# MENSURA CAELI

## Territorio, città, architetture, strumenti

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# INDICE

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# ARCHAEOASTRONOMY AND LANDSCAPE ARCHAEOLOGY AS CLUES FOR A NEW INTERPRETATION OF MACHU PICCHU*

Abstract. *Machu Picchu, la enigmatica città costruita dagli Incas circa 80 Km a nord-ovest della capitale, Cusco, è attualmente interpretata come una "Tenuta Reale" del sovrano Inca Pachacuti. Questa idea è fortemente criticata qui tramite un riesame delle fonti esistenti e una nuova valutazione delle prove, come l'urbanistica, la posizione della città rispetto al paesaggio sacro e l'archeoastronomia. In questo modo si rivela una chiara somiglianza tra Machu Picchu e il centro di pellegrinaggio Inca situato sull'Isola del Sole nel lago Titicaca. Pertanto, si propone che Machu Picchu sia stata intenzionalmente pianificata e costruita per essere a sua volta un centro di pellegrinaggio collegato con la visione Inca del cosmo.*

## 1. *Introduction*

We shall be concerned here with one of the most beautiful and enigmatic achievements ever reached by human architecture, thought and ingenuity, the ancient Andean town customarily called *Machu Picchu*. This town was abandoned at the time of the Spanish conquest or perhaps slightly before, and was "lost" to the European's knowledge (although of course rural people living in the area remained always aware of its ruins). It was brought again to the attention of the world with the famous Hiram Bingham expedition (Bingham 1952; see Burger – Salazar 2004 for an up-to-date account). Since then however, a halo of mystery remained about its history, meaning, and function. Bingham by himself thought it to be the "lost capital" of the last Inca reign, Vilcabamba, an interpretation that we know to be untenable today, and various errors and misunderstandings further contributed to the mystery. Modern archaeological research has cancelled out most of the legends (see Burger – Salazar 2004 and references therein) but, at the same time, contributed to establish a sort of untouchable *dogma* on the true meaning of the town. This idea developed in the eighties and became a firm belief with a paper published in 1990 by the authoritative scholar John Rowe. Rowe indeed proposed to identify Machu Picchu as one of the "royal estates", that is, the private possessions of the Inca rulers mainly used for amusement, relax and administration of state affairs – dating its construction to the time of the Inca Pachacuti. Most scholars have enthusiastically and somehow uncritically adopted this as the final, authoritative, long-time sought solution for the very existence and the date of construction of the

* The ideas exposed in this paper benefited very much of several discussions with my friends and colleagues Laura Laurencich Minelli and Jean-Pierre Protzen.

town, at the point that today it is usually considered as *proved* (see *e.g.* Niles 2004) that Machu Picchu was constructed to be Pachacuti's "Camp David", using by the way a quite debatable analogy.

The aim of the present work is to report briefly on an ongoing research project aimed at a better understanding of astronomical and symbolic references in Inca architecture and town planning and, in particular, on the way such understanding can be of help in the interpretation of Machu Picchu (Magli 2005; 2009a; 2009b).

## 2. *The royal estate theory*

The idea that Machu Picchu was built as a "royal estate" of the Inca Pachacuti was put forward by John Rowe (1990). The main aim of Rowe was actually to find traces of the town in the Spanish documents. As a consequence, he had to face with the fact that we do *not* know how the town was called by the Incas; we only know that it lays between two paired peaks which were called by inhabitants of the area *at the moment of Bingham's arrival* with the names *Machu Picchu*, the old peak, and *Huayna Picchu,* the young one. These names were reported to Bingham and it was he to call the town as one of the peaks. A town with this name (or with the similar name Picho, see below) however, is *never* mentioned in the many Spanish historical chronicles, which of course are by far the main sources of information about Inca life. To get rid of this puzzle, Rowe searched into other kinds of existing documents, such as legal documents and letters, calling attention on the fact that a place called Picho (Picchu) *is* indeed mentioned in some 16$^{th}$ century Spanish writings. Rowe thus proposed that Bingham or his informants made confusion between the town – which Rowe thinks was originally called simply Picho – and the nearby mountain. To maintain his proposal, he relies in particular on a travel account to Vilcabamba. In this manuscript the author, Diego Rodriguez de Figueroa, cites Picho – apparently *without* having visited it – as a place located on a certain path between Condormarca and Tambo. The same place is mentioned in a legal document of 1562, first discovered by Glave and Remy (1983) where the existence of a Picho *cacique* (local chief) farming Coca is also cited.

