





The Propylaia and its surroundings from the level of the Parthenon metopes. Photo S. Mavrommatis, June 2007

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Under the circumstances, we were obliged to manage and to perform interventions of great importance on monuments of unique value for the entire world; on architectural works that expressed the artistic volition and merit of the citizens of a city that once not only held hegemony over all Greece but, in terms of culture, supremacy through all antiquity. The heavy responsibility of undertaking this work of rescue required from the very beginning that the circle of those responsible be as wide as possible and that a number of theoretical principles be established as a standard for decisions, large or small. The principles, indeed, are

small to large scale. The type of the peripteral temple was crystalized, while, from the standpoint of morphology, a ceaseless perfecting of forms is evident, beyond the natural, reaching its peak in the Athenian Acropolis, precisely when both the political and cultural floruit reach their peak of perfection. Shaped through tragedy, poetry and philosophy, a new consciousness emerges, and at the same time the purpose of temple-building undergoes a change. Now the building programmes project primarily the prestige and superiority of the *polis* (city-state).

The principle value is the artistic. There is complete purity and clarity of architectural



The Acropolis from the west. Photo S. Mavrommatis, 1987

no other than respect for the values, which the community renders to material monuments but especially to the spirit of the monuments. This is the subject of the present talk.

But the ancient Greeks themselves, their creators, what were the values they attributed to their works? Basically, they were artistic values. A brief retrospection of the architecture of antiquity demonstrates this. During the archaic period, the impetus for erecting temples came from religious sentiment, at that time still lively. The protecting deity guarded the city-state in return for the honour. During the long process of maturing, from the utilitarian shelter of the cult statue we moved on to the monumental building, from substances easily worked to noble materials, stone and marble, from

form, which is achieved through the use of marble, a material both difficult and valuable. This clarity of form is in total correspondence with the lucidity of the word, of reason. The hidden harmony of the refinements combines with the Doric seriousness and balance of volume to achieve a perfect, harmonious result. And this is based on perfection of construction, when sculptural members many tons in weight are set in place with the precision of a tenth of a millimeter.

For the ancient Greeks, there were no other values. The temple was a dedication to the god, without interior function and the relevant cult practices took place in the open air. It had no utilitarian value. The concept of historical values began to be apparent later on, with the treasuring of culture, the collections, the copies and the whole related outlook of Alexandria and Rome. The boundaries standards set by the Athenian monuments will never be surpassed. Hellenistic and Roman architecture during the next six centuries produced imitations with other goals and with quality in practically continuous decline.

What have we, the modern Greeks, inherited from that architecture, unprecedented in all the world? After catastrophes (wrought by human beings and not by the forces of nature) we have inherited a pile of ruins. The constructional and formal self-sufficiency of the architectural members means that the ruins preserve their artistic value to a great degree. Since antiquity the structural nature of the members gradually became apparent: invisible joints in both columns and overlying members became visible and for various different reasons gave a new character to the monuments, the character of the ruin.

The collapse of the roofs and the pillaging increased the ruinous aspect, which was consolidated later on. This was not a natural collapse (where one observes the inner law of the damage and fall) but it is the product of violent activities. Despite that, in the eyes of the travellers and painters of the period before the War of Independence, the romantic image of the Acropolis monuments was created, together with the desire for things to remain unchanged.

Immediately following the Revolution interventions began on nearly all the monuments of the Rock, for the purpose of removing all the later elements that had changed their appearance and also, to an extent, in order to strengthen them. During the final years of the 19th century, an exhaustive excavation followed and the

big anastelosis programme of Balanos, with which the image of the Acropolis was completed. This situation remained until 1975, when the works that are in progress today were programmed and initiated.

All now know a set of principles that govern the interventions on ancient and historical architectural monuments. It is the Charter of Venice, that from 1964 to the present is internationally accepted as the framework guiding studies and the evaluation of stud-

ies and works. The Charter satisfactorily responds to a set of values that the western world sees in the monuments of the past and it is significant that it has neither been renewed nor replaced during the past 43 vears.

Thus, the Committee for Conservation of the Acropolis Monuments (ESMA), while aware of the Charter's deficiencies, has accepted all its articles, on which I shall now comment

In 1975, the political leadership considered the interdisciplinary approach and the collaboration of scholars of different specialties, demanded by Article 2 of the Charter, as absolutely necessary for the works of the Acropolis. Today this interdisciplinary composition is considered self-evident for the undertaking of any serious archaeological work, because the great extent of what is now attainable in the scholarly sphere has brought to light problems previously unknown. The earlier errors on the Acropolis, for which Nikolaos Balanos bore the sole responsibility, must not be repeated. Articles 2 and 11 refer to the historical and more general academic values of the monuments and the consequent principle of preserving the significant additions of all periods, since the purpose of restoration is not the cohesive unity of the original order. Here the situation is particularly difficult, for in most cases the historical values clearly militate against the artistic and one is therefore obliged to evaluate and to assess which is the greater good. In accordance with these articles, the later deformations, changes, even vandalism, are part of the history of the building, having left their marks on its body and they are therefore to be preserved. Yet, they change the form of the building and they remove us from the ideals of the creator of the work. On the Acropolis, the massive clearing between 1835 and 1890 (a well known example being the so-called Frankish Tower of the Propylaia) has delivered us of this dilemma. Yet, valuable evidence of the mediaeval history of all the monuments has been lost. Be that as it may, the tower in the opisthonaos of the Parthenon has survived and Professor Manolis Korres has planned, for this

same monument, "syn-anastelosis" a simultaneous anastelosis of remains of more than one period, in this specific case, restoration of the remains of the Byzantine apse of the church of the Christian Parthenon; in addition, to restore the marble pieces that had been removed earlier from the Roman west door of the monument, to their original state as bases for ex-votos around the temple. The reinforced cement fillings of the Parthenon west door placed by Balanos, however, can in no way be considered as "phases" of the great temple. Article 5 of the Charter refers to utilitary values, and recommends the use of the



The east portico of the Propylaia from the east. Photo S. Mavrommatis, 1986



The Parthenon from the west. Visible to the right is the mediaeval tower in the opisthonaos. Photo F. Mallouchou-Tufano, 2006

monuments for public purposes. During the decades of the 70's and 80's, the reuse of the monuments and "integral" restoration was considered obligatory in all interventions. Yet, what meaning has all this when applied to the monuments of antiguity such as those of Athens? Their only "use" is to be considered exhibits of great artistic and educational value. Thus, the monuments that are "not living" become more useful when they are more comprehensible to the general public and when, in various ways, they can "teach" their message and promote their aesthetic values.

Article 8 of the Charter provides that "The

sculptural, painted or decorative elements, which are an integral part, inseparably bound to the monument, may not be separated from it, unless that is the only way of insuring their preservation". The sculptural decoration of the Parthenon, the Erechtheion and the temple of Athena Nike, after the destruction and theft of Elgin, were well enough preserved *in situ* on the three monuments. Apprehension as to their polis, has both advantages and disadvantages that have occupied the Committee for years. The advantage, apart from saving the sculpture, of course, is that they can be seen and appreciated in the museum surroundings. The disadvantages are the limited resistance of artificial stone over time in comparison to marble, the impossibility of giving the surface the clarity or translucency of the marble and the difficulty of



Detail of the restored east façade of the Erechtheion. Photo S. Mavrommatis, 1988

condition had already surfaced before the war and it reached a peak in the decade of the 60's when the accelerated destruction of their surfaces from acid rain and pollution became apparent. The hesitation over cleaning them and exhibiting them in a controlled atmosphere went on for decades, but the research of the late Theodore Skoulikidis on the mechanism of marble erosion showed that the only escape route for assuring their preservation was, indeed, to remove them from the monuments.

Some ask why we save the sculpture and not the architectural members. Because the second can be made again and are geometrically definable, but not the sculpture. The only solution after they are removed from the building is to replace them with precisely cast copies in artificial stone. This solution, which is being applied on the Acro-



Column and architrave of the north side of the Parthenon. Photo S. Mavrommatis, 1988

harmonising the colour with that of the monuments. These question have indeed been the subject of endless discussions in the Committee and long research by civil engineers, chemists and conservators.

The principle that is retained in this case is that of the least possible change in the image of the monuments that we have to now. Thus, only the sculpture removed from each monument is replaced by a copy. Sculptures removed at another time (such as those taken by Elgin) are not replaced by copies, since there is always the fear that when copies exceed the limit of necessity, the authenticity of the monument may suffer. The only exceptions to this comprise the northernmost column of the east porch of the Erechtheion and one of the Carvatids, now in the British Museum, which have been replaced by exact copies in order to restore the closed plan of the two porches.

Articles 9 and 15 refer to restoration with the help of fillings and to the anastelosis of archaeological finds. The use of fillings that are not precisely correct morphologically or have not been preceded by an archaeological study is forbidden. In the Acropolis works, the systematic research that had already been carried out has revealed every formal detail of the monuments and it has led to new discoveries by M. Korres on the Parthenon, by A. Papanikolaou on the Erechtheion and on the Propylaia by T. Tanoulas. Research in depth, indeed, made possible the removal of architectural members that had been placed incorrectly in the anastelosis of N. Balanos.

Article 12 is concerned with the harmonious incorporation of the necessary fillings. Interposed, however, is the stipulation that "the fillings must be distinguishable from the authentic parts so as not to falsify the artistic and historical evidence of the building". For the classical Greek monuments in particular, this article must be applied with the utmost sensitivity because each change in the original forms affects the morphological unity of the entire monument. In accordance with Article 15, fillings on the Acropolis have for years been restricted to the absolutely necessary, in order to assure the stability of the ancient members and the desired morphological continuity.

The systematic documentation and the publications stipulated in 1964 by the Charter have been greatly simplified by computers and the technical assistance provided by digitisation. Meticulous drawings, photography and cinematography document all phases of the work, and are inserted in a data base, which will soon be available to everyone through the internet. At the same time, many of the studies have been published as books and each year an Acropolis News Letter for the general public is published in Greek and in English. This assures complete "transparency" of the work of both the Committee and the Service

The method of construction in ancient Greek architecture, which was built from



Dismantling a north metope of the Parthenon. Photo R. Christodoulopoulou, 2007



Making the new marble filling for an architectural member of the Parthenon, using the pointing device. Photo F. Mallouchou-Tufano, 2006

cut stone members, as dry masonry, has made it possible to respect two more principles in addition to those of the Charter of Venice.

The principle of reversibility of the interventions, the possibility of reconsidering errors in the future, is based on ultimate respect for the architectural members that are never to be recut, and on detailed documentation of the interventions in all phases.

The second principle concerns the preservation of the structural self-sufficiency of the architectural members with the restoration of each one separately to its original structural function, and employing the ancient technology for their final cutting and filling.

The general development of society creates in the topics examined as well a drive to assess the values of the architectural heritage and, as a result, continuous review and improvement of the principles that dictate the interventions on monuments and on historical complexes. This is a never-ending process of evaluation of the ways in which the past is to be handed on to the future. That does not mean that the Committee for Conservation of the Acropolis Monuments alters the principles it adopted in 1975, since the nature of our monuments is unique: the problems of modern monuments and complexes that occupy restorers internationally, by good fortune do not concern us. It means, rather, that our experience continuously expands and our critical ability improves, allowing us to make choices that are more correct when alternate solutions are at hand.

Professor Emeritus **Charalambos Bouras** President of the ESMA

\* The text in hand was presented at an One-day Conference on the works of the Acropolis, on the 16th of March, 2007, in Thessalonike. The Acropolis Restoration Service (YS-MA) was established in 1999 by Presidential Decree ( $\Pi \Delta 97/99$ ), as a special regional service of the Hellenic Ministry of Culture, its objective being the organization and implementation of the works of restoration on the sacred rock. The foundation of the YSMA, an autono-

mous Service with specific administrative and economic facilities, responded to a need that had been recognized for a good many years: to accelerate the anastelosis interventions on the Acropolis monuments, responsibility for which had been held by the Committee for Conservation of the Acropolis Monuments (ESMA) since 1975. The YS-MA was joined by those who had been engaged until then in the works on the Acropolis. Because of its establishment by presidential decree and because of its bylaws, the YSMA has a versatile system of decision-making and administering the funds that enabled it to increase the scholarly and technical staff of the works. The inclusion of the Acropolis works in the 3rd Community Support Framework in 2000 and their funding with

an estimate of 5.740. 000.000 drachmas up to 2004, coincided in time with the creation of the YSMA. The expansion of the works into parts of the monumentts that showed serious structural problems was an organizational challenge for the Service. Using the powers it had been given, the Service undertook the difficult task of accelerating the great work on the Acropolis, always adhering to the same principles and methodology that had been established in the previous years and keeping the same close connection with scientific research in all fields

studies that had been approved for the proposed interventions, and the realization that during the period since its formation the YSMA had organized and prepared for the initiation of a large anastelosis programme: a) using strict criteria in choosing, it had taken on additional specialized

scholarly and technical personnel, b) it had already updated the equipment of the work-sites and c) it had assured the quarrving of the masses of marble needed for the interventions from the Dionysos quarries on Penteli Three and a half years after the approval of the above programme and shortly before the beginning of the Olvmpic Games of 2004, the YSMA handed over four completed separate programmes on the Acropolis: the restoration of the opisthonaos and pronaos of the Parthenon, the conservation and cleaning of the west frieze of the same monument in the laboratory of the Acropolis Museum and the rebuilding of the north wall and the east colonnade of the Propylaia. The handing over of these works took place in a brilliant ceremony on the rock, in the presence of the (then)

President of the Hellenic Republic, Konstantinos Stephanopoulos and the (then) Alternate Minister of Culture, Fanny Palli-Petralia.

From 2005 on, new programmes have been added to those already completed by the Service, and Community funding has continued. The total amount of funding

from the 3rd Community Support Framework for the years 2000 to 2008 reached 31,3 million €. To this funding should be added the expenses that are covered by national funds and which to now have amounted to 5,3 million €.

