General view of the Acropolis from the southeast. Photo G. Paganis, January 2008

M. Ioannidou, 2007-2008, progress of the Acropolis Anatoite Works
M. Ioannidou, Conservation and Restoration of the Acropolis Monuments: interventions planned for the period 2009-2013
V. Eleutheriou, V. Manidakis, A. Vrouva, Restoration of the west side of the Parthenon. General programming of the work and proposals for intervention
D. Melanou, The use of orthophotography in the geometric documentation of the Parthenon
E. Sionparka, Inventorising the Scattered Members of the Acropolis
D.N. Engleos, D. Moullou, Preservation of the Circuit Wall of the Acropolis: past and future
F. Mallouchou-Tufano, News from the Acropolis
F. Mallouchou-Tufano, Honouring the marble technicians of the Acropolis: the Gold Cross of the Order of the Phoenix to Nikos Skaris
Anastelosis on the Acropolis continued at diminished pace during the second half of 2007 and the first half of the present year. The works, as is well known, are carried out by the Acropolis Restoration Service (YSMA) itself, a special Service of the Ministry of Culture, with the academic supervision of the Committee for the Conservation of the Acropolis Monuments (ESMA); funding is provided by the 3rd Community Support Framework.

In brief, the following works were carried out on the monuments of the Acropolis Rock during the past year:

In the Parthenon, structural restoration of the dismantled members of the north colonnade was continued. During the second half of 2007 the eight columns were reset in place and work began on resetting the entablature, at the level of the architrave, under the supervision of the architect-archaeologist Lena Lambritis, responsible for the relevant study and the civil engineer Antonios Vosou. Work on the west end of the north colonnade was also initiated with the dismantling of the metopes.

Specifically, from June 2007 to June 2008, the structural restoration of 34 members (two column capitals, four architrave blocks, five filling blocks, ten frieze blocks, seven cornice blocks) was completed, and 24 members were reset on the monument (six drums of the 4th column, four capital columns and fourteen architrave blocks).

Six metopes, three filling blocks and one triglyph were dismantled from the west end of the north side. Their structural restoration was begun, and work proceeds on copying the metopes to replace the originals on the monument.

The Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture made a photogrammetric survey of the entablature of the west end of the north colonnade and the west façade of the Parthenon. The orthophotomosaics were processed by the rural and surveying engineer Christodoulos Troullinos.

In the Propylaia, from July 2007 to date, work on restoring the monument has continued in accordance with the approved study of Tasos Tanoulas and Maria Ioannidou. Specifically, work continued on resetting the ceilings of the west hall and this has been completed with the resetting of restored architectural members of the superstructure, i.e. the beams, the inter-beam blocks and the coffered ceiling blocks. With the recent removal of the workstands from the area of intervention, the coffered ceiling of the west hall is now visible to visitors approaching along the central passage.

Work continued also on restoring the members of the entablature and pediment of the west portico, specifically the blocks of the cornice, the tympanon, the raking cornice and the sima. Restoration of the east portico has reached the level of the frieze and the overlying members are expected to have been set in place by the end of 2008.

In addition, in March 2008, conservation was carried out on the reinforced concrete floor of the Propylaia Pinakotheke, introduced in the stabilizing intervention of Anastasios Orlanos and Evangelos Stikas in 1955. The work comprised surface water-proofing of the slab, repairs to parts of the bearing elements and testing of the strength and homogeneity of the concrete.

In April, 2008, work started on the infra-structure of the Justinian cistern of the Propylaia, and it is continuing at present. This involves the replacement of the wooden floor and suitable reforming of the space, so that it can serve as a storeroom for the ceiling coffers that will not be used in the recent intervention. For interventions planned for the future, in July 2008 the architect K. Karanasos submitted to ESMA the study for restoring the south wall of the Propylaia. On approval by the Committee, the study has been submitted to the Central Archaeological Council, where it is expected to be discussed at the next meeting. Work continues on the structural restoration of the columns of the epistyleis with their joining elements. Resetting of the restored blocks of the architrave was begun, also as the column bases. Work continues on the structural restoration of the cornices of the overlying layer (coffers, inter-beams, horizontal cornice blocks).
as well as on the piers of the monument. Restoration of members of the columns has also been completed, and casts have been made of the figures of the original friezes for replacing them on the monument in artificial stone. Likewise completed is the study by the architects Kostas Mamalougas and Demosthenes Girard for the arrangement and setting of the column capitals. Work on the temple of Athena Nike continues under the direction of the civil engineer Dionysia Michalopoulou.