Basing on such evidences, it looks *reasonable* to think, with Rowe, that this place was indeed the town we call Machu Picchu, although the point looks somewhat weak. First of all, indeed, the name Picchu (peak) is *exceedingly common*: for instance, one of the sacred hills north-west of Cusco is precisely called Picchu. Further, it is at least possible that the place mentioned with this name was located in the same area of Machu Picchu but down in the valley, along the course of the Urubamba river, to which the administration of Coca and other agricultural activities referred. Finally, it cannot be forgotten that there is no archaeological evidence for the presence of Spaniards in the town at any time (in spite of existing claims, also no clear

signs of intentional destruction of Inca "idols" – a fact exceedingly common in all the Cusco huacas – are visible).

Having established in this way the identity of Machu Picchu with the place "Picho", Rowe proceeds, using the same legal documents mentioned above, to propose his interpretation of the town as a "royal estate" of the Inca Pachacuti.

What is today customarily called a Inca "royal estate" was a property nominally owned by the king and managed by his family, composed by agricultural lands and "palaces" meant as residences for the ruler and the *elite* (Niles 2004). A good example of such estates is Chincero, property of Topa Inca, described in details by the chronicler Betanzos as a property «where to go for recreation». Other important Inca sites have been interpreted as royal estates as well, and in particular Ollantaytambo (see Protzen 1993 and references therein). To pursue his "royal estate" theory for Machu Picchu in absence of explicit mentions of the town, Rowe resorts to a quite indirect resentment. He calls attention on the fact that a list of agricultural terrains of the area attributes the farmed lands of the Urubamba valley between Ollantaytambo and Chaullay to the private possession of the Inca Pachacuti. Picho is *not* explicitly mentioned, but Rowe proposes that «since the terrains of the valley bottom belonged to Pachacuti, it is quite probable that the places at higher quotes in the same zone were part of the royal estate of the king as well»; finally, he concludes by saying «we can suppose [*podemos suponer* in the original Spanish] that the Inca ruler choose Machu Picchu as a personal estate and as a memorial of war campaigns in the zone of Vitcos».

In spite of such a correct prudence however, the "Camp David" theory established as "the truth" in the scientific literature, while it is apparent that the evidences for as much as three *subsequent* implications [Machu Picchu was called Picho/ Picho was a property of Pachacuti/Pachacuti built it as his personal Camp David] can be considered, to be fair, weak. It can be mentioned that also the archaeological evidences coming from recent studies of the town does not give any conclusive argument in this direction (see Magli 2009a for a complete analysis of this point).

## 3. *Archaeoastronomy and landscape archaeology at Machu Picchu*

All in all, there is no proof whatsoever that Machu Picchu was an Inca Royal estate; since, as we shall see, there are actually many clues which *conflict* with this interpretation, we shall follow Occam's razor and just re-start to analyze the possible meaning of the town without pre-concepts (Machu Picchu is of course an extremely complex site, and I will only mention here some of the clues which led me to propose a completely different interpretation of this town).

The citadel lies at 2400 mts. of altitude, built as a Condor's nest between the two paired peaks and surrounded on three sides by the gorges of the Urubamba river, some 80 Kms north-west of the capital of the Inca empire, Cusco. To have a clear glance at the site it is, in my opinion, absolutely necessary to work with a viewpoint different from the standard one usually given in most maps or descriptions, which are laid out – for saving of sheet space – in an approximate southeast-northwest direction. Indeed this is not the viewpoint of a newcomer, who necessarily approaches the town from the south and experiences it in a south-to-north direction. In what follows I shall thus refer to FIG. 13.1., which is the original Bingham map that I have rotated in such a way to have north on top.