The main features of the work of the YS-MA today, which in a sense assure its success, comprise:

• The assuring of the highest possible standard of scholarly knowledge and experience in programming and carrying out the works, through the collaboration of the specialist scholars of the ESMA with the specialist personnel

of the works. Likewise, the relation between the works and research is stable and continuous. In order to resolve the theoretical and technical problems that emerge during the interventions, many research programmes are carried out by the scholarly personnel of the works, either independently or in collaboration with educational institutions or other research organizations in our country.

• The system of carrving out and supervising the interventions by the Service itself, applied to practically all the works on the Acropolis, which

assures their economic and effective completion. Moreover, the programming of the works and the relevant studies by the specialized scholarly staff of the YSMA with the accomplishment of the works by the extremely experienced technicians under the supervision of the scholarly personnel, assures the highest possible quality of the works as well as their completion in the shortest possible time.

• The forming, in the course of the works,

of a personnel that is highly specialized in anastelosis interventions on classical monuments and the development of special technology for doing this work in a shorter time.

• The effective use of the entire Community funding because of the advantages and increased strengths of the YSMA by-laws, mentioned above.

The works carried out on the monuments are as follows:

In the **Parthenon**, under the direction of the architect N. Toganidis and with the scholarly staff made up of the architects V.





1.-2. The north colonnade of the Parthenon from the NE in 1986 (left) and 2003 (right). Photos by S. Mavrommatis and L. Lambrinou respectively 3. Restoration of the capitals of the columns of the Parthenon opisthonaos. Photo R. Christodoulopoulou, 2002 4. The copies of the west frieze on the Parthenon. Photo R. Christodoulopoulou, 2004

Eleutheriou, L. Lambrinou, A. Papandropoulos, C. Paraschi and R. Christodoulopoulou, the civil engineers A. Vrouva, M. Mentzini (to 2006), E. Toumbakari and the archaeologist E. Karakitsou, three parallel programmes are being carried out, beginning in 2000:

The restoration of the north colonnade and entablature of the temple is the most extensive of the restoration programmes of the Parthenon, for it involves the structural res-



#### Completed Works

1. Anastelosis of the Erechtheion 2. Consolidation of the rocks of the Acropolis slopes 3. Anastelosis of the Parthenon east facade 4. Anastelosis of the eastern part of the south wall of the Propylaia 5. Anastelosis of the Parthenon pronaos 6. Anastelosis of the Parthenon opisthonaos 7. Partial anastelosis of the north wall of the Propylaia 8. Reburial of the House of Arrephoroi

#### Current Works

9. Recording and tidying up the scattered ancient material on the Acropolis plateau. 10. Restoration of the coffered ceilings of the central building of the Propylaia 11. Anastelosis of the Parthenon north colonnade 12. Anastelosis of the Temple of Athena Nike

#### Future Works

13. Consolidation of the Acropolis Circuit Wall. 14. Anastelosis of the lateral walls of the Parthenon cella 15. Restoration of the west wall of the Parthenon cella 16. Restoration of the Parthenon west façade 17. Anastelosis of the Parthenon south colonnade 18. Partial anastelosis of the south wall of the west hall of the central building of the Propylaia 19. Restoration of the Propylaia north lateral wing 20. Restoration of the Propylaia south lateral wing 21. Final display of the surface of the Acropolis plateau

> On the 13th of August, 2001, the Central Archaeological Council approved the initiation of an extensive project of restoration on the Acropolis, the largest that has ever been undertaken on the monuments since 1975. Determining factors in the approval of the programme were the existence of

toration of eight columns (from the 4th to the 11th from the east) and the corresponding area of the overlying entablature. The intervention began in October 2001 with the dismantling of eight columns and the corresponding entablature blocks (a total of 230 members, weighing 900 tons) by means of a crane that was installed for this purpose outside the monument. Then came the removal of the rusted clamps and dowels and the replacement of the reinforced cement, introduced in the older intervention, with fillings of new marble. In resetting the members, the iron clamps and dowels are replaced by similar ones in titanium, and all



ing rapidly. Completion of the intervention we are discussing is expected to give the monument, apart from structural strength, aesthetic wholeness since the north and west sides of the Parthenon together provide one of the fullest views of the temple, both for visitors to the sacred rock and from most parts of the city.

In the **pronaos** of the temple, during the summer of 2004, anastelosis of the 6 columns was finished with fillings in the

the ancient fragments that have been identified are reset in the monument. The architectural members are restored to their original positions so as to correct the older misplacements. An original device that was specifically designed and made by the YSMA greatly accelerated the cutting of flutes in the column drums of new marble. The final carving of the surface of the flutes will be done by hand by the experienced YSMA marble technicians after the drums have been set in place. The greater part of this project has already been finished and work is proceeddrums made of new marble. In accordance with the relevant study by Prof. M. Korres, the first three columns from the north were fully restored, the other three partially. In addition to the column drums, the ancient architrave blocks of the first two intercolumnar spaces were set in place on the monument. In accordance with the decision by the Central Archaeological Council, the filligs in new marble of the column drums were to remain unfluted. During the actual work, however, in an effort to improve the aesthetic result, 48 flutes were mantled members of the entablature and the cast copies of the west frieze, which had been made of artificial stone of a new improved composition, which was determined after a series of relevant test-studies. Completion of this work, before the Olympic Games, made it possible to remove the scaffolding from this area of the monument. Thus, on the 12th of August 2004, the view of the west façade of the Parthenon, free of scaffolding and illuminated, was beamed by television throughout the world during the ceremony of the lighting



View of the Parthenon from the northeast. Behind the façade the restored columns of the Pronaos. Photo F. Mallouchou-Tufano, February 2007

cut in fillings of ancient drum fragments where their fluting was still preserved.

where their fluting was still preserved. The work of restoring the **opisthonaos** of the Parthenon began in April 2001 with the assistance of the architect P. Kouphopoulos as technical advisor and was finished during the summer of 2004. The twenty-one architrave blocks of the opisthonaos were dismantled and structurally restored while on the ground. The columns of the opisthonaos, damaged by fire in ancient times, had already been restored using special grouting. In addition to the dismantling of architectual members, structural restoration was carried out on a considerable number of the underlying members. Then came the resetting of all the dis-

#### of the Olympic Flame.

In February 2007, the Central Archaeological Council approved the removal of the seven westernmost metopes of the north side of the Parthenon, still in situ, in order to better protect them in the Acropolis Museum. It is planned to replace them on the monument, according to the usual practice, with cast copies. The intervention planned includes as well the removal and structural restoration of four already restored cornice blocks, four filling stones, one triglyph and, in addition, the structural restoration of all the underlying members. With the conservation of the metopes completed in situ, work has begun on removing them. The process of making their cast copies is under

way as also the study for application of the work.

In addition to the works in progress today, studies are being made of the areas of the Parthenon where future interventions are planned. The most important of these is the study of the west facade since after detailed examination it is clear that the general condition of that area is very critical, both in the parts preserved in situ and in the sections where interventions were made by N. Balanos. In accordance with the general study-plan for restoration of the Parthenon by Korres and Bouras of 1983, a rescue intervention is needed as a first phase in order to replace the rusted clamps and dowels in parts of the west façade that were restored in the past (corners of the pediment, 1st, 4th, 5th, 7th column capital etc). In a second phase it is planned to reset in the façade of the building ancient fragments that have been identified and to do restoration of an aesthetic/didactic nature. For a definite programme of intervention (with credible time-schedule, economictechnical budget etc), what is needed is an analytical study for its application, the precise and in-depth knowledge of the preserved condition of the area and, especially, the determination of the final extent of the intervention (if, for example, it will include taking the west metopes to the museum that are still in situ on the monument, or even the end metopes on the north and south sides at the west). Making decisions on these matters is extraordinarily difficult, since it concerns the main view of the Parthenon, which dominates the site of the Acropolis and which has never been dismantled in the past. The relevant architectural study has already been started. For access to that part of the monument without the installation of scaffolding, a special twin mast self lifting platform has been installed, a solution that assures easy access to the west facade of the monument with the least possible aesthetic interference. One of the future programmes of restoration of the Parthenon is the anastelosis of

tion of the Parthenon is the **anastelosis of the long walls of the cella**. The studies for rebuilding the two walls, north and south, of the cella of the monument have already been completed, with proposals for resetting the some 700 wall blocks in their original positions or in positions comparable to the original. Indeed the studies were presented at the 5th International Meeting for the Restoration of the Acropolis Monuments of 2002. For their application a relevant structural study is needed, which is already under way. The structural study is expected to solve the problem of how to secure the blocks when setting them on the monument and to determine the amounts of new marble that will have to be added. The difficulty is due to the fact that practically the entire inner side

of the walls was destroyed during the ancient fire. This is a difficult problem and it is especially crucial since it touches directly on serious aesthetical questions, such as the appearance of the interior of the Parthenon, the encumbrance or alteration of the character of the monument as a ruin, or the change of its texture.

In the **Propylaia** the architect T. Tanoulas is in charge of the work, with the scholarly personnel, the architect K. Karanasos, the civil engineers V. Papavasileiou, V. Paschalidis († 2003),

the undersigned and the archaeologist E. Petropoulou.

The restoration of the ancient architectural members of extensive parts of the magnificent **ceilings of the central building**, that very part of the monument which was so much admired already in antiquity, is proceeding. Today's anastelosis –over a surface approximately double that earlier restored by N. Balanos– became possible through extensive research on the fragments of members that were dismantled from the restored ceilings and the ceiling fragments that had not been used in the previous intervention. The study showed that a great many fragments of architectural members (beams, coffered slabs and interbeam slabs of the ceilings of the monument, could again be restored with the addition of small amounts of new marble and could be placed in the ceilings in their original positions or in positions comparable to the original. Specifically, set again in the ceiling of the east portico of the central building, in the three first from north interbeam spaces, are seven beams (four more than in Balanos' anastelosis) and coffered





1. The cella walls of the Parthenon from the east. Photo S. Mavrommatis, 1986 2. The cella walls of the Parthenon, dismantled, on the ground, from the east. Photo M. Korres, 1993 3. Restored architectural members of the north colonnade of the Parthenon ready to be reset on the monument. Photo L. Lambrinou, 2007 4. The Propylaia from the southwest. Photo F. Mallouchou-Tufano, February, 2007

slabs. Restored to the ceiling of the west hall are six beams and the coffered slabs in the two inter-beam spaces of the northeast corner, that had been restored earlier, as well as in the two adjacent spaces to the N, above the central passageway of the monument.

Among the members of new marble set in place on the monument in the present anastelosis a place of honour is held by the two Ionic column capitals that were restored to the west hall either side of the central passageway. The capital of the previous anastelosis, which had been composed from four ancient fragments that did not belong together, has been kept in the Acropolis Museum. The capitals of new marble, exact copies of the ancient prototypes, were carved by hand by the marble technicians of the Propylaia. In a few months, when the anastelosis will have been finished, the entrance to the interior of the Acropolis along the central passage through the Propylaia, between the two Ionic columns, will enable visitors to have the unique experience of the roofed space of one of the most impressive monuments of classical antiquity.





realization, together with the obviously bad condition of the iron reinforcements of the earlier anastelosis and the resulting cracking of the members, necessitated a gradual extension of the work during the present intervention. It was now necessary to dismantle fifty-five architectural members of the north wall, among them the three architrave blocks above the wall, the corner triglyph, the metope and a block from the doorway wall. A similar problem emerged during the dismantling of the column drums of the east portico, where the known documentation showed intervention on on-

The partial restoration of the north wall of the central building and the east portico was in essence a work that was inserted into the programme of restoring the ceilings of the Propylaia, when it was realized, after the overlying members were dismantled, that the intervention of 1909-1917 had included a significant number of blocks in those parts of the monument. The earlier intervention had in all probablility extended to the north wall in order to reduce the deformations that were caused by the great explosion of the 17th century. This

ly 8 drums of columns 4 and 5 from the N. In the end, the number of dismantled members in the east portico was extended beyond the 6 column capitals and the 8 drums of the 4th and 5th columns to take in 21 more drums.

Since 2000, conservation and anastelosis has been carried out on the **temple of Athe-**

forced concrete, on which the temple had been assembled in the past, with a grid of stainless steel, on which the temple now stands. After the crepis of the monument was restored, the cella blocks were reset in a new arrangement correcting the earlier misplacements, in accordance with the study by the architect K. Mamaloungas. Restoration of the temple of Athena Nike will be

Restoration of the ceiling of the central building of the Propylaia. View from the northwest. Photo M. Ioannidou, June 2007

na Nike, in accordance with the study by D. Giraud. The work is being directed by the civil engineer D. Michalopoulou with the scholarly personnel, K. Mamalougas, architect, and E. Lebidaki, archaeologist. The serious damage and structural problems that were evident in the temple, after the earlier anastelosis interventions of 1835-1845 and 1935-1940, made necessary its restoration, with total dismantling, structural restoration and resetting of its 319 members. The frieze of the temple had already been removed in 1998 and placed on exhibition in the Acropolis Museum. The intervention was expanded to include the remains of the poros shrine that is preserved in the underground space beneath the marble temple, whose members underwent conservation. The programme included also the replacing of the slab of rein-



The two new Ionic column capitals of the central building of the Propylaia restored and in place. Photo E. Petropoulou, September 2006

completed with the setting of copies of the Ionic frieze in artificial stone and the anastelosis of part of the east pediment, the cornice blocks and the sima of the temple with extensive fillings in new marble.

The Acropolis Restoration Service has an organized Section of Surface Conservation of the Monuments, directed by the chemical engineer E. Papakonstantinou, with a scholarly personnel comprising the following conservators: D. Garbi, D. Damianos, Ch. Laskaridi, A. Maridaki, A. Panou (head of the Parthenon team), S. Papida, A Tsimereki (head of the temple of Athena Nike team), E. Frangiadaki, G. Frantzi (head of the Erechtheion team), K. Frantzikinaki (head of the Propylaia team), and A. Hatzipappa. Since 1987, the Conservation Section has been faced with damage to the marble surfaces of the monuments resulting from internal composition, environmental factors and the actions of man. The methodology for interventions of surface conservation on the monuments was planned by the late professor and founding member of the ESMA, T. Skoulikidis. It is constantly enriched by new information stemming from the works in hand and from interdisciplinary collaboration with specialists. The materials used in conservation are inorganic, of lime composition, especially designed as to their physiochemical and mechanical properties so as to be compatible with the damaged marble. Wherever reinforcement with metal elements is needed, titanium is employed. Organic materials have been ruled out because they have a limited life-span, they are affected by the ultraviolet rays of the atmosphere and they are incompatible with the marble. Rescue and systematic interventions for surface conservation is being carried out on the areas of the monuments being restored and in other places that show severe surface damage, including the Erechtheion. The Conservation Section of the YSMA is also working in the Acropolis Museum, doing research on sculpture fragments, identifications, joins and preparing objects for exhibition in the New Acropolis Museum. In the framework of this collaboration of YSMA with the Acropolis Ephorate, specialized conservators of the Service are the heads of the technical team now preparing and wrapping the sculpture that is to be transported from the old Museum on the rock to the New Acropolis Museum at the foot of the hill.