Carried out during this same period were also the continuous works of surface conservation on all the monuments, headed by the chemical engineer Evi Papakonstantinou-Zioti, the inventorying of scattered ancient members on the Acropolis rock, under the direction, since 2008, of Elizabet Sioumpara, the digitization and digital management of documentation of the works of preservation and surface restoration of all the monuments by the Documentation Office, headed by the archaeologist-Fetia Maltezou-Tofaro, the conducting of the educational programme by the YMGA Office of Education and Information, directed by the architect-archaeologist Cornelia Hatziastani, the production of copies in artificial stone of the architectural sculpture removed from the monuments, by the Can Laboratory. Electro-mechanical support of the works continues to be headed by the mechanical and electrical engineer Spyros Oikonomopoulos, and the Accounting and Secretarial Offices of the YSMA are headed by Panayiotis Karismatas and Hara Papadokokou respectively.

The commencement during this past year of systematic attention to an additional monument of the rock, the Acropolis Circuit Wall, is considered to be of special importance. In order to explore and document its state of preservation, a series of works were initiated (including: photogrammetric survey of the Wall and of the Acropolis hill in elevation and in plan, a three-dimensional scan of the Wall and hill, the development of Geographical Information Systems and data base for the Wall) that will form the basis for further research and studies. The civil engineer Dimitris Englezos is in charge of the work of restoration of the Acropolis Circuit Wall. Responsible for archaeological documentation of the work is the archaeologist Doxia Moulou, for photogrammetric applications, the rural and surveying engineer Dionysia Mavromati. Funding for the above works is provided by the European Operational Programme, «Information Society».


Marina Ioannidou
Civil Engineer
Director of the YSMA

The great restoration programme of the Acropolis, initiated by the Acropolis Restoration Service (YSMA) in 2008, with the scholarly supervision of the Committee for Conservation of the Acropolis Monuments (ESMA), is expected to be completed in 2008.

The YSMA, a special Service of the Ministry of Culture created by Presidential Decree 97 of 1999, undertook at that time, with funding from the 3rd Community Framework, to develop and carry out restoration interventions on the Acropolis monuments. Full use was made by the YSMA both of the Comprosus, including consultations with both local and international specialists and the continuous development of contemporary technical knowledge, together with a highly specialised personnel, all practices established by the ESMA and they assure the high quality of work characteristic of these interventions.

With the completion of the programmes inaugurated in 2000, a creative period in the restoration of the Acropolis will come to an end, while another will begin. Programmed for the coming years are interventions, the basic purpose of which is to continue the arc of future programmes has been made on the basis of priorities, determined mainly by the structural problems of the monuments, in connection with already existing studies for intervention, both approved and pending. A basic criterion for determining future interventions was the possibility of making use of infrastructure and actions that had been installed and carried out in previous years with Community funding.

Planned in this framework for the period 2009-2013 are the following:

1. Extension of interventions in areas of the monuments restored by N. Balanos that show structural problems and, with this, removal of the sculptural decoration that is still in situ, in order to preserve it from continuing damage.

2. Research on the present condition and studies of both restored and undisturbed areas of the monuments with various structural problems, in order to make their condition clear and to implement them in future intervention programmes.

3. Studies and supplementary interventions, making it possible to restore areas of the mon-
ments, not only to increase their static efficiency but also to make them more easily understandable and their architectural form and function must be comprehensible.

4. Problems of surface conservation of the monuments that arise during the course of the work must be confronted with systematic conservation and with the application of the laser method for cleaning.

5. Documentation and protection of the architectural members scattered on the rock, while at the same time distinguishing and displaying the historical topography of the Acropolis.


7. Programming of activities that will further the promotion and display of the large-scale restoration work being carried out on the Acropolis monuments. Analytically, the following is programmed for each monument:

Restoration work on the Erechtheion by the ESMA was completed in 1987. The following is planned for the coming years:

1. Sheltering of the north porch: it is planned to protect it from the corrosive effect of rain-water. The relevant study, which calls for a light shelter of wood and titanium, has been carried out by the YSMA architect V. Manidaki and it has been approved by the ESMA.