To understand the layout of Machu Picchu, it must first of all be stated clearly that the complete urban plan was conceived and built on the basis of a unitary project. Machu Picchu, as other Inca towns such as Huanuco Pampa, was conceived in a quadripartite way, with four parts divided by a central plaza. However, buildings blocks are present only in two of the four parts, roughly the east and the south parts, while the north sector is missing – it is actually *occupied by the Huayna Picchu mountain* – and the western one is not filled by dwellings but contains a sequel of three main "elements":

1) the gate of the town. Contrary to almost all Inca cities, such as Huanuco Pampa, Machu Picchu was indeed fenced by a wall.

2) A zone usually identified as a "quarry". It actually shows clear signs of stone-quarrying activities, but also boulders covered by carved reliefs.

3) The so called Sacred Plaza. It is a small space open to the west horizon and closed on the other three sides. To the east, in particular, one finds the famous Temple of the Three Windows, actually a 3-sided building. The windows, a spectacular feat of engineering composed by huge, perfectly dressed polygonal blocks, are located on the east wall facing the central plaza.

4) The so called Intihuatana, a terraced, steep pyramid on the summit of which lies a carved stone of white granite.

Most of the buildings of Machu Picchu can be understood trough stylistic analysis of Inca architecture (Niles 2004) as residences of the elite, as shown by "details" such as fine stoneworks and double jamb doorways. In particular, the SE block, provided with a private garden and with direct access to the first of the gravity fountains which are the unique source of water inside the town, was very probably the private apartment of the ruler when he visited the town. Scattered around in these residential quarters are, however, many buildings which are clearly conceived for ritual purposes, as it is shown, for instance, by their astronomical alignments. Being located on the eastern flank of the hill, all such alignments refer to the ob-

servation of the *rising* of celestial bodies, a thing which looks confirmed by some hints on the Inca calendar (see Laurencich-Minelli – Magli to appear and references therein); in particular, we have (Dearborn – Schreiber – White 1987, Dearborn – White 1989):

1) the *Torreon* whit a window aligned to the winter solstice sunrise
2) the *Intimachay* (a cave with a carefully constructed window) which was used to measure with high accuracy the summer solstice sunrise

Astronomically related is also, probably, the very choice of the site. Indeed, it exhibits a peculiar "cardinal" relationship with the sacred mountains which occupy its horizon (Reinhard 2007):

1) the peak of the highest mountain of the region, Salcantay, lies due south
2) the peak of Mount Veronica lies due east
3) the peaks of the Pumasillo range span the south-west horizon from the town
4) the peak of Huayna Picchu lies due north

The place where Machu Picchu was built seems therefore to have been chosen because it satisfied an impressive amount of geographical/symbolical requirements. Actually, the position of Machu Picchu exhibits also another interesting feature. To discuss it, we observe that, together with the cardinal directions, also the directions characterized by a relatively thin "void" of azimuths between 135° and 155° degrees (as seen from Cusco) are of tantamount importance for understanding the complex connections between religion, astronomy, cosmology, and sacred geography among the Incas (Urton 1978; Zuidema 1982a; Magli 2005). First and most of all indeed, it has to be observed that this "void" actually characterizes the "preferred" direction of the orography of the geographical region of interest here. Further, this "void" characterized also one "ideal direction" of the Inca cosmological myth, and these two aspects merge together with another very important one, namely, that the "void" happens to be connected with orientation. Indeed, in the southern hemisphere a "pole star" is never available (since precession never brings the south celestial pole sufficiently close to a bright star). As a consequence, the natural way for a person for establishing (roughly) the south pole is to follow a bright star or group of stars up to culmination. The most natural choice at the Cusco latitudes is to follow those stars of the Milky Way which culminate near the pole, and indeed the principal constellations of the Incas were located along the Milky Way; in particular Gamma-crux and Alpha-crux were raising in 1430 AD at azimuths (with a flat horizon) around 146° and 152° respectively, and the head of the "dark" constellation of the Llama was raising roughly between 141 and 151 degrees. There is little doubt that

the Milky Way, meant as a huge "double branched" celestial river, played a fundamental role in the Inca "cosmovision" also because – in the centuries before Inca times – precession brought the solstitial points near the intersection between the ecliptic and the Milky Way. As a consequence, the position of the sun with respect to the Milky way could be used to calculate the times of the solstices, which were, in turn, fundamental dates among the yearly Inca rituals (as is well known, the coincidence between the solstices and the intersections of the ecliptic with the Milky Way is fundamental also in the Maya creation myth, see *e.g.* Schele – Freidel – Parker 1995).

