

ARCHITECTURAL COMPOSITION IN JAVA FROM THE EIGHTH TO FOURTEENTH CENTURIES

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The definitions of architecture are legion, and are often verbalized by art connoisseurs. One of the baldest, by the classical theorist Blondel, is "Architecture is the art of building well." Nearer to our times, Le Corbusier stated "Architecture is an intelligent, judicious and magnificent play of volumes beneath light." But above all, as the late Leroi-Gourhan, an anthropologist, noted, "Architecture is the putting in order of the universe from a particular viewpoint"; in other words, it is a way of expressing our desires.

The remains of Javanese architecture from the 8th to the 14th centuries are essentially of religious origin, either Buddhist or Hindu. Because of this, a study of architectural composition of this period takes on a limited aspect which can certainly not be used to cover all the buildings which have disappeared. They are indeed the illustration of an attempt to regulate the universe, the expression of a desire for a rigid organization of space, incorporated in a partially incomprehensible and hostile world.

Architectural composition is subject to numerous constraints, which are first of all economic and technical, and can only be overcome by resorting to artifice. The other constraints can be modified, namely the building programme, the iconography which should adorn the structure and the symbolism; for this, architecture usually remains resolutely abstract, permitting many sometimes contradictory interpretations.

Of all the constraints which the construction of a building is subject to, the most obvious is its financing, though it is possible that sometimes the faithful compensated for a lack of means. This was the case, for example, with the Buddhists in central Java at the beginning of the 9th century, at the time of the maximum extension of the Buddhist Sailendra. Politics played a role by imposing corvées, avoiding an impossible financial burden. So the vast undertakings beginning around 835 and finishing about 860 presupposed considerable human resources, and most probably could not have been finished without innumerable corvées. This must have been a means of reasserting Hindu Sanjaya influence, imposing the renewal of Hinduism on the Buddhist milieu and blocking the expansion of the rival religion.

The Sanjaya kings had the dignitaries of the kingdom participate in architectural undertakings, which somewhat reduced the overall costs. This is shown in the short inscriptions at Prambanan and in those of Candi Plaosan studied by de Casparis. These inscriptions were painted or carved on the small shrines surrounding the main sanctuaries and indicated that the shrines or stupas were the gifts of such-and-such a personality in the kingdom, who could be either living or dead. Such gifts had to follow a required form in agreement with the overall plan.

If the financing of a construction at its inception does not seem ever to have been mentioned in Javanese epigraphy, this is not true for the upkeep of or improvements to the temple. Numerous inscriptions refer to the constitution of a *sima* or a *watek*. It is not very easy to decide what was the exact nature of these notions. The word *sima* has been translated by "empty



Candi Jago, 1269 A.D.

Photograph by Luca Invernizzi Tettoni.

space" or "tax-free zone": one could perhaps call it an area where the revenues were reserved for a temple or some other institution. Fines imposed on those who illegally entered the sites protected by the *sima* also went to the shrine. The same is true when the tax-free zone was a village; the taxes due from the artisans were no longer collected by the authorities but given to the temple. The establishment of a *sima* was a very important act which was updated on several occasions; some inscriptions before the 11th century are only known by copies dating from the 14th century.

In spite of these indications, the economic constraints which evidently played a very important role in construction are not clearly determinable, as the huge ensemble of Candi Perot shows. Candi Pringapus is out of proportion with the village authorities named in the inscriptions, and there were probably other economic sources for this foundation which we do not know. The participants in the ceremony of consecration of the temple named in the inscriptions cannot be the persons

who initiated the construction, or at least cannot be these who financed it.

The technical constraints depend on the materials employed, though sometimes techniques appropriate to wood are used on stone constructions. The techniques of stone or brick masonry were probably brought from India with the first architectural prototypes, doubtless around the beginning of the Christian era, but by the 8th century they had already considerably evolved and were at variance on several points with those of their country of origin. However, masonry in India derives from the cavernous origins of a large part of religious architecture, and when a building was constructed a rock-like coherence had to be sought so that the sculptors could exercise their art.

The master craftsmen thus had to avoid joints which would stop the sculptor's chisel; it is with this idea constantly in mind that stonecutting evolved in Java. There was for a brief

period a difference in techniques according to the two great religions present in the 8th century. The Buddhists, to obtain a better coherence to a building, employed the forcing of the foundation course by a wedge of vertical stone, which the Hindus did not know, but from the beginning of the 9th century this technique became general.

