

Mystery on the Desert

Maria Reiche



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The secret of Pampa: the most important astronomical monument of the world

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Márcia Nascimento (b. 1982), **Nuno Costa** (b. 1984).

They have a Degree in Architecture from the University of Minho (DAA-UM, 2007) and a Master Degree from the University of Santiago de Compostela (USC, 2009).

Since then, they run their activity as architects developing their own works from which should be underlined the project Tapio Wirkkala's Saivaara Monument, awarded with grants, among others, from the Arts Council of Finland (TAIKE, 2014) and the Calouste Gulbenkian Foundation (FCG, 2017).

They are co-founders of Kärjäkivet (2019, onwards).

Synopsis

“Kärjäkivet” is a periodical publication of thought and criticism that was born from a wider project developed around a proposal which was never accomplished, concerning the Saivaara Monument, elaborated in 1978 by the legendary Finnish artist Tapio Wirkkala.

“In 1975, the President Urho Kekkonen expressed as his wish that his monument should be placed in northwestern Lapland, on the Saivaara mountain. [...]”

How to make a monument on a site that is naturally so beautiful that one cannot take away anything from it, neither is man able to add anything to it? Tapio Wirkkala ended up with a proposal in which all the materials of the monument have been picked from the mountain itself.

The monument consists of a straight, paved, almost imperceptible path crossing over the Saivaara mountain. Five stones will be raised from the mountainside to the summit of the mountain, [...]. These stones will form a circle, similar to the court venue stones of the old days [called in Finnish as “Kärjäkivet”], on which the wise men of the village got together in order to decide about common matters. The one who has the strength to climb up the stony path may sit on these stones, look at the landscape and think. This artless monument is not going to change or destroy the landscape.”

Tapio Wirkkala Rut Bryk Foundation Archive, 1978

In this sense, this publication intends to accomplish, not in form but in content, the idea of Tapio Wirkkala for the Saivaara Monument: the creation of a place where men of all races and colors can gather together to think.

For that purpose, an online platform was created where different invited authors gather together through texts, illustrated and edited in small booklets, expressing their thoughts on architecture, art and culture in general, with the Saivaara Monument as the main driver.

Based in Portugal, it is published, as a general rule, every quarter, by adding a new text that can be viewed or downloaded online.

Editor's Note

Márcia Nascimento
& Nuno Costa

It is republished in this issue a text around the largest monument that humanity has ever produced, which we consider appropriate to use as a comparative work with the Saivaara Monument, the main subject of this publication. It is the introduction to the study of Nazca's pre-historic ground-drawings in Peru, written and published in 1968 by Maria Reiche in the book *Mystery on the Desert*.

Beyond the evident formal evocation - subtle lines spread over a vast wild territory - we are interested in the exploration of the historical dimension of this work as a primitive example of how Men has always been able to transform Nature in a balanced way, without preconceptions and with the sole purpose of improving it for its own well-being. A balance that can only be achieved through a perfect mutual understanding and respect, which makes us reflect on the infinite possibilities that may exist between the extreme concepts that nowadays are in constant confrontation: literal conservation or unlimited exploration. Under such a reductive debate, a work of this scale could easily have been condemned to an utopia like so many others, instead of being a concrete testimony of our search for an harmonious relationship with the world around us.

As a result of this imbalance, the Nazca lines are currently subject to permanent aggression but also forgiveness. Through this publication we also want to modestly contribute to its study and valorization by appealing to the support of the entities that are continually dedicated to this difficult task, such as the Asociación María Reiche on behalf of Dr. Ana María Cogorno without whom the publication of this issue would not have been possible.



Maria Reiche, 1946.



Maria Reiche in Nazca.

