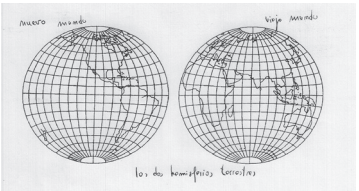


Two spheres sharing their edge, with no space between them and jointly forming the Universe of all there is, the Riemann's hypersphere! The four-dimensional manifold suggested by the German mathematician as a model of the Universe.

> The concept of a multidimensional manifold persists regardless of our spatial intuitions. Space, plane and line are only the most intuitive examples of a three-, two- or one-dimensional manifold. A four-dimensional manifold is here something that contains unbounded spaces within itself, although we can never contemplate more than what lies in the same space. When I say hereafter that two constructions are not in the same space in a four-dimensional manifold, I mean by this that I cannot contemplate both at the same time; I cannot make absolutely any picture in my mind; I can only draw logical conclusions from the premises I make about them, and it is an essential requirement for the understanding of what follows to adhere only to these logical conclusions.
>
> We want to deal with a four-dimensional spatiality. This is a continuous spatiality of greater extension than all of unbounded space. Certainly, we can only take in a single unbounded space with our intuition, but we can move through several spaces, one after the

other. By this I mean: I first imagine all of unbounded space, then I imagine all of unbounded space again, but thinking that all the points I now contemplate are different from the points I contemplated earlier.[6]

The mental image of four-dimensional spatiality described by Riemann in the last paragraph is analogous to the cartographic representation of the globe as two flat circular hemispheres.



Each circle represents half of the terrestrial sphere, and their circumferences represent the maximum terrestrial circle common to both. If we approach its circumference from any point within either hemisphere, we will automatically find ourselves at the corresponding point in the second hemisphere and be able to take in the interior of both with our eyes.

Let us now place two spheres, two balls before our eyes. Let us imagine that the Earth is positioned in the centre of one of these, which has within it everything that our civilisation will ever see. Then imagine that a distant civilisation, beyond the range of our vision, is positioned at the centre of the second sphere, which contains within it everything that such a civilisation will ever see. There are several theoretical possibilities: that the spheres are positioned far apart from each other with much universe between them, that they have parts in common with galaxies observable to both civilisations, or, as Riemann proposes, that they share their surface and together make up the entire universe, like the two hemispheres on the map of the Earth share

6. “Fragmentos sobre variedades y geometría”, in Bernhard Riemann & José Ferreirós (trans.). *Riemanniana Selecta*, (Madrid: Ediciones CSIC, 2000), pp. 93-95.

their circumference and jointly make up the globe. If we approach the shared surface from any point within either of the two spheres, we will automatically find ourselves at the corresponding point of the second sphere and be able to take in the interior of both with our eyes. If the Universe has positive curvature and the shape suggested by Riemann, then it can be simultaneously bounded and have an infinite extent, with no boundary.

It was the physicist Mark Peterson[7] who realised that Riemann's description of the Universe both as two spheres sharing a surface, and the experience of being able to take in the interior of two of them simultaneously from any point on the edge common to both, coincided with Dante Alighieri's model of the Universe in *The Divine Comedy*.

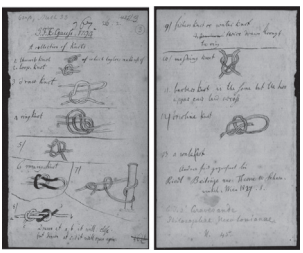
The feature of this model that most pleased Riemann — who before studying mathematics had studied theology — is that it provided an answer to one of the oldest questions our species had been asking: "is the Universe bounded or unbounded, does it have a finite or infinite extent?" The possibility that it had an infinite extent had been rejected by almost everyone who had given serious thought to these questions. But the alternative had not solved anything either: if the Universe did not have an infinite extent, then – as would happen if the Earth were, as some maintain, flat – it would have to end somewhere, and if so, what happened at the edge? What would be on the other side? The model proposed by Riemann resolved the apparent paradox that so far assumed the existence of a simultaneously *bounded* and *infinite extent* universe. The difference between unboundedness and infinite extent is described precisely by Riemann in the lecture "On the Hypotheses which lie at the Bases of Geometry", which he gave for his teaching qualification in 1854, the subject of which had been chosen by his teacher Gauss. In 1922, Albert Einstein wrote:

> We have to thank the geometrical investigations of Gauss and Riemann for the mathematical knowledge that made it possible to establish the theory of general

7. Mark Peterson. "Dante and the 3-sphere", *American Journal of Physics*, vol. 47 no. 12 (December 1979), pp. 1031-1037.