About 830 there appeared in Java a procedure which the Indian master craftsmen had known since prehistory (it is found on the site of Nindowari in Beluchistan from the second millennium before Christ). This consists of masonry known as double facing. The walls have two unconnected external surfaces and the space between is filled with rubble of various kinds bound with mud. The techniques of stone assembly in all their diversity were established from the end of the 9th century. This possibly over-rapid attempt at invention halted technical evolution and there were no important changes in stone construction until the 14th century. The only way of obtaining a stone roofing in this period is corbelling. The surface covered cannot exceed, on a square plan, 80 square metres, as at Prambanan, which is already remarkable. The assembly of brick structures varied little but from the 14th century a strong influence of stone can be detected in the use of wedges and double facing. Brick corbelling covered smaller areas than stone; the 36 square metres of Candi Pari are maximal; the binders were of very mediocre quality and did not permit a greater extension.

The fragility of brick was recognized, so lintels, with very rare exceptions, are made of stone, and steps are often stone too. The adaptation to the land required innovations in construction; in this way, at Borobudur, built on a hill that was oval in plan, it was necessary to fill in the spaces left empty by the approximate square perimeter of the structure, and with a sufficiently homogeneous mixture for it not to cause too much pressure on the walls. The sites chosen were sometimes unsuitable for construction and had to be adapted. This is the case of Candi Dadi, built on top of a rocky peak where the huge scale of the undertaking is completely disproportionate to the resulting building.

To these unavoidable constraints had to be added those of the ritual of the building which required an order to the layout of the different elements of very complex structures. The ritual differed depending on whether the building was Hindu or Buddhist. The complete dismantling of the main Buddhist temple of Candi Sewu prior to its reconstruction has enabled the different periods of Buddhist rites to be reconstituted.

First of all, a huge square excavation was dug into the ground to a depth of some two metres. This space was then filled with stones mixed with sand to 75 cm below the surface. A mandala was drawn at this point and the shapes formed by the crossing of the lines of the drawing were decorated with symbols of Buddhist divinities, of which only two have been found, both representing Taras. This mandala was covered up and the excavation entirely filled to the original surface level. A layer of sand was spread over this and on it a square was marked out by four stones. A brick altar surrounded by stone paving was built on this square. When the ceremonies required by

this altar were completed, the cruciform perimeter of the base of the temple was laid out in stone and raised to the upper level of the brick altar. From this level just on the surface of the altar a vast rough-hewn stone block with ten courses was built. Above this then came a dressed stone block 1.78 m high. Then a moulded plinth was laid down and on this a very large seated statue was raised on an ellipsoid cutting, the larger axis of which measured 3.5 metres. After the statue was put in place, work continued on the base, but before the stairways were built; these were added at the very end of the construction work.

The rites of Hindu constructions in Java have not been re-established with the same precision as those of Buddhist temples, but thanks to the dismantling of Candi Brahma at Prambanan we have some details. First of all, in contrast to what was done at Candi Sewu, there was no excavation into the earth. This was not a general rule though, and there are exceptions; there is, for example, an excavation for the Candi Arjuna complex, but not for Candi Gatokaca, likewise at Dieng. The perimeter of the temple was laid out on the surface and in the centre the square which would become the axial well of the monument was fixed. These two concentric elements were both built with dressed stone on the outside and the space between, sometimes enormous, was filled either with quality rough-hewn stones bound with a mud mortar, or else with indifferent rocks mixed with sand. This structure went as far as the upper level of the base going around the temple, when construction on the temple proper began.

These rites, whether they be Hindu or Buddhist, determine an order in the building of structures with concentric elements, which had serious consequences for the solidity of the monuments, as for example with the virtual independence of the stairways. It is also possible that the master craftsmen were constrained by these ritual obligations. Sometimes difficulties which occurred because of the rites have come to light, as when, from the 9th century on, the nine pegging-out markers were replaced at the end of the works with small lingas, sometimes protected by little shrines; this required that the central point of the enclosure be unencumbered. When the remodelling of the older temples was felt to be necessary, rather than shift the monuments, the enclosures were reconstructed in such a way that the central points were left free, as at Candi Badur and at Dieng.