## 4. *Machu Picchu as a pilgrimage center*

The proposal I put forward for the interpretation of the town is that its location has been chosen and its plan has been conceived from the very beginning for the specific purpose of monumentalizing a *pilgrimage center.* It has been actually already proposed by some scholars that Machu Picchu was a sacred center, and was therefore a *meta* of pilgrimages (Reinhard 2007; Malville – Ziegler 2007). In both works, however, the "royal estate" theory is anyhow maintained. It is instead the aim of the present paper to propose that Machu Picchu was meant and built *specifically* to be a place of pilgrimage, and that the whole urban layout of the town was conceived from the very beginning with the specific aim that the final part of the pilgrimage could take place *inside the town*. All other possible functions (for instance, administrative) are not excluded by this interpretation (neither is excluded that the Inca visited the town on the occasion of rituals; on the contrary, the evidence for a royal residence is quite compelling), but have to be considered as subsidiary to this one.

To develop this interpretation, it is fundamental to observe the many similarities an Inca pilgrimage site which is historically well documented and has been the subject of a recent, exhaustive study: the Island of the Sun (Bauer – Stanish 2001), a rocky islet located near the southern end of Lake Titicaca. Here a natural rock formation present in the northern part of this island was identified as nothing less than the place of origin of the sun, and therefore of the Incas: this place actually appears, although with different details, in most versions of the Inca cosmological myth. The sanctuary area was extensively modified and several buildings were constructed inside it and on nearby Island of the Moon, which was visited by pilgrims as well. The whole site was administrated by the state, and the Incas removed the existing population replacing them with colonists from the entire empire; also, a specialized group of women was established with the purpose of serving the sanctuary. The pilgrimage had as the final objective reaching the sacred rock from where the sun was born, and took place in subsequent stages:

1) Pilgrims traveling to the sacred place gathered at today's Copacabana, and then sailed to the island from the south.

2) Once landed they followed a path oriented – as the island – in a SE-NW direction. The path ultimately brought them to the most sacred part of the Island, which was fenced by a low wall.

3) Apparently not all of the pilgrims were allowed to pass the entrance to the northern part of the island; those not admitted could anyway have a look at the rites carried on in the plaza behind the Sacred Rock, staying in a appositely leveled terrace out of the wall.

4) After the wall, the sacred path passed some other gates and "stations", in particular the pilgrims could look at the "footprints of the sun", an area where the exposed bedrock contains natural marks resembling footprints.

5) Finally, allowed people gathered in the plaza in front of the Sacred Rock, were they witnessed to rites and, at the time of the winter solstice, at the Hierophany of the sun setting between two pillars on a ridge to the northwest.

To discuss the similarities with Machu Picchu, observe that there are two main ways to approach Machu Picchu coming from the Inca heartland. One is the famous, hard, leg-consuming hike which attracts many tourists each year and it is called *Inca Trail.* However, it is not the easiest route, which is instead the obvious way: just follow the Urubamba valley up to the Machu Picchu ridge and then ascend for some 600 meters up to the town. As was to be expected, this latter route also coincides with an Inca path endowed with fountains and resting spaces, a thing which has been definitively demonstrated recently (Wright – Valencia Zagarra 2001). Following this route, the Inca ruler sitting on his human-transported chair could reach Machu Picchu from Cusco in, say, four days/three nights, as opposed to some five full days. It is therefore *obvious* that the Inca trail was a *ceremonial* route to the town, not a functional one. Its very existence contributes to cast serious doubts on the royal estate theory: indeed the Inca would certainly *not* have had any need of such a longer, uneasy way to arrive to his (anyway very far) estate, unless obliged for ceremonial reasons.