© Asociación Maria Reiche

Maria Reiche,
Mathematics, Geologist,
Pedagogue

Mystery on the Desert ¹

The secret of Pampa: the most important astronomical monument of the world

Shortly after my arrival in Peru in 1932 I came across an article, written by the astronomer Rolf Müller about the "Intihuatanas" (sun observatories) in ancient Peru. This article roused my interest in the astronomy of ancient Peruvians and I began to examine some of the ruins and stone-structures of the Incas and their predecessors, many of which were probably built for observation of the heavenly bodies and the fixing of important dates throughout the year. When later I came to the coast, I abandoned this study. I did not imagine then, that it would be near the coast, that the most important astronomical monument of Peru, and perhaps of the world, would be found.

In 1939 Dr. Paul Kosok of Long Island University discovered the mysterious ground-drawings of Nazca (department of Ica, in Peru). He handed over the information to me and in 1946 suggested my going to Nazca and starting with the investigation which I have carried on until now.

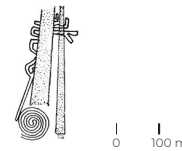
(...)

There is no doubt that among all Southamerican countries the most interesting is Peru. (...) Together with colossal and mysterious pre-historic stone structures, they give testimony of a once highly developed civilization. Cuzco and Machu Picchu with their well-known fortresses and edifices are only a small part of the wealth of imposing remnants from prehistoric times. Peru is widely known as "the Land of the Incas".

(...)

Several centuries before the time of the Incas, the inhabitants of the southern Peruvian coastal region created a monument which, being unique in this kind, was intended to transmit an important message to posterity. Its enormous extension and the accurate lines of its contours could remind us of the Pyramids of Egypt. But instead of looking up to a work of monumental three-dimensional simplicity, we look down from great heights on flat surfaces, which over miles are covered with geometric patterns which spread, as if drawn by giants with rulers of hundreds of feet. Here as there we are in the desert. But instead of the glare of yellowish white sand reflecting relentlessly into the eyes, an agreeable brownish colour spreads over plains and mountains and the slopes of the deeply

¹ Extract from the preliminaries for a scientific interpretation of the pre-historic ground-drawings of Nazca, Peru and introduction to their study, 1968.



< The marvellous regularity of two spirals of which one runs inside the other was produced by winding two ropes, 150 and 130 feet long, around three posts forming a triangle.

> > The ground-drawings not consisted only of animal-figures. They are but small units, spread here and there between the huge geometric drawings. On pages 12-13 it is apparent how insignificant are for example the bird with the undulating neck, the iguana and a small spiral among the maze of giant triangles and wide and narrow lines. These drawings continue with the same density for another mile and a half along the border of the Ingenio-valley.

cut-in valleys which emerge from the towering Andes.