The organization of religious architecture is also intimately tied to the rites celebrated inside the buildings. The construction of a temple had as its principal though not its sole aim of allowing the religion to be celebrated, so the necessary arrangements for this are important parts of an architectural programme. These can take the form of the circumambulation galleries or the substantial closure systems permitting the priest in charge to shut himself off in the cella while honouring his god.

The iconographic element also conditions to a considerable extent the architectural plan, so the cruciform shape of Candi Siva at Prambanan or that at Candi Singosari only take on a meaning in relation to the iconography to be displayed there.

The Hindu iconography remained essentially unchanged from the 8th to the 14th century: Siva was placed in the centre, Agastya to the south, Ganesha to the west and Durga to the north. This is not the case for Buddhist buildings, where the iconography was changed twice. Until about 790, the Buddhist statues were all visible from the outside, the temples having to that date no doors or porches. Then came an enormous campaign to renew completely the old iconography which was replaced by that of the five Jinas (the five Buddhas perpetually in existence); doors and porches were added to all existing Buddhist monuments. Temples built after this reform were constructed with these elements which had become essential. There was a second campaign at the end of the 9th century but this was not completed; it would appear to have been the replacement of the Jinas by triads (a Buddha flanked by two Bodhisattvas), but this vast effort coincided with a loss of Buddhist influence and the master craftsmen were not able to finish the undertaking.

The building of a temple is doubtless the most obvious attempt to arrange the universe which one can undertake. In Java, this is translated by the construction of huge complexes like Candi Sewu, Prambanan or Candi Plaosan, where the arrangement of the different buildings in relation to each other is probably the expression of an ideal order of the kingdom, as is indicated in the inscriptions from Candi Perot. This is not a matter of architectural symbolism which can be decoded; architecture in Java remained completely abstract. However, in the 14th century, some elements ended up by taking on an overt meaning. Thus the illustration on the doors of Belahan and Candi Pari of a roof ridge in tension, carved in stone or brick with no architectural context, is doubtless there to indicate a Vishnuite cult, more particularly that of Sri, the first wife of Vishnu and the goddess of rice. Models of rice granaries with the roof resting on stretched beamwork carved in the stone can be found throughout Java and are an indication of this cult. One is struck by the fact that while the technique of roofs in tension is hardly anywhere employed, it is still however to be found in Sulawesi in the Toraja region and in Sumatra among the Minangkabau for rice granaries. But in the 8th century nothing seems to have been fixed. In a recent study, Professor Gomez of the University of Michigan identified Borobudur with the divine palace called Kutagara of the future Buddha Maitreya, where the internal measurements were greater than the exterior dimensions. This is very interesting since we have not only the literary description of this monument but also its representation on the relief of the third gallery of Borobudur, illustrating an episode from the Gandavyuha, where Sudhana can be seen trying many times to enter the monument. The texts are very inexplicit and Professor Gomez himself concludes that any building can be a Kutagara providing it is in the form of a stepped pyramid. However, the passage illustrated at Borobudur is rather more precise; it is about a building reserved for Bodhisattvas who knew the real condition of the world; the building is hollow and its dimensions are infinite; it contains hundreds of thousands of other Kutagara which reflect each other. The sculptors at Borobudur confronted with such a

description let their imagination run free and the building is shown fifteen times, on each occasion in a different form; an essential element of the description, its suitability for habitation, was for the most part omitted.

It can be seen that if Borobudur is going to be discussed in this context, one can talk about other monuments as well, in particular Candi Sewu, where, after entering the enclosure the visitor is confronted with two hundred and forty shrines, all alike. In their first state they had no doors and their statues inside could be seen from without. It can even be supposed that the reflection of the buildings on each other was desired, since in some cases the exterior reliefs of two different shrines facing each other are reversed.

When all these constraints had been noted, the master craftsman could undertake the composition of the building, but he faced right from the beginning an enormous difficulty, because he lacked the means to anticipate how the completed work would be viewed. So there was constant and obligatory reference to buildings already constructed whose beauty was assured. Manuals and architectural treatises of all kinds fixed the proportional relationships recognized as agreeable and permitted the composition of something reliable.