Conservation of the blocks of the west frieze of the Parthenon is certainly among



The restored central architrave block of the east portico of the Propylaia. Photo T. Tanoulas, 2003

the most important conservation works on the Acropolis. The work was undertaken in order to repair the damage suffered by the frieze during its long existence on the monument. Thus, a long period of research, tests and checks had as its goal a safe method of intervention for preserving these masterpieces of classical sculpture with the best possible aesthetic results. The intervention began with the structural restoration of the frieze blocks. Cleaning the frieze blocks of pollution deposits and the black incrustation that covered them was the most delicate and detailed operation, since while this was being done, great care had to be taken not to remove, but to save, the historic layers of the surface of the sculpture that preserve information about their initial carving and colouring. The cleaning method that was chosen as the most suitable is the Laser method, in an original system, with the simultaneous use of two rays, infrared and ultraviolet, a system developed by the Technology and Research Foundation (ITE). The work was carried out between 2002 and 2004 with excellent results. After cleaning, the surfaces were sealed with plaster without aesthetic remodelling of the relief, in accor-

The temple of Athena Nike from the level of the Propylaia ceiling. Photo M. Ioannidou, June 2007



Conservation of the interior face of the ceiling of the north porch of the Erechtheion. Photo G. Frantzi, 2002

dance with modern conceptions of conservation. Thus, from July 2004, visitors to the Acropolis Museum have been able to admire again this sculptural complex of unique historic and artistic value, in all its richness and its beauty.

In addition to the four great monuments, the work of the YSMA extended to other





General view of the House of the Arrephoroi after reburial. Photo M. Ioannidou, June 2007

monuments too, examples being the House of the Arrephoroi and the Circuit Wall of Rock, both of them necessary for their protection and for study. Interventions were carried out with the architect V. Manidaki and the civil engineer D. Englezos in charge.

The Acropolis Restoration Service decided to backfill the foundations of the House of the Arrephoroi, the remains of which had been found northwest of the Erechtheion and against the north Acropolis Circuit Wall, in order to protect its fragile poros foundations. The work was completed in May 2007.

The Acropolis Circuit Wall in itself is a monument of great importance. The con-

Arrangement of the inventoried scattered on the Acropolis ancient fragments in piles. Photo K. Kissas, 2002

stant repairs made from antiquity to today have helped to preserve it. Even so, structural damage, such as cracking, gaps and serious deformations are apparent in many parts of the ancient construction, and in the more recently repaired sections as well. The programme, which is well underway at present, comprises analytical documentation and systematic monitoring of the Wall by mechanical means and with fully up-todate methods of electronical recording, so as to explore its static efficiency, to make studies and to carry out rescue interventions where needed. Included with these methods are geophysical diascopy and the installation of a system of optical fibres and a geodetic station. The Circuit Wall programme includes in addition the installation of a quickrecording network for documenting the seismic behaviour of the geological formation of the Acropolis. The analytical documentation of the Wall is expected to improve our knowledge of its ancient form, materials, building methods and its historical phases, thus providing the data base necessary for evaluation and budgeting of future interventions.

The programme for Inventorying the scattered ancient fragments lying on the Acropolis began in 1977 and was finished at the end of 2006. The purpose was to recognize the fragments, which were lying in 25 large piles, and to attribute architectural members to the monuments, so as to be used in the anastelosis programmes. This was accompanied by the identification of fragments of sculpture and inscriptions that were moved to the Acropolis Museum. By the end of 1999, 14,000 members had been inventoried, and between 2000 and 2007, the archaeologist K. Kissas had recorded 7,000 more fragments. The programme will continue from 2007 with the inventorying of scattered poros members.

Likewise included in the works of the YSMA is the Lift giving access to the Acropolis to people with special needs. The installation of a lift on the north side of the Acropolis, under the guidance of the mechanical and elecrical engineer, S. Oikonomopoulos, was finished in the

record time of 5 weeks, in order to have it ready for the Oympic Games of August 2004. Since then it has worked without interruption due to high technical ability and experience and the technical equipment of the Service.

Important and necessary for the YSMA to function are the sections that support the work: that of **Electromechanical support** headed by the mechanical and electrical engineer, S. Oikonomopoulos, the Laboratory for producing moulds headed by the undersigned, the Laboratory of specialized photography and cinema headed by the photographer S. Mavrommatis, the Accounting office headed by P. Katsimichas, the Secretariat headed by C. Papanicholaou, the Supplies office headed by T. Foutsas. Special sections of the YSMA are those of Information and Education headed by the architect-archaeologist C. Hadziaslani and of Documentation headed by the archaeologist F. Mallouchou-Tufano.

For every work of monumental restoration -and all the more for the Acropolis- it is absolutely necessary that the citizen be continuously informed on the subject and that it be connected to education. For this reason one of the priorities of the YSMA was to be in touch with the general public and with the educational world, in the belief that the first step in respecting and conserving a monument is to make the citizen aware from an early age. This is successful through the educational programmes, in which the children come to know the monuments and the works being done, they take part in the unavoidable theoretical discussions and they gain direct experience. The Department of Information and Education organizes educational programmes for defined groups and in particular for school classes on the subject of the Acropolis and its monuments, holds seminars for educators and for students in order to educate them in the subjects of classical architecture and art and to inform them about the anastelosis of classical monuments. It also produces educational material, special publications and museum kits that it sends out on loan or presents permanently to schools. It organizes



The educational kits of the Acropolis. Photo S. Mavrommatis, 2002

the proceedings. In addition to all this, it plans exhibitions in collaboration with the scholarly personnel of the works and others. Analytical documentation of the works of anastelosis and conservation, apart from being required by international restoration ethics, assures in addition the theoretical

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special symposia for educators and publishes principle of reversibility of the interventions, which has been applied from the beginning of the works on the Acropolis. All phases of the interventions are documented using various methods. This includes recording the works in daybooks, documentation by drawing (topographical drawings of the extant condition of the monuments, drawings to show the structural restoration of architectural members, mappings showing the



nentation of the Acropolis restoration works

surface damage on the monuments and the relevant interventions for conservation), and systematic photographic and cinematographic monitoring of the works.

The vast amount of documentation accumulated necessitated its digitization. The documentation data base for the works of anastelosis on the Acropolis manages the material produced each day on the worksites, as well as the archival material of the Acropolis Committee. The ability of the data base to handle complex answers about the architectural members of the monuments and the interventions carried out on them, makes it a valuable tool for those engaged in the work and for the scholarly world as well.

In the wider framework of the documentation of the YSMA interventions, designed and developed from 2007, by the undersigned together with the archaeologist D. Moullou, is the work "Development of Geographical Information Systems on the Acropolis of Athens", funded by the European Programme "Information Society". The chief goal of the programme is to map the relief of the Acropolis rock, using the full topographical and photogrammetric survey of the Wall and the plan of the Acropolis, together with the 3-dimensional scanning of the Erechtheion and the Wall for its full length. All the information to emerge is to be entered in a versatile Geographical Information System that will be connected with the up-dating of the existing data base of the anastelosis works. In the near future we expect also to have ready a special website on the Internet, through which the interested public will be able to follow on a regular basis the development and results of the works.

In the framework of firmly established procedures of scholarly transparency and dialogue as well as general circulation of information about the Acropolis works, in the period 2000-2007 the YSMA continued at undiminished rate the publication of studies for the restoration of the monuments (2002: K. Zambas, *The Refinements of the Parthenon Columns and Study for the Structural Restoration of the North Façade of the Parthenon*, E. Papakonstantinou-K. Frantzikinaki-P. Pouli-V. Zapheiropoulos, Study for the Cleaning of the West Frieze of the Parthenon, T. Skoulikidis, Methods of Conservation of Pentelic Marble, C. Paraschi-N. Toganidis, Study for the Resto-



Dismantling the westernmost north metopes of the Parthenon. Photo R. Christodoulopoulou, 2007



Restoration of the north colonnade of the Parthenon. View from the northeast. Photo L. Lambrinou, 2006

ration of the South Wall of the Parthenon, T. Tanoulas-M. Ioannidou, *Study for the Restoration of the Superstructure of the*  Central Building of the Propylaia, N. Toganidis-K. Matala, Study for the restoration of the North Wall of the Parthenon). In addition the YSMA organized an international meeting of specialists (2002: 5th International Meeting on the Restoration of the Acropolis Monuments), held exhibitions (for example, the exhibition of photographs by S. Mavrommatis), and its scholarly staff took part in one-day conferences and symposia, gave talks and so forth.

Beginning in 2000, the YSMA has been publishing on a yearly basis its Newsletter providing information about the continuing anastelosis of the Acropolis monuments, *The Acropolis Restoration News*.

The work of the YSMA during the seven years of its existence has, in my opinion, fully justified the establishment of this peripheral service of the Ministry of Culture. With the completion of the programmes still under way, a period in the works of restoration on the Acropolis will come to an end, a new one will begin. It is my belief that in this new phase of the works the guiding forces will be the knowledge already gained and the experience and with this always the creative spirit and enthusiasm, so that in a reasonable length of time we shall see the monuments of the Acropolis restored, not only as ageless symbols of the universal classical Greek spirit but also as testimonia of the scholarly and technical knowledge of modern Hellas.

> *Maria Ioannidou Civil Engineer Director of YSMA*

#### Pı

A basic aspect of every large restoration project is to inform the public, especially when this is being carried out in an archaeological site that receives great numbers of visitors daily. The regular evaluation of the general public's reaction to works of restoration may well contribute to a more effectively planned communication policy by a restoration service, such as the YSMA. With this perception as starting point, research on public opinion about the restoration of the Acropolis monuments was planned and put into practice. The research was focussed on exploring the visitors' views about restoration in general and in

particular about the practices adopted by the Committee for the Conservation of the Acropolis Monuments (ESMA).

The method of a questionnaire with multiple-choice questions was considered suitable for approaching a large and complex public, with differing demographic characteristics and varying interests. Questions concerning know-ledge were avoided in planning the questionnaire as they might discourage visitors from par-

ticipating in the research. Particular care was given in framing the questions so as not to direct those questioned to particular answers but, to the contrary, to give them sufficient alternatives so they could define their outlook accurately. The limited amount of time the visitors could spare before their departure from the archaeological site was taken into account as was the physical fatigue resulting from their tour on the Acropolis. This meant the compiling of a questionnaire that was as short as possible.

Conduct of the research was assigned to the public opinion surveys company Metron Analysis. Research was carried out over a period of six months (June-November 2006), during three randomly chosen days each month, from 11 a.m to 3 p.m. The questionnaire was translated into five languages, English, French, Spanish, Italian and Chinese. A total of 1032 visitors took part in the research.

The results, which were handed in to the YSMA by the public opinion surveys company, can be arranged in five categories, corresponding to an equal number of units of the questionnaire: • General characteristics of the visitors (Quest. 13 to Quest. 16)



Visitors to the Acropolis. Photo E. Petropoulou, 2006

Special characteristics of the visit to the archaeological site (Quest. 9 to Quest. 12)
Opinions about the restoration of the monuments (Quest. 1 to Quest. 5)
Degree of contentment with the restoration and the visit (Quest. 6 to Quest. 8)
Spontaneous comments and observations In the analysis that follows, for the sake of simplicity, all fractional numbers have been rounded to the nearest whole number.

### General characteristics of the visitors

To begin with it was thought worthwhile to explore the demographic profile of the visitors. Analysis of the replies showed that both men (53%) and women (47%) par-

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# Public opinion poll about the restoration of the Acropolis monuments

ticipated in the research. The age groups best represented are 31 to 45 years (37%) and 18 to 30 years (35%). The remaining sample ranges between the categories of 46 to 60 years (21%), over 60 years (4%) and below 18 years (3%). An interesting finding of the research is that the overwhelming majority of visitors (81%) had received upper or higher education, while only a small percentage of those asked (15%) had terminated their education at the middle level. Exploration of nationality revealed that the European countries (with Spain, France, Italy, Great Britain and Greece predomi-

> nating), and United States of America have the strongest representation.

# Special characteristics of the visit to the archaeological site

In planning the questionnaire, it was considered worthwhile to explore the special features of the visit. Factors such as previous experience, the social environment of the visit (visit as part of an organized group or independent visit) and the sources of information used during the visit may affect the

process of absorbing information and, by extension, the impressions and views of the visitors. In this sense, they form an interesting base of analysis for the results of the research.

During the processing of the answers, it was found that 70% of those asked had visited the archaeological site of the Acropolis on their own/alone, while 27% had come with an organized group. It should of course be emphasized that this picture in no way represents the total of the visitors. Quite otherwise, every-day observation shows that the majority of visitors are participants in some organized group. The representation is due mainly to the unwillingness of members of organized groups to participate in the research, evidently because of the strict time frame in which their visit is carried out. Even so, because participants in the same group tend to have similar demographic features and common perceptions during the visit, the results yielded by analysis of the answers, with a small margin of error, may be generalized in the population under investigation, as a whole.

Of particular interest is the finding that

the guide and 30% the archaeological guidebook or other printed matter. In this case too the visitors had the option of more than one choice.