> relativity. The former investigated in his theory of surfaces the metric properties of a surface immersed in a three-dimensional Euclidean space, demonstrating that these can be described by concepts that relate only to the surface itself, and not to the immersion [in space]. Riemann extended the Gaussian line of thought to continue of any number of dimensions, and he foresaw the physical significance of this generalisation of Euclid's geometry with prophetic vision. Natural laws only take their most satisfactory logical form when they are expressed as laws of the four-dimensional space-time continuum.[8]

The research on the metric properties of a surface immersed in a three-dimensional Euclidean space led Gauss to conduct the first systematic study of knots, to connect the geometries of magnitudes and positions and to initiate the study of the relative position of curves in the sense that — following the path laid down by another pupil of Gauss, Listing and by Max Dehn — we would today describe as topological.



From Lootz's to Dante's knots, from Dante's model of the Universe to the Riemannian hypersphere and from Riemannian manifolds to Gaussian knots. A simple and closed outline, the first knot of my chain.

Second proposal: *Tú y yo I* [You and I 1] (1997), *Tú y yo II* (2000).

> The piece comprises a long table for two diners, two chairs and two plates containing the same amount of sand. The sand in one remains as it is, conserving its volume and shape, while in the other it becomes

8. Albert Einstein, cited in Bernhard Riemann. Op. cit., pp. 93-95.

> apparent over time that both the plate and the table have a hole in them, and through this the plate is losing the sand as it spills out onto the floor. There are three large photographs in the same room on which a soft candle that follows the outline of the writing has spelled out the words: TÚ, Y, YO [written in German].[9]

It is difficult to look at *Tú y yo I* with Dante in mind and not immediately associate the two shapes produced by the silica sand, the cone-shaped hole on one of the plates and the mountain at its feet, with "Hell" and "Purgatory" respectively from *The Divine Comedy*. Silica is a compound of silicon and oxygen, the two most common elements in the Earth's crust, the crust that according to Dante was broken by Lucifer, whom the poet refers to as Dis, when he fell by force of gravity on Jerusalem after being expelled from the Empyrean and thrown into the sphere of the visible world. After passing through the Earth's crust, Dis continued to penetrate the depths of the Earth until reaching its centre, where he was trapped and has lived ever since. His fall produced a huge cone-shaped hole in the Earth, Hell, with its base centred on Jerusalem and its apex at the centre of the Earth. Purgatory is the mountain formed at the antipodes of Jerusalem by the lands displaced by Dis during his fall.

In order to reach Beatrice, who awaits them atop Purgatory, Dante and Virgil descend to the depths of Hell, where they meet Lucifer, whose navel coincides with the centre of the Earth, sunk to his waist in an (ice) pit in the rocks. They have to enter the water and let themselves slide down his body to access the tunnel that will allow them to ascend back to the Earth's surface. Virgil leads the way and, according to Dante (*Inferno*, Canto XXXIV, 5-93), after passing the navel of Dis, he stopped sliding and began to climb, something that makes perfect sense. No matter where we commence from, when we go from the Earth's crust towards the centre of the planet we descend with gravity and when we go from the centre towards the crust we ascend against gravity. Virgil and Dante emerge back at the Earth's surface at the antipodes of Jerusalem, the beach of the island of Purgatory, off which Ulysses' ships had been shipwrecked, where the eponymous

9. Eva Lootz: https://evalootz.net

mountain rose. Virgil and Dante walk along its eight cornices until reaching the Divine Forest at its summit. Beatrice appears there and Virgil disappears.

Beatrice and Dante. *Tú y yo I*. “The knot of the basic commitment to otherness, the theme of the couple”, in the words of Eva Lootz. The almost symmetrical set-up of a dinner party for two in which the diners are missing. A mountain made of grains of sand that have slowly and almost imperceptibly fallen one by one, leaving a cone-shaped hollow on the plate with a contour analogous to that of the mountain at its feet. “Don’t make a mountain out of a molehill”, we often say to ourselves. A grain of sand takes up barely any space, leaves no hole behind it nor forms a mountain when it is deposited. And so, day by day without us realising it, the grains of sand pile up at our feet. We try to cover them, to protect them from the tiny quartz crystals that make up the silica sand.