In the 8th century, Pallava architectural models were still very much present in the minds of the master craftsmen. This is evident in Borobudur in a relief on the first gallery. The structure can be reconstituted and in both cases we are dealing with a wooden building whose load-bearing was external, as is still the case in contemporary Java. But in India the movement from light buildings to more solid structures occurred at this moment in the evolution of building, and the temples of Mahabalipuram or Panamalai recall external loadbearing wooden structures but where the load was actually carried on internal walls and load-bearing pillars. In Java as in Thailand, at Chaiya, the movement was made at a different time, when the master craftsmen had adopted a more solid form using the corner block formed by four pillars linked together. In India wooden buildings followed a similar evolution but the changeover to stone only took place much later in the Chola period.

In Java, this changeover to stone can be seen in the buildings on the Dieng plateau or the Gedung Songo site, where the projection of load-bearing pillars can be seen on the walls, forming an important part of the architectural decoration. It seems that the external composition of the building is completely independent of its internal volume. For example, at Candi Nandin, in the third group at Gedung Songo, the interior floor is completely embedded in the volume of the base, the outline of which was cut to leave room for the door. This no doubt derives from the use of a treatise, although no relevant texts have come down to us. In Java there are many buildings like this, as in Bali, where examples are more recent, sometimes completely contemporaneous. In the group of Balinese texts known as Hasta Kosali some passages can be identified as going back to the 14th century; these works are norms, codifying works considered satisfactory. Their measurements are translated into a system of proportions whose primary value changed

according to the scale of the project. Thus the point of departure of Hasta Kosali is particularly suggestive: the *güle* (in Balinese) is the length of the first bone of the index finger of the master craftsman.

On the work site this type of information could not be given to the workmen, and the proportional values were translated in concrete terms, which Lordereau has established: the measure is a cubit of 34 cm divided into ten inches. This transformation of the ideal project into a design that could be executed was the source of many changes in the rhythm of proportions. This is especially true of the superstructures requiring perspective effects to increase their height visually. This is obtained by reducing the dimensions of elements of the same type, which shortens the vanishing point in the perspective. It is obvious that these reductions ought to be very regular and the least error breaks the illusion. For example, at Candi Siva and Candi Visnu in group three at Gedung Songo the artifice is not very well executed since the reductions of the elements are not strictly regular, nor are they similar. On the other hand, on the southern annex temple at Prambanan the illusion is perfect. With this, the master craftsman suppressed all the elements which could not be seen because of the projection of the cornice; the builder did not worry about this at Gedung Songo, where everything was carved, even if it could not be seen.

The master of works of the Prambanan ensemble built many structures which were meant to be seen from particular vantage points, fairly near the temples, some 15 metres on average; it is from these points, and only these, that the artifices used in the buildings appear coherent. Today, with all the enclosures and small shrines destroyed, one can see the central temple whole from all sides, which gives the monument its real dimensions, but when the enclosures were still standing, it could only be seen in parts, which made it appear larger and gave complete coherence to the perspective effects.

Buddhist architecture at the end of the 8th and the beginning of the 9th century was without any artifice. The plan is primary, while with Hindu sanctuaries the external shape has no relation to the internal volume. Candi Sewu was begun about 775 and more or less completed in its first state about 790. At this time the central temple in the complex was redesigned and given a cruciform plan, as with the nearby Candi Kalasan. Borobudur is in its present state, after many refurbishings, a Buddhist monument, but it was probably constructed on the outline of the stepped Hindu pyramid which included perspective effects. One can only be struck by the similarity of composition of the first state of Borobudur, that is, a stepped pyramid surrounded by brick monuments (those of Pawon, Bajong and Mendut also in their first state), with the Khmer monument at Roluos, the Bakong, built by Jayavarman II, who was the guest of the Sanjaya until about 800, the approximate date when the Sailendra extended to the north of central Java. The second state of Borobudur was already Buddhist and included, extending from the outline of the base (almost entirely carved all around the perimeter), the broad stairways framed by string-walls; the remains of these can be seen in the extension built in the third state. During the construction of the latter, the exist-

ing doorways were probably altered by adding a framework to them; this partly covered the existing reliefs. It was also during these works that the summit of the monument was considerably modified; it should have comprised just one big stupa, which corresponds to the restoration proposed by Parmentier, though without his grandiosity. This was destroyed, and the upper part was built which can be seen today. From these different examples it can be seen how difficult it is to speak of the architectural composition of Borobudur. This accumulation of refurbishings, sometimes remarkably well executed, gives however the impression of motley architecture. While the very fine horizontals of the monument are conserved, it is somewhat by good luck, and successive intentions did not succeed in changing the shape of the initial undertaking.