# Opinions about the restoration of the monuments

Questions 1 to 5 form the basic body of the questionnaire, since their purpose is to investigate the opinions of the visitors about the restoration of the monuments. To question 1 ("According to your opinion, what are the reasons for the restoration of the Acropolis monuments?"), 73% of

Asking the visitors about the restoration of the Acropolis. Photo E. Petropoulou, 2006

36% of those asked had visited 2 to 5 archaeological sites during the past 12 months, while 23% had visited more than 5, a percentage considered particularly high. The percentage of those who had visited only one site (23%) was the same, while 17% replied that they had not visited another archaeological site during the same time. To the question exploring their first source of information about the Acropolis, most of the respondents mentioned school (62%) and books (52%). It may be noted that for this question the visitors could choose more than one answer. Finally, in reply to the question exploring the sources of information used by the visitors during the visit, 42% mentioned the signs, 36%

those asked replied "for the protection of the monuments", 35% replied "for making monuments understanable to the general public", 26% replied "in order to repair faults of earlier restorations" and only 12% replied "in order to increase the visitors' attendance". This question had multiple answers. To question 2 ("The monuments' restoration consists of..."), the majority of the respondents (70%) replied "resetting of the ancient material and partial supplementing with new marble", while a smaller number, not insignificant, (23%) was the percentage of those who replied "full reconstruction of the monuments". The opinions of the visitors about the

The opinions of the visitors about the methods and practices adoped by the ES-

MA were investigated through questions 3 to 5. For reasons of economy, but also to make it simpler for the reader, in the analysis that follows the answers have been gathered into wider categories. Thus, combined in the category "I agree" are the percentages of the sub-divisions "I totally agree" and "I rather agree" and, correspondingly, the percentages of the sub-divisions "I completely disagree" and "I disagree to some extent" are combined in the category "I disagree".

To question 3 ("During the restoration, the monuments are being supplemented with new marble. What is your opinion of this practice?"), 68% of those questioned replied that they agree, whereas 16% disagree. To question 4 ("During the restoration, the original sculptures are transferred to the museum for maintenance/protection and replicas are placed on the monuments. What is your opinion of this practice?"), the percentage of the respondents who agree is impressive, at 82%, whereas those disagreeing are limited to 9%.

These viewpoints were explored further in Question 5. Here the visitors were asked to take a position between opposing propositions. Four opposing schemes were presented to those being questioned and they were asked to choose the one with which they most agreed. The first opposing pair comprised the statement "the restoration brings out the appearance of the monuments" as opposed to "the restoration distorts the appearance of the monuments". 44% of those questioned agreed with the first supposition, whereas only 29% agreed with the second. A significant percentage of the respondents (27%) took no position either for the one or the other. The next opposing pair comprised the proposition "the colour contrast between the ancient marble and the new supplements contributes to the distinction between the ancient and the new material on the monuments" as opposed to "the colour contrast between the ancient marble and the new supplements has unpleasant aesthetic results". 43% of the respondents agreed with the first proposition, and 29% with the

second. Here too, 27% of those guestioned took no position either for the one or the other proposition. To the opposing propositions "the use of new marble contributes to the comprehension of the appearance of the monuments" and "the use of new marble spoils the original character of the monuments", 47% of the respondents agreed with the first proposition, while 26% agreed with the second. Again, about a quarter of those asked (26%) agreed with neither one nor the other proposal. The final opposing scheme comprised the proposition/statement "the replacement of the ancient sculptures with replicas is essential/necessary for the protection of the sculptures" as against "the replacement of the ancient sculptures with replicas spoils the original character of the monuments". Most of those questioned (50%) were in favour of the first proposal, whereas a significantly smaller percentage (22%) responded in agreement with the second. The percentage of respondents who took no position at all came to 27%.

# Degree of contentment with the work of restoration and with the visit

It was considered necessary in making up the questionnaire to explore the visitors' total impression of the archaeological site and the restoration of the monuments, especially in relation to their expectations before the visit. The degree of contentment can be a significant factor in understanding the work being carried out on the monuments of the Acropolis, since a visitor who leaves the archaeological site with positive impressions is more likely to consult secondary sources of information after his visit. To question 6 ("What was your overall attitude towards the restoration of the Acropolis monuments during your visit?") 39% of the repondents replied "very positive", 46% "rather positive", 4% "rather negative" and only 1% had a "very negative" attitude. 10% of the visitors replied "neither positive nor negative". To question 7 ("Would you say that the architecture of the Acropolis monuments came up to your expectations? If so, to what degree?"), 43% replied "absolutely", 34% "very much", 16% "quite", 4% "a little"

and only 1% replied that the architecture does not correspond "at all" to their previous idea. Finally, to question 8 ("According to what you were expecting to see, how satisfied or dissatisfied were you with the overall experience of your visit to the Acropolis?") 44% of those questioned replied "very satisfied", 45% "rather satisfied", 6% "neither satisfied nor dissatisfied", 3% replied "rather dissatisfied" and only 1% claimed to be "very dissatisfied".

Spontaneous comments and observations In an open question added at the end of



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the questionnaire, the visitors were asked to comment freely on the restoration of the monuments of the Acropolis and on the overall visiting experience. The replies numbered 269, 32% of which had favourable comments in general about the Acropolis, 15% made favourable comments about the restoration, 14% were negative about the restoration, 12% expressed some disatisfaction with the archaeological site of the Acropolis and 4% expressed impatience about the completion of the works

#### Conclusions

A penetrating look at the above results

Polling the visitors to the Acropolis. Photo E. Petro-

enables us to understand the opinions of the visitors about the restoration of the Acropolis monuments. It would not be exaggeration to say that as a whole the visitors react positively to the work of restoration. Even when they do not know the specific reasons that made restoration necessary, the visitors are convinced that the efforts being made are for the protection of the monuments. This choice is indicative of the high position the protection of the monuments has on the scale of evaluation in the mind of the general public, in comparison to their educational value or, much more, their profit-making potential. Beginning with this conviction, most of the visitors approve of the restoration practices that are being adopted, such as the filling in of ancient architectural members with new marble, or the removal of sculpture from the monuments in order to protect them. In particular for the critical question of replacing the sculpture with replicas, it appears that there is almost unanimous approval on the part of the respondents.

These results are slightly different, without reversing the general picture, when the visitors are asked to take a position between a positive and a negative statement. The positive statement describes the need for the monuments to undergo restoration with the aim of bringing out their appearance and better preserving them. The negative statement refers to the distortion of authenticity of the monuments or the reduction of their aesthetic quality. A significant number of visitors (a quarter of those asked, approximately) appear to hesitate in taking a position on one or the other view. Even so, the percentage of those who recognize the positive side of restoration remains high, reaching 50% in the case of the removal and transportation of the original sculpture to the Acropolis Museum.

On the basis of the results of the survey, one could argue that the appearance of the Acropolis monuments corresponds to the expectations the visitors had before their visit. We can also say that the degree of satisfaction with the entire experience of the visit and with the works of restoration, is particularly high. The individual comments work finished, while others compare the

present appearance of the monuments with an image derived from an earlier visit.

For each question in the questionnaire statistical analyses were made by sex, age, nationality and the educational level of the visitors, the way in which their visit was made, and their previous experience with visits to archaeological sites. These analyses show that the educational level and the previous experience are important factors in understanding the works of restoration. This realization in part explains the positive (beyond all expectation) results of the survey. The visitors to the Acropolis show a high educational level and considerable previous experience, a fact that implies -- among other things- an understanding of the aims of an attempt at restoration and a certain familiarity with the limitations that a restoration imposes.

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Another important, if not definitive, factor for understanding the results is age. The relevant analyses of the replies demonstrate that the more elderly visitors tend to be more satisfied with the work of restoration and the visiting

experience than the younger visitors, who seem to have more reservations. A likely explanation of the phenomenon is that younger visitors, being more familiar with the use of advanced technology, look for more modern methods of presenting the monuments and the works.

Of the comments in reply to the open question at the end of the questionnaire,

information on the history and architecture of the monuments, particularly compared to the information given about the restoration project.





Results of the polling: opinions about the restoration works in general, the use of new marble and the removal of the architectural sculpture to the Acropolis Museum

the most useful is the request for the installation of fuller visual material in the archaeological site. Quite a few visitors noted the lack of a general information board at the entrance to the site, and the need for more

Fani Mallouchou-Tufano Archaeologist, Ph.D., Head Evi Petropoulou Archaeologist, M.Phil.

visitor, the Acropolis works

are well worthwhile.

Documentation Office of the YSMA

The case of the House of the Arrephoroi on the Athenian Acropolis is a characteristic example of a rescue intervention using the method of reburial. In view of the intervention, an architectural study was made by V. Manidaki in order to document the construction of the monument after it was completely unearthed for archaeological exploration and the relevant geotechnical study by the undersigned. Object of the geotechnical study was the backfilling of the foundation walls of the Arrephorion and the shapeless marble fragments that had piled up and were found in the removal of earth from the monument. The work was carried out by the EDRASO-MICHANIKI ATE, under the supervision of the YSMA

The Arrephorion (House of the Arrephoroi), on the north side of the Acropolis next to the Circuit Wall, was a cult building dedicated to the goddess Athena. The preserved parts of the building include the foundation walls, which form two underground halls. The dimensions of the central hall (YTI 1) are 8.30 x 4.30 sq. m and the maximum height of the foundation 4.90 m. The smaller hall, that is the porch  $(Y\Pi 2)$ ,

measures 8.30 x 2.30 sq. m and the maximum height of the foundation wall is 3.00 m. The foundation walls, which are rectangular blocks of poros-stone (brittle marl limestone from Piraeus), range between 1.40 and 2.00 m in thickness.

#### Purpose of the backfilling

The main reason the backfilling of the Arrephorion was considered necessary was the continuous damage to the structural components of the monument from the physical and chemical action of the envi-

ronment. The course of this damage is clear from the photographs that have been taken at an interval of some 70 years (1932 and 2003 correspondingly). The backfilling of the foundation walls of the Arrephorion has the following goals: • Protection of the structural components

from the adverse mechanical and physicochemical action of the environment. • Protection of the amorphous marble fragments in the porch by burying them. • Protection of the interior foundation walls, which are founded on ancient introduced fill within the central hall. • Relief of the section of the north Circuit Wall of the Acropolis, which is in contact

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#### General plan of the Athenian Acropolis. Drawing by V. Manidaki (based on drawings by G. Kaveraw, J. Travlos, T. Tanoulas), 2006

with the north foundation wall of the central hall, from charging actions of the fill under static or seismic conditions.

A presupposition for accomplishing the above goals is to insure -in so far as possible- the necessary mechanical and physiochemical conditions (temperature - moisture) within the fill. It is worth noting that the technical solution of backfilling was judged the indicated method for protecting the structure of the poros foundation walls, based on the obser-

## Protective filling of ancient monuments. The case of the Arrephorion on the Athenian Akropolis

of the foundation walls of the Arrephorion

vation that the buried sections of the foundation walls were preserved in far better condition than the sections that had been exposed above ground.

### Planning the backfilling

#### Principles of backfilling

The backfilling of monuments is considered an intervention on ancient monuments and therefore requires special attention. In making the geotechnical study for backfilling, the general principles of the Charter of Venice were borne in mind.

In accordance with these principles, we aimed at the following:

be easily removable without damage to the monument.

• Preservation of the existing structural function of the members of the monument.

• Minimalizing changes in the appearance of the masonry of the monument: the fill must not alter the technological and constructional characteristics of the masonry as evidence of the technology of the past.

• Bearing capacity: the backfill must be able to bear securely self-weight loads or the accidental (dead -

• Reversibility of the backfilling: the fill must

live) loads.

• Minimalizing the load on the structural members of the monument: the backfill must be introduced in such as way that its charging action on the building blocks of the monument is minimized.

• Longevity of the backfill: The method of backfilling must insure that the work has the maximum longevity.

#### Choice of method for backfilling

In order to comply with the above general principles and with special requirements in



the case of the Arrephorion, alternate methods of backfilling were examined as a preliminary approach.

After comparative qualitative analyses, it was decided that the most suitable method of backfilling in the case of the Arrephorion is to introduce reinforced soil into the central hall and in the porch simple fill consisting of amorphous marble fragments and supplemented by suitable well graded selected granular soil. Around the edges of the monument smooth slopes were formed (with an inclination of about 30°) of well compacted gravel. The reinforced soil represents a relatively modern technique, which is already regularly used in our country –primarily in road construction– as an alt• Minimal loading of the foundation walls and of the part of the Circuit Wall that is in contact with the ruins from the action of horizontal thrust of the fill under static and seismic conditions:

- Facility in future removal of the fill to return the area to its former state.
- Durability of the work (at least 120 years with the endurance of the geosynthetics as criterion).
- Full analytical documentation and evaluation of the solution in static and seismic conditions.
- Short time needed for doing the work.
- Facility in implementation of construction.
- Reasonable cost of the operation.

επιβεβλημένη ανάγκη για προστασία των διαβρωμένων θεμελίων του Αρρηφορία





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H durkpion ut makatorepet over oppopting anomalument mode roppin tives in Karaatpoopt Development over time of the damage of the Arrephorion foundation walls. Photographic composition by V. Manidaki, 2006

ternative to costly retaining walls of reinforced concrete. Briefly, the method comprises layers of well compacted gravel, with suitable granulometry and geogrid sheets made of geosynthetics of high resistance introduced between the layers; the mesh of the geogrid sheets interlock with the grains of the soil filling.

With the method chosen for backfilling, the following advantages are assured:

Geotechnical calculations

The geotechnical study for the backfilling comprises the following calculations:

a) Calculations of external stability: these include analysis for slide of the reinforced soil block on the geotextile of the base. Analyses for overturning and bearing capacity of the subsoil stratum are considered redundant.

b) Calculations of internal stability are used

for the deign of: the thickness of the soil layers of selected gravel, the required tensile strength of the geogrid for each layer, the geometric characteristics of the reinforcement and its positioning. The calculations were made for the most unfavourable contour, in which the reinforced soil has a height of vertical slope equal to 5.00 m. A lifetime of t=120 years was accepted for the backfill, based on the strength of the geosynthetics.

Examined in addition, in the framework of the geotechnical planning of the work, were subjects such as:

• Sufficient drainage of the underground areas.

•The isolation of the monument from the filling material with adequate separation geotextiles.

•Surface protection from rainwater seepage.

