B. Paolo Torsello

LOGGIA   N º8

Project, Conservation, Innovation

For many of us, a project is an extraordinary adventure of the spirit which embodies an instinctive wish for power by means of an act of modifying the world. Nevertheless, in its development it must comply with certain conditions that regulate its meaning and its reach. In fact all projects contain an extremely rich range of potential solutions, because, as we know, each project creator finds different results from everyone else for the same problem or reaches different solutions himself if he tackles the same problem at different times. Due to this specific feature of his work, he has the chance of picking one particular possibility from among the infinite possibilities on the horizon. This is the first condition imposed on him by the obligation to choose, and choice always involves decision. We might say he finds himself in the situation of being an arbiter of a particular project, while avoiding arbitration: his task consists of convincing himself and the community of the coherence of his decisions. This attitude is not entirely free from risks arising from the indetermination of the process and in this sense a project can gamble: the passage of being an arbiter carries with it the weight of responsibility, of an ethical stance. But what is the origin of the project and what is its purpose? The creative/compositive itinerary starts from a series of problems created by a series of complex demands, aspirations, cultural resources, pre-ideas, stimuli... which constitute the "pretext" for the materialization of the work. A pretext seen both as a "tool", an "excuse", an "opportunity" and as a real pre-text, that is to say a circumstance that goes before the text and paves the way for it. What the project maker achieves with his work is tantamount to a text, a product of culture, arising from the matter and laws of nature. In the project of new architecture, the Text is determined as the origin, in other words, as a pristine source. Starting from the final project, which has a totally new character, the task of reading, interpreting and "understanding" the work can be initiated as soon as it appears, in a hermeneutical way that, in the words of Gadamer, will lead to ulterior views of the text, so that "understanding never consists merely of a reproductive act, but also of a productive one", That is what brings about the loss of the illusion that the act of interpretation is a simple or merely explicative one, or that we can examine the text until we extract its most secret meaning, glean its most intimate structure and reach a total and definitive state of knowledge. On the contrary, where interpretation seems to want to conceal that knowledge, it really reveals it, thus elaborating new enigmas. Gadamer seems to warn us that research always involves a kind of inevitable distance from the object studied, gives rise to a new kind of concealing and keeps changing the search to different angles, creating a stage for the text in continuous expansion, according to a cycle constantly fed by our capacity to rephrase the question, and based on the permanence of the full chain of events from which the question actually arises. In fact, contrary to what occurs in natural sciences based on a universe of extraordinary but immutable phenomena, from which it hopes to extract its general laws so as to reach the simple prime cause, in human sciences the route takes on a specular form: starting with the first elementary Text produced by primitive men, every interpretation task has broadened and continues to broaden the horizon of the sense in which we must measure ourselves. Besides, the sciences of nature tend to "forget" their annoying and erroneous past, whereas human sciences are inclined to "recall" it entirely and on the long term, also because they do not involve the concepts of error and self-improvement.

What happens, then, when we must act on a historically predetermined architectural text? Can we assume it as the pretext, or as the pre-text, of a project? Nineteenth century historicism tried to give a positive response to these questions, but as far as the nature of the project is concerned, the question seems to be quite difficult to answer. In fact, to begin with, all existing fabrics are the result of a choice (or of a stratification of choices) of a historically determined possibility: this is indeed, in other words, a pristine source that activates and feeds the critical question and it is a link in the "chain of events" whose permanence is essential for the critical task itself. Otherwise, this essentialness is confirmed by the fact that all interpreting activity obtains its authority from the source to which it owes its own origin and existence. It is not by chance that a constituting aspect of the critical act resides in the fact that it belongs to the regions of thought and the expressive horizon of the word. Thanks to this circumstance, it can freely use its right to self-contradiction, to repeated thought, to exploration, to rectification, to a change of mind, and in general all the elaborations and retranslations proper to intellectual pursuits. One hand, in other hand, it cannot afford to be seen as definitive and immutable, as that would involve a total loss of meaning. Therefore it seems impossible to accept that any interpretative effort can guide the project maker’s work –even when it is a question of restoration– until it becomes "stone figures," in other words an irreconcilable construction/modification of forms (that would also give rise to an alteration of the very sources that have generated the process). The critical discourse tends to be more persuasive than demonstrative, to pose questions in the community rather than provide answers and explanations, to pay more attention to the accidental than to the general. That is why it has neither predictive force nor authority to make decisions.

Perspectives

Where is the way out then? Wall archaeology, a discipline consolidated in the exercise of the critical understanding of architectonic texts, provides us indirectly with part of the answer. In the specific field of historic interventions, the kind of archaeology which is quite exemplary. For them, the architectonic elements and their configuration do not appear as "values to be confirmed or denied", but as a "system of material signals". From their point of view, a wall is not really a "form", but rather a "topography", that is to say a "place" marked by a kind of "writing" or "script". With non-destructive analyses and by means of research of a cultural objective is clearer and more complex. The historic work offers us leads us to think of a much richer offer than the hedonistic pleasure of dominating nature or anthropic origin belonging to the work as a testimoni of the vicissitudes of time and culture, provided it does not involve any risk for its survival.

1. Within the limits of the technical sources available, restoration pursues the conservation of all signs of natural or anthropic origin belonging to the work as a testimony of the vicissitudes of time and culture, provided it does not involve any risk for its survival.
2. Restoration seeks to eliminate or reduce the causes of degradation within the possibilities of the technical resources available in order to prolong the life of the work and its parts, endowing it with solidarity and resistance, provided that the solutions adopted do not contradict the previous principle.

3. Restoration strives to slow down or stop and, where possible, to reverse degradation, in order to improve the conditions of durability and the capacity of the historic work to absorb uses. In this way a healthy conflict arises – and not necessarily incompatible – with the creative activity of new, as a very modern version of "restoration" as an area of commitment and creative/compositive substitution is excluded. Of course it will be necessary to understand to what extent the "new" can coexist with the "old". On the one hand, indeed, the objective of rigorous conservation defines "restoration" as an opening and a prologue of a potentially endless phase of constructive acts and analysis rather than a conclusion and epilogue of the so-called "preliminary knowledge" and avoids the risk that the intervention, conceived as the end of the research, ends up being the objective of the work. On the other hand, the project of reuse is seen as an operation of maximum creative freedom within the limits marked by the conservation criteria and in frank contradiction with them, constraining the compositive act (but also all other kinds of technical and constructive options) from breaking the self-referentiality of the process itself.

The very nature of the intervention, its constant, renewed historic condition, lies in the declared opposition between old and new, between conservation and innovation. The monument/document becomes a theatre of analytical and interpretative attention; but at the same time a place of new use, an arena of innovation, of the most advanced technology or the spatial conception of our time. In this new condition it continues to exist and act as a pristine source and a provocation of modernity. In this perspective – not totally new, by the way, but still capable of being analysed in its theoretical and operative aspects – the task of protecting our heritage is complex and partly requires a reconsideration of the methodological and technical aspects; however the aspect of planning new over old is rather complex and in any case confrontation with these themes cannot simply affect the legality or modify the historic work or the mere operativity of the alternative between memory and oblivion, between "iconoclasm" and "ecumenism". The affirmation that all projects are the result of an irreparable individual trajectory is true, because each problem admits infinite solutions. Nevertheless, hidden behind this affirmation there is, at least, in the current state of culture, a trap: the individuality of the process is practised today as self-referentiality. This aspect was already present, by the way, in the nineteenth century debates about eclecticism and that "abundance of style" that the artists of that time criticized. Creative actions (among others) do not seem to have any need for a referent to "account for". Paraphrasing a saying of Lyotard’s, we might say that the practice of dissent (with its simultaneously destructive and creative consequences) replaces legitimation based on consensus, in which any subject feels free to act according to their personal preferences and counterpoises. The utopian design of a value-creating system to fulfill the role of a regulating reference of options and behaviour is replaced by a non-regulated proliferation of values. This occurs in restoration and new architecture as it is inefficient to have a look at the projects of the last fifty years and recall the protests against the poor quality of the works and the destructive character of their presence in old city centres and landscapes to obtain the confirmation of the large variety of stances. But we can also see in it the progressive loss of the specific character of restoration and architectural planning: all the social actors of our time feel free to carry out (and in fact do carry out) these activities. In this context, the role of the architect and the restorer seems to be almost superfluous. With the exception of the technical risk area, still commended to the expert, anyone can put into practice his own aesthetic, historic, functional, etc. preferences. Thus, besides a serious reflection about the objectives and means of conservation, it is necessary to initiate a debate about architectural compositive practice whose results, beyond the intentions declared and individual pursual of private or collective interests, do not achieve the goal of a good planning level. On the contrary, if we exclude the rare cases in which the architectural production of today has yielded plausible results, the debate about architecture denounces a genuine calmancy and our cities are a living confirmation of it: even in the area of restoration. We may say that if our job consists of rejecting poor quality architecture as unacceptable today, there is all the more reason for us to prevent the substitution or alteration of the architecture of the past.

Antoni González
Getting rid of the magic without giving up the method. The restoration of Sant Pere de Serrallonga

A few years ago, the León architect Javier Ramos Guallart, now living in Santiago de Compostela, luckily for the Galician capital, published a series of texts titled “The End of Magic”. In them, he criticizes the criteria and procedures usually followed by the public administration in the restoration of our monumental heritage and suggests that they be revised. He proposes that this should be done with a new mentality that conditions the behaviour of all those who intervene in the process, including the professionals (particularly the architects) and those on whose behalf the intervention is carried out.

According to Ramos, this mentality should be ruled by a tendency towards the conservation (maintenance) of the monument rather than a transformation of it and therefore by an inclination of the public rather than the professionals to assume the process, as the latter (especially the architects) tend to hold an elitist (magic) view of the work, more often willing to show off their skill than to respect the monument. This new mentality, which is fortunately gaining ground in the restoration of monuments, is not free, however, from pitfalls and hazards that must not be ignored. The main difficulties arise, in my opinion, both from the essence of the act of restoring (is it possible to “preserve” if we do not “transform” first?) and from the social context in which the act is developed and carried out. The restoring activity, indeed, is not merely the result of people’s love for their monuments. Many different types of interests, both individual and collective, are also involved, going from the proprietary and utilitarian, even economic, to the emotional or emblematic, or purely political, interests that cannot always be branded as illegitimate. And as regards the procedures of the administration, very often more complex than they appear, they are usually not as easy to simplify as we might think. As for the probable hazards arising from the commendable purification of “elitist” attitudes (the disappearance of this misleading magic), the main one, in the strictly professional territory, is the risk of endangering the monument. This risk is not limited to the methodological rigour in the interventions, a rigour that makes us consider not only the social objectives but the scientific restoration procedures and their absolute character as genuine architectural practice, and always to combine the laudable participation of the public and the professionalization of those in charge of the process. These difficulties and dangers that must be taken into account do not contradict the ultimate message in the writings by Javier Ramos, whose effect can already be detected in the interventions carried out by SPAL, by Barcelona Provincial Council. The restoration of the little church of Sant Pere de Serrallonga can serve as an example of this attempt to avoid certain magic of yore without abandoning our “obligatory restoration” method.

Sant Pere de Serrallonga
The building is situated in the town of Alpens, on the north east border of the province of Barcelona, on the eastern slope of Serrallonga mountain, over 1000 m. high, in a spot from which one can get an ample view of the Lluçà region and, in the distance, some of the most emblematic basaltic mountains: the Montseny, the Pedraforca and the Puigmal. It has a ground plan typical of religious architecture just before Romanesque, with a single nave, rectangular, about 30 m2 interior surface and an apse or sanctuary, with an almost square project attached to the eastern wall. The access from the sanctuary to the nave is crowned by a triumphal horseshoe arch, typical of the architecture of that period, supported by plain monolithic imposts. The walls are made of stone, 0.8 m thick (with different layouts and textures, depending on the building date and the transformations practised), with larger stones used as ashlers at the corners. The nave and the apse are covered by a pitched roof, the former, on plain beams with a central rafter without a truss, and the latter, on a slightly horseshoe-shaped vault. On the north side, a rectangular body, used as a sacristy, with thinner walls and a tiled roof is attached to the apse. The entrance is through a semicircular arch opened in the south facade. There are also two windows in this facade, one semicircular in the nave, Romanesque like the doorway, and another in the apse, originally medieval but refurbished in modern times, and in the east facade, at the centre of the apse there is a single splay window from pre-Roman times. Outside the west facade, crowned by a modern belfry, there is a cemetery, which was used from the 10th century to the 19th.

History
The temple was built around the middle of the 10th century and it was one of the first ones to be built in order to settle the population in that territory, maintaining the category of a parish church until the 14th century, when the church of Santa Maria in Alpens took its place. Some of the country houses in the old parish were still used until a few years ago. We must visualize the original building with its walls washed in lime mortar (naked stone seems to be a very modern practice) and its roofs covered with stone slabs, with the east wall emerging from the nave between the nave and the apse roofs, as a gable wall. The walls inside were also white and the pavement was made of stone tiles. The presbytery floor had two levels; on the upper one, sloping slightly towards the west, was the altar, next to the east wall. The lower level was also higher than the nave floor, and there may have been a masonry bench attached to the west and north walls for the congregation to sit on. The first roof on the nave was very probably made of timber beams on large girders. The apse was covered with a stone vault.