After the renewal of Hinduism at the beginning of the 9th century (more precisely, about 830), Buddhism did not collapse and the Sanjaya undertook an arrangement of the universe similar to that at Prambanan, but in a Buddhist context, at Candi Plaosan. This temple comprises two main tiered sanctuaries surrounded by shrines and stupas. The iconography is different from that followed at Candi Sewu and Borobudur; each cella contains a triad, as previously indicated a Buddha between two Bodhisattvas. At least one other temple, Candi Sari, was built on the same model. With these two temples the master craftsmen expressed the internal volume without artifice (as the master craftsmen in Ceylon did with similar structures); the storeys are shown in elevation and if at the top there are attic windows to light a non-existent loft, that at least corresponds to the volumes of the internal corbelling.

This tremendous building spree was spread over a very short period of time, fifty to sixty-five years at most. The same rate could not be maintained, so new forms in the very last years of the 9th century were adopted, giving a larger place to the use of wood. This is apparent on several sites, first of all at Candi Plaosan in the extension of the building known as sanctuary C. This building consists of a single very large hall, the roof of which was raised on wooden columns. The same principle of construction can be seen at Ratu Baka with all the buildings on the southern part of the site. The main innovation consisted in suppressing the internal corbelling which was replaced by wooden beams supporting a roof feigning to look as though it derived from a stone vault. This can be seen on the northern entrance pavilion restored by the Dutch, who replaced the wooden beams with a concrete slab. These methods of lightening the structure made the work easier but considerably increased its fragility, which perhaps explains the small number of buildings of this period (between the 10th and 13th centuries) which have been preserved.

There are less frequently combinations where wood figured in a structure surrounding the main building in stone, as is the case in Candi Sambisari. The main structure remaining is extremely squat, appearing to have sunk into the balustrade of the base, but the usual proportions were restored with the construction that covered it: this was a roof resting on wooden pillars, the stone bases for which still rise from the level of the platform. The whole plan of Candi Sambisari (a main sanctu-



Candi Sambisari.

Photograph by Luca Invernizzi Tettoni.

ary with three secondary shrines facing it) was much used in central Java, for example, at Candi Cangal and Candi Merak, as well as in east Java, where Candi Badut was refurbished in the 9th and Candi Gurah in the 11th century.

The continuity of art from the 10th to 13th centuries in central and east Java, in spite of the great disparity of forms, is marked by the reuse of ancient monuments. In addition to Candi Badut, the baths of Jalatunda and Belahan were old foundations rearranged to the taste of the time. This prolongation is marked by a sort of return to the sources of Javanese art; for example, Candi Singosari has the same plan as Candi Sembodro at Dieng. Even the detail of the elevation is taken up with the contraction of the square plan on the upper level over the cruciform ground plan. While bearing in mind that most civilian as well as religious architecture was likely to be in wood, one can reduce architectural composition of the east Javanese temples from 13th century to two types, represented by Candi Kidal and Candi Jago, both temples of a similar order, but with the latter raised on a very high foundation.

Candi Kidal is a building where display is important. The temple is built in a pool where the building is reflected, and may be intended to recall the churning of the sea of milk; the reliefs on the base show Garuda carrying Sri, Garuda carrying the flask of the liqueur of immortality and Garuda carrying the serpent which acted as the rope to churn the sea. The main building is entirely displaced within the surrounding wall, leaving the central point free, and in front of the temple is a terrace which would have had three shrines on it.

Candi Singosari, as indicated, has a cruciform plan but the tower above the first level is of the same type as Candi Kidal. The pegging-out points have not been replaced by small lingas as was the practice up to and including the construction of Candi Kidal, but by statues of the guardians of space. Only six have been discovered on the site and the state of the enclosure wall is such that is not possible to say if the central point was left free or not.