All the roads (including one coming from north-west) meet at the so-called upper Agricultural Area outside the main gate. Here is located a huge *kallanca*, Machu Picchu's largest building. Clear traces of ritual activities are present here, in particular a "replica stone" which, as does the so-called sacred rock at the northernmost end of the town, replicates Cerro Yanatin. In the area there is also a number of piles of small stones of different nature, and at least some were evidently carried to the site from distant places; for instance, a number are rounded river rocks. Probably, thus, at least part of such stones are offerings left upon arrival. The whole area presents clear similarities with the area located outside of the innermost sanctuary on the Island of the Sun, and, exactly as it occurred there, people

who were not admitted inside the town could anyway look at the events taking place in the plaza and in the western sector by looking from the platform and the terraces. Curiously, the Sacred Rock, located in the eastern sector, is not visible from here, and perhaps for this reason a "replica" of the same monument was created in this place.

Continuing their way down, the pilgrims eventually reached the gate of the town. The admitted visitors perhaps left ritual offerings just near the entrance wall, since many peculiar stone pebbles (mainly of obsidian) have been recovered there. Then, people were fronted by a corridor (service buildings such as stables and magazines are located on the left of the entrance but fenced by a wall) with the imposing view of the Huayna Picchu mountain, the likely final meta of the pilgrimage, just in front of them.

Today, at this point most tourists turn right, visiting the "residential sectors" first. However, in ancient times these sectors – which begin with the Royal residence – were very likely closed to public; therefore, a person entering would have had by necessity to proceed straight in the western sector encountering the sequence of structures we became familiar with in the preceding section (or looking at them from the central plaza): first, the so-called quarry; second, the temple of the three windows and, finally, the Intihuatana platform. Why? The idea I would like to put forward is that this path was meant as a replica of the Inca cosmological myth. The first Incas – after that creation occurred on the Island of the Sun – travel underneath the earth in the "void" (SE-NW) direction, and emerge in a place called Tambo-tocco. According to Sarmiento and others, this name means "the house of windows" because "it is certain that in this hill there are three windows" and the first Incas came out from one of these windows. Tambotocco is located south of Cusco, and therefore north becomes the second fundamental direction: the Incas travel up to the summit of the Huanacauri hill, where one of them is turned into stone becoming a fundamental huaca of the future empire, and finally arrive in the Cusco valley.

A pilgrimage in direction SE from Cusco, clearly connected with the cosmological myth and of length comparable to that of the here-alleged Machu Picchu pilgrimage, is documented by Cristobal De Molina and has been studied in details by Zuidema (1982b). The idea that I would like to propose here is thus that Machu Picchu represented the end of a "dual" pilgrimage which moved towards the opposite direction (*i.e.* west of north) having as the ideal end the summit of Huayna Picchu, and that the final path that people followed inside Machu Picchu in view of the sacred mountain was conceived as an image, a *replica* of the path followed by the first Incas in the cosmological myth: a newcomer encounters indeed in succession the three main elements of the myth, symbolized respectively by the quarry – a zone intentionally left in "disorder" which shows also signs of ritual activities such as carvings of serpents on the rocks and may therefore be associated with Pachamama (the Mother Earth) as an image of the underground travel – the sacred plaza with the temple of the three windows,

to be associated with Tampo-Tocco, and finally the Intihuatana pyramid which might therefore have been conceived as a replica of the Huanacauri hill, the Intihuatana itself resembling the sacred mountain Huayna Picchu located at the end of the path (as noticed by Reinhard 2007) as well as the sacred stone-huaca which was located on Huanacauri itself.

At the level of a curiosity, it may be recalled that the presence of the 3 windows temple in Machu Picchu led Hiram Bingham to propose that the town had to be eventually *identified* with the place called Tampu-tocco. It is *not* my intention here to revive his theory: there is no doubt indeed on the identification of the Huanacauri hill as one of the most important huacas of the Cusco ceque system (Bauer 1998) and actually the chronicles concord to associate Tampu-tocco with the Pacariqtambo hills south of Cusco (probably, the imposing Inca site of Maukallakta was built there to recall the mythical events, see Bauer – Stanish 2001 and references therein). However, at least in my view, there is also little doubt that the above mentioned key elements of the myth find a close correspondence in structures inside Machu Picchu. This idea also seems to open new possibilities in trying to identify the town in Spanish chronicles, such as that by G. Poma de Ayala. Work in this direction is in progress.