Romanesque restoration
At the end of the 11th century or during the 12th, important restoration work was carried out on the fabric (although it may have been done in two phases within this period, the second perhaps around the year 1200). The original door was then replaced by the current one, a little larger, which made it necessary to
remarkable change was possibly brought about by
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projecting joint typical of 12th century Catalan
Romanesque, although they were later plastered with
paved again, also with tiles, placed on top of the
that of the presbytery and the step leading into it
and left free-standing.

same height, was amplified and the altar was moved
of any other works apart from improvement in the
furniture. At the beginning of the 17th century, on 5th
by the Catalan religious sculptor Domingo Casamira,
who signed the receipts in 1613. We do not know for
A 1689 document tells us that Joan Prats, a farmer who
lived in Serrallonga house, paid for some work done by
counterfort of the south facade, only a few rows of
This counterfort is a sign of the fabric's gradual loss of
stability, the cause of a battle between the peasants and
"Our Lord to lavish them with spiritual and temporal
lifted and enclosed by railings, a choir was built at the
However, the vault, which had been in danger of
collapsing since 1706, was not repaired at this time and
"was in danger of imminent ruin". Even so, it
Miró– were commissioned to decide what should be
done. Following their advice, the church was closed
mass"), but these were not definitive either.
upper part of the west wall collapsed. Two documents
confirm this: the parish work book ("In the year 1827," it
tells, "the church fell down of its own accord.").
According to the 1839 Book of Works, the money for
these repairs had once again to be lent by a parishioner,
since the parish did not have any funds available at the
time. In the second half of the 19th century some
maintenance works were performed. There is a record
that in 1866 a plaster of the nave was put on
White Monday, and afterwards not at all until 1999),
the habit of conserving the building was lost, which
brought about its progressive deterioration and the
disappearance of the closed vault. Around 1964 the
parish started negotiations so that Barcelona Provincial Council would

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lived in Serrallonga house, paid for some work done by
master mason Salvador Païrot, from Alpens. The
counterfort of the south facade, only a few rows of
which are now conserved, must date from this period.
This counterfort is a sign of the fabric's gradual loss of
stability, the cause of a battle between the peasants and
the episcopate that was to last over two centuries,
because the latter, instead of paying for the works as
would have seemed appropriate, expected the
parishioners to do so, for which they had to wait for
"Our Lord to lavish them with spiritual and temporal
blessings". Around 1725 new works were started. The
floor was paved with ceramic tiles, the presbytery was
lifted and the openings, a choir was built at the
foot of the nave and the sacristy was added.
However, the vault, which had been in danger of
collapsing since 1706, was not repaired at this time and
in 1731 and 1746 the Episcopals visited the church and
insisted on the urgency of having it done. The 1775 visitor said the
temple "was in danger of imminent ruin". Even so, it
was not until 1808, a century after the first warning,
that two master builders –José Quintana and Mariano
Miró– were commissioned to decide what should be
done. Following their advice, the church was closed
and not opened again until the "provisional repairs"
had been carried out. In 1813 new repairs were performed
(because otherwise "it would not be possible to say
mass"), but these were not definitive either.
In view of all these facts, in 1827 the vault and the
upper part at the beginning of the 17th century, events
confirm this: the parish work book ("In the year 1827," it
says, "the church fell down of its own accord.") and the
inscription on the coat of arms that presides the
nave, which says: "This church was rebuilt in the year 1827
and was opened in 1829." The repairs were not
finished until 1839. A new roof was built, with rafters
placed on top of a vault made of thin hollow bricks on
a cane frame, the west wall was rebuilt –although the
tower with the belfry seems to date from 1845– and, as
the stone vault that supported the wall had disappeared,
the south counterpart was removed. Inside, the choir
was rebuilt or repaired, the nave pavement was again
raised, using the existing tiles and altering the height of the
opening of the triumphal arch. The interior surfaces
of the walls were again whitewashed and on the west
wall of the nave, over the triumphal arch, the coat of
arms with the above-mentioned text was placed.
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tower with the belfry seems to date from 1845– and, as
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the Romanesque walls and doorway to recover their original appearance. We took advantage of the occasion to separate the cemetery enclosure from the west facade, improving the crowning of the surrounding wall and opening up a new entrance. As regards the walls of the church, other works carried out consisted of opening up the walled-up areas (between them with glass or railings after priming the carpentry work), replacing a few stones or ashlars that were missing or the odd roof tile to help evacuate water better and clear away vegetation indiscriminately and without eliminating the remains of mortar that still existed. The works on the inside consisted, basically, of consolidating the lime and gypsum mortar finish and recuperating the old paving and the original appearance of the presbytery, all of which was done without damaging any of the modern additions (the sacristy, the altarpiece, etc.), elements which have been conserved and restored as a testimony of their period, just as worthy of respect as earlier and later ones. The floor of the nave had three different levels after restoration, corresponding to the three kinds of paving that have existed through history: the original 10th century paving, which can be seen beside the triumphal arch; the original Romanesque 12th century floor, visible in the central section; and the 18th century slabs—covering the whole nave until 1998—of which part can be seen at the foot of the nave. After the paving around it recovered its original height, the horseshoe triumphal arch can now be seen with its original dimensions, which was not the case before the restoration. The pre-Roman space in the presbytery, occupied by the modern altarpiece, could not be understood before either. When this was moved to the end of the nave, the presbytery could be recovered again and now looks as it did in the 10th century: the vault and the walls plastered with mortar and whitewashed, and the stone paving (which is the original one) on two levels, with the remains of the original altar on the higher platform. The altarpiece timber (pine and poplar wood) was cleaned and the elements that had been practically disintegrated by xylophagous attacks were replaced, all of which was done in situ by the town carpenter (an expert restorer, and as a result more efficacious and less cleaned by specialists. The winged confessional with a outside door. Once the works were finished, the usual celebration for such cases was held by SPAL, a little of the church, the works performed and the criteria they were based on. This party was perhaps the best result of the restoration works, as a harbinger of the return of the traditional pilgrimage that used to be held there in olden times. The total cost of the intervention, including V.A.T. (excluding expenses for ‘Chapter F’, in other words, the salaries of the functionaries) amounted to around 6.5 million pesetas, including the archaeological work (675,000 pesetas); the new roof (1,760,000 pesetas), the work on walls and pavements, including the surveys carried out beforehand (1,580,000 pesetas), the carpentry works (including treatments), glass and signposts (504,000 pesetas), restoration of the furniture and altarpiece (1,107,000 pesetas), the movement of the surrounding earth and the reconstruction or consolidation of the walls around the cemetery (627,000 pesetas) and the leaflet (18,000 pesetas). Given the result of the intervention, the knowledge acquired and the level of diffusion, the work performed, the total cost and the time spent, we are absolutely convinced that this is a method that permits us to set up more ambitious programmes as regards the number of works to be carried out without renouncing to the methodological rigour of the restoration. With some of the sums invested by the public administration on great restoration works on unique buildings of our medieval heritage, it would be possible with this new mentality (and technically well equipped service to conserve with sufficient dignity the bulk of this apparently minor heritage, currently neglected. It is clear that these interventions would not have such a great impact at a political level (or that the promoters would have to stretch their imagination more in order to achieve this impact, which is not always justified), but "getting rid of the magic" also involves that.

Fernando Vega López-Manzanares

Reconstruction of the Frauenkirche in Dresden

Origin of the church

The origins of the Frauenkirche date back to the 10th century, at the early stages of Dresden’s foundation as a city. The place chosen to build it was an elevated area to avoid the frequent floods caused by the river Elba. The original church was probably built with a timber framework. Later, in the 12th century, a three-nave Romanesque church was built out of stone, with a sloping gabled roof and a bell tower finished off with a high spire. The church underwent numerous transformations over the years, with Gothic additions and repairs of all sorts interfering with the original fabric. However, both the state of repair of the church at the start of the 18th century and its small size made it necessary to build a new temple. In 1722 Dresden City Council decided to commission the master carpenter of the city, George Bähr, to build a new Frauenkirche to show off the prosperity achieved by the capital of Saxony. That same year, Bähr presented his first project for a church with a central ground plan in the form of a Greek cross with a dome with an altar and galleries attached (fig. 1). The construction of the dome was to be carried out with fir-limed timber, as was the custom in those days. The interior was to have three superposed levels of galleries. This first idea of an attached altar in the shape of an apse was included in the following designs and maintained until the church was actually built. The governor of Dresden and right hand of Saxon Elector Augustus II, Count Wackerbath, dissatisfied with this project, asked court architect Johann Christoph Knöffel to draw up an alternative plan. This new proposal in a Frenchified style turned the Greek cross ground plan into a square with towers at the corners concentrating masses and transformed the interior octagon into a circle (fig. 2). This option did not prosper, but did serve to suggest certain changes to George Bähr, which he included in his second plan for the church (fig. 3), which was now accepted thanks to the personal intervention of the Elector of Saxony Augustus II in 1726 the ceremonial laying of the first stone took place, and the construction went on until 1743. George Bähr died in 1738, so that he never saw his great work completed. In its final form, the church has a square ground plan with an apse attached to one end to house the altar. In the version built, Bähr elevated the external dome visibly and transformed the city, George Bähr, to build a new Frauenkirche to Dresden with a series of buildings among which the people of Dresden to the church services by means of the sound of its daring outline. The dome had 23.5 m internal diameter and the superior vertex of the lantern was 90 m high. The interior layout was like a theatre with a central ground plan, with the ensemble of five superposed galleries situated between the pillars accentuating this impression. The eight pillars supported the interior forty-metre dome with an opening at the crown through which the intrados of a second external dome situated forty metres above could be seen. Bähr had designed a platform on top of the lower dome, around the skyline, to hold a large number of musicians, so that when they played the space between the domes would act as a resonance box for the music coming from the heights of the skyline as though it were a choir of angels or music from heaven (fig. 5). The church organ, on the other hand, situated over the altar, was built by the famous organ master Gottfried Silbermann (fig. 6). A week after the organ had been tuned, the Leipzig chapel master gave a concert lasting several hours to test it. This musician gave frequent concerts in this place with the Frauenkirche as a luxury concert hall. His name was Johann Sebastian Bach. A hundred years later, another illustrious musician by the name of Richard Wagner was inspired by this space between domes to write the oratorio Das Liebesmahl der Apostel to be played in the Frauenkirche. Strangely enough, Bähr, who had been born in a wood-heated town called Fürstenwalde (prince’s woods) and had grown up as a carpenter in a city, Dresden, whose name refers to a kind of timber, decided to build a church “all out of stone from top to bottom as though it were a single block”. And his decision is even more paradoxical if we take it into account that the usual thing at the time was to build domes with a timber structure and line them with copper and that there was not one precedent in the whole of Germany of a dome built out of stone. Bähr, who in the early years of the work kept to himself his decision to build the dome out of stone, little by little managed to persuade the Dresden authorities of the wisdom of this decision by using arguments to do with the project, stability, durability and the high price of copper. As a carpenter Bähr was well aware of the plastic force of the materiality of timber work, guessed rightly that this uniformity in the material would have the virtue of transforming the building into a large music theatre 90 metres high erected in the centre of the city. Transcendence and Architectural Uniqueness of the Frauenkirche

Two centuries had gone by since the birth of the Protestant Church and, nevertheless, it still had not managed to build a temple with the symbolic significance necessary to serve as the collective identification mark of the faithful. The Frauenkirche in Dresden materialized this desire to build an emblematic church, to such an extent that throughout its history it has often been compared to the Catholic Saint Peter’s Basilica in Rome. Strangely enough, the main promoter of this highly symbolic church for Protestants had been a Catholic convert, Elector Augustus II, who had to abjure his Protestant faith and convert to Catholicism in order to take over the royal throne of Poland. Both Augustus II and his son Augustus III, both kings of Poland and Catholic electors of Protestant Saxony, contributed to the embellishment of their capital city Dresden with a series of buildings among which the Frauenkirche represented the peak of Protestantism and a symbol of Saxon tolerance at the same time. The first stages of the project for the church show that Bähr followed the traditional Lutheran line of the churches in the area of Silesia and Scandinavia, with
ground plans in the shape of a Greek cross but designed
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the choir situated in the resonator formed between the
area. Another reference can no doubt be found in the
typology of the theatre. Leonhard Christoph Sturm, a
1712: "A fundamental requisite of the church consists
of all members of the congregation being able to see
the clergyman". What better solution could Bähr have
adopted to reach this aim than to include the
achievements of a building typology like the theatre
where, indeed, visibility plays an all-important part.
In late Baroque both Catholic and Protestant churches
underwent a convergence that was probably involuntary
liturgical necessities of both religions and the different
evolution of both types of church tended towards
often had the peculiarity of being openwork, light,
"transparent" structures. This inward-facing space
can be included within this classification as a
which, in the words of Christian Norberg-Schultz, "the
face of the building was undergoing a disintegration
sandstone of the most exposed areas of the outside
affected the facade, dome and interior pillars. The
impacts of Prussian cannons in 1760 during the
Seven Year War. The morning of 15th February it still
rose up apparently undamaged among the smoking
ruins of the city. However, the precautions adopted
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1948-49, in spite of the aftermath of the war, a group of volunteers inventoried and gathered together 600 cubic metres of blocks and fragments of stone to be used again. However, the socialist government had political and economic reasons to ignore an archaeological reconstruction scheme for the church and in 1958 it made an attempt to clear up the remains of the Frauenkirche within a cleaning programme for the whole city. In Dresden alone, the remains of ten churches in ruins were completely cleared away. This action did not go ahead thanks to the zeal of the ruins declared a war memorial monument in 1967.