Tú y yo II, a duet. Once again, an almost symmetrical set-up: white shoes for a woman, black boots for a man; white shoes for a man, black boots for a woman. I attempt to follow the thread of voices, a woman’s and a man’s, emerging from loudspeakers inserted in the shoes. I find it impossible: the voices do not weave a dialogue; they are two monologues emitted simultaneously to form a kind of conglomerate of sounds. Then it dawns on me that the shoes and boots are made of felt. Felt is not a fabric; it is not made by crossing warp and weft, or by interweaving a thread. Fibres are not woven together to make felt, but they adhere to each other by means of steam and pressure to make a conglomerate out of them. How to follow the trail of a thread that is part of a jumble, a heap mixed together without order or harmony? Felt offers many advantages as a textile material. Besides being inexpensive, it is easy to work with and can be cut with scissors, sewn and glued to almost any surface. On the other hand, there are no gaps between the fibres because they are not woven, and clothing made of felt is waterproof and protects against wind and cold. Finally, it is an insulating, shock-absorbing material.

However, the fact that its fibres are not woven is one of its main disadvantages: it tears very easily and shrinks, and it takes a long time to dry when it becomes wet. It is therefore not a recommended material for knot tying or for using when crossing the water. When I was a teenager, I often sailed the Galician estuaries with a friend of mine, Moncho Lastra, now deceased, an expert sailor, voracious reader of books on the history of the sea and a great connoisseur of the history of shipbuilding. He taught me how to tie knots with lines (as the different cords used on a ship are called) and explained to me that the best lines in the world were those made from the fibre of abaca, an herbaceous plant of the banana family native to the Philippines. The abaca can reach up to five metres and the fibres for making rope come from its trunk, which is made up of leaves wound tightly around each other. Abaca leaves are made up of extremely large air-filled cells whose walls contain, lengthwise along the trunk, fibrous strands more than two metres long and one millimetre wide from which lines, ropes and twines are made. Fibres perfectly aligned around large air gaps in the abaca, fibres bundled together with no tone or gaps between them in the felt.

Abaca fibre became known in Europe when Ferdinand Magellan, in the service of the Crown of Castile, landed in the Philippines in 1521. The native population used it to make ropes and cloth, and the Spaniards realised that ropes made from abaca offered enormous tensile strength and were unlikely to deteriorate under the action of fresh or salt water, wind and sun, making it perfect for their rigging. In 1565, Miguel López de Legazpi subdued the city of Manila with three hundred soldiers, occupied the island of Luzon, the most important island of the archipelago, set up shipyards in Cavite and Pangasinan on the island of Luzon and in Bagatao on the island of Bagatao and began the construction of ships. The Manila-Acapulco route was initiated in 1565, the origin of the galleon shipping line that was known as the Manila Galleon until 1815. Most of the eastern goods on this route were disembarked in Acapulco and transported by land to Veracruz, where they were loaded onto the Fleet of the Indies bound for the Iberian Peninsula (the remainder was transported to Callao in Peru). The ships of the Fleet of the

Indies made a stopover in the Canary Islands before docking in Seville.

I entered the last room of the exhibition with these ideas running through my head.

Third proposal: *La habitación de Manila* [The Manila Room] (1993)

Eva Lootz made the pieces on display in this room, many of them almost symmetrical, with the paper that wrapped the items from an exhibition of hers in Lanzarote. Roll and knot Manila paper in Lanzarote. Philippines, Canary Islands? I started following the thread and soon learned that the conquistadors of the Philippines called the fabric made from abaca *medriñaque*, and its pulp "Manila hemp". Would the paper used by Eva Lootz have something to do with the lines used for centuries by sailors to tie their knots?