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FIG. 13.1. *North-on-top Map of Machu Picchu with highlighting of the sites discussed in the text (adapted from Bingham 1952)*

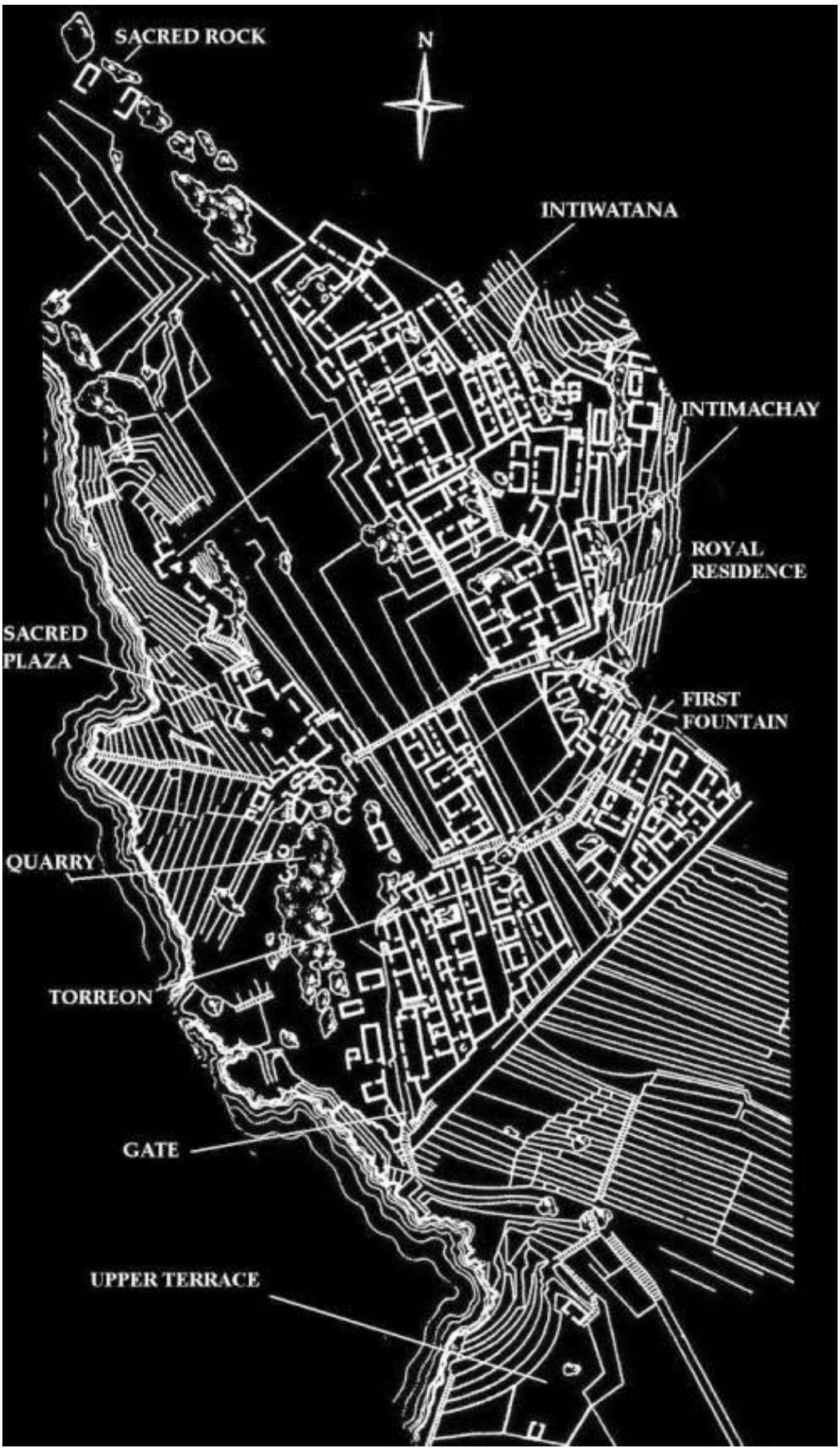