After the attempts to wipe the Frauenkirche off the map, at least the government acknowledged in this way that the ruins existed. Later, especially during the eighties, there was a discussion about the possibility of rebuilding the Frauenkirche on the occasion of the urban reorganization programme for the Neumarkt area, but this intention never saw the light due to the difficult economic circumstances that characterized the last period of the German Democratic Republic.

Dresden's appeal

During the weeks of the autumn of 1989, just after the fall of the Berlin wall and the political change in the German Democratic Republic, the Dresden citizens started an initiative with a public "appeal from Dresden" on 14th February, which contained the following sentences: "We do not want to resign ourselves to the ruins of this unique and magnificent work remaining as they are forever more or disappearing in any way. We call for world action to rebuild Dresden’s Frauenkirche and make it a Christian centre of world peace in a new Europe [...] 45 years after its destruction, the time has come to restore the Frauenkirche as the inalienable heritage of European culture".

This wish of the citizens must be understood from a particular point of view, characteristic of the nations that were within the orbit of the Soviet Union in the second half of the century. The effects of World War II and its aftermath healed completely in Western Europe in the sixties at the latest, with the fast economic development and the creation of the first political and economic institutions with pan-European aspirations.

On the contrary, for the countries in the Eastern European bloc, the war has remained close and recent until very lately because of the historic consequences it had on the countries concerned with, the clearing of rubbles in the bombed cities went on in some cases until the early seventies, leaving bare the dreadful consequences of the war. Even today in these cities one can see buildings destroyed by bombs or damaged by shrapnel during the World War that have not been restored in the last fifty years. The post-war ration books in some cases prolonged their existence until they coincided with the ration books brought out under the economic recession in Communist countries during the eighties. Besides, the rehabilitation and/or architectural reconstruction processes of cities and monuments were prolonged in some cases until the eighties, as in the case of the Warsaw Castle, or even continue today, as in Dresden Castle. We might say without exaggeration that at least for some of these countries, freedom from the yoke of the Soviet Union has meant the actual end of the war. This will be evident in the next paragraph of the Second World War after a peculiar epilogue, in which neither the will, nor the history, nor the prosperity belonged to the country in question. Consequently, the appeal from Dresden paradoxically constitutes a maudlin plea after the war. The communists plucked many consciences and awoke real reconstruction expectations, backed by the democratic decisions of the regional synod of the Evangelist-Lutheran church on 18th March 1991, and the National Congress on 20th February 1992. After these initiatives, the "Frauenkirche Reconstruction Association" was founded, and the "Frauenkirche Foundation" was created to see to the actual reconstruction of the church.

The reconstruction: technical considerations

The clearing up of the ruins was carried out between 1993 and 1994 by a team of specialists according to each architectural archaeologist and drew all the pieces extracted. At the same time as they removed the rubble, this team controlled the deformations undergone by the existing remains of the church according to what they freed it from this weight. This process contributed a great deal to adapt the reconstruction technique of the period and about the stone with its case history of damage and the degree of mechanical application supported, as well as exposition to the fire that destroyed the church. The engineers Wenzel and Jäger, coordinators of the group of professionals involved in the reconstruction, affirm they recovered 8,390 ashlars from the facade, the interior wall and roof surfaces, 84 large agglomerated fragments of the stone and mortar and 91,500 stones from the inside walls. These ashlars from the facade make it possible to incorporate in the current restoration by Wenzel and Jäger, a proportion that is not insignificant but perhaps insufficient to qualify the works as pure anastysis, as I shall explain below. As regards the large fragments, most of them are being used again although some of them had already been included in the present state or their lack of load-bearing capacity. The rest of the ashlars needed are being extracted from the original quarries and cut on site. On the other hand, this same team of engineers studied the original structure designed by Bähr with its force unloading systems and weak points using historic documents available from the restorations carried out between the wars. They discovered that the problem did not reside in the dome itself but in the load transmission to the rest of the building. To start with, Bähr designed the dome with a centripetal eccentricity of 90 cm between the drum and the sections of the pillars. Besides, the reduced section of these pillars in comparison with the radial walls of the roof was aggravated by their greater rigidity due to the use of ashlars with double thickness. In any case, if either the inner annulus situated at the level of the main interior cornice or the metal clamps on the radial walls had worked to absorb the traction forces as Bähr had foreseen, most of the load would have been transmitted to the walls, liberating the pillars from an external stress. However, the inner annulus broke and stopped absorbing traction and ended up passing most of the weight of the dome on to the interior pillars, which produced the pathologies described above (fig. 11). This analysis permitted the team to begin the reconstruction with full awareness of the weak points in the original structure, and suggested a way to alleviate these deficiencies. Nevertheless, before starting to rebuild it was necessary to verify the state of the existing structure. In the first place, this team began an investigation that started by discovering the load-bearing capacity of the subsoil of the church and by reinforcing it by injections under the pillars until their same resistance was reached to a depth of practically 1.3 m. They studied thoroughly the load-bearing capacity of the existing pillars in the choir, even going so far to conduct a geo-radar survey to detect possible cracks, inclusions or hollows inside. In spite of the effects of the fire, the aftermath of the collapse and being left out in the open for fifty years, they verified that they were in a good state to be included in the rebuilding of the temple. They achieved the same results for the remains of the naves of the staircases in the northwest, reaching 31 m high, and the perimetral west and north walls, which are 8 m high. They considered the rigidity of the new ashlars to be incorporated in the facade and the mortar seams between them in order to achieve a complete and homogeneous transmission of forces. Besides, they proceeded to carry out an investigation into chemical, mineralogical and microbiological issues of the existing ruins and loose ashlars, and a verification of the behaviour of the contact area between them and the new ashlars and their reciprocal compatibility. I believe that the process followed in the investigation to eliminate the weak points of the original structure is an interesting example of maturity in the intervention of historic fabrics, rarely to be found in restoration. Before taking a determined decision, the people in charge of the restoration studied a possibility that they analysed not only from a structural viewpoint but also according to their physical compatibility and their communion with the spirit of the existing building. Fortunately, the experience accumulated in many years of unsuccessful restoration work brought about a cure for the superiority complex with which repairs to historic fabrics were often carried out, with an excessive use of reinforced concrete or invasive interventions that ignored the natural functioning of the existing structure. In this way, the group of engineers directed by Wenzel and Jäger rejected four different proposals, which we shall describe below (fig. 12).

The solution adopted by Wenzel and Jäger recuperates the use of the metal anchors that already formed part of Bähr’s original fabric. The abuse of reinforced concrete would have distorted the concept of archaeological reconstruction that characterizes the foundation’s actions. In this case, unlike earlier strengthening proposals, which must await the subsidence of the structure before starting work, these anchors are active, that is to say, they begin to support tension from the very beginning by means of screwing (fig. 13). All of them together form an annulus of pressure bearing the load of the dome and transmitting it outwards where Bähr had wished. Wisely, a double ring was designed so that the pieces can be replaced where necessary without losing the contention effect, and it is completely reversible besides (figs. 14 & 15). It is not a new or foreign element, but a reinforcement that falls on the structural philosophy conceived by Bähr, whose intuition came close to working perfection. The ensemble will be made up of a polygonal double annulus formed by compact steel sheets joined to anchor blocks of reinforced concrete situated at the ends of the radial walls. Besides, in order to improve the transmission of forces, Wenzel and Jäger have foreseen placing the seams of the fabric corresponding to the area of the buttresses over the radial walls with an inclination of 40° over the horizontal, to make them perpendicular to the compression forces attacking it. The purview of the authors who seek a reconstruction faithful to the philosophy of the original fabric is slightly betrayed at this point with the structural excuse, since the external form is maintained but the internal layout of the ashlars is altered. Whatever opinion one may have on this point, this system conceived by Wenzel and Jäger as a whole makes it possible to homogenize the efforts and improve the weak points of Bähr’s original structure, that is to say, both excessive compression and unacceptable traction that caused the fabric to crack.
The reconstruction: urbanistic considerations

If we consider the city of Dresden not as a cumulus of random buildings constructed one after the other but a living organism whose streets form the arteries of this being, we can understand how traumatic was and still is the destruction of 95% of the historic centre for the urban life of the city on the Elbe. The expeditious philosophy of the history of the world after the war included cleaning up the ruins of the city and demolishing buildings in a bad state of repair which, however, could have been restored. The historic weft of the city was not respected either in many places and horrible, unnecessary jeans were corrected in the fifities and sixties ignoring the historic memory of the pre-existing arteries. Nevertheless, the restoration and reconstruction of some symbolic monuments in the city was started, such as the Opera House, the Catholic Hofkirche, the Zwinger, which were completed, or Dresden Castle, whose works are still being carried out today. Within this panorama, the area around Neumarkt square, where the Frauenkirche was situated, still conserves the old historic city layout. Neumarkt, which means New Market in German, was an expansion zone of the city in the mid 18th century, which took the place of an old fishing district, where the old Frauenkirche had stood. This network of old streets has great historic importance since it conditioned the ground plan and layout of the Frauenkirche. The project has been drawn up by court designer Johann Christoph Naumann in the year 1718 is still conserved (fig. 15), in which the outline of the future Frauenkirche (fig. 15d), taking into account the conditions of the surroundings, is included. The existence of the old Frauenkirche (fig. 15a) and the old Weber Hospital (fig. 15b) and the need to keep them operative while the new church was being built; the desire to respect the urban streets that existed at the time and build the church within the boundaries marked by the cemetery (fig. 15c) at the end of the old Frauenkirche; and finally the intention of orienting the altar (in other words, turning it towards the Orient) all conditioned the layout of the future building. In fact all these conditions limited the site of the future building on three sides: the old Frauenkirche, the old Weber Hospital and the wall of the old graveyard. Using the site to full advantage meant building a church with a square ground plan. It is worth pointing out also that the Elector of Saxony, Augustus II, who seems to have played an important part in the new urban layout, had travelled around Italy and France, where he had had the chance to see a number of square churches first hand. All the urban designers were well aware that to cover a ground plan of certain dimensions, it was necessary to use a dome. Behind this deliberate central layout of the church lay also the intention of accentuating the singular character of the building. That is to say, along with the urban layout, the shape and general appearance of the new temple were also being clearly designed. Later, it was thanks to its author Bähr that the monolithic dome rose so gracefully over the roofs of the city (fig. 20). The present idea of Dresden Council is that the restoration of the Frauenkirche would be incomplete without recuperating the space and scale of the surroundings that made it what it was. It is a question of looking back to a time planned by the temple’s musical note. This totally justified recuperation of the scale and urban network may, however, turn into a dangerous game as it involves the literal reconsideration of some historic buildings (the Cosel Palace, the Kürlander Palace, the British Hotel, the Sax Hotel, The City of Rome Hotel, etc.), which were a guideline or a reference for the rest of the layout, to be built by modern standards (fig. 19). Indeed, it is considered that at least a third of the buildings in the Neumarkt were perfectly documented before the war broke out.

Besides, in 1946, before completely razing the ruins of the buildings, professor Hans Nadler measured exactly the corners and layout of the buildings, and placed the plans meaningfully in the crypt of the Frauenkirche for a future reconstruction of the ensemble. The case brings to mind the reconstruction of the historic centre of Warsaw. The capital of Poland, which had hardly been damaged during the war, was conscientiously dynamated block by block by Hitler’s sapper corps at the end of 1944, in an attempt to wipe the historic memory of the city off the map in revenge for the uprising in the summer of that year. After the war, the inhabitants started to rebuild the historic centre with works that continued until the Royal Castle was completed in 1981. Due to the enormity of the misfortune and the psychological and sentimental implications involved in the regeneration of the area, the international community by no means would disapprove of an action that involved reconstructing the buildings, but particularly restoring the collective memory of a whole people. Warsaw’s historic nucleus offers today a rather artificial image, lacking historic patina, although it rouses the visitor’s curiosity in view of all the tragedy and the grief caused by all the inhabitants. The important restoration or even reconstruction works seem to be more successful in the case of outstanding historic buildings than in the residential area. The residential area in the old city of Warsaw has been turned into an open air monument itself and constitutes an environmental illusion of a past that no longer exists, without going into the important reasons behind this intervention. In the case of the Neumarkt in Dresden, the long thought over and justifiable reconstruction of the Frauenkirche threatens to spread like wildfire to the Baroque facades of the buildings around it, in spite of all the precautions being taken in this sense. In my opinion, the situation is similar to that of the historic centre of Warsaw and the actual end of the war has been quite recent for Dresden, but the theoretical discourse has matured in this fifty years and we now have enough experience in massive postwar reconstruction to avoid making the same mistakes all over again. At the end of the day, it is up to the inhabitants of Dresden to take the decision of extending the reconstruction works to the surrounding area, and their general remark is that “it would have been better if the Neumarkt were still standing”. In spite of everything, even in the case of disagreeing, I cannot take on the responsibility of throwing the first stone in view of an action with profound psychological implications for the inhabitants.