2. Intervention on the west façade of the monument: the state of preservation of this side of the monument, in both the restored parts and the parts that have never been restored, is especially critical. The general preliminary study of Korres and Bouras of 1983 included replacement of the rusted metal joining elements in areas of the west façade that had been restored in the past and interventions to reintegrate into this section fragments identified as ancient. The recent study by the YSMA architects V. Eleutheriou and V. Manidaki, which has been approved by the ESMA, calls for dismantling of the two previously restored corners of the west façade, structural restoration of the members and their resetting on the monument, removal of the mortepe from the two corners and their replacement with copies in cast artificial stone. Infrastructure for plotting the photogrammetric survey and the formation of an orthophotomosaic by the YSMA rural and surveying engineer, D. Mavromati. This was carried out in collaboration with the Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture. The study is to be submitted directly to the Central Archaeological Council of the Ministry of Culture (KAS) for approval.

3. Intervention on the north side of the monument: the work comprises chiefly the dismantling of the lintel of the west doorway, restored earlier using reinforced concrete, the replacement of this lintel with new marble and the partial dismantling of the upper section of the west wall. The study for this intervention, made by Professors M. Korres, has been approved by the Central Archaeological Council and the definitive study is being carried out by the architect L. Lambrinou.

4. Intervention on the west façade of the monument: the state of preservation of this side of the monument, in both the restored parts and the parts that have never been restored, is especially critical. The general preliminary study of Korres and Bouras of 1983 included replacement of the rusted metal joining elements in areas of the west façade that had been restored in the past and interventions to

The north porch of the Erechtheum from the NW. Photo F. Malisoudo-Talasas, July 2006

The interior of the Erechtheum from the east. Photo E. Pantopoulou, November 2006

Proposal for the restoration of the north cells wall of the Parthenon. Photographic reconstruction by C. Pavlidis and S. Mavrommati, 2002

The west side of the Parthenon. Photo E. Pantopoulou, February 2006

The west wall of the Parthenon from the east. Visible is the concrete ceiling of the west door from the Parthenon intervention. Photo S. Mavrommati, 1996
clades collecting identified ancient material, its documentation and the joining of frag-
ments that belong together, for use in the fu-
ture restoration of members to the monu-
ment. Both study and joining are in process
by personnel of the YSMA.

In the temple of Athena Nike when its restoration
has been completed, the plan is to remove the work-
site equipment now in place, to conserve in situ the old
slab of reinforced concrete south and east of the temple
and, on the basis of a special study to be carried out, ex-
amined and approved, to work on the problem of rain-water that stagnates on
the Nike Pyrgos.

Programmed for the Cir-
cuit Wall of the Acropolis
are documentation and sup-
porting studies (geotechni-
cal-geological study, labo-
atory research on the build-
ning material of the Wall). The purpose of these stud-
ies is to make a definitive study for intervention that will comprise geotextile mon-
itoring of the Wall, study of the filling material, the watering proofing material and the material of the final sur-
facing, and study of the drainage. Proposals will be
made for restoration of the planned in addition for the period 2007-2013, is the application of a pilot pro-
gramme for the structural damage in the SE part of the Wall. Stabilisa-
tion of the SE corner of the
Wall will serve as a pilot programme for the main work to follow, i.e. the stabilisation of the entire monument. The definitive pro-
gramme depends on the preserved state of the Wall, which will be evident on comple-
tion of the monitoring, documentation and studies now in progress.

Surface restoration of the monuments will continue to be carried out on the areas of the monuments undergoing anastelosis and also
on other areas, where structural intervention is not being carried out but where surface
damage is evident and needs attention. In-
cluded under this heading are architectural
members of the north side and both architectu-
rical and sculptural members of the west side of the Parthenon. Also planned is the system-
ic cleaning of the surfaces of the monu-
mants with the laser method. The crumbling
of the porous foundations of the monuments is a problem that will have to be confronted in the future.

The Project of the Scattered Members for
the period 2009-2013 comprises completion of the inventory, photographic and graphic
documentation and classification of all the porous architectural stones, so that they can be
stored and preserved in a closed area. It is
likewise planned to record, classify and ar-
range the two stone piles, totalling 3000 mem-
bers, that resulted from clearing the foundations of the House of the Areoph-
atos.