FIG. 13.2. *Machu Picchu (from Magli 2009a)*

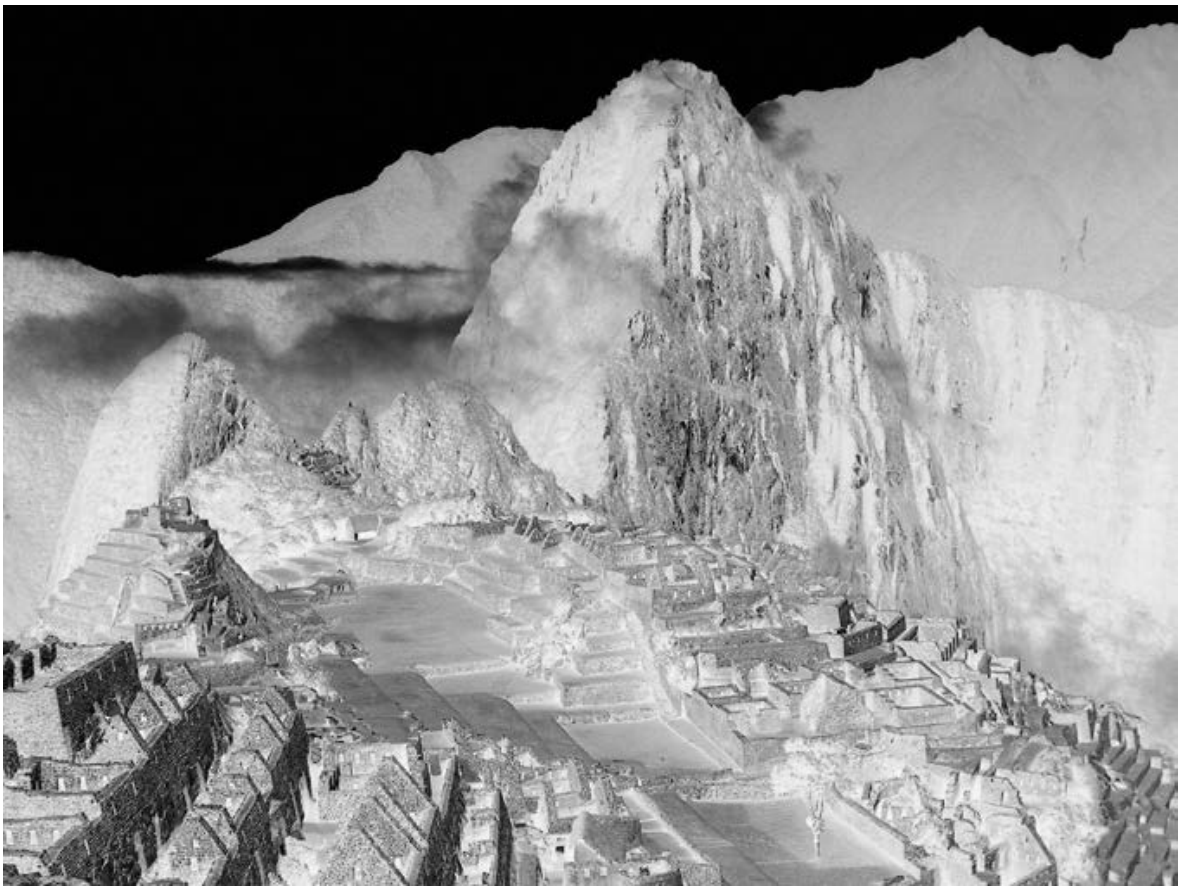

FIG. 13.3. *The geographical position of Machu Picchu with respect to "cardinal" mountains and to the Urubamba river*