The reconstruction: theoretical considerations

The Frauenkirche Foundation refers to the intervention on the ruins of the church as an archaeological reconstruction. Traditionally this concept has been considered to be the rebuilding of architectures that have disappeared during periods –normally prehistoric– characterized by the lack of representative architectonic monuments. These archaeological reconstructions do not extend to the whole archaeological site but are single, exemplary and basically didactic works, as they are carried out for a non-specialized public. Examples of archaeological reconstruction of prehistoric times could be the Castell Archeodrome* in France. In the case of the Frauenkirche, the classification as archaeology for the reconstruction works is used with the intention of underriding the metrical Sous le nom de l’Hotel, The City of Rome Hotel, etc., which were a guideline or reference for the rest of the layout, to be built by modern standards (fig. 19). Indeed, it is considered that at least a third of the buildings in the Neumarkt were perfectly documented before the war broke out.

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term reconstruction, since it includes several actions at the same time. In the first place, the remaining walls of the original church were restored. In the second place, the ashlars rescued from the rubble are being subjected to anastylosis based on the comprehensive documentation available and with the help of computer technology. In the third place, the missing ashlars are being replaced by stone obtained from the historic quarries by the original extraction methods. Anastylosis (from the Greek ἀναστύλωσις –upward movement– and στυλός –column– in other words the rebuilding of a column) is generally considered to be the reconstruction of a historic building or part of it in its original site, using mostly the original elements of the fabric. The case of buildings made of ashlars has the peculiarity that their collapse can be considered a mere breaking up of their elements and not just destruction of their matter. Anastylosis in these circumstances seems to be more justified, but since it is almost impossible to recreate all the ashlars, it is always necessary to remake the missing parts.

The Frauenkirche is not a case of pure reconstruction like, for example, the Campanile of San Marco in Venice, but it is not pure anastylosis either. The fall of the San Marco Campanile caused the pulverization of the bricks in its fabric and its erection com’era, dov’era, was carried out completely with bricks. The collapse of the Frauenkirche, built entirely out of stone, and the exposition of its ruins to the elements for fifty years resulted in the recuperation of 8,390 pieces from the facade, the inside and the roof, in other words, 25% of the outer skin of the church. We must add the parts of the walls of the original church that remained standing to this percentage, and the almost 100,000 rescued stones of the interior of the walls. 62% of these pieces were treated and repaired in depth, 27% received cleaning and improvement treatment and only 11% survived the collapse and the elements undamaged. In the famous case of the Duomo de Venzone, there was also a large number of the original ashlars, but it was necessary to add new ashlars to fill in the gaps. The rebuilding works on the Frauenkirche could be called textual reconstruction, that is to say, the literal rewording of a text starting from an incomplete series of words –ashlars– by using a perfectly well known syntax –the documentation of the restorations carried out between the wars. It is an apocryphal text insofar as it is not corresponding to Böhr’s plan or hand directly, but possesses a reasonable value as it will permit the reading of an architectonic poem destroyed by history. In recent times, we have witnessed the interesting although less justified textual reconstruction of modern buildings, which were nevertheless born with a provisional character, and have had their very essence betrayed by their forced construction works on the Frauenkirche today constitutes a interesting and unique token of this attitude is the altar inside the Frauenkirche to recuperate its predominance in the city. Of the few that have always assumed their action wholeheartedly and never tried to cover it up by means of subterfuges. On the other hand, many other European and even German cities had the opportunity and a sort of “built” from restoration theoreticians permitting them to rebuild their monuments after the destruction caused by the Second World War. The architectonic reconstruction processes of the cities destroyed during World War II with the intention of recuperating unique buildings or groups of buildings for the collective memory of a people in some cases have lasted until our days. Is it acceptable to do the same thing today? Is it acceptable to strive for the material purism of a monument of cultural memory of a nation or a civilization is involved? We are dealing with a building with a bell-shaped dome that is quite similar and unique in importance to Saint Peter’s Basilica in Rome, the Duomo in Florence or Hagia Sophia in Constantinople. In the case of ruins, the 1931 Athens Carta del Restauro recommended anastylosis interventions in order to achieve better conservation, provided the new material added were recognizable. In none of its points did it contemplate the cases of traumatic destruction through war or natural catastrophes. Today the Italian restoration regulations in force consider this circumstance as a case apart and shows greater tolerance as regards the possible reconstruction of the building in ruins. These regulations, for example, have permitted the anastylosis of the Campanile of Pavia Cathedral, which has collapsed recently due to progressive natural degradation. An interesting case with certain similarities in the sense that a completely different solution, was that of the city of Coventry in England. This city was one of the first to be destroyed by German bombing in 1940. Besides, the total destruction of the city was deliberate, part of an attempt to impress and upset the psychology of the British people, as occurred in the case of the city of Dresden. The Gothic St. Michael’s Cathedral was razed to the ground. Shortly after the end of the war, the decision was taken to keep the ruined walls of the church as a monument of destruction and build a new cathedral on a nearby site with an altar that used old material taken from the rubble of the old one. There are critical voices that say that the ruins that have come down to us today are a genuine historic document to be conserved, and this statement cannot be denied in any way, as it is quite a proper assessment from a theoretical point of view. On the other hand, it is necessary to consider the psychological factor surrounding the issue. The German people still feels the weight of guilt for having started the Second World War, and have suffered national secession between the Federal Republic and the Democratic Republic, affecting them not only at a national level but affecting specific families divided by the circumstances after the war. The unification of Germany has meant an opportunity for national regeneration, an end to the aftermath of the war and a horizon open to a future full of optimism. The underlying danger is the elimination of the vestiges of this embittered past. It is significant that it has recently been decided to include in the reconstruction of the Frauenkirche the ruins of the west pediment, which was originally to be left as it was as a witness of the destruction by war. Another token of this attitude is the altar inside the Frauenkirche. This altar, built out of stone in 1738 by Johann Christian Feige, was one of the most appreciated Baroque altars in the whole of Germany. 2,000 fragments of the altar have been found, of which about half could be stuck together. To begin with, the idea was to rebuild the altar with the pieces available only, leaving gaps between them as a sign of the effects of war. This original idea seems to have been discarded and now the intention is to reconstruct the original altar in its entirety, probably making a distinction between the old parts and the new, but which tends to cancel out the past completely, rather than reflecting about the effect of the passage of time and incidents on the monument. A firm decision still has not been taken about the delicate subject of the restoration of the inside of the church, and the intention is to wait until the volume of the church has been completely recovered, although there are those who are in favour of the old interior decoration. It seems that there is a tendency to drop theoretically more conservative positions and seek for more dynamic solutions. The philosophy underlying the intervention can be found in the basic theories of the Foundation behind it. The Foundation Statutes for the reconstruction of the Frauenkirche, that do not specify about internal details and decoration, state as follows: “The objective of this circle consists of promotion of an integral historically faithful reconstruction of the Frauenkirche according to the plans of its designer George Bähr, using the ruins and the fragments of fabric and taking into account the archaeological methods, the use of historic craft procedures and the relevance of the constructive details for the future maintenance of the building”. The objective wants the Frauenkirche to recuperate its predominance in the city and in the urban structure of the historic centre of Dresden. The architectural and cultural polysemy of the church must be in keeping with a manifold use that reflects the opinions one may have, it cannot be denied that the Frauenkirche today constitutes an interesting and unique process from many points of view.
Restoration of roof trusses in mudejar churches in Granada

The ceiling truss covering the Mudejar spaces in Granada are a clear example of the interrelationship between different building and/or artistic activities, in which a high quality technical structure incorporates a complex geometrical system of a manifestly formal nature. The decorated ribs make up the ornamentation and in many cases are completed with rich polychromy. The decorated rib is a manifestation of the formal, functional integration, rather than the kind of restoration showing a strong contrast between what is original and what is not, which simply shows the historic and documentary decontextualization of the conserved or restored elements. From a constructive point of view, the original solutions are considered to constitute the best technological response for the proper functioning of the truss and the traditional model is deemed to be a guarantee of its conservation. This implies starting our work with a deep knowledge of what already exists by means of analysis and systematic documentation of the constructive techniques and the traditional elements used in the construction of the building, and a critical study of the patrimonial and general state of repair. The collar truss frame is a structural system that works independently from the rest of the building. It has support elements (rafters) and bracing elements to avoid deformation and the transmission of unwanted pressure to the walls (collar rafters, pole plates, tie-beams and dragon-ties). The decoration of the ribs, which are decorated with supports every so often on the walls, located on the corbels of the tie-beams, on the dragon-ties and the four corners of the pole plates. The proper interpretation of this complex system and the decision to maintain its original form is the basis of the intervention on the structure. As regards the interventions carried out on the purely decorative elements and paintwork, the criteria adopted for the rest of the intervention were maintained, so in principle the idea was to restore the ornamental and pictorial elements completing the forms and restoring the original colours. Nevertheless, in the areas where the polychromy had been totally lost, the gaps that did not alter the interpretation of the affected fragments were preserved and were only restored in certain cases, using different mechanisms to permit identification.

Church of Santa María y San Pedro de Caniles

The building, which dates from the 16th century, as we mentioned above, has a single nave and presbytery with a square ground plan separated by a main arch. Then chapels were added and finally formed side aisles. The truss covering the central nave is made in a collar truss design with single hip rafters (limas) and with six railed double tie beams that are decorated with cables, moulding and leaning on foliated carvings. The truss of the main chapel is octagonal with double hip rafters (limas moamaraes) and railed tympans with eight-shaped bows (lazos de ocho) and scallops (pechinas) at the corners, with an upper hip roof that supports the roof plane.

Reconstruction of the trusses

The wooden structures were mostly in a very advanced state of deterioration, mainly due to the leaking of water from the roof, provoking an attack by xylophagous agents. The worst damage is to be found in the supports, so that the elements that suffer most are the bracing elements, that is to say, the tie beams and pole plates, causing horizontal thrusts at the crowns of the walls. To reverse the intervention, it was decided to maintain the basis of the intervention on the structure. As regards the interventions carried out on the purely decorative elements and paintwork, the criteria adopted for the rest of the intervention were maintained, so in principle the idea was to restore the ornamental and pictorial elements completing the forms and restoring the original colours. Nevertheless, in the areas where the polychromy had been totally lost, the gaps that did not alter the interpretation of the affected fragments were preserved and were only restored in certain cases, using different mechanisms to permit identification.

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place due to the steep slope of the tympanums. In this sense bituminous materials were avoided because of their incompatibility with the rest of the materials used and because of their poor durability. Other rigid materials like fibre cement do not resolve the sliding problem either, nor do they adapt to the compressed concrete was decided against because of its irreversibility, its great weight and its scant constructive coherence with the wooden truss. The solution adopted once again involved resorting to traditional materials and techniques. A cane mesh was nailed to the buttress and arice finisher layer of black plaster was poured over it to fix the tiles, placed deeply overlapping each other and set with a very poor lime mortar. The intervention on the roof conserves the concept of a light, flexible, permeable roof, permitting the seasonal movement of the timber, the transpiration of the building and the integral ventilation of the whole truss, so that even though there were a certain amount of humidity, it would not be a serious problem.

The recovery of the bow elements and their polychromy

On the inside, after a general initial cleaning process with a vacuum cleaner, the trusses were restored by replacing missing ledges and fixing loose pieces with glue and nails. The cracks and gaps were filled in according to their dimensions, either with treated wood or wood paste. As a preventive and curative measure, the timber structure without polychromy was impregnated with Xylamon T Special injected into the affected zones after cleaning to get rid of parasites. In order to return the wood to its original consistency, lost through natural ageing and degradation factors, an acrylic resin (Paraloid B72) dissolved in 8% Proquisol was systematically applied to the whole surface. The new wood and the old faded wood in the faces was touched up with natural dyes, matching the shades to the original ones after cleaning, brushing and treating them adequately. As regards the polychromy, because of the very bad state of repair of the woodwork, it was necessary to carry out consolidation work before cleaning, which was done by aspersion of Paraloid B72 in 4% Xileno. The cleaning process consisted of removing the stains and dirt with cotton buds impregnated in acetone, ethyl alcohol and ammonia, neutralizing their effects on the paints. There was a white strip between the structural elements that was partly missing and it was decided to mark it slightly in the collar of the nave truss and in the presbytery rails. The procedure followed consisted of applying a glaze of a similar colour to the existing remains, as this was considered essential to restore the appearance of the truss.