Protection of the structural blocks of the Arrephorion with simple physical methods.
The suitable choice of surface materials and geosynthetics for implementing the process of backfilling.

c) Calculations for seismic action: These were based on the provisions of the Greek Antiseismic Code (EAK2003) since the backfill constitutes a new construction within the monument.

In particular for the antiseismic planning of the fill:

i) The seismic loading was determined for the design. On the basis of the Code (EAK 2003) the area of the work is in a zone of seismic hazard "1", with a seismic acceleration of A=0.16 g. The design acceleration was increased because of the importance of the work, the increased length of the lifespan of the work and because of the amplification of the acceleration due to the topographical effect of the rocky Acropolis hill. As a result, the design acceleration was determined as A=0.30 g.

ii) Calculated with well documented empirical methods were the permanent displacement of the reinforced fill under seismic conditions, shifts owing to shaking of the foundation walls, shaking of the fill and in the long run distortion of the reinforced fill through creep of the geogrid. All this showed that it was necessary to make a joint between the north foundation wall and the reinforced fill as follows: from the crest of the fill to the bottom 2 m joint b=15 cm and from a depth 2 m from the crest to the base joint b=10 cm.

#### The intervention

Briefly, in the framework of making the backfilling and giving functional shape to the wider environs of the area, between September 2006 and April 2007, the following works were completed:

1. A base was formed for the backfill by placing a levelling layer of selected gravel on the rock and covering it with an impervious insulating membrane, in order to avoid seepage of local stagnant water.

2. A separation geotextile was laid as a covering for the area to be filled. The foundation walls in particular are covered with the clean sand introduced between the foundation walls and the geotextile in order to a) avoid direct contact of the foundation walls with the geotextile and b) create a better adjustment of the geotextile against the irregular side of the foundation walls.

3. A drainage layer was placed (selected gravel with a <3% percentage of fine grains) on the separation geotextile of the floor with the slope necessary for water to flow out.

4. A drain made of pebbles (12-60 mm) with a diam. 20 cm, was constructed in the north side of the central hall and enclosed in geotextile. For the exterior run-off of the water, a perforated pipe of PVC was placed transversely at the end of the drain, with the opening of a hole in the northwest corner of the central hall.

5. A separation geotextile was placed on the upper surface of the drainage layer as protection from chance pollution from fine grains of gravel.

6. A reinforced embankment was made on the separation geotextile with successive lavers of compacted select gravel (at least 95% of the modified Procter test), 25 cm thick and geomesh. The layers of geomesh are set at intervals of 50 cm (each two lavers of fill), with the main tensile strength oriented N-S. The façade of the fill is formed by a geomesh wrap-around, and the encasement of the ground material with the placing of a separation geotextile within the part of the geomesh that is wrapped around. Particularly in the areas of contact between the fill and the foundation walls light compaction was applied in order to lessen the lateral compaction pressures on the foundation walls. In the areas of contact between the



The House of the Arrephoroi. Section N-S. Drawing by V. Manidaki, 2006



The House of the Arrephoroi. Section E-W. Drawing by V. Manidaki, 2006

reinforced fill and the north foundation wall, special arrangement was made for the construction of an antiseismic joint of graded width with the setting of a suitable, very deformable synthetic insert of sheets of polystyrene, 5 cm in width. Special care was taken also in the areas of contact between the reinforced fill and the foundation crosswalls in the central hall, by placing supplementary perimetrical layers of geomesh so as to improve the total contribution of the reinforced fill in areas where the armature is interrupted because of the foundation cross-walls.

7. Covering the reinforced fill with separation geotextiles and then placing a sealing layer of surface material of low permeability comprising a mixture of argillaceous matter and pebble (so as to combine impermeability with strength); also drainage was arranged for rainwater. the amorphous marble fragments from the removal of fill from the monument, and the rest of the empty space was filled in with select granular material. When the filling had been completed, a separation geotextile was phorion with well compressed select gravel. This perimetric fill was formed with a slope no greater than 1:2 (height: width).

10. Construction of a wall of stone mason-



The House of the Arrephoroi. Construction of reinforced embankment with wrap around face formation. Photo D. Englezos, November 2006



The House of the Arrephoroi. Perimetric drain to carry off rainwater. Photo D. Englezos, March 2007

8. Together with the introduction of reinforced fill in the central hall, the filling of the porch proceeded to the same height. Specifically, the porch was filled in part with placed on top, over which the insulating sealing layer was spread and compressed.

9. Extension of the filling around the Arre-

Stone masonry wall at NW border of the Arrephorion. Photo D. Englezos, December 2006

ry with mortar at the NW side of the monument at the boundary of the mediaeval stairway, to support the fill.

11. Construction of a drain around the edge at the foot of the slopes of the fill (to carry off rainwater) consisting of a pierced plastic pipe  $\Phi$ 100, enclosed in a separation geotextile, with a perimetric filter of finegrained gravel likewise surrounded on the exterior by a separation geotextile. The drain empties through an opening in the neighbouring mediaeval stairway.

12. Transportation of the piles of amorphous marble fragments from the south side of the Arrephorion to the area NW of the backfill and its covering over (with select gravel), with a slope toward the drain for the run-off of rainwater from the immediate area.

13. Making the final coating of the fill over the water-proof sealing layer (with the insertion of geotextile) of well compressed gravel with an aggregate of a suitable colour, so as to harmonize with the surrounding archaeological site.

14. Architectural arrangement of the fill to show the plan of the buried foundation walls by means of zones of garbuglio 5 cm thick (reinforced with geogrid), of white cement and of a suitable flat colour so as to harmonize with the final surface of the fill. 15. In order to monitor the backfill, we placed the following: a) pile witnesses on the foundation, the cross-wall in the central hall and on the top of the reinforced fill, for the topographical monitoring of

the reinforced fill to monitor chance horizontal pressure shifts.

During the work, in addition to continuous macroscopic monitoring, there was inces-



Plan of the backfilling of the Arrephorion. Drawing by V. Manidaki, 2006.



The Site of the House of the Arrephoroi after its backfilling. Photo F. Mallouchou-Tufano, May 2007

settling; b) optical fibre for monitoring possible movements of the north wall of the central hall; c) a pressure sensor on the north wall of the central hall at the base of sant quality control, with sufficient laboratory and field tests relating to the determination of granulometry, permeability and the compaction of granular materials. Likewise, there was systematic documentation of the construction with the compiling of a register of the work: daybook, plans "as built", photographs, tests of quality control, technical record, statistical entries etc, and a conservation manual of the work.

Used in carrying out the construction were approximately 1200 m<sup>3</sup> choice inert materials, such as sand, pebbles and gravel, 600m<sup>2</sup> geomesh, 1000m<sup>2</sup> geotextiles, 1000 kg cement, 30 m<sup>2</sup> timber etc. The total time for completing the project (backfilling the monument and arranging the surrounding area) was around 7 months, a very short time considering the special difficulties of carrying out the task in the archaeological site of the Acropolis. During this period the staff of the YSMA cooperated fruitfully with the contractor, particularly on moving materials and on conservation - repair of tools and machinery.

Finally, it should be noted that the backfilling of the monument has already been successfully completed (May 2007) and that the work is now in the phase of conservation by the contractor, in accordance with his obligations in the relevant contract.

Dimitris N. Englezos

Civil Engineer Ph.D., Geotechnical Engineer In charge of the work on the Circuit Wall of the Acropolis On the top of the tower that guards the Acropolis rock, the temple of Athena Nike has been undergoing anastelosis since the year 2000. The monument, a work of the architect Kallikrates, built in the years 427-424 B.C., housed the cult statue of the goddess for the second time in the history of her sanctuary.

The tower at the southwest corner of the Acropolis, primary defensive position of the fortification wall, was already a cult site in Mycenaean times. On the occasion of dismantling the temple and the classical phase of the *pyrgos* by the Archaeological Society of Athens in 1936, in order to strengthen the foundations of the monument, excavations were carried out by Nikolaos Balanos. These excavations showed that in that area of the sacred rock there stood in Mycenaean times a strong tower of Cyclopean construction. Then too, in a small double niche in the west side of the tower, a goddess was worshipped who was the protector of the entrance to the Acropolis and by extension the fortification Wall and the palace.

#### The early sanctuary

The cult of Athena Nike, continuing the religious tradition into historic times, had occupied the top of the Mycenaean tower already by the middle of the 6th century B.C. The oldest remains of that early sanctuary that came to light in the excavation of the preclassical fill within the classical *pyrgos*, 1.83 m lower than the level of the marble temple, are the following:

• the inscribed fragment of the earlier poros altar of the goddess (580-530 B.C.), founded or dedicated by Patrokles and

• the poros base measuring 0.96 x 1.08 x 0.41 m that held, according to most scholars, the archaic, wooden figure of the goddess (560 B.C.). The rectangular cutting in the centre of the base, which was made to hold the cult statue, was found full of clay figurines of a primitive female type (geometric – middle of the 5th century B.C.). For this reason, when it was found it was considered by those who studied it to be a *bothros* for chthonic sacrifices.

#### The first stone temple

Around this base, which follows the orientation of the Mycenaean bastion, there came to light remains of a little poros shrine of  $\Pi$ -shaped plan, measuring  $3.125 \ge 2.46$ m. The building, which was the first stone temple of Athena Nike, was discovered beneath the NE section of the marble temple, together with its altar. Today it is preserved in a specially constructed underground space in the classical pyrgos. As is evident from its slightly different orientation from that of the poros base, the shrine is later than the figure that it housed. The monument incorporated the base of the cult figure in its NW corner and not on its longitudinal axis, probably because the available space on the bastion did not permit further of the building to the north. Scholars have various opinions about its chronology, ranging from 500 to the middle of the 5th century B.C. Yet, the form of the altar and the lack of traces of burning on its walls make it more likely to postdate the Persian invasion. It appears that the venerated figure of the goddess escaped the catastrophe of 480 B.C., because it was hidden in a safe place. Thus, it was that after the return of the Athenians, probably in Kimon's time, it was set again in its original place as soon as the base was housed in the first stone tem-

The placing of dedications in the rectangular cutting of the base, about which there are opposing theories, appears likely to be connected with the end of the history of the first stone temple. Perhaps this happened during the filling in of the monument, which occurred before the founding of its new marble successor, as an ultimate offering to the cult figure that had stood there until that time.

#### The marble temple

The new marble, tetrastyle, amphiprostyle, Ionic temple of Athena Nike was built in the framework of a basic renovation of the temenos of the goddess at the new level of the sanctuary, after the Mycenaean bastion was replaced by a new defensive pyrgos. It was founded further west than its predecessor with its altar precisely above the earlier poros one. Together with the brilliantly conceived and executed marble sculptured parapet that crowns the bastion, the monument continues the tradition of being both sign and ornament of the defensive pyrgos. For the second time it houses in its little cella the venerated cult statue. Athena Nike, goddess protector of all that is fruitful, guardian of the well-being of the city of



The temple of Athena Nike around 460-450 B.C. Drawing by D. Giraud, 1994

Athens, was encircled by other ancient cults of vegetation on the pyrgos (Hekate/ Artemis Epipyrgidia and the Charites) and around it (Aphrodite Pandemos, Peitho, Ge Kourotrophos, Demeter Chloe). She was honoured on this spot by the Athenians as guarantor of success and protector of the fruits of every activity -athletic, artistic, military- yet with emphasis on the military and political side, which had developed further after the Persian Wars along with Athenian power. That is why in the sculptural decoration on her temple, the historical struggles of the city of Athens are presented as a continuation of the victorious struggles of the mythical ancestors of the Athenians, struggles which are indeed collated with the victorious struggle of the goddess in the mythical battle of the Gods against the Giants.

#### The cult statue

In his first book about the Acropolis, fragments of which are preserved by the 1st century A.D. lexicographer Harpokration, the Athenian traveller Heliodoros, a writer of the 2nd century B.C., applies the term

xoanon to the cult statue that was in the marble temple. He reports that the god was portraved wingless, with a chthonic symbol of fertility, the pomegranate, in her right hand, and holding in her left a helmet, symbol of war. This picture, connecting the chthonian fertility nature of the goddess with her warlike aspect, shows the deity as peaceful rather than martial. Four centuries later, the evidence of Heliodoros is verified by Pausanias, who, however, has probably taken the views of others without having actually seen the work himself. By his time the name of Athena had given way to the essential quality of Nike. The official inscriptions (IG II<sup>2</sup>, 1425) refer to the temple as the temple of Nike and show that the process had already started in the 4th century B.C. The goddess is now known as the Wingless Victory, "Nike Apteros" (I, 22, 4-5) because of the absence of the wings that might have been expected on the Goddess of Victory. This representation, according to the tradition of the time of the ancient traveller, insured that the goddess would be forever beside the Athenians (3, 15, 7).



The temple of Athena Nike from the east. Photo S. Mavrommatis, 1983

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Both the term used by the two travellers for the cult statue of the marble temple of Athena Nike and the early features evident from the description of Heliodoros, prompt us to ask, whether the statue that was placed in the marble temple was the archaic figure of the goddess that had survived the Perian Wars. The term *xoanon* in Heliodoros, as in other later writers, is synonymous with the term *agalma* (statue). In Pausanias, moreover, it means that the cult statue of the marble temple was assuredly made of wood (2, 15, 17). The position of the outstretched hands holding the symbols, as the traveller



The first stone shrine of Athena Nike within the classical pyrgos after its restoration in 2004. Photo D. Michalopoulou

pictures the *xoanon*, is known as early as the archaic period, and agrees with the dating of the preserved base of the *xoanon* in this early period. The pomegranate too is among the first symbols to become common in the Attic plastic arts from the beginning of the 6th century B.C. In any case, the evidence provided by Pausanias (5, 26, 6), that this *xoanon* was the model for the Wingless Victory dedicated by the Mantineans at Olympia and made by the sculptor Kalamis (second quarter of the 5th century B.C.), certifies its existence before the marble temple was built.

Thus, it is highly likely that the statue that was placed around 425 B.C. in the marble temple of Athena Nike, on top of the rebuilt *pyrgos*, inaugurating a new period in the cult of the goddess, will have been the same archaic *xoanon* of the goddess, refurbished and placed on a new base.