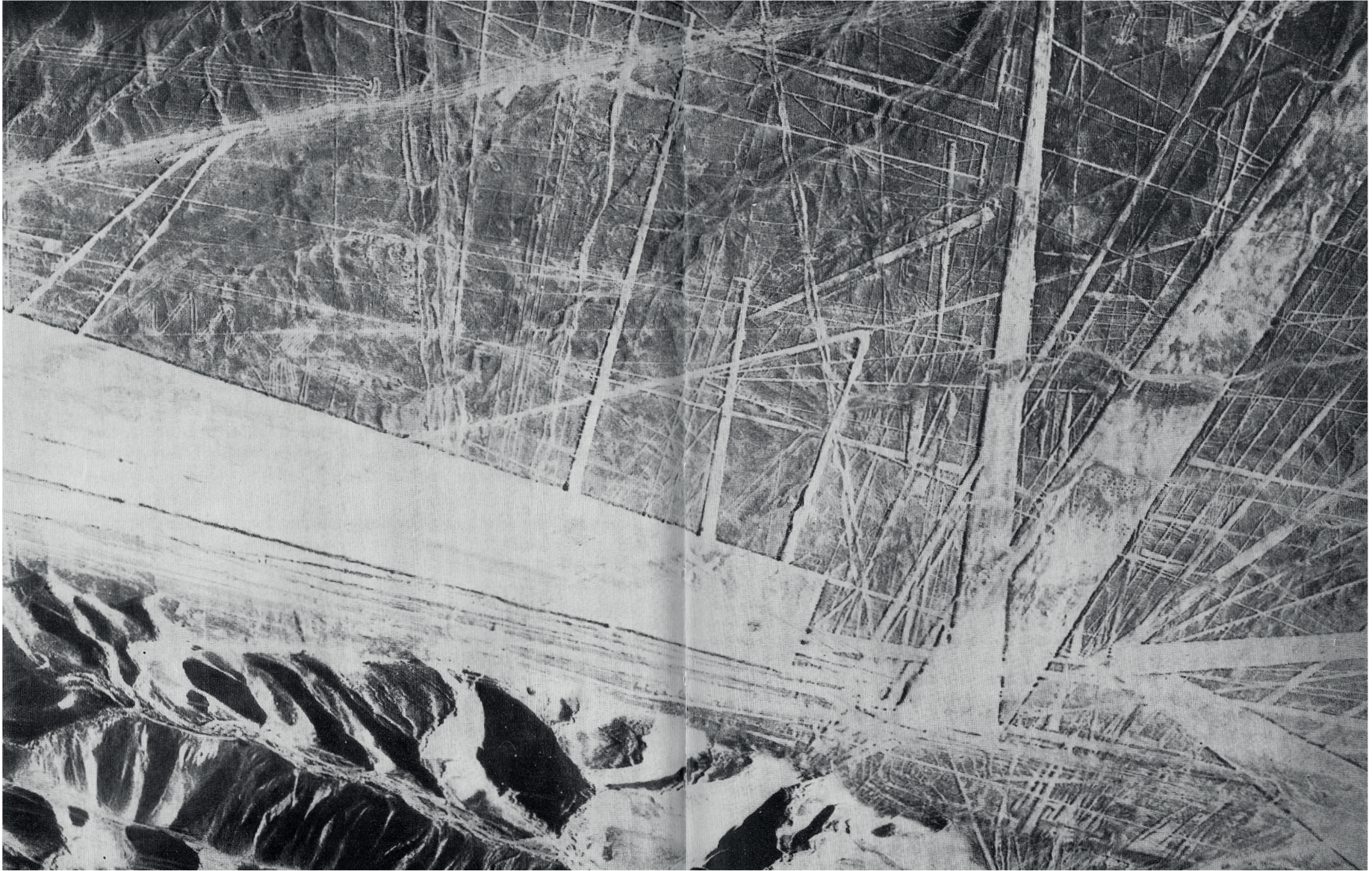
Travelling by air (not by jet-plane) from Lima to Chile or to Arequipa, halfway between these two cities our route may take us, if we are lucky, along the western slopes of the Cordillera. Looking down on plains, terraces and tablelands, there appear in different places triangles, rectangles and trapezoids neatly outlined in a lighter colour on the brownish surface. Many of them are in style and appearance similar to airfields. Flying at lower altitudes, in a small plane or a helicopter, we shall detect in their vicinity a great number of smaller geometric designs, consisting of straight lines of different widths and lengths and smaller triangles and quadrangles. The lines cross over the straight-edged fields, run beside or radiate from them, intersecting each other and forming intricate networks. Other shapes, instead of being abstract and geometrical, represent animals, appearing in different places among the straight lines. Being clearly visible even from altitudes of about 1500 feet (457,2 meters), one can imagine their enormous sizes. It is evident, that all these figures and lines are man-made having been preserved intact over centuries and escaping detection only by their large scale making them unrecognizable from the ground.

(...)

It seems almost incredible that ground-drawings made by superficially scratching the surface could have withstood the ravage of time and weather over such long periods. The climate is one of the driest of the globe. One could say that it rains for half an hour every two years. And although strong winds carry great quantities of sand, not encountering any obstacles on the vast table lands open towards north and south, they take it further north, where at seventy miles' distance one can see huge dunes on both sides of the highway.

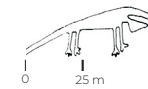
Moreover close to the ground the air is becalmed considerably. Owing to their dark colour, the surface-stones absorb much heat, causing a cushion of warm air to protect the surface from strong winds.