Santiago de Baza Church

Santiago parish church is one of the first foundations of the city of Baza and it was built in the year 1505 on top of the old mosque of the Jewish quarter, and is one of the most interesting examples of Mudejar architecture in the region. The element with the most artistic quality is the octagonal truss covering the main chapel. Its structure is made up of wheels of ten and twenty mixed bows under the roof boards painted with candelieri. The central panel is decorated with carved angels and the pendentives are covered with coffers decorated with roses, painted bush and amorphous mouldings. The central nave is covered with a collar truss with scalloped hip rafters (limas bordones) and a railed modillions and single dragon-ties.

Structural consolidation of the truss

With a general character and from a structural point of view, the resistant elements of the truss were in a good state of repair. We came across only one specific problem in the truss of the central nave due to the opening of a window at the top of the wall on the left side. The poor solution adopted for the roof involved the closing and the buttress located over this window, causing it to rot and lose its functionality. This situation had brought about the collapse of part of the roof gable affected, so that it was necessary to replace the damaged elements and also the buttress located on the side of the main chapel, the existence –probably from the very beginning– of a hip superseded truss in an acceptable state of repair had saved the octagonal truss from structural effort, so that the pathologies found only involved several leaks, which, although they had altered the surface of the wood and the polychrome, they did not affect its structural stability.

The analysis of the pictorial materials as a basis for intervention

The restoration works on the intrados of the truss of Santiago church were preceded by a series of studies and tests of the different layers of paint. Samples were extracted and the layers were examined by X-ray diffraction and optical microscopy. The results yielded interesting data, not only as regards the characterization of materials and their execution technique, but also as regards the state and the alterations that had taken place, a reflection of specific historic deeds. Thus it was found for example that the blue pigment –black in appearance– that had been irreversibly altered by the heat from the bonfires lit inside the church during the civil war. This fact was also evident from the presence of basalt in the layer of preparation for painting, as this mineral appears in dehydration processes of plaster, which is the main component of this layer. Another of the conclusions gleaned from the tests has to do with the presence of water and damp in zones apparently unaltered by this factor, as once again the mineral providing blue, azure, presents chemical and chromatic alterations, being transformed into malachite, a greenish colour. Partial recrystallizations can also be seen inside some plaster pores as a result of dissolution processes due to the presence of water. In the performance of the painting technique, we can observe once again the quality of the work, as we have observed to date, a lack of differentiation of the composition –plaster with an organic agglutinate– although of different thickness and impurity content, applied as a base for the paint. The colours most used in the ornamentation are red (vermilion), blue (German blue), yellow (cadmium yellow) and white (Saint John’s white), each of which correspond to the minerals cinnaabar, azurite, greenockite and carbonate Ca-Mg. These same pigments were the ornamental basis of the trusses of the church of Caniles, although in that case they were not previously prepared, in other words they were applied directly to the timber. Finally the gilt and silverwork were adhered with fish glue to a layer of clays which formed the base on which the gold and silver leaf was polished.

Restoration of the decorative elements and the polychromy

Basically the tasks performed on the decorative elements and the polychrome consisted in the first place of the previous fixing of the pictorial layers with vinyl resins and in the restoration of zones that were in serious danger of loosening and detachment. Next a general cleaning process was carried out with a vacuum cleaner and soft brushes to remove accumulation of dust and pigeon excrement. The fumigation, consolidation and cleaning of the timber was done in the way described for the Caniles trusses, and the loose or missing elements were replaced in the same way. Following the usual practice in the replacement of missing decorative elements, pieces were fashioned from synthetic resin by means of moulds taken from the original ones. As regards the polychromy, the broken or loose pictorial layers were systematically consolidated and adhered by aspersion and/or injection of synthetic resins (polystyrene alcohol and Paraloid B72), covering the surfaces to be treated with Japanese paper and attaching these layers with a thermal spatula. The cleaning tasks on the polychromy were decisive in order to appreciate the great richness of the patterns and colours, up to then hidden under the dirt. Several chemical means were used (trichloroethylene, acetone, isopropyl alcohol, butylamine, dimethylformamide, turpentine essence and Proquisol), combining their action with other mechanical ones (cotton buds and scalpels), adapting the products and methodology according to each type of dirt and keeping a slight film as a patina. The chromatic replacement of the missing paintwork was done by means of natural pigments and an inorganic aggregate in which the loss took the form of whole panels that had been substituted by others and whose designs had no connection with the original ones that existed. The original design and colours, easily identified because of the symmetry of the paintwork, were reproduced and the rigattino was used as a differentiating criterion. Finally the whole surface was protected by applying Paraloid B72 diluted in 5% Proquisol.

Urban Restoration of the Plaza de les Caseres and the surrounding walls

Introduction

The fort of Peñíscola is set on a rocky promontory surrounded by the sea and joined to the land by a sandy causeway. On the highest part of the rock we find the castle, built by the Knights Templar in the 13th century. The lower enclosure holds the town and includes the walls that surround the rock, accentuating its powerful image as an unsailable fortress. In the 16th century works were carried out on the medieval fortress to bring its defences up to date. Philip II commissioned his deputy Captain Vespasiano Gonzaga to rebuild the stronghold and the Italian engineer Juan Bautista Antonelli to draw up the project for the defences. The Renaissance ramparts constituted a new front facing northwest configurating Peñíscola citadel. This work is an important example of Renaissance military architecture, incorporating the constructive elements typical of bulwarked fortifications at the time. At the end of the 19th century, Peñíscola was dismantled as a stronghold, so the walls lost their earlier function as ramparts. In this century and after the civil war, the whole ensemble of the fortress was in a very poor condition. From the sixties on, restoration works were initiated on the castle, and the rest of the walls were integrated into the urban space practically without any major modification. In those years the lower part of the town began to be developed and, on restructuring the levels, some elements of the fortifications were absorbed by the works. At this stage the construction of the port was completed, and the tourist boom really started. The inhabitants of the historic town moved out of the walled town to the isthmus and great building activity was initiated along the sea side areas. In 1994 all the walls were in a state of evident neglect. Some elements of the fort, such as towers, ramparts, parapet walls, gunpowder magazines, etc., had been

Pepa Balaguer Deccallar

Urban Restoration of the Plaza de les Caseres and the surrounding walls
built into later constructions (some of which were private). Other emblematic spaces, such as the bulwarks, arsenals, turrets and vaults, had been closed up or were being used as store rooms, and some of the parapet walls were impossible to get at. The ramparts, having lost their military function, were now used for various purposes either by the City Council or the people themselves. This situation is reflected in a Guide Plan containing strategies for the restoration of the walled city. The intervention on the Plaza de Caseres and the surrounding area was carried out for the fundamental purpose of restoring and enhancing the exterior and interior spaces that make up the walls, recuperating connections and elements lost among the different parts of the fortress and incorporating the parapet walls, bulwarks and batteries in the main tourist routes of the city. In this way, the idea was to give a purpose and use to the wall in order to restore it to its leading role within the urban space, as well as favouring the valuation and conservation of the monument as an element of the first order in the definition of Peñíscola citadel. The urban spaces that constitute and delimit the fortifications also have great interest as a present and landscape concern due to their connection with the fortress and the natural elements surrounding it (water springs, the sea, rocks, etc.). The intervention concentrated on the fortifications at the south-west of the citadel, around the Plaza de Caseres and the spring of Font de Dins. This situation is reflected in a Guide Plan containing strategies for the restoration of the walled city, including the urban renovation of the latter. On the higher level of the ramparts, the crowns and parapets were restored, pavements and connection elements between the different parts of the ramparts refurbished, and the drainage system was repaired, as water had been leaking to the centre of the ramparts. The sentinel routes and the Department of Culture and Science commissioned an archaeological study to look into the findings and to gather documentation for the following interventions, works to be carried out in the near future on the walls giving on to the port.

Description of the work by zones

The intervention took place on Santa María Bulwark, Santa Ana Battery, Fuente Rampart and the walls around the Plaza de los Caseres, including the urban renovation of the latter. On the higher level of the ramparts, the crowns and parapets were restored, pavements and connection elements between the different parts of the ramparts refurbished, and the drainage system was repaired, as water had been leaking to the centre of the ramparts. The sentinel routes and the Department of Culture and Science commissioned an archaeological study to look into the findings and to gather documentation for the following interventions, works to be carried out in the near future on the walls giving on to the port.

Building developers and stages

The works planned and carried out between 1996 and 1998 corresponding to the projects described on these pages were promoted by the Peñíscola Municipal Tourist Board and developed within a Plan of Tourist Excellence between 1993 and 1998. Besides, an INEM Educational Workshop was set up to work in this area. After several meetings between the people running the workshop and the Excellence Plan, the Municipal Tourist Board commissioned two contracts, one to determine the works to be carried out by the workshop and the other to be performed by a building company. The Educational Workshop was left to do the craft-like jobs that coincided with their training units. In this way, they would see to the carpentry and stonework, which would be detailed, and other works necessary at the start of the intervention. On the other hand, a building company specialised in restoration would carry out most of the work, particularly the most risky tasks. The project included a survey about the area to be acted on, with a revision of all the historic documents available. The written documentation about this zone was difficult to interpret as there were no archaeological works to confirm the few hypotheses about the elements to be worked on. A fundamental reference for this study were the plans of the project on the wall drawn up by J.B. Antonelli (1578) and A. Montaigú (1730). Besides, old engravings and photographs provided very interesting information, making it possible to predict some later findings. A comprehensive graphic survey was carried out and exploratory trenches were opened on the pavements of the ramparts and the characteristics of the fillings. At the initial work phase, on removing the additions to the original pavement, medieval wall structures were found, interesting enough to make us reconsider our ideas and fashion the plans. Since these works were finished, we have continued with our study, because, thanks to the interest of the findings and the need to complete the restoration of the whole area, new subsidies have been obtained.

Thus, the Council promoted restoration works on the space of the Font de Dins spring. These works, carried out between 1998 and 1999, involved the restructuring of an old factory that lay on the spring and was attached to the city walls to be used as a "Museum of the Font de Dins" and the restoration and cleaning up of the area surrounding the spring and the fortifications there, which had been covered up by this building. In 1998, the Department of Culture and Science commissioned an archaeological study to look into the findings and to gather documentation for the following interventions, works to be carried out in the near future on the walls giving on to the port.

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Montalau S.J., who performed these tasks with a little backhoe, as manual methods had to be discarded due to the hardness of the fillings. The lower walls of the dwellings attached to the ramparts were reinforced as they were simply leaning against the wall, and were left very fragile once the level of the filling descended. The entrance to the dwellings was also restructured, because the previous sentinel path had been above the foundations of the houses but was now below. To bridge the gap between the two levels, some steps made of recuperated natural stone were laid down. These works were complicated, as there was very little space to place the stairs and they had to be situated on the landmass, with no support for the foundations of the ramparts. Besides, the doors into the dwellings were replaced because the original ones were not high enough after the level of the threshold had been lowered. The pavement of the lower level of the whole path was made of stone concrete similar to the original, with fillets and gutters made of the local grey limestone, as in the rest of the intervention. Stone gargoyles were set there to drain rainwater and lamps were placed on the pavements and the walls to light these routes and highlight the main points of interest. The Santa María Bulwark constitutes the end of the current frontier and historical reconstruction of the fortification designed by J.B. Antonelli. This project was left unfinished, as the last part joining the Santa María Bulwark and the Sant Pere Portal by sea was never built. The exact outline of the earlier medieval fortress can be gathered from J.B. Antonelli's plans and the abundant documentation accompanying it in the Simancas Archives and the polemic that arose between J.B. Antonelli and El Fratin, both Italian engineers at the service of Philip II, about how to resolve that stretch. The latter did not agree with the former's proposal to prolong Santa María Bulwark into the sea and continue on to the Portal with the same kind of construction and suggested an alternative solution that consisted of forming a tenaille leaving the Font de Dins outside the ramparts. Neither of the two proposals was carried out. A provisional solution was adopted, closing the fortress quickly and cheaply in the south with a stone masonry wall built on the medieval structures associated with the spring area and later called Santa Ana's Battery. This battery was begun at that time and finally consolidated in the 18th century. The Santa María Bulwark is made up of five very resistant internal hollow or armoured vaults on which the upper battery zone leans to install the artillery. The exterior is made up of a sloping ashlar wall with a strong continual stringcourse resolving the change of plane. The interior of this arch which was to be used for military purposes with a timber framework at an intermediate level. These spaces were closed until the arches were opened up on to the square in the seventies. The rest of the openings were useful to determine the height of the intermediate level and the materials to use in the restoration. The intervention consisted of cleaning and adapting the vaults and installing a wooden footbridge at intermediate level and a staircase to recuperate the original connection with the upper level of the batteries. On the upper level, the pavement, which was in very poor condition, was reconstructed with stone concrete, stone fillets and timber joints. The slopes had to be inverted to evacuate the waters outside by means of stone gutters and gargoyles, made by the students of the Educational Workshop. The low walls or parapets were then to be reconstructed with stone concrete, stone fillets and timber joints.