One of the most comprehensive studies on the cultivation and use of abaca that I have been able to access was written in 1937 by Miguel Palacios and Salvador Peña Trejo, commissioned by the Ministry of Livestock and Agriculture of Costa Rica. This investigative work explains to us that at the turn of the last century abaca was used in rope making, for rigging, in the manufacture of fabrics[10] and to cover telegraph cables. And in the section entitled "Abaca waste", we read:

> Abaca waste is a very precious raw material, superior to esparto grass and hemp, for the manufacture of paper. Trials have been made to make paper from this waste, resulting in very good grades. A large amount of waste in abaca plantations is produced from the processing of the fibre, and among us this would imply the development of yet another industry, which would be that of paper. The establishment of the paper industry among us is currently a problem, as we do not have enough materials for it. But with large abaca plantations we would necessarily have to have this waste in its exploitation, and this would be

10. Unwoven textile materials are today used in tea bags and filters made from abaca fibre.

> used to sustain this industry without detriment to other materials that are currently precious in our country.[11]

The first tests led to the production of a highly resistant quality paper with abaca or Manila hemp fibre that continues to be used to make paper money, envelopes for storing documents known as Manila envelopes (yellow, closed with a cardboard button and string) and a thin, resistant paper that is very suitable for packaging and making patterns in tailoring known as “Manila paper”.

The paper that Eva Lootz rolled, wrinkled and deformed in one of the stages of what was for centuries a commercial exchange route between the Crown of Castile and its colony in Asia, is made from the manufacturing waste of the fibre used in making the lines in which sailors tied their knots, which led Philip II to conquer the Philippines! This discovery not only closed the last knot in my itinerary through Eva Lootz’s exhibition, but also linked together much of her previous work, as she herself explains in the text with which I would like to close these pages.

> There is a telluric component in my work that clearly appeared when I began to be interested in mining around 1980, when I realised that everything associated with the extraction of minerals and raw materials, with their trade and exchange, with their repercussions on society and history interested me more and were much more fascinating than what a sculptor could do with iron, copper, gold, silver or marble; in other words, traditional sculpture. From there, I began to study what I later called the theatre of matter, the routes of exchange, the history of technological advances, the sociological implications, the repercussions on language, and soon enough I realised the scarce importance given to sites, to those ‘places of matter’ always behind the scenes, only known to those who work there.

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11. Miguel Palacios & Salvador Peña Trejos, “El abacá: Etimología, características”. *Revista de Agricultura del Ministerio de Ganadería y Agricultura de Costa Rica*, no. 4 (April 1937), pp. 119-129.

I became aware of the radical dichotomy that runs through our tradition between matter and spirit, the human implications of work often conducted out in conditions of semi-slavery. I began to delve into the parallelism between the devaluation of matter and that of women, in the fact that what has always been valued are the 'monuments', the cathedrals, the palaces, the pyramids, the bronze and marble sculptures, leaving hidden the places of their origin, the first work, the womb, the quarry and the mine, that which has made the work possible.[12]

12. Eva Lootz. *Escultura Negativa* (Madrid: La Oficina de Arte y Ediciones, 2014).

Eva Lootz was awarded the National Plastic Arts Prize in 1994, the Tomás Francisco Prieto Prize by the Royal Mint Foundation in 2009, the MAV (Women in the Visual Arts) Prize in 2010, the Art and Patronage Foundation Prize in 2013, the Baron de Forna Prize 2013 from the RABASF, and the Madrid Regional Government's Plastic Arts Prize in 2022.

Her latest exhibitions include *La canción de la tierra* [The Song of the Earth] (Tabacalera, Madrid, 2016); *Cut Through the Fog* (C.G.A.C. Santiago de Compostela, 2016-2017); *Binomio, un diálogo entre arte y ciencia* [*Binomial, a dialogue between art and science*] (CNIO, Madrid, 2017), and *El reverso de los monumentos y la agonía de las lenguas* [The Underside of Monuments and the Agony of Tongues] (Patio Herreriano Museum and National Museum of Sculpture in Valladolid, 2020).

She has carried out several permanent interventions in public spaces, including *NO-MA-DE-JA-DO* on the Isla de la Cartuja at Expo'92, *La mano de Linneo* [Linneo's Hand] in Bohuslän (Sweden, 1996) and *Endless Flow* (Silkeborg, Denmark, 2002). She constructed *La oreja parlante* [The Talking Ear], a piece located on the right bank of the river Ebro for the Expo 2008 in Zaragoza, and recently inaugurated *La cama de Penélope* [Penelope's Bed], a permanent intervention at Coster d'Art i Natura (Pollença, Mallorca, 2022).