Likewise, we cannot exclude the possibility that its place was taken in the new monument by an exact copy of the venerated wooden prototype, the "ancient statue" (*ap*-  $\chi a {\it lov}$   ${\it d} \gamma a {\it l} \mu a)$  mentioned in the decree IG I^3 64 (440-415 B.C.)

The ancient literary sources do not give a fuller picture of its appearance. Some scholars believe that the proportions of both shrine and base show that the *xoanon* of Athena Nike was small enough to have been removed from the Acropolis in an emergency, as was the wooden *xoanon* of Athena Polias. It is a fact that the measure-

ments of the base  $(0.53 \times 0.54 \text{m})$  and the form of the cutting for setting the *xoanon* agree as well with a standing *xoanon* of large size as with a seated figure of smaller dimensions. Yet, the relative depth of the cutting  $(0.23 \times 0.28 \text{ m})$  for holding the statue would appear better suited to a standing *xoanon* of large size.

Representations of Athena on pottery and in sculpture support the validity of He-



Plan of the pyrgos of Athena Nike showing the Mycenaean fortifications, the first stone shrine and the classical temple. Drawing by V. Douras, Archive of the Archaeological Society at Athens



The temple of Athena Nike, under anastelosis, from the east. Photo E. Lembidaki, June 2007

liodoros' description, as well as the likelihood that the xoanon was a standing figure. In a relief from the Acropolis of the first half of the 4th century B.C., L. Beschi recognizes the archaic xoanon of Athena Nike in a female figure shown standing within a temple, with a table of offerings before her. The figure is behind and to the left of a seated goddess who is identified as Athena. The figure wears chiton and himation, but the way in which the figure is depicted is reminiscent of Archaic statues: she wears a polos, she is frontal and her elbows are bent with her hands outstretched and holding symbols. The symbol in her right hand could be a fruit.

Of particular importance for the history of the statue that was set up in the marble temple of Athena Nike is the decree IG I<sup>3</sup> 64 (440-415 B.C.), which refers to the announcement of a contest for undertaking some unspecified work in the framework of the building programme of the late 5th century in the temenos of Athena Nike. According to the most recent interpretation (D. Giraud, P. Schultz), the first decision of the decree refers to the choice of valuable materials -gold leaf and ivorythat were needed for the renovation of the cult statue that was housed in the new marble temple and for setting its new base. The sort of renovation that comprises its sheathing and redecorating with ivory and gold on the exposed parts was carried out as well on the archaic xoanon of Athena Polias that was housed in the Erechtheion around 540 B.C. The practice was employed also for other cult statues down to the 2nd century A.D.

This interpretation is supported both by the word  $\delta \rho \dot{u} \varphi \alpha \kappa \tau o v$  in the decree, which could refer to a barrier in the cella to safeguard the valuable cult statue or to the parapet of the *pyrgos*. It is supported also by the reference to participation of the Allies in the final decision, since it was a matter of using funds of the Delian League to restore an important statue of the goddess protector of the Alliance that had been saved from the Persian invasion. This participation would have been senseless if the decree had referred to the refurbishment of the doorways or construction of the coffers or acroteria of the temple, as has been suggested by a number of scholars.

The submission of a plan and the involvement of an architect mentioned in the decree is perhaps to be connected with the requirements of planning the entire intervention, which included the designing and setting of the new base of the *xoanon*, which, again in the NW corner of the area, exactly as it was in the first stone temple. These slabs are the only ones to have escaped the dismantling of the floor of the monument during the Ottoman domination, in order to construct the vault of a gunpowder storage room beneath the cella. This repetition in the second temple of the arrangement of the first is paralleled in the great temple of Hera in Samos at the end of the 6th century B.C., attributed to Polykrates. Here too



Restoration drawing of the first stone shrine with its altar and the statue. Long section. Drawing by D. Giraud, 2002

probably faced with relief plaques, will have shown off the statue to its best. Such a base, made of the same valuable materials as the statue, would have been entirely suitable for the chryselephantine statue. Indeed, ivory is mentioned in the treasury inventories of the Parthenon in the 4th century B.C. as a decorative material that was inlaid in the stone bases of cult statues.

In its new position in the cella of the marble temple, even if the temple were closed, the restored figure of the goddess would have been permanently visible through the fencing ( $\delta \rho \dot{u} \varphi \alpha \kappa \tau a$ ) that connected the two wall antae with the two pilasters in the centre of the east end of the cella. Two pryholes, useful for setting a base 1.70 m wide, preserved in the two westernmost of the eight slabs that form the central part of the cella floor, show that the cult figure was set the position of the cult statue of the preceding temple of Rhoikos and Theodoros of 570/560 B.C. was abandoned, just as in the new temple of Athena Nike, and the old base was replaced by a new one. It may well be that the exact position occupied by the archaic figure of Athena Nike in the poros shrine was not retained in the successor temple, as in the case of the most ancient statue of the Samian temple of the 8th-mid-7th centuries B.C., while still retaining the tradition of its off-centre position.

Until the 2nd century B.C. the cult figure of Athena Nike, according to Heliodoros' evidence, still stood on top of the bastion. Whether the temple and the statue suffered damage in 86 B.C., with the taking of the Acropolis by Sulla's troops, is unknown. Nor do we know if the Herulian incursion of 267 A.D., so catastrophic for the monuments of Athens, spread to the Acropolis. It is a fact that traces of destruction by fire were not observed on the temple of Athena Nike, which, exposed on top of the *pyrgos*, would have been at the centre of hostilities. Yet, the cult statue, covered with valuable materials surely did not escape the noice of the attackers, as is evident from the inscription IG II<sup>2</sup>, 3198, which tells us that the Athenian priest and historian P. Eren-



Plan of the temple of Athena Nike showing the position of the cult statue. Drawing by D. Giraud, 1994

nios Dexippos, who took part in driving the Herulii out of Athens, set up the statue of the divinity ( $\tau o \ \epsilon \delta o \zeta \ \tau n \zeta \ \theta \epsilon o u \ av \epsilon \sigma \tau n \sigma \epsilon v$ ), probably for the last time in its history. This inscription, incised in 269 A.D. and set up opposite the temple, on the central pilaster of the west façade of the south wing of the Propylaia, provides the last preserved evidence for the adventures of the cult statue of Athena Nike on her *pyrgos.* 

> **Evi Lembidaki** Archaeologist, Ph. D. of the Temple of Athena Nike Restoration Project

From Prehistoric times down to the predominance of Christianity in the 4th century A.D., the Greeks, continuing with the Romans, worshipped gods and goddesses who, according to tradition, dwelled on the untrodden heights of Mt. Olympos. The religion is a complex one and it is directly connected with a vivid mythology, which had a role for the ancestral leaders of the Greeks, the heroes of a shrouded but illustrious past, and above all the places, the mountains, rivers and seas of the Greek world. These numberless tales with their various versions, the myths about the

material in the schools within the programme "Alternative Zones" of the Ministry of National Education and Religion organized then for the first time.

This is a very pleasing museum kit, the subject of which is of interest to Greeks and to foreign educators worldwide. The purpose of the kit is to give students and educators the opportunity of approaching the vast richness of ancient and modern art, to learn some of the beautiful myths of antiguity and to connect these with the sites, monuments and history of our land.



The educational museum kit "The Twelve Olympian Gods". Photo S. Mavrommatis, 2007

twelve immortal and most important gods, with an entire world of lesser divinities, provided themes that nourished and inspired for thousands of years both pre-Christian antiquity and, after the European Renaissance, poets, writers, musicians, painters, sculptors, in sum culture itself.

With this as our theme and focusing on the Olympian divinities shown in the Parthenon frieze, we have prepared the educational museum kit, "The Twelve Olympian Gods". It is a subject on which we have worked for over 10 years. A first version of the museum kit appeared in 1998 in the framework of the programme "MELINA - Education and Culture". In 2001, it was chosen by the Institute of Education to be offered as educational

During the past years our museum kit has become a favorite with educators and students. It has provided the possibility of a multi-thematic approach through the teaching equipment. As a result it has been included with the new school books provided for the 3rd Elementary grade as suggested supporting material for the History-Mythology course. At the same time, the number of requests for receiving it on loan has increased in Greece and abroad for the English version. Thus, after 10 years, and thanks to the generous funding by the Stavros Niarchos Foundation, we have developed the contents and form of the museum kit and we have brought out what is actually a new museum kit, on the same theme, with 500 copies in Greek and 300 in English.

The museum kit comprises various booklets and games.

#### 1. The book of the museum kit

It includes an introduction to the subject. It describes and connects the various leaflets and games. It has instructions on how to use them and suggestions for the instructor divided into the following categories: Mythology-History and Art. Mythology and Language, Mythology and Natural Sciences, Mythology and Contemporary Professions. Many of these proposals have already been applied by educators with whom we have had a long collaboration. The museum kit "The Twelve Olympian Gods" has been designed to be used in the classroom and then in a place of cultural importance, thus practically anywhere. A single work of art devoted to only a single god is enough to activate the entire educational force of this museum kit.

Information is thus given for using the museum kit in a museum, an archaeological site, an art gallery, a library or a bookstore.

#### 2. A file with twelve leaflets, one for each god

Each leaflet contains a brief description of the characteristics of each divinity, the most important myths about him/her, the names of his/her companions and children, his/her principle epithets, characteristic features of the cult, the festivals held in his/her honour, and the main Sanctuaries and Temples dedicated to his/her name. Noted too are characteristic representations of the divinity in sculpture and vase painting and also the identifying attributes by which the god may be recognized; so too, the animals and plants that are sacred to him/her. One side of the leaflet has pictures only and it can serve as a mini-poster in the classroom. The illustrations are varied and they are representative of each one of the twelve gods and goddesses. Shown in each triptych are the head of the god or goddess from a well known work of ancient art and smaller pictures from a piece of sculpture, a coin, a vase with mythological scenes, an architectural work and a modern work of art from the Renaissance to the present.

We have chosen 101 works from 14 Greek Museums and 24 Foreign Museums in 8 different countries. An effort has been made

to chose works of art that will show the children the many aspects of the ancient world, of ancient art and the personality of each god or goddess. Where possible, we have given preference to works that are from the Athenian Acropolis.

The following principles have determined the choice of illustrative material.

• The form of the divinity on the first page was chosen from ancient sculptural works in marble. The purpose is to emphasize the anthropomorphism of ancient Greek religion.

• The ancient sculptural works, be they statues in-the-round or reliefs, have been selected from works of various sizes and different materials.

• The vases have been chosen on the basis of the clarity with which each divinity is depicted and according to the possibility of recognizing him from his attributes.

• Moreover, to demonstrate the richness and range of ancient Greek pottery making, we have chosen black-figured, red-figured, relief-decorated vases, white ground vases, and vases of various shapes: amphorae, craters, kylikes, lekythoi, pyxides, hydriae and so on.

The architectural monuments dedicated to the gods likewise vary. We have open-air Sanctuaries in a natural setting (such as the Sanctuary of Aphrodite at Daphne), simple altars (such as that of Dionysos), sacred precincts surrounded by stoas (as at Brauron), Telesteria (such as at Sangri in Naxos) and, of course, many temples of different types, built in the Doric, Ionic or Corinthian styles.

The ancient coins of the various Greek cities, of gold, silver and bronze, have been chosen for their artistic values, and for the ease with which each divinity can be recognized from his attributes.

Each leaflet contains a picture of a more recent work of art, whose theme is drawn from ancient mythology and the gods and which show the extent to which they influenced later artists. The works comprise paintings and sculpture by both European and American artists, covering a chronological span from the early Renaissance (Sandro Botticelli, 1481) to modern times (A. Karo, 1990).

3. An envelope with cards a. Thirteen myth-cards, wonderful works by the painter P. Valasakis, show scenes and myths characteristic of the gods. There is a card for each divinity, and another with all the gods together for the cover.

b. Five game-cards illustrate works of ancient and more recent art with representations of the gods, in sculpture, on vases, on coins and on postage stamps. Each card comprises a complete educational programme. The student identifies the divinities and the myths and compares different



types of statues, vases, coins and so forth, as follows:

### Recognizing the gods

On this card are twelve ancient marble sculptures that represent the individual gods. Some come from statues in-the-round, some from reliefs. The students try to identify each divinity and to imagine the figure without the missing fragments and damage suffered through time, but with the colours it will have had originally.

*Recognizing the gods... in sculpture* Illustrated on this card are twelve works of ancient sculpture from different periods, archaic, severe style, classical, Hellenistic, classicistic, Roman. They show sculptural types, that were created by the

great artists of antiquity, that went on to be copied in various sizes and materials in later times. The students try to recognize each god and to imagine the statues in their original form.

#### Recognizing the gods... on vases

On this card twelve ancient vases are shown. On each are depicted scenes with a god as protagonist. The students identify each god from his characteristic attributes or from the myths that are illustrated and they observe the shapes and types of decoration of the vases.

The book of the museum kit "The Twelve Olympian Gods". Photo S. Mavrommatis, 2007

#### Recognizing the gods... on coins

Represented on one side of the card are ancient coins, two, usually different, for each god, one showing the head and the other showing, in most cases, the entire figure of the divinity.

On the other side of the card are shown coins of the 20th century and also paper money, with representations of the ancient gods. The students identify each god, and they are asked to make their own collection and to draw their own proposals for coin design.

#### *Recognizing the gods... on stamps*

On this card are stamps with scenes depicting the gods and their myths as shown by ancient statues, vases, and coins and also by more recent works of art by well-known

Greek artists. The students identify each god and create a collection of their own.

c. Two cards follow, entitled "Recognizing plants and animals dedicated to the gods", by the painter, M. Kallimopoulos. Various myths from all over Greece lie behind the attributes or the predilection and relationship of each god for a specific animal or plant. The students are asked to indentify and find what is sacred to each divinity, and to pick out the corresponding myths.

d. A game-card with twelve figures-gods of different colours stimulates the children to create their own gods, to choose which colour best expresses each one, to find pictures in periodicals and newspapers, to clothe the figures and to add their attributes, and so forth.