The Santa Ana Battery, built between the medieval and Renaissance walls, was constructed in different phases between the 16th and 18th centuries, as we explained above. It is a fairly wide platform delimited by walls of dilapidated rubblework. There are two different parts
that converge at an angle and on which some trapeze-shaped pinnacles are placed to form gun emplacements. These pinnacles, built out of solid brick and rubble, were built at a later date, in the 18th century. Underneath the Santa Ana battery following the line of the pinnacles, there is a vaulted pipe one metre above sea level to channel the waters from the Font de Dins to the Santa María Bulwark. The pavement and the five missing slabs have been replaced by grey limestone slabs. The walls that could not be left on view have also been represented on the pavement by the timbers and a slight change of texture. Besides, the pores and pedestals of the wall have been consolidated, the parapets, pavements and staircases restructured and the water evacuation and illumination systems renovated. The lateral and inside faces of the pedestals have been consolidated with solid bricks at the corners and filled in with coloured cement mortar. As regards the pavement, it was necessary to take into account the condition of the pavement and the awkward, inelegant staircase communicating these zones before restoration. The plaza de les Caseres has constituted a unique space in the city since the opening of the Santa Maria gateway in 1754. Its name comes from the fact that there are some houses or "caseres" beside the wall that were used for military purposes. The work on the square was centred in the restoration of the wall delimiting it, the rehabilitation of the facades of the buildings attached to it and the urban renovation of the space. A high-quality finish has been applied to the facades of the dwellings, which were unfinished and in a very poor condition. Some of the carpentry of all the boys has been replaced or restored, and all the houses have been given a unifying treatment as far as colour and materials are concerned, differentiating facades, jamb, carpentry and shutters using as a reference typical Peñíscola houses. Wires and installations have been removed and street lamps replaced. All of this has been done with a view to making the fragments of the original ramparts stand out, distinguishing them from later phases and reducing the visual impact produced by the new buildings. The installation in the square have been renovated, the infrastructure have been buried and part of the pavement that was in bad condition has been replaced, giving it a homogeneous treatment. Urban equipment, illumination and trees have been included to turn the square into a site for leisure activities and street shows.

Conclusion
It is worth mentioning the task carried out by the Escuela Taller de Peñíscola and the Building Company in charge of the works (Construcciones Monllau, S.L.), who made a great effort at all times to work in a coordinated manner and overcome the difficulties that arose. From these pages we wish to thank the promoters, builders, students, workshop leaders, researchers and technicians for the work they have done, of which we are all extremely proud and which has made it possible to uncover and restore parts of Peñíscola fortress that were unknown until now. This zone has acted as a Pilot Zone for the Special Preservation Plan that was drawn up in this city between 1996 and 1998, and this experience has made it possible to draw some conclusions regarding urban equipment, the preservation of infrastructures, the treatment of facades, etc., that were later included in the Urbanistic Regulations of the Special Preservation Plan.

F. Javier López Martínez
Mud and cob walls

Definition
Cob walls are a kind of fabric used until recently in our country and acknowledged in old historic sources, treatises and ordinances. The cob wall is a basically modular type of construction that is made by setting up a plank frame called tapial, pouring raw soil and/or other materials inside and tamping it in layers; once the cobs have been completed, they can be placed side by side in a row and on top of each other until the desired height is reached.

There are two basic conditions that define this form of construction:
1) The use of a characteristic mould.
2) The use of tamping as a way to order, stabilize and consolidate the mass.

Etymologically speaking, according to Joan Corominas, the word tapia is related particularly with raw earth and the word tapia itself seems to have an onomatopoeic origin based on the sound made by a tamper or a hammer tapping the earth. As a fabric of raw soil, it is one of the typical possibilities and ways of using this material:
- Moulding: hand-made clay balls placed while damp. Projected: panels made by wefts of reeds, twigs, planks, twine or strips of leather, on which the mud is thrown and spread.
- Compacted: cob wall, tamped floors.

Although an exact composition is not required, each type of soil is suitable for a different type of fabric, and sometimes it is necessary to make mixtures or additions to correct the deficiencies of a single type. In this way, the first requirements is a grease remover, that is to say an element that helps to resist the traction due to retraction produced by drying, either in manufacturing or due to dampening-drying processes. As regards the walls, it will be necessary to have enough clay to fulfil its binding function but, at the same time, the quantity must be limited, because it is rather sensitive to damp. Depending on the proportion of clay it contains, natural soil can be used directly or after adding sand or fibres in the event that it contains too much clay, or other aggregates if it does not contain enough. In general the fine content will be about 40%, and it must be free from organic matter, so that the upper layer of vegetable soil is traditionally removed and the mounds of soil are left out in the open for quite a long time so that the vegetable residues will rot away. Although most of the recommendations consulted reduce the amount of gross aggregates and limit their maximum size to 20 mm, in practice there are many cob walls that do not have this proportion. Although it is better that the earth for walls should not come from the vegetable layer, some other types of fibre can be added to the mass to improve its behaviour in situations of traction, and even chaff has been added to the cobs used for making fences. Although we could consider these building materials weak, it is surprising to see how resistant and durable they actually are when their composition is correct, they are properly compacted and protected; in regions with a wet climate or a wet season, they say cob work needs "good shoes and a good hat," which means a socle base made of stone on which the cob wall is placed, and a prolongation of the roof by means of eaves or cornices. Thanks to the use of soil, many cob walls harmonize or blend in with the landscape, since both the colour and the matter itself coincide with their surroundings. Unlike most of our current materials, as it has hardly undergone any transformation, its degradation only involves a return to the ground it came from, so that it can be used again for building or agriculture. Aggregates were soon added to the soil to improve its qualities, and the residuum describes the technique used in the 14th century, he says that "a mixture of earth and lime" was poured between the planks. When medieval Andalusian walls and floors are uncovered, it is common to find the soil mixed with ashes.
The plank moulding the frame

The plank moulding is one of the basic characteristics of a cob wall, and the reason for its shape. We can say that the image of cob walls, due to the many traces left by the different elements of the moulding, has a didactic value, because it reveals the constructive process to us. It is characterized by its man-sized measurements and planar stability, and the fact that it makes it possible to construct a building without scaffolding.

This moulding can be called frame, mould, rigging, skeleton, shell... Elements of the moulding:

1) PLANK MOULDING. The planks are the main part of the framework (cf. References 2.4 & 2.5) and the 1) PLANK MOULDING. The planks are the main part of the framework (cf. References 2.4 & 2.5) and the

Measurement. Traditionally it consists of a timber board about three centimeters thick, laid down horizontally and joined by vertical laths, rods or strips, also made of timber, usually placed on the outside and nailed, for obvious reasons, from the inside of the board, so that the heads of the nails are in the laths, which gives the cob wall one of its features: a column of holes all over the surface. These rods that are used to "staple" the planks are sometimes placed on both sides of the cob wall, one near each end, giving rise to a reversible wall; in this way the vertical lath has another function besides: holding the side door of the mould in place (as we shall see in the next point). The measurements of the moulds must be such that it is possible for two or three people to transport and handle them. Their height must permit tamping inside the mould (the upper edge will be lower than a man’s elbow). Taking into account its use as a unit, its measurement has lasted for a very long time, especially the height, which is usually two cubits or one vara, the proportion of the moulds is usually 1 x 2 or 1 x 3. We must take it into account that when we see the traces of a mould in a wall we do not see the mark of the whole plank; that is to say, the length of the mould does not coincide exactly with that of the wall, unless the cob has been placed overlapping the previous one and it has not been necessary to place a door at the end, which occurs in the case of continuous moulding, common in important works like city walls. The cob module, based, as I have said, on human measurements, affords the following fundamental applications: a cob corresponds with the height of an apron, two cobs with that of the lintel of a door or window, three cobs with a ceiling. In medieval defensive structures, this proportion was followed to the letter: a cob would form the parapet of a sentinel path or the apron underneath a loophole, reaching a height of two cobs, another cob would provide the mason, three cobs would be the usual height for the chamber underneath the terraces of the rampart towers, etc. Three cobs is also the minimum height for a partition wall, on which the framework of the upper storey can be laid (other functions with a greater symbolic value: planks and not in the laths, which gives the cob wall one of its features: a column of holes all over the surface. These rods that are used to "staple" the planks can be recovered and reused; however in some cases it is difficult to recover them and in that case 'half pins' are used, nailed to the mass of the wall and left inside them, in the case of large walls like ramparts. Here once the cob has been made and the planks taken away, the pins are cut and sealed with mortar. These little pins for large walls usually have a hole in them to insert a wooden or iron nail, or the nails hold them up without perforating them.

4) BRACES. These are linear elements assembled vertically with the pins to hold the cobs in place. They are attached to the pin at the bottom and can be attached to another pin at the top or tied by twine that can be tightened by means of a winch or a crank so that two braces and two pins (one above and one below), can achieve the greatest possible density. The optimum amount of water will depend on the granulometric composition and the compacting energy: the greater the energy, the less humidity; if the water content is too high, it can be dried by adding dry adobe or quicklime to the mass. 12% of the water content is an average value that can orientate us, always inferior to the plastic limit. (In the case of the restoration of the mausoleum of Toral de los Guzmanes, 8.5% of water was the percentage that obtained the greatest resistance.) On site we can gauge the ideal consistency by taking up a handful of the soil and squeezing it. It must retain the shape we give it and when pressed from a distance of about one and a half metres, it must break into a few pieces and not become shattered or pulverized. A more rigorous test is Proctor’s test, which will tell us how much water is required to achieve the greatest resistance starting from an energy, or number of blows, applied to compact a given soil. The compacting or tamping is a characteristic of cob walls that distinguishes them from other techniques that also require moulding. Concrete of conventional cement is moulded although it is not usually compacted but submitted to vibration and hardened by setting and not by drying or carbonisation as in the case of a traditional wall. A semidried concrete mass tamped in layers could, for example, be considered an example of the concept of cob wall. As another consequence added to the low humidity necessary for good compacting, we have the possibility of a quick demoulding as a consequence of which the planks can be used again, which reduces the number of instruments required. The moulder builder or cob maker only requires one pair of cob moulds; large works like ramparts are another matter, as the organization of the work must be much more complex. Traditionally the tamps used are made of hard wood with a shaft about 1.5 m long. There are different types but the most common one is a truncated pyramid shape. They can have a pointed or a wide base with all the lateral sides trapezoidal in shape, and there are some special ones like the one ending in a row of little arch-shaped cavities and others. It weighs under twelve kilos and is used by hand and brought down from a short height starting at the edges of the cob. There are usually one or two builders inside the box, beating rhythmically and stopping in order to add another layer; when the cob is made of soil, the builder knows when it is properly compacted from the sound it makes on being struck by the tamp.

Types of cob

A) SIMPLE COBES. These consist of a single material, no matter whether it is only one element or a mixture of several.

1. COMMON OR ORDINARY EARTH COB. These are the most common type of cob. They are used both in urban and rural dwellings and in fences, in which case they can rise directly from the ground without a stone socle, although this circumstance constitutes their weakest point. When all the mass of the soil is mixed with lime, a stabilized earth cob is
In this case the earth or shell wall is built between piers (with or without layers of bricks) made of brick, C.1) WALL BETWEEN PIERS OR PILLARS

This has its origin in the Roman opus caementicium; there are examples of mortar walls in Rome that have survived since the 3rd century B.C. in which traces of the moulding and the layers of material can still be detected. In his Book I, Palladio mentions this type of fabric, but, as I pointed out above, earth coffins do not consist of using intentionally closed concrete. The layers poured into the mould can be made of the same material or alternating, with or without the addition of large stones (cyclopean concrete).

The mortar must have a fairly thick consistency, similar to that of soil, to permit proper compacting, the possible interruption of the fabric in a sloping plane and immediate demoulding. Although lime has traditionally been used to agglutinate, it would be possible to use other materials instead.

B) REINFORCED ON THE SURFACE

This consists of the construction of a cob with a shell including bricks on the outside. This type of wall would resemble a series of wedges laid down vertically and bound together by the soil. The humidity of the mortar must be similar to that of the soil. In the tamping process, both in the case of mortar-spiked and concrete walls, a kind of grout flows into the voids of the cobs, in which the moulds are set up and the walls are built. The difference between this way of building and the previous one resides in the fact that in this case the reinforcement or first order structure is built first and in mixed fabrics it is all built at the same time between the planks, so that there are not two structures but in fact only one structure with different layers.

Finish for cob walls

This is an interesting issue, quite difficult to handle from a restoration point of view. The first thing to take into account is the compatibility between the material of the finish and that of the fabric; in order to avoid the former rejecting the latter, the former must permit the humidity to get out and must not be too rigid to follow the deformations of the latter. In most cases the constructive process actually provides the finish itself. The tamping produces a grout that covers the outside. In the cases of shell walls, a layer of mortar is spread over the whole surface at the same time as the flaws or gaps produced by the pins are filled in. Whitewash is also a popular finish, as is the mud and straw finish for earth cobs. Where there is a thick coat of whitewash, the surface is usually stamped first to make it adhere better.