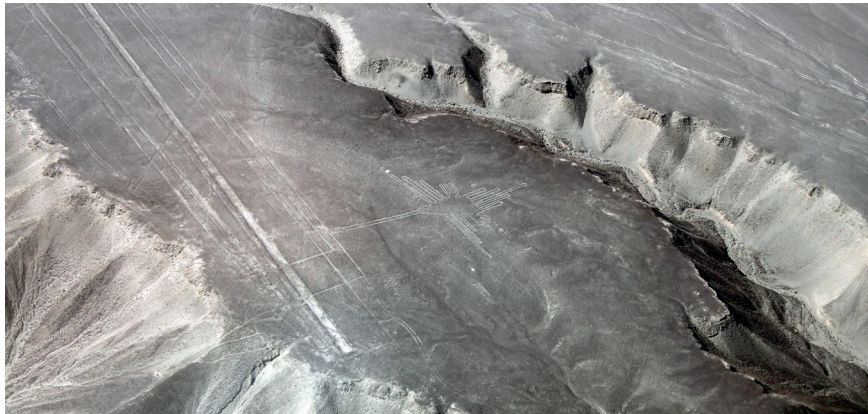
Gran Espiral. From a helicopter.



Numerous lines radiating from the border of the Ingenio-valley.

© Asociación Maria Reiche





An additional factor contributing to the ground remaining undisturbed for hundreds of years is that the soil contains a certain amount of gypsum which, moistened by daily morning-dew, slightly affixes every stone to its base. This makes it possible to retrace the steps by which the ancient topographers laid out the accurate shapes of their complicated structures, having used stones as markers which have remained in the same place where they were put when the drawings were made. It was found, for example, that the huge regular curves of animal-figures were composed of segments of circles, whose centers were marked by a stone which had, or was cut to, one hundredth of the corresponding radius.

The whole region of the ground-drawings was originally an extensive basin between the Andes and a range of elevations along the coast. It filled up with alluvionic material coming down from the Andes, at the same time rising and falling periodically and sometimes sinking below sea-level, by which process it was penetrated by seawater, which is the cause of the aforesaid occurrence of gypsum in the ground. Afterwards began the process of oxydation of the surface-stones, exposed to daily morning-dew followed by excessive heat. The fine material between the stones was blown away by the wind. The result of this process was a vast plain, covered with dark stones, which was gradually cut by rivers, whose widening valleys were to provide the ground-drawing population with their beans, maize and peanuts.

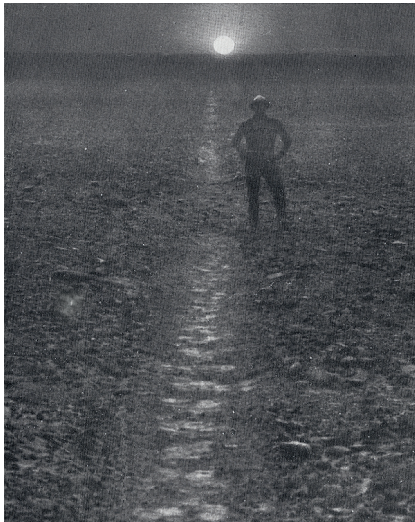
(...)

All over the thirty miles and more of desert where ground-drawings can be found, these show always the same basic forms. The same kind of quadrangles, triangles, zigzag- and oscillating lines on large and small scales, the same starlike centres can be found everywhere, on vast plains, narrow plateaus between gorges and on islands of even ground amidst a maze of dry riverbeds. They are one single creation and are, together with the animals-figures, quantitatively and qualitatively the most outstanding of all works by ancient Peruvians. One as to consider the countless tons of stones which were removed from the geometric surfaces, the care that had to be taken to make lines and borders absolutely

Humming Bird. From a helicopter.

© Asociación Maria Reiche.