The composition of Candi Jago is similar, but the base is very different, being divided into three levels decorated with reliefs, and the stairways are somewhat complicated, the flights not being all situated on the same vertical plan. The master craftsman of Candi Jawi tried to express the convictions of his sovereign who believed in the unity of Sivaism and Buddhism, so the base of this temple is decorated with Sivaite reliefs while the summit is in the form of a stupa. Candi Cungkup is of a similar composition but is raised on a vast terrace nearly 800 square metres in size and covered in bricks.

The extremely large complex of Penataran is the result of a long works programme begun at the latest in 1347 and finished at the earliest in 1375, with many resumptions and changes of plan. The successive master craftsmen all aimed to preserve the dominance of the main terrace supporting a temple which has disappeared. The access ways have the same complications as at Candi Jago but the reliefs are very different, in particular the upper level formed by winged animals recalls the representations of the Khmer flying palaces of Preah Khan at Angkor and Kompong Svay. In the courtyard of Penataran a dated temple corresponding to 1369 was built level with the ground of the same type as Candi Kidal, but the perspective effects are completely unintelligible because of excessive decoration. The nearby Candi Naga is raised on a foundation reduced to a single level and would have had a roof resting on wooden beamwork. Outside the enclosure are baths; that to the south is decorated with reliefs illustrating animal tales and that of the north includes two tanks into which water pours.

In the middle of the 14th century, the Mojapahit capital was fixed in the region of the present hamlet of Trowulan, where very many buildings, all brick, were constructed, for the most part following the same types as in the previous century. However, far away from the town, on the eastern extremity of Java, a Buddhist temple, Candi Jabung, was built with a plan that was on the outside circular and on the inside an irregular octagon. Notwithstanding the plan, though, the upper part of the structure is the same as Candi Kidal, for the doorway and false doors are topped by three false storeys. The topmost of all of these met and in the space between there used to be a circular feature, probably a stupa, which has now disappeared. At the end of the 14th century, carved decoration on brick with a stucco covering was much employed, as in Candi Gambar, for example, and the brick foundations of wooden temples are sometimes of considerable size, like the Buddhist temple of Candi Gayatri.

Throughout this same period an attempt was made to obtain a new formula for perspective effects in the region of Gempol, at Candi Pari, at Gunung Gansir, and on the doorways of Belahan, where not only the enhancement of the vanishing point is obtained by proportional diminution of similar elements, but also by the displacement towards the centre of the antefixes in superimposed rows, as if the master craftsmen in this region had discovered a very simplified form of graphic perspective. If the arrival of Islam had allowed it, Javanese architects would doubtless have been able to finalize a procedure to anticipate in part the way a completed work would look, and the relationship between buildings and their creators would have been profoundly changed.

The way architecture from the 8th to the 14th centuries was perceived is not easily put together, and the few notions on this subject in the Negara Kertagama limit themselves to banalities concerning beauty and magnificence. However, it is quite certain that these temples were viewed in an entirely different manner from the way they were conceived. If, a little after the inauguration of the monument, the artifices used in the conception of the structure were coherent, in particular in relation to the perspective effects, this is not the case with the passage of time after different structural changes sometimes profoundly transformed the buildings, to the point where the initial undertaking lost some of its meaning. This is the case with Borobudur, where the perspective effects of the original state are hidden by balustrades, and the duality of the architecture noted by so many scholars is only a more or less accidental transformation in the transition of a structure; the function of this, without any doubt different from the original, had become essentially the practice of the rite of the Pradakshina. The spectator participates in a certain way in the creation of the building, in spite of the architects' desires. So the master craftsman of the second state of Borobudur employed all his talent in giving a unity to the building and in suppressing anything that could recall the original pyramid, adding a projecting base to the walls which lacked it, unifying the width of the stairways, and constructing string walls that are now encased in the third state. The work we can see today is a sort of combination of happy accidents, whose meaning was never very precise, leaving the spectator free to view his universe and participate in the composition of the work, because one can suppose that these diverse interpretations caused in turn certain modifications. The architectural composition did not finish with the end of the construction work, and one can say without appearing too paradoxical that each alert visitor participates in the creation of the building.



Prambanan; Chandi Sari (p. 25).



Candi Sewu (p. 23).



Gedung Songo (p. 24).



Prambanan; Lara Jonggrang Temple.



Candi Jawi (p. 27).

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