The al Andalus caliphs’ forts are a peculiar case: strips of plaster are placed on the outside to look like the joints of large ashlaris with a sgraffito-like technique, sometimes reproducing epigraphic motifs. These are examples in Silves (Portugal), Puerta Elvira (Granada), El Vacar (Córdoba) and Xivert (Castellon).

Constructions

Although it is the same principle, there are logical differences between what we could call domestic or popular building and public works, although the distinction would be between architecture with thin walls (up to about sixty centimetres) and thick.

Thin wall construction

This is the kind of construction we most often find in dwellings and popular constructions throughout history. It usually starts with a socle with or without a plank moulding, made in the material most resistant to damp and water. The planks are placed on top of the socle. If they are not prepared to fit into the lower fabric, there are at least two solutions: a) to use a mould with slots to place the pins in or b) to place them between one of several rows of bricks or flat stones. The moulds are placed on top of the pins and held in place by the braces located on the lower pin while they are tightened at the top by means of a rope, pin or chain. To avoid the planks collapsing inwards, the braces are located, and the box is closed with the head or end plank. Between three and five people are needed to carry out these chores: one or two tamp the material from inside the box and the others prepare and transport the mass. In 16th century Murcia ordinances it was made between moulders and tampers, although neither of them had the power to act as master builder. According as the wall grows, the braces are removed. Once it is finished, the moulds are taken down in the opposite order from that in which they were put up, and finally the pins are removed. Then the whole thing is set up again and the operation is repeated. As the wall is built in sections, it is important that the vertical joints should not coincide. Apart from the traditional resources of shackle posts and pillars, the corners can be reinforced with pieces of timber imbedded in the fabric as clamps.

Construction of thick walls

The construction of very thick walls such as those in ramparts and forts involves the use of special elements and procedures (although everything we said above still applies). In this case a mason with a pair of moulds is not enough, but a systematic process involving a large number of people, trades and tools is required, all well organized so as to work quickly and efficiently as well as economically by using the resources to be found in the area. Continuous planking and the use of disposable accessories, like “half pins” to be left inside the fabric, are two basic characteristics of these constructions, in which we also find elements imbedded to form shed. In many ramparts we can see how the vertical joints are not really joints at all but the union between different doors, allowing us to measure the total length of the planks. Interruption in the work usually shows also sloping joints, fairly far apart from each other, meaning that the work was stopped without using an end door, which would have had to be even larger than the planks due to the great thickness of the fabric. The excessive length of the pins and the difficulty in extracting them without damaging the fabric gave rise, as I mentioned above, to the use of disposable “half pins” to be left inside the wall. At the corners there are two pins placed perpendicularly over each other, sometimes joined to each other by means of metal carpenter’s nails. Many of these pins have an origin at the back in which wall was made of wood; this element could have two functions: one, to attach the crossbar to the mass, and the other, to tie the ropes to fix the braces to avoid the moulds overturning. These ropes or the traces of them still exist in the ramparts and can be seen in the ruins. Because of the great thickness of the walls, it is not always possible or practical to locate those diagonal strips (from pin to brace); sometimes there are other laths or the mark of other rods that must have been imbedded vertically or obliquely in the mass like little posts as tying points (see drawings). The problem of the mould tilting outwards can be solved as I described above, but there is still the problem of its tilting inwards. This difficulty can be overcome by using timber props or by inserting wedges or nails on the inside of the mould when it is placed on top of a footing. Some of the accessories mentioned can be extracted and used again because, for example, the danger of the planks tilting inwards disappears when the filling has reached a certain height; nevertheless there are others, such as the pins, which work out with an axe once completed and the holes were filled up, and the operation was also used to correct other imperfections by spreading the coat of mortar over the surface, giving it a finish no different from the rest of the material except for the absence of plank marks. Another way to go about
building thick walls without using special tools consists of manufacturing and combining the moulds as though each one were a brick corresponding to a wall one foot or more thick. In this way each module of the wall is easier to make, although the whole procedure is not so fast as the system of continuous moulding.

Other constructions
As well as their use as loadbearing, closing or defence walls, these cob walls, especially those whose main ingredient is soil, have been used as props or provisional closing of arches and doors. The capacity of these walls to be pierced, excavated or eliminated after building can be seen in many cases. It is common to find in ramparts many towers which were solid at the base and excavated like caves to form dwellings. It is a common procedure in popular architecture to build blind walls and hollow them out afterwards. As regards the use of the cob as an intrados, a magnificent example was found during the excavation of the Alcázar in Murcia, in the city where the School of Dramatic Art stands today; an arch leaning on a cut-off cob wall was the foundation of some rooms. An example is the Alcázar de Fadrell (Castellón), and the blind arches between the presbytery and the apse aisle in the Colegiata de San Patricio in Lorca, where the wall also fulfilled the role of provisional closing (until the present day).

Restoration of cob works
I shall now explain the restoration of two cob walls which I have been involved in as an example. It will illustrate what I have said above.

1) The Verónicas section of the Islamic wall of Murcia was uncovered on the demolition of the convent of the same name. The convent building had been set in the wall, rampart and the space between them, and due to the great width of the medieval wall, it had been reduced to half its size. The original fabric was of mixed earth cob with a thick layer of concrete on the outside, with concrete reinforcements in the form of alternating planks placed alternately on top of each other. The wall had undergone repairs throughout its long history, by means of the addition of rows of stone between layers of brick, or brick alone when the gaps in the material were more irregular, that is to say, where more or less superficial repairs had been required. However, the current works, promoted by the City Council of Murcia, were more serious, as there was a layer about one metre thick missing from the ground of the stockade to the crown, which meant that it was totally unprotected from the elements. With a view to restoring its value, the decision was taken to restore the cob work with cobs, as the "layer" to be added was as important as a real wall. A mortar-spiked wall was made (mortar of natural greasy lime, slaked by fusion for years) moulded on one side only and while restoring the wall to its urban appearance, we were giving a didactic demonstration of the method at the same time.

Whether to leave the pins visible or not was a moot point. The use of pins was part of the construction method, as I pointed out above; when a thick wall was built, pins were used and then cut by an adze after they had been covered (evidence of this existed inside the walls) and covered with a grout of mortar so as not to leave any weak points in a structure that was intended to be inaccessible and indestructible. In our case, with an aesthetic and didactic need not to cut the pins which had indeed been used to hold up the planks although lack of maintenance, time and the elements will destroy them. The building of the wall was carried out with continuous moulding, by means of several planks, just as the original wall must have been built. The planks were 2.5 m x 85 cm, with grooves of 30 cm between the axes to place on the pins of 2 x 7 cm, (typical of this type of construction); the grooves allowed us to locate the pins on the lower planks without making a channel beforehand and without leaving a lower strip of the wall demoulded. The parapet and the repairs to the tower were carried out in lime concrete. The north face of the same wall, where the removal of half the section had not taken place, was treated, as had occurred after the Christian conquest of the city, with rubble and layers of brick which, at least in its line, coincided with the wall sides, and thus two rows of stone between layers of brick coincided with the height of a cob. Another work was performed in 1996 on the north face, promoted by the Autonomous Community, with a view to solving the union of the rampart with the church of Verónicas, a structure that formed part of the monastery and used the rampart as a wall or foundation.

2) The south rampart of the Castle of Monteagudo, near Murcia, had two emergency works performed on it by the Autonomous Community. a) The first of these took advantage of scaffolding to solve an intervention in collaboration with the L.N.E.M. that had never actually been carried out; on the other hand, they were looking for possible solutions to consolidate or repair a wall, difficult to get at and badly damaged. Trying to use a technique that would be coherent with the cob and as it was not possible to lay down vertical pieces, they decided to use lime concrete using the cob pins and other longitudinal planks as an adhesive to hold and adhere the new material to the old. There would be a kind of compacting, but horizontally this time (which also occurs when the mass is tamped in the conventional manner, due to the constraint exerted by the planks). It was an interesting experience: the lime concrete was stored sixty metres from the works (prepared in a cement mixer) and there it was mixed with five per cent white cement immediately before using (to obtain a suitable resistance quickly in order to continue with the building). The material behaved very well in spite of many difficulties that we did not go into here, and it was possible to put down layers of more than ten centimetres and sixty or seventy centimetres altogether. One of the great problems of the method resided in the difficulty in dominating the wall, i.e., the danger of staining the surrounding areas, and another was the rejection that occurs when the concrete cannot be laid down from the right angle. In this case the pins were located as a frame and as a reference to the technique, but only with the length corresponding to some cut-off ones uncovered by erosion. In this case the heads of the pins had a V-shaped cut, which indicated they had been cut by an adze. Although the idea was to recover the plane corresponding to the surface of the wall, for unforeseen reasons it was necessary to stop the works before all this surface had been replaced. Even so, the resources used provided a coherent image: we had repaired the walls to achieve a surface like a badly eroded wall with large, although uniform, losses of material, so that it fitted into the general discourse that the broken pins should appear.

b) The second occasion arose a year later. This time large work platforms were set up and, taking into account the serious loss of material, the walls were repaired on the adze side and others raising the whole cob, without surpassing the height of the remains conserved but defining the geometry of the walls, at least up to that level. They were built with lime concrete and large stones, and in the areas where the whole wall was rebuilt, layers of earth were placed between the layers of concrete. In this case, when a large enough stretch had to be rebuilt, the technique of visible pins was used, like in Verónicas. When the walls to be completed were located on a plane sloping lengthways, the work was started with masonry up to a height where a whole cob could be placed (a technique that had also been used in the building of the original fortress). An important matter for me (in a negative sense) was the lack of parallel archaeological excavations because, although most of the works did not require them as they were performed mainly "from the outside face" and based on the visible evidence, when it became necessary to continue the restoration on the inside I had certain doubts that were reflected on details of the finish (if there should be another chance to work on it in the future, it will be possible to rectify or complete some points thanks to the information acquired in archaeological research).

Reflections
While writing this article, I have started restoration works on another cob wall: a tower of the Castle of Pliegues (Murcia). Here the wall is in sound condition, and it will continue to occupy most of the elevations and our intervention, although it will necessarily be of great importance, will also be fractional, so that in the new cobs (in my opinion they are necessary so as not to distort the meaning and image of an Andalusian wall) we shall not leave the pins on view, although we shall leave the holes made by them, and the only purpose will be to complete the image of the surviving walls. Another possible intervention that I am working on is the replacement of large walls which jut out (extraordinary lengths) in the castle of Santa Catalina or that of Verdoyal (Murcia): a projection 3 x 3 m in ground plan and seven cobs high, with a free height of over 2 m underneath the projection. In this case I do not think it is right to build cobs or anything like that but an independent element acting as a large wedge or base on which to place another work. Each case is different but, in my opinion, it is always important to point out the modular character of a cob wall, the density and tension-compression of its surfaces; that is why, except in some very particular repairs, I do not think the restoration should be superficial. Another important aspect to mention is the colour of these walls. They are normally a characteristic ochre colour; however, when for some reason there is a breakage or loss of surface (like the bolt of lightning that hit Siyasa fort), we can see that the colour is almost white. As there are no superficial treatments, I think the colour is due to the carbonation and oxidation of possible demoulders; it is a different matter when they are earth walls which are the same colour on the surface and all the way through.

Conclusion
The cob technique is as appropriate for the construction of humble buildings as for large luxurious works such as the Alhambra. It is easy to adapt to a scarcity of means and at the same time permits making full use of them where they are abundant. The walls are long-lasting and resistant provided minimum rules are followed and slight maintenance is observed. They have a great capacity to withstand deformation and adapt to new situations. It is a technique that has been used in numerous monuments and popular constructions in Spain, which is characterized, among other things, by the many marks that demonstrate the constructive process which is, for this reason, easy to understand. I think the technique in itself is another value to be considered in their restoration.
The Aga Khan Architecture Awards were created by His Highness the Aga Khan in 1977 to attract the world’s attention to Islamic culture through its architecture. Their objective consists of acknowledging examples of architecture that are outstanding from different points of view, such as contemporary design, social dwellings, the development and improvement of a community’s environment, restoration, reuse or conservation of a particular architectural area, gardening and environmental design. The selection process emphasizes the architecture that not only covers people’s physical, social and economic needs but also caters to their cultural and spiritual aspirations. Special attention is paid to buildings that use local resources and suitable technology in an innovating fashion, and to projects that can inspire others to follow in the same line. The selection and awarding of the prizes takes place every three years and the cash reward is US$ 500,000, the highest architectural award in the world at the present time.