< The bill of this bird ends at a group of lines, the last of which pointed to the rising sun on December the 21st.



< The line on the beside picture could have been used for a solstice-observation with the sun touching the horizon between 800 and 1400 A.D. We have to discard the possibility of an observation of the last point of the sun, as only now it has reached a position over this line. On the picture, taken against the sun, the borders of the line appear irregular. They can however be defied within a margin of two inches (five centimetres). The two lines are 2600 and 1400 feet long (800 and 425 meters).

<< On the cover image: On December 21st the sun sets to the right of two lines. At some time within the first and the sixth century B.C. it touched the horizon exactly over the line on the cover picture. In case of having been constructed for a solstice-observation, the line must date from this period. It could however refer to the last point of light. In that case it would belong to some time between 350 and 950 A.D.

Paul Kosok next to a line showing the sunsetting on December 21st 1940.

© Asociación María Reiche. Photo: María Reiche

straight and to give them the exact directions which they were intended to have. To that must be added the difficulties which lay in the drawings of the figures with their beautiful and regular curves, which could only have been produced in these giant sizes, if every piece, being part of a circle, had a radius and a centre, whose length and exact position were carefully laid out.

There can be no doubt that with this enormous amount of work, continuing through hundreds of years, ancient Peruvians pursued a definite aim, which lay in the centre of their interest. Dr. Paul Kosok who was the first to tell about the drawings, was also the first to suggest a plausible explanation. A chance observation, which he made on the same day he discovered the first figure, led him to it. After recovering from the wonder of seeing on his tracing-paper the figure of a bird, which had taken shape gradually as he was surveying the winding paths he saw before him, he left and on his way back found himself at a place with many lines radiating from it. At that moment the sun set in the direction of one of these lines. It was 21st, the solstice-day, in the northern temperate zone the longest day of the year. If this line was constructed specifically for a solstice-observation, then at least the meaning of one was explained. Perhaps all lines were constructed towards horizon-points were heavenly bodies set and rose, and the drawings were, as Dr. Kosok named them "the largest astronomy-book of the world". The first step towards obtaining proof of this was a search for more solstice-lines. It can be no chance-happening that of each of three largest oscillating lines the first piece points in a solstice-direction.

People in the temperate zones of the northern hemisphere from December 21st on begin to look forward to the arrival of spring bringing new life to the frozen earth. They watch the sun attaining higher positions, rising earlier and setting later. December is also a month of expectation in Nazca. People watch eagerly the dry riverbeds which are due to fill with water which can be conducted over the fields to cover again the dry, barren lands with luscious green. The sun's rising - and setting-points, oscillating like a pendulum over east and west, could be employed as a giant time-



The Monkey. From the helicopter.

© Asociación Maria Reiche. Photo: Maria Reiche



< (...) This drawing consists of no more than two elements. One is a wide line (or better geometric surface, being at the beginning twice as wide as at the end) with a stem which, almost a mile long, leads into the maze of lines at the edge of the pampa. The other is one single uninterrupted line, of which only a small piece is lost between the end of a zigzagline and a small winding path at the bottom of the long geometric surface. The line starts from one side of the long surface and after describing the contours of the monkey, consisting only of curves, runs through two different zigzag-shapes and crosses sixteen times over the geometric surface at whose top it finally ends.

measuring device on which to read the return of the fruitful season and the intermediate epochs.

All over the world monuments can be found, which were built for the observation of the solstices. The best known in Europe is Stonehenge in the southern Britain. It consists of giant stonepillars which were arranged along sun-and moon-directions.

(...)

In a similar way as the moon-directions found at Stonehenge, the numerous lines in Nazca pointing in the corresponding directions, could have been constructed as indicators for extreme positions of moonsets and -rises on both sides of the East-West direction.

(...)

On the Peruvian coast, where a high cultural level was reached in ancient times, astronomy must have been cultivated. Later the Incas based their calendar on observation of the heavens. Even now people in the mountains celebrate June-solstice by lighting fires on mountain-tops, dancing around and jumping over them, which is the same custom that is still alive in many places in highly industrialized Europe.