#### 4. An envelope containing a card on the subject of attributes and symbolism

Shown are 12 attributes - forms that lend themselves to multiple interpretations. The multifacetted interpretations that each attribute can be given, the sequences and correlations that can be made, help the

pupil to imagine and to remodel creatively the world of the ancient divinities. The students decode them and fill the envelope with their own objects - attributes.

### 5. The leaflet "The Olympian Gods in the Parthenon Frieze"

A game is devoted to the Twelve Gods as they are depicted in the frieze of the Parthenon. Information is given about the monument, and for each god an epithet and the animal and plant that are sacred to him. The students try to identify the gods and their attributes

#### 6. The game of recognizing the gods "Who's Who on Mt. Olympos"

The game is based on the matching of photographs of a characteristic head, of a sculptured work, a vase, a coin, a temple, and a more recent work of art for each god. The student identifies the gods and chooses and matches the photographs of the various works

Finally, in the museum kit the student finds also an invitation to participate in a game of finding works of art of universal cultural heritage, with the gods of Olympos as pro-



The leaflets of the museum kit "The Twelve Olympian Gods". Photo S. Mavrommatis, 2007

tagonists. In order to participate, the student should send us photographs of one or more works of art. The work can refer to one or more divinities, it can be an ancient or more recent piece of sculpture, vase, coin, temple or neo-classical building, or a more recent work of art or whatever else offers the possibility of being matched with the world of the ancient gods.

Special care has been devoted to the pictorial quality of the museum kit. The excellent artistic and editorial supervision of the museum kit is the work of Ina Melengkoglou (AltSvs), to whom warm thanks are due; without her, the museum kit would not have had the same quality.

#### Circulation of the museum kit

From December 2006 to June 2007, 320 museum kits were given to educational institutions throughout Greece and it is estimated that some 10,000 school children will have made use of them. During the same time, around 2,000 children from 40 schools through Greece used them as material on loan.

Great interest was shown in the loan of the museum kit "The Twelve Olympian Gods" by district schools. In order to meet the demand for this circulation on a local level, a collaborative network was organized with local institutions, to which we delivered the museum kits so that they could be lent to the district schools. Thus, for each Prefecture a museum kit was sent to the local Ephorate of Prehistoric and Classical Antiquities, to the corresponding Ephorate of Byzantine Antiquities, and to Museums with organized sections of educational programmes. Likewise, for each Prefecture, our Service gave a museum kit to the Official in charge of Cultural Affairs and Artistic Competitions in both the Elementary and High Schools. These kits were distributed in the course of a special seminar held in Patras in February 2007, by invitation from the Ministry of Education and the Institute of Learning of the National Centre of Public Administration and Local Government. Many of the 100 Cultural Officials who took part in the Seminar, subsequently organized in their own Prefectures a similar presentation of "The Twelve Olympian Gods", informing the educators in their district about the use and availability of the kit on loan from the local institutions.

For example, in March 2007, in Thessalonike, the four Officials in charge of Cultural Affairs in the Elementary School system of the Prefecture, in collaboration with the Tellogleion Foundation for the Arts of



the Aristotle University of Thessalonike, organized a seminar addressed by C. Hadziaslani on the subject of the Educational Material of the Acropolis, and in particular the use of the museum kit, "The Twelve Olympian Gods" in educational practice. One hundred seventy educators from 120 schools took part in the seminar, and were given an Educational Folder on the Acropolis.

The schools of the Prefecture no longer need to borrow the museum kit of "The Twelve Olympian Gods" directly from Athens. They can now receive it on loan from the institution of the Ministry of National Education and Religion (four Cultural Officials of the Elementary School system and four of the High School system), from the institutions responsible at the Ministry of Culture (16th EPKA, 9th EBA, Archaeological Museum and Museum of Byzantine Culture), and from the Tellogleion Foundation of Arts and the Museum of Casts of the Archaeology Department of the Aristotle University of Thes-salonike.

In the Prefecture of Pella too, the Official for Cultural Affairs in the High School system organized a similar seminar for educators.

Another such seminar has already been scheduled for September in Athens for the schools of Attica and similarly at Pyrgos for





the educators of the Prefectures of Elis. Achaia and Aitoloakarnania. A different situation applied in the Prefecture of Rhodope, where our collaboration with the educators of the Prefecture was arranged through the local 19th Ephorate of Antiquities, which had a tradition in educational programmes. The archaeologist in charge of the Educational Programmes of the museum held a special seminar for the educators of the Prefecture on the subject of the new museum kit, "The Twelve Olympian Gods" and its use in the Archaeological Museum of Komotini. Between October 2006 and January 2007, 600 school children, with the help of the museum kit, took part in a specially arranged educational programme in the Museum.

Officials from abroad have shown special interest in the museum kit. Museum kits have been presented to 17 Foreign Archaeological Schools in Athens. They have also been given to educators from schools abroad with whom we have worked during this period. Thus, in a first phase, museum kits have been given to 33 institutions in Australia, France, Germany, United States, Spain, Italy, Lithuania, Great Britain, Holland, Poland, Romania and Turkey. We expect the sending of museum kits to selected institutions in Greece and abroad to have been completed in December 2007.

The cards of the museum kit "The Twelve Olympian Gods". Photo S. Mavrommatis, 2007

In closing we should like to thank particularly the Stavros Niarchos Foundation, whose generous funding completed first the museum kit "Let's go to the Acropolis" in 2002, and now the museum kit "The Twelve Olympian Gods".

> Cornelia Hadziaslani Architect-Archaeologist, Head Irini Kaïmara, Assimina Leonti Archeologists

Department of Information and Education of the YSMA From July 2006 until now, much activity has gone into informing the general public as well as specialists about the restoration of the Acropolis and generally about the work of the YSMA.

### Educational activities

The Information and Education Department of the YSMA carried out a programme on the theme "Let's Go to the Acropolis" at the Centre for Acropolis Studies for 2,100 school children. Yet, another year saw collaboration of the Department with the Greek Parliament, with 875 pupils, 23 of them from remote Gymnasia in the Dodecanese, visiting the Acropolis with the booklet "Let's Go to the Acropolis" in hand. All the Gymnasia that took part in the programme of the Parliament received a folder containing educational material for their libraries.

Likewise in 2006, it is estimated that a total of 14,196 school children from 266 schools worked with the Department's museum kits. This year, the museum kits were used by 10,780 school children from 189 schools (490 sections) in Attica, Lechaion of the Prefecture of Corinthia, Kos, Katerini and Dion of the Prefecture of Pieria, Kalamata, Pyrgos, Kerkyra, Volos, Thebes, Trikala, and Kalabaka. In addition to the above schools, which borrowed the museum kits directly from the Department, another 3,416 children from 86 schools used the museum kits through agents, mainly in the provinces, with which the Department has been collaborating during the past few years. These are various institutions, such as the Ephorates of Antiquities (for example, the 19th and 25th Ephorates of Prehistoric and Classical Antiquities), Museums or Foundations that have departments with educational programmes (for ex., the Archaeological Museum of Thessalonike, the Tellogleion Foundation for the Arts of the Aristotle University of Thessalonike), Schools (for ex. the 7th Lykeion (High School) of Larissa, the 6th Lykeion of Aigaleo and the 2nd and 3rd Educational District of the Evros region) that belong to the programme of School Libraries and who have copies of the museum kits "Let's Go to the Acropolis", "An Ancient Temple", the "Parthenon Frieze" and the "Twelve Olympian Gods". This has been arranged through a yearly loan to the various institutions, so that the schools in these places have easier access to the museum kits and can make use of them in their lessons.

Likewise, 58 museum kits were presented this year to institutions in Greece and abroad

(Great Britain, Italy, Holland, United States) seminars were held for a total of 555 educators and students and educational material was given to 145 individuals and 50 institutions. Among these we may note the seminar held in December 2006 for the Mayor of Nashville Tennessee and the presentation of the Department's new museum kit "The Twelve Olympian Gods" at the 10th Information Meeting of ICOM, December 2006 in Athens.

The new museum kit "The Twelve Olympian Gods" of the YSMA educational programmes was presented on 30 November 2006 in a special event at the Centre for Acropolis Studies. The gathering was greeted by the General Director of Antiquities and Cultural Heritage, V. Vasilopoulou, the Director of the Acropolis Restoration Service, M. Ioannidou, the Director of the 1st Ephorate of Prehistoric and Classical Antiquities, A. Mantis, and the President of the Organization for the Construction of the New Acropolis Museum, D. Pantermalis. The head of the Information and Education Department of YSMA, C. Hadziaslani, gave an analytical presentation of the museum kit.

#### Exhibitions

The well known photographic exhibition of the restoration works of the Acropolis by the YSMA photographer, S. Mavrommatis, continued its journey through the United States, where it was exhibited from January to March 2007 at the University of Maryland.

In March 2007, on the occasion of a special Day Conference, a photographic exhibition of the Acropolis restoration works was presented at Storeroom D of the Thessalonike Harbour. The exhibition was curated by P. Psaltis and S. Mavrommatis.

#### Symposia – Day Conferences

Held at Acragas in Sicily, from the 24th to the 25th of November 2006, was the second scholarly Conference "IIa Giornata Gregoriana" on the theme "The temple of Concord: History and Restoration". The Organization "Park-valley of the Agrigentum Temples", responsible for the protection and management of the monuments of



On March 16, 2007, the Office of the General Secretary of the Hellenic Ministry of Culture, held a successful Day Conference on the anastelosis works of the Athenian Acropolis, in Storeroom D at the Thessalonike Harbour. The Conference was opened with an address by the General Secretary of the Ministry of Culture, C. Zachopoulos. This was followed by talks given by Ch. Bouras on the theoretical principles of the Acropolis interventions, by M. Ioannidou on the past, present and future of anastelosis on the Acropolis, by F. Mallouchou-Tufano on the work of restoring the Erechtheion, by N. Toganidis on the restoration of the Parthenon opisthonaos, by D. Michalopoulou on the restoration of the Temple of Athena Nike, by T. Tanoulas on the Ionic column capitals of the Propylaia, by E. Papakonstantinou on



Day-Conference on the Ac March 2007



Day-Conference at the Cer. Tufano, November 2006

the conservation and cleaning of the west frieze of the Parthenon, by S. Oikonomopoulos on the technical devices designed for carrying out the works, by K. Kissas on the results of research on the fragments scattered on the Acropolis, by C. Hadziaslani on the YSMA educational programmes. In between the talks, the following films were shown: "The Works on the Athenian Acropolis. The People and the Monuments" by S. Mavrommatis, "The Erechtheion and Time" by S. Drakopou-



The photographic exhibition of the Acropolis restoration works in Thessalonike. Photo P. Psaltis, March 2007

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Day-Conference on the Acropolis restoration works. Storeroom D, Thessalonike Harbour. Photo T. Souvlakis,



Day-Conference at the Centre for Acropolis Studies in memory of T. Skoulikidis, Photo F. Mallouchou-

lou, "The Parthenon. The restoration of the east Façade" by D. Vernikos, "The Sacred Rock" by M. Paraschi and "Conservation and Cleaning of the west Frieze of the Parthenon" by S. Mavrommatis.

#### Lectures

The Director of YSMA and other members of the scholarly staff of the Service gave lectures and reports both in Greece and abroad on general or special subjects about the restoration works of the Acropolis.



Visit of the President of the Hellenic Republic K. Papoulias and the Minister of Culture, G. Voulgarakis to the Acropolis. At the left, the YSMA Director, M. Ioannidou. September 2006

In October 2006, M. Ioannidou spoke about the Acropolis works at an event organized by the Association of Friends of the Acropolis at the Centre for Acropolis Studies. She also took part in a Day Conference organized in Athens, in April 2007, by the Technical Chamber of Greece, with a report entitled "Antiseismic protection of ancient monuments: the case of the Acropolis".

E. Toumbakari, structural engineer in the restoration project of the Parthenon, gave reports on subjects relevant to her specialty at symposia held in New Delhi in November 2006, in St. Louis in the USA in June 2007, and in Alexandroupolis in October 2006. She also gave a report at the Day Conference for the Protection of Cultural Heritage held by the Technical Chamber of Greece in Athens, in March 2007. Finally, in April 2007, the head of the Documentation Office of YSMA, F. Mallouchou-Tufano, gave a number of talks on the restoration works of the Acropolis at the Universities of Ohio and of Arizona in the United States.

#### Event in Memory of Theodore Skoulikidis

On 25 November 2006, the Association of Friends of the Acropolis (EFA) and the YSMA held a Day Conference in memory of Theodore Skoulikidis, member of the ESMA continuously from its foundation and responsible for the physico-chemical part of the Acropolis works.

Among those who gave talks about him were the President of the ESMA, Ch. Bouras, the Director of the YSMA, M. Ioannidou, the head of the Section of Conservation, E. Papakonstantinou-Zioti, the President of the EFA, M. Neiadas, colleagues of the late professor at the National Technical University of Athens, students and friends and also his widow, the painter A. Venieri-Skoulikidi. Foreign colleagues in his field also spoke: M. Laurenzi Tabasso and L. Lazzarini. Shown during the



The publication "The Restoration of the Propylaia on the Athenian Acropolis"



The President of the Hellenic Republic, K. Papoulias, with the President of ESMA, Ch. Bouras in the Acropolis Museum. September 2006

event were sections from the television programme "Night Visitor" that were dedicated to T. Skoulikidis.

#### Visits

On 29 September 2006, the President of the Hellenic Republic, K. Papoulias, accompanied by the Minister of Culture, G. Voulgarakis, visited the works on the Acropolis monuments. They saw the various work-sites of the monuments and were guided by those responsible for the works. At the Propylaia they watched the setting on the monument of the new capitals on the easternmost Ionic columns in the west hall of the central building.

#### New publication

An elegant publication, in both Greek and English, was added in June 2007 to the list of publications on the Acropolis works. This is the "Restoration of the Propylaia of the Athenian Acropolis", by M. Ioannidou, in the series "Ergon IV, Publications of Architectural Books".