The Award has been set down seven categories of architectonic, social and environmental quality or merit, whose promotion is precisely the mission of the Award. The first category includes designs that responded to the needs of the poorest in the developing Islamic world, strategies of self-help, government-sponsored infrastructures as well as projects (such as building and restoration training programmes) to help improve the productive capacity of the poor so that they can increase their income. The second category honours projects that are coherent with their historic context. This category includes contemporary buildings that harmonize with old buildings around them because of their form, materials and scale, transforming a traditional language into modern, and also those additions that give old buildings a new and yet harmonious air, without resorting to mere imitation. Within the third category we find current attempts to preserve the architectonic heritage of a region, be it a street of houses, a district or a whole town. The projects in the fourth category, pure restoration, are evaluated by the quality of the research, the technical skill, the suitability of the materials and the success in the training of new generations of craftsmen. A fifth category, the contemporary use of traditional language, rewards those projects that fulfil current functions connected with the revitalization of the old centres of Bukhara and the integration of the old centre in the modern city. Many of the over 500 monuments in Bukhara were restored by using traditional materials such as hand cooked bricks and gaj burn, modern materials like reinforced concrete were also used in order to fulfil modern regulations regarding seismic protection. The buildings were reused: retailers set up their shops in old restored houses, the Mi-Ar Arab madrasa (religious school) was set up and other restored buildings were turned into workshops. The project proved that historic places can involve something more than a museum or a tourist attraction: restored and reused, they can function as integral parts of flourishing, active modern cities. The conservation of ancient Sam’a in Yemen (1995 Award) is a complex example of international backing and financing. The multi-storey storerooms with their profuse decoration, the high minarets and gardens make up a unique urban landscape that the General Organization for the Preservation of Historical Cities in Yemen (GOPHYC), financed by international bilateral development agencies, is struggling to preserve and revitalize. Many buildings have been refurbished and are being reused, and these projects supported by the GOPHYC have in turn sparked off private renovation projects and revitalization attempts outside the historic centre of the city. For the first projects, Yemeni architects and craftmen were trained by foreign experts in architectural conservation, and now they are tackling sophisticated restoration works on their own. The conservation project, which has made great use of the support of UNESCO and other foreign agencies, has triggered a positive dynamic. This case shows that even in the most difficult conditions great achievements can be reached in the challenge that arises from the conservation of a historic city.

The conservation programme at al-Qayrawan in Tunisia created by the Association for the Safeguard of al-Qayrawan medina (city centre) (ASMO) won the award in 1992 not only because of the quality of the restoration works carried out, financed by visitor’s entrance fees, but also because of the way new functions were introduced in the refurbished structures, such as self-supporting cafés, museums, social services and craft centres. The experience acquired during this first part of the global project can now be used by the citizens who wish to refurbish their dwellings. The programme is an excellent example of how to adapt an existing urban fabric to contemporary requirements. The city of Istanbul in Turkey has won an award on two occasions, first with a mention of honour in 1986, for the renovation of historic sites in Istanbul, a programme put into practice by a non governmental organization that was responsible for the restoration, reconstruction and suitable utilization of many historic buildings, parks and neighbourhoods in Istanbul and outside it; the second award was granted in 1992 for the refurbishment of parks and palaces in the city. In 1984 six Ottoman palaces were once again opened to the public by the Istanbul Municipal Palaces. Three of them were made into museums, whereas the others play an important role in the congested urban centre of Istanbul. The jury congratulated the Foundation of National Palaces for ensuring the constant increase in visitors thanks to the efforts made in the areas of education, restoration and maintenance, emphasized the success of the programme because of the active thanks to the Istanbul residents’ taking over their urban heritage and praised the model adopted for the efficient utilization of spaces and resources whose value would otherwise have remained underestimated. The efforts made in the recuperation of the Hafisia district in the Medina of Tunis, with the marvellous attempts to solve the problems of urban dwellings in a sensitive, humane way and its reversal of the deterioration process that had started to take place under the French protectorate in 1911, were awarded two awards, in 1983 and 1995. Specifically phase II of the Hafisia project carried out by the Association for the Safeguard of the Tunis medina (ASMO) has preserved and protected the traditional urban fabric of the Medina and improved the urban infrastructures at the same time. It also revitalized the commercial area of the quarter, refurbished a great deal of its dilapidated heritage and encouraged the repopulation of the quarter with a mixture of different economic and social backgrounds. The Association has established an innovating credit system that has made it possible for the owners of the houses to get loans for the refurbishment of their houses.

The ambitious restoration programme of the Darb Qirimar quarter, carried out as part of the global rehabilitation of the old centre of Cairo, was appreciated as much for the quality and exquisiteness of the restoration works as for the influence it exerted in making the community of residents aware of their heritage, and was granted the 1983 Award. The conservation of the old centre of Mostar in Bosnia-Herzegovina, much in the news in recent times for other reasons, was given the 1986 Award in acknowledgement of the preservation of the whole city centre, built in the 16th century, the oldest part of a complex range of buildings, including the river docks, a 16th century Ottoman tower and bridge, a 17th century clock tower, two mosques, a madrasa, the residential area, a tannery and several 18th and 19th century shops was carried out in a mangy fashion. The jury pointed out in its conclusions that "all the restoration works were well integrated in the general atmosphere of the old centre, without altering its homogeneous appearance; nothing is exaggerated or falsely attractive to the tourist".
Restoration awards for unique buildings

This section deals with the awards granted to unique single buildings restored in an exemplary way. The first edition of the Aga Khan Awards for Architecture was especially prolific in this sense. The National Museum of Doha in Qatar was given a prize for the restoration of the whole group and the creation of a national museum in a group of buildings closely linked to Qatar history and traditions. Both the preservation, completion and adaptation to a new public use were considered admirable achievements. The excellent restoration of the Rüsten Pasa Caravanserai at Edirne in Turkey was also granted an award. There was an old inn where the caravans of camels used to spend the night in the 16th century, was restored and made into a 150-room hotel. The restoration of the three pavilions at Ali Qapu, Chehel Sutun and Hasht Behesht and their gardens at Isfahan, Iran, also received a prize in the first edition for their meticulous restoration and their contribution to the knowledge of Islamic urban planning, architecture and building. Other unique buildings have since received the same award, such as the Azem Palace in Damascus, Syria (1983 Award) for 34 years' labour in preserving, restoring and reconstructing an 18th century palace that was in very bad repair, although it was one of the most important masterpieces of Islamic architecture. The implantation of cultural identity and continuity and the development of craftsmanship were also taken into account, so that the refurbishment of the palace was a landmark for the Islamic world, and not just a mere restoration work. The recuperation of traditional craftsmanship was also taken into consideration during the restoration of the tomb of Shah Rukh-i-'Alam in Multan, Pakistan, an important 16th century mausoleum that was granted the 1983 Award. The restoration of mosques, the most important religious buildings for Muslims, naturally occupies an important place in the Aga Khan Awards for Architecture. The quality of the restoration of the Al-Aqsa mosque at al-Haram al-Sharif, Jerusalem, and the recuperation of the whole al-Haram al-Sharif ensemble received the 1986 Award. In this intervention, the dome, which had been patched up with concrete and covered with anodized aluminium during earlier restoration works, was "de-restored" and the aluminium was replaced by the original corrugated lead. The decorative paintings on the inside of the 14th century dome, which were believed to have been lost forever, were discovered and were totally restored by means of the rigatino technique, a method using fine vertical lines to distinguish areas of the original paintings. The reconstruction of the Great Omar Mosque at Sidon, Lebanon, whose origin dates back to the end of the 13th century and which was seriously damaged during the invasion of Lebanon in 1982, was given the Award in 1989. Refusing an offer to build a new mosque, the inhabitants of Sidon preferred to rebuild this monument that is part of their history. However, the work was carried out with scientific precision, style and intelligence. The jury described the restoration as "a sign of hope for the reconstruction of nations that have been destroyed by warfare".

Awards for the restoration of traditional houses

In this section we must mention the award won by Ertuğrul House in Bodrum (Turkey) in the 1980 edition. Bought by the family of Halicarnassus, with a castle that belonged to the Knights of St. John crusaders and a sea port with a large number of traditional Turkish houses, among which Ertuğrul House is to be found, made up of two of such houses, it was turned into a summer residence, by combining with great imagination the two hundred-year-old seaside houses, thus showing that old structures can be transformed into beautiful and functional buildings without resorting to imitation. The different language of the linear element that links the two houses at the back harmonizes with the existing architecture and proves that the old and the new can successfully joined. This project was also appreciated for furthering the tendency to preserve in the Bodrum area, where the typical traditional house style was fast disappearing.

The most recent 1998 Awards

In the restoration section of the last edition, the refurbishment of the historic centre of Hebron was granted the Award. This was an ambitious and creative restoration project, full of imaginative solutions and carried out under difficult circumstances. Hebron (called Al-Khalil in Arabic) goes a long way back in the Palestinian memory and is rooted in religious beliefs and a cultural legacy common to many religions. Like other Palestinian cities, Hebron has suffered a great deal because of the well-known conflicts between two peoples with the same religious fervour for their respective religious heritage. In spite of these conditions, the Palestinian residents are mainly responsible for the renovation of the city. This project had to deal with very delicate issues: land, property, identity, cultural and historical memories. They were all effectively addressed without altering the social structure of the city or taking the buildings away from their original owners. By granting this Award, the jury wished to acknowledge the skill, competence and courage of the local community. They were all important in the work and the promising future role of the refurbished city. Besides, this intervention can be a valid example for similar urban situations in many other parts of the world. The work was promoted by the Hebron Rehabilitation Committee, founded by the Union of Hebron University Graduates. The committee is made up of thirteen members, who include government ministers and representatives of community NGOs, including the Union of Hebron University Graduates. Work on the houses began in 1995 and will continue until 2002. So far 127 dwellings and 25 small shops have been restored and another 95 buildings are currently being refurbished. The rehabilitation is limited to what is absolutely necessary. For example, there is no extensive rebuilding carried out to replace missing parts of buildings. The alterations on the buildings are restricted to the inside, so as to preserve the historic value of the urban fabric. Only doors and windows, originally made of timber, have been replaced by others with metal frames, grilles and shutters. The renovation of the historic centre of Hebron is being financed by public and international sources. To date, the Hebron Rehabilitation Committee calculates that three million dollars have been invested. The rehabilitation cost of a house amounts to $200 per square metre. According as each building is restored, the families return to the historic centre. In spite of the fact that the historic centre was neglected for over twenty years because of the conflicts, 99% of the buildings did not change hands. The unique restoration system not only refurbishes the constructed city but returns the buildings to their owners, who have the right to decide on the use to be given to each one within a strict ratio of owned or rented dwellings, 67% of the inhabitants in the historic centre live in their own houses. The tenants, selected by the committee from applicants, are paid only low salary government employees or manual workers, and they pay no rent for the first five years they live there. The revival of the historic centre of Hebron has already had a positive effect on the economy of the city. About 400 jobs have been linked to the programme, and the businesses in the ground floors of the restored buildings and the markets in the old city are just as active as the rest of the city. Besides, the remarkable historic stone architecture of Hebron has been saved, structurally consolidated and cleaned up without creating a worrying difference between the buildings that have been restored and those that have not. Thanks to the pride and care of the local community, the erstwhile neglected and desolate centre of Hebron has been turned into a healthy, lively, vibrant part of the city.

The Aga Khan Awards for Restoration, A philosophy of action.

The Aga Khan Awards for Architecture seem to be raising a third subject for debate in architecture, as Charles Jencks pointed out in 1995. This third debate consists of a multiple, complex reality that covers a large range of architectural projects including modernity, regionalism, dwelling problems, the conservation of historic buildings, urbanistic and landscape issues. This position is half way between the international debate on modernity and the regional debate on authenticity, cultural continuity and craftsmanship. And this attitude is extremely important as regards the fundamental value granted to the conservation and restoration of the constructed heritage within the panorama of contemporary architecture. Implicit in the Aga Khan Awards lies an aspect that must not be forgotten: the appreciation of team work, interdisciplinary groups, popular initiatives for the conservation or recuperation of a heritage people consider their own, the real commitment of official organizations, the selfless collaboration of NGOs, in summary, interventions in which the synergy of the individual efforts has brought about a result whose value is way above the arithmetical sum of the individual investments made. In the twenty years the Aga Khan Awards have existed, there has been a tendency to acknowledge the restoration and recuperation of the urban texture of historic centres as well as the restoration of outstanding buildings. This may be due to the fact that a large number of people, not least important the residents, are involved in the former, whereas the latter is usually linked to one organism alone. Besides, all those cases in which these restorations have contributed to the recuperation of half-forgotten or lost crafts and the creation of craft schools that can go on applying their newly acquired knowledge to future interventions are praised and applauded by the jury. The latter not only take into account the material aspects of heritage conservation but attach equal importance to the survival of intangible aspects of our cultural heritage. The awards granted to new buildings each year also play an important role by pointing the direction, by valuing the interpretation of the local traditions and vernacular architecture of each place, not as an excuse for gross imitations but as encouragement for innovating design spiritually linked to autochthonous tradition. Seen from this point of view, these awards for new architectural works seem to become awards for the preservation of the vast heritage involved in the cultural identity of every community, city or country. They categorically reject any kind of servile imitation or kitsch and the theme park philosophy of newly painted heritage for the sake and entertainment of masses of consumer tourism. The Aga Khan Foundation Awards for Architecture dedicated to the restoration and recuperation of constructed heritage open up a path for the valuation of intervention projects in which the consensus does not lie in the abundance of means or the size of the budget, in which theoretical reflection is a starting point to lay down a methodology without disturbing the issue with Byzantine arguments where the best result of the restoration depends largely on the catalysing of the energies of the agents taking part, and where these agents are strongly linked by awareness regarding the preservation of their heritage.