What is most impressive in all ground-drawings is their great size, coupled with perfect proportions. One wonders how this could have been accomplished. Especially the animal-figures with their beautifully laid out curves and their well balanced dimensions are so difficult to construct, that the ways and means of how they were made is a mystery which, if ever solved, will take years to investigate. The basic tool for the transferring to the ground the elaborate shapes the ancient craftsmen had in mind and which, in their final form, unless they were able to fly, they could only see with the eyes of the mind, was a unit of measurement. They must first have drawn models on scales comprehended within their field of vision, on which length and direction of every piece was carefully measured and taken not of an approximate estimate of these would not have been enough to produce shapes, in which a deviation of a few inches would spoil the proportions, which, as we see them on aerial photographs, are perfect. Those acquainted with surveying techniques will best understand the



Pair of parallel lines. From the ground.

© Asociación María Reiche. Photo: María Reiche

< A pair of parallel lines, after traversing a dry desert-valley, runs up steep slope. Connecting two plateaus covered with ground-drawings, they could not have been built as footpaths, being extremely time-consuming to climb straight up. Moreover one line would have been enough instead three (the left one being a double line in itself). The picture was taken from their starting-place on the preceding plateau, which is situated south of Palpa.

accomplishments needed for such an undertaking. Ancient Peruvians must have had instruments and equipment which we ignore and which together with ancient knowledge were buried and hidden from the eyes of the conquerors as the one treasure which was not to be surrendered.

A possible unit of measurement of 1.10 meters, or 36.08 ft was obtained from careful examination of sizes. It appears as if it could have been subdivided according to the decimal system, the same way as the numbers in Kechwa. (Place-names in this region are Kechwa). If this unit or a fraction or multiple of it were used as a basis, would have to be investigated.

(...)

Although there could be different opinions about the Nazca-drawings and their meaning, one thing is certain, and that is that the figures give evidence of the fact that early Peruvians have attained a hitherto unsuspected cultural level. The process of planning and converting one scale into another presupposes a highly developed faculty for abstract thinking, which at least part of the population must have possessed and which we would never expect in a primitive people.

One of the most important tasks of prehistoric study lies before us. It can only be accomplished by painstaking and accurate investigation of sizes and directions and the manifold combinations of basic elements. A long way lies before us. Unlimited time and patience are needed in this work, which in the end will lead us to a new understanding of prehistoric man and his way of thinking.

Bio Author

Maria Reiche (born 1903), is a German-born Peruvian Mathematics, Geologist and Pedagogue who went to Peru in 1932 to work as a teacher in the house of the German consul in Cuzco. After two years in Cuzco she moved to Lima, where she met the American specialist for ancient irrigation systems - Dr. Paul Kosok.

In December 1941 Maria travelled the first time to Nazca. Dr. Kosok had asked her to take a look at the strange, dead straight depressions in the desert, which look like lines. At first he thought these were irrigation ditches, but then he suspected that it is an astronomical calendar installation.

She started her research work in the desert of Nazca in 1946. In the first days of June 1946 she found a stylized drawing of a spider between the lines. Little by little she discovered more and more of the geoglyphs, but at the beginning it was not her main task. With measuring tape, sextant and compass, later also with a theodolite she measured almost 1000 lines and investigated them for their astronomical orientation.

She investigated the Nazca drawings for more than 40 years.

From 1955 she fought in many ways for the protection of the Nazca Lines. Forty years after in 1995 the Nazca Lines were declared a UNESCO World Heritage Site.

Maria Reiche died on June 8, 1998 and was buried near Nazca with official honors.



KÄRJÄKIVET

Finnish word meaning “court stones” or “circle of stones”: places of judgment (originally iron age graves), where judgments were held and justice carried out, accordingly to the Finnish National Board of Antiquities.

In the ancient times, they were important places where the primitive leaders of the North got together in order to discuss and decide about common matters.

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