### Fani Mallouchou-Tufano

Archeologist Ph.D. Head of the Documentation Office of the YSMA

Twenty years have passed since the restoration of the Erechtheion was completed (1979-1987). It was the first intervention carried out on a monument of the Acropolis by the ESMA and in this work the methodology, which later became the established one for all the Acropolis interventions, was applied for the first time. The process comprises dismantling the parts of the monuments already restored in the past, including some parts theoretically "never disturbed", in which there are serious problems of cracking and fragmentation, in the conservation of the dismantled members on the ground, in their re-assembling on the monument, if possible in their original positions, in the transferring of the architectural sculp-

tures (in the case of the Erechtheion of the Carvatids) to the Acropolis Museum and in their replacement on the monument by casts made in artificial stone.

Looking at this first anastelosis intervention of the Acropolis Committee after 20 years, with the experienced eye gained thus far, we see many points of interest.

1. First of all, this is the first time in the long history of monumental restoration

in Greece that a multidisciplinary comprehensive study is published prior to any intervention on a monument. It is "The Study for the Restoration of the Erechtheion", published in December 1977, a collective work by the young scholars working then in the Acropolis, in which the problems of the monument are examined from every point of view, archaeological and architectural, structural, physical and chemical, and precise ways of dealing with them are proposed. Another innovative feature of the study is that the theoreti-

cal principles guiding the programmed restoration are stated as well. The procedures that followed the publication of the study were still more pioneering: it was submitted to successive assessments first by the Acropolis Committee itself, secondly by experts from all over the world during the "International Meeting for the Restoration of the Erechtheion" held at Athens in December 1977 and, finally, by the members of the Central Archaeological Council of the Hellenic Ministry of Culture, which is responsible for all final decisions of intervention on the monuments. This multiple sequence of assessment, discussion and approval was aimed at guaranteeing the greatest possible objectivity in the decisions



The Erechtheion from the southeast. Photo F. Mallouchou-Tufano, March 2006

uations of the past, often characterized by personalized, arbitrary decisions and actions (such as those by Balanos or Orlandos). All these procedures during the years that followed were to become established as standard qualitative features of the Acropolis Restoration Project (to now 15 comprehensive studies for the restoration of the monuments have been published and 5 Interna-

2. The conditions under which the inter-

vention on the Erechtheion had to be carried out, especially at the beginning, were extremely difficult (there can be no comparison with the conditions of the current interventions). The works proceeded under the administrative jurisdiction of the Acropolis Ephorate with very limited and, above all, unstable funding and exclusively by personnel with a daily wage. There was no work-site infrastructure for the execution of large-scale interventions, especially for load-hoisting and transporting or for marble working. Used for the hoisting of loads from outside the Acropolis to the top, was a manually operated winch with lifting capacity up to 500 kilos, handled by 8 workmen. It was installed at the SE corner

adopted. The purpose was to avoid the sittional Meetings of Experts have been held). of the rock. From the SE corner the loads were transferred to the area of the Erechtheion on rollers, in the ancient way (the Acropolis Committee of that time did not approve the transport of loads with wagons on rails, in order to cause the least possible aesthetic interference with the rock landscape). Exterior marble laboratories were charged with the marble cutting. On the monument the cutting and the elaboration of the marble were done

exclusively by hand with the traditional tools (mechanical marble pantographs and cutters and the specifically designed machines for marble elaboration were installed in the Acropolis worksites after the year 2000)

For the hoisting of loads, a system of four bridge cranes on elevated rails had been chosen: one bridge crane with a 10-ton lifting capacity had been installed along and above the south wall of the monument, another with a 5-ton lifting capacity along and above the west wall. Two bridge cranes,

with a 5- and 3-ton lifting capacity, had been installed in the north porch. (It is indicative that as the lifting capacity of these bridge cranes was not sufficient for hoisting the marble beams of the ceiling of the north porch, each weighing 8,5 tons, the beams, which were broken in two pieces, had been repaired in situ, on the monument rather than on the ground). The bridge cranes and the winches suspended from them were all manually operated (the Acropolis Committee excluded

rescue operation. The initial programme of the work, closely attached to the relevant theoretical principles adopted by the Acropolis Committee, comprised the dismantling and restoration only of those parts of the monument, that had been restored in the past, even excluding some of them. In the north porch, for example, the intervention was limited to the ceiling and did not extend below to the parts of the columns previously restored. These were preserved in very good condition (the



Drawings by † A. Papanikolaou, C. Zambas, P. Psaltis, 1979-1987

electrical movement of the hoisting machinery, in order to better control the movements and operations). In general, the Acropolis Committee of that period was cautious about the use of modern technology in the interventions. Moreover, the installation of a wooden scaffolding instead of the bridge cranes had initially been considered (the installation of a slewing crane had not been considered at all by the Acropolis Committee members, being a priori excluded). Yet, these conditions for the execution of the work lent the Erechtheion restoration a manual quality, and connected it directly to ageold traditions and practices.

3. The intervention on the Erechtheion began -- and largely remained- as a strictly joins between the restored drums were hermetically closed, with no sign of rusting or other damage). In the course of the works, however, the exceedingly poor state of preservation of the part of the north wall above the north entrance had been revealed. This obliged the Acropolis Committee to intervene for the first time on a section of the monument that had never been dismantled in the past, although it had been seriously disturbed by Balanos' insertion of two reinforcing bars, which were, indeed, the cause of the damage.

The restoration of the NE corner of the monument, visualized since the beginning, was included in the initial programme of the work. This intervention had been considered necessary for the structural improvement of the monument against horizontal charges of wind as well as possible seismic action. Also for the formal restoration of the eastern, main facade of the monument, which had been mutilated by the Lord Elgin's activity. Established during the course of the work was the material used for replacing missing architectural members: artificial stone for the replacement of architectural members preserved outside the monument (as, for ex., of the NE column preserved in the British Museum), natural stone, identical to the one used in the initial construction, for replacing architectural members that had definitively been lost (such as the northern block of the east frieze or the NE cornice block).

4. The restoration of the Erechtheion saw the first application and testing of the materials and the techniques of intervention, which were later to become standard in the Acropolis restoration project. We shall look at some examples.

• First of all, this was the first use, internationally, of titanium in the restoration of a monument. Titanium was employed for joining together either fragments of the ancient members, or for joining new marble fillings with the ancient members, for replacing the metallic elements of the previous interventions, including clamps, dowels and the larger metallic reinforcements, such as the metallic structure inserted in the interior of the architraves of the porch of the Caryatids or the big iron beams from which the marble beams of the ceiling of the north porch had been suspended. This pioneering use of titanium led to a faithful repetition of the solutions set forth by Balanos, especially for structural reinforcement, although these solutions were technologically behind the times and did not take full advantage of the potentialities of the new material. (This is particularly valid for the structural restoration of the ceiling beams of the north porch. In similar cases later on, such as the structural restoration of the ceiling beams of the central building of the Propylaia, more technologically advanced solutions were adopted, which are more compatible

with the potentialities of titanium). As for the new structural reinforcement of the Carvatids' porch, it is identical to the older one (a II-shaped titanium structure set in the interior of the architraves of the porch, with vertical supports that transfer the weight of the ceiling to the podium, thus relieving the statues of the Caryatids), with the sole difference that the upright reinforcements are now concealed inside the casts of the Carvatids. This has improved the appearance of the porch, since the vertical supports were visible in Balanos' inter-

vention, between the statues. An identical titanium bar replaced as well the older iron one above and along the architrave of the west wall of the Erechtheion. Behind the lintel of the north entrance, however, a sole titanium beam has replaced the two iron beams set there during Balanos' restoration.

· For joining the members new titanium clamps and dowels have been used. The horizontal clamps are of various dimensions and shapes, double T-shaped (of various sizes), II-shaped or of special profiles, designed ad hoc (these replace joining elements of four types: the ancient ones, those of Roman times, those of Pittakis' restoration of the middle of the 19th c. and those of Balanos' intervention at the beginning of the 20th c.). In order to avoid further cutting of the ancient pieces, the extant reused sockets (the cavities that receive the clamps and dowels) have been in the new restoration, with the insertion, in each case, of the suitable joining element. The profiles of the new joining elements and their proportion in relation to the size of the sockets and the thickness of the cement compound of special composition introduced around them (the new titanium joining elements are sheathed in cement mortar and not in lead, as in antiquity) have been carefully studied during their fabrication and placement in the monument. All these technological applications were completely original at that time, and the goal was to insure the best behavior of the joining elements in case of charging. The composition of the cement compound around the joining elements has also been specially studied. In the

lower courses of the Erechtheion walls a cement compound has been used that is richer in Portland Cement in proportion to silica sand. In the upper courses, the composition of the cement compound used was exactly the opposite, for the same reason: the reduction in height of the resistance of the cement compound entails a bigger elasticity and freedom in the movement of the walls in case of charging.

• In the present restoration of the Erech-





respectively

theion those restoration practices of Balanos that are contrary to today's restoration ethics, have been dealt with for the first time These are the erroneous and random positioning of the monument's architectural members in their re-assembly and the practice of creating architectural blocks by "stitching them together" from various ancient fragments of different origins. In 1982, C. Zambas, the civil engineer in charge of the restoration, first systematically investigated, with the aid, indeed, of a P.C., the

The Erechtheion from the east in 1979 (above) and 1988 (below). Photos by A. Tzakou and S. Mavrommatis

correct position of the blocks of the south wall of the monument. This study, pioneering in its time, opened the way for research in that direction and invented the relevant methodology. In 1985, the corresponding study for resetting the blocks of the north wall was made by A. Papanikolaou, the architect in charge and director of the whole restoration operation of the Erechtheion. In this way, the lateral walls of the cella of the monument recaptured to a significant degree, in their new restoration, their original struc-

ture and their original structural inclinations (during the re-assembly, 23 blocks of the north wall, that had been used for the restoration of the south wall, returned to their original position; 6 blocks of the south wall took the opposite route). The gaps that resulted from repositioning the members have been filled with completely new blocks of new Pentelic marble. Furthermore, through the repositioning of the blocks in their original places, it became possible to recapture and reuse the original sockets of the joining elements. In some cases, the edges of the

sockets had been destroyed in the past with the violent extraction of the metallic joining elements; these had to be filled in new marble in order to be used. The irrelevant ancient fragments that had in the past been used to fill in the blocks of the lateral walls of the Erechtheion have now been removed and replaced by new Pentelic marble.

Unfortunately it had proved impossible to identify the original location of the blocks of the west wall of the Erechtheion, recomposed as a sort of "pastiche" by Balanos. Thus, in the new restoration, only the rusted iron joining elements of the previous intervention have been replaced by others of titanium, while Balanos' arrangement of the wall blocks has been followed. In this case too, the wall blocks recomposed by Balanos have been retained. Only in a few cases, where it was considered necessary to create a better bedding surface for the superimposed course, have the blocks been filled with new marble.

The original positioning and sequence of the architectural members have been recovered in other parts of the monument as with the *epicranitis* course above. In these cases the problem of lack of coincidence between the dowel sockets in the vertical joining of the blocks has been solved by the use of joining elements designed specifically *ad hoc* (in the specific case of the two upper courses of the south wall, S-shaped dowels have been used).

• Finally, during the restoration of the Erechtheion, one of the most complex problems in the restoration of the Acropolis mon-

uments has been resolved, in my opinion successfully: the restoration of the inner faces of the walls of the monuments seriously damaged by fire. The missing portions cause great problems as far as the stability of the monuments is concerned. Thus, during the intervention in the Erechtheion the orthostates of the lateral walls of the cella have been restored, for structural reasons, to their original thickness. Likewise, in the upper parts of the walls some other blocks have also been filled in with new marble. in order to ameliorate their structural capacity. Depending

on the individual case, the surface of the new stone was given a final or semi-final treatment to harmonize better with the adjacent ancient blocks. Likewise, both for stability and for didactic considerations, part of the inner, transverse wall of the monument was restored

Many are those who contributed to the restoration of the Erechtheion. In this brief article only a few could be mentioned: First of all the three founding members of ESMA, Charalambos Bouras, Sokratis Angelidis and the late Theodore Skoulikidis, who had guided and supervised the inexperienced young scholars at the beginning of the works, established the procedures of studying and decision taking, formulated and defined the theoretical principles and the methodology of the interventions, the choice of materials and the application techniques.

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Secondly, the engineers in charge of the work, Alecos Papanikolaou and Costas Zambas. Despite their youth, in an exemplary harmony and collaboration they handled all the problems that emerged and brought to completion an operation, that was pioneering in its time.

Finally, the most valuable contributors: the marble technicians. In the restoration of the Erechtheion three generations of marble technicians have worked: some old technicians who had worked under A. Orlandos, in the large scale restorations of the period 1960-1970. These had returned to the Archaeological Service - among them Nikolaos Skarris, son of Evangelos, the foreman of the crew, was distinguished for his character and above all for his incomparable skill; some younger, but experienced technicians, who had occasionally worked on monuments; finally young technicians, who had just finished the Technical School of Tinos island These are the foremen of today.

The sudden and unexpected loss of A.Papanikolaou in 1998 left unfinished the text of the final report on the work. Its completion and editing has been undertaken by the personnel of the Documentation Office of the YSMA in collaboration with the President of ESMA Prof. Emeritus Ch. Bouras. The work is almost completed and its publication is scheduled for the end of the current year. Thus, 20 years later, the work of the restoration of the Erechtheion will become known. It will be rendered to the community as a whole, experts and non-experts, in a spirit that is fully in accord with the international ethics of restoration.







well, for example, in the crown course of

the podium of the porch of the Carvatids

or in the coffered ceiling of the north

porch. In other cases however, the older

Installing the scaffolding for the restoration of the Erechtheion. Photo A. Tzakou, 1979

een arrangement had been kept: for example in the entablature of the north porch and the *epicranitis* course (crown course) of the south wall. In some cases a course in which the original structure has been recovered meets another one that follows Balanos' arrangement. This can be seen, for example, in the junction of the second from above course of the south wall, in which the original structure had been recovered,











Restoring the Erechtheion, 1979-1987



The west metopes of the Parthenon. View from the north. Photo S. Mavrommatis, June 2007



The west façade of the Parthenon with the twin mast self lifting platform for inspection and study. Photo M. Ioannidou, June 2007

News Letter of The Acropolis Restoration Service of the Hellenic Ministry of Culture

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