Programmed in addition to the interventions on the monuments for the period 2007-2013, are activities that –as required by the principle of publication in Article 16 of the Charter of Venice- will contribute to advancing and diffusing scholarly knowledge, pro-
vide information for the in-
ternational community of scholars, and will publicize and protect the work being
conducted on the Acropa-
lis. The purpose is likewise to familiarise the citizens with subjects associated
with the protection of cul-

nural heritage.

Programmed in this frame-
work are the following:

• Organisation, in 2009, of the 6th International Meet-
ing for the Restoration of the Acropolis Monuments,
at which the completed inter-
ventions and the studies for future works will be pre-
sented. Symposia and one-
day conferences will like-
wise be organised in Greece
and abroad for the scholar-
ly and general public.

• Scholarly results of the completed works and publication of relevant volumes: Fisch-
duction, opausthdon and north side of the Par-
thenon, Propylaia, temple of Athena Nike, the backfilling of the Acropo-
lon, and the scholarly community: the YSMA
Newsletter, an informative booklet about the

Acropolis Works to be distributed to visitors
to the Acropolis, a special volume on the
Acropolis Works reporting recent research
with scholarly and technical information.

• Organisation of exhibitions in Greece and abroad.

• The production of movies showing the
completed interventions on the monuments
by means of conventional and three-dimen-
sional drawings.

• Creation of a cultural complex in a new
building where exhibitions, lectures and vari-
ous other activities of cultural interest can be
held for the public. (A proposal to this effect
has been made to the Ministry of Culture).

In addition, the same building could house
the valuable but perishable ESMA archive,
which has a desperate storage problem.

• Restoration of the ESMA YSMA building
at Polypygous 10 street, which has serious
problems – repair of the upstairs offices
of the building.

The main characteristics of the work of the
YSMA today, which have assured successful
execution of the programmes of 2000-2008
and in a sense insure successful accomplish-
ment of the works proposed for the period
2007-2013 are:

• The securing of the greatest possible schol-
arily knowledge and experience in both pro-
gramming and execution of the works,
through collaboration of the specialist schol-
ars of the ESMA with the specialised scholar-
ly personnel of the works and the consistent
and continuous connection of the works with ongoing research.

• The creation, in the framework of the works,
of a staff that is highly specialised in the ob-
jective of anastelosis of classical monuments
and the development of special skills and
technical knowledge for accelerating comple-
tion of the work.

The securing of the greatest possible schol-
arily knowledge and experience in both pro-
gramming and execution of the works,
through collaboration of the specialist schol-
ars of the ESMA with the specialised scholar-
ly personnel of the works and the consistent
and continuous connection of the works with ongoing research.

• The creation, in the framework of the works,
of a staff that is highly specialised in the ob-
jective of anastelosis of classical monuments
and the development of special skills and
technical knowledge for accelerating comple-
tion of the work.

The securing of the greatest possible schol-
arily knowledge and experience in both pro-
gramming and execution of the works,
through collaboration of the specialist schol-
ars of the ESMA with the specialised scholar-
ly personnel of the works and the consistent
and continuous connection of the works with ongoing research.

• The creation, in the framework of the works,
of a staff that is highly specialised in the ob-
jective of anastelosis of classical monuments
and the development of special skills and
technical knowledge for accelerating comple-
tion of the work.

The securing of the greatest possible schol-
arily knowledge and experience in both pro-
gramming and execution of the works,
through collaboration of the specialist schol-
ars of the ESMA with the specialised scholar-
ly personnel of the works and the consistent
and continuous connection of the works with ongoing research.

• The creation, in the framework of the works,
of a staff that is highly specialised in the ob-
jective of anastelosis of classical monuments
and the development of special skills and
technical knowledge for accelerating comple-
tion of the work.
The west side of the Parthenon is indeed the best preserved, in that it did not suffer the severe damage or collapse inflicted on the other sides of the monument. As a result, it has not undergone restoration, with the accompanying mis-settings of ancient architectural members evident, for example, in the north side. Yet, during the long history of the building, it suffered significant damage, such as cracks in the marble and opening of joints with measurable changes in the original geometry of the monument. Restoration of marble fragments and their joining elements was undertaken for the first time during stabilization projects at the end of the 19th century.

The Balanos interventions

In the first period of anastelosis of the Parthenon under the supervision of N. Balanos, interventions in the ophiolithe were followed by efforts to stabilize the west side.

The works, carried out from 1900 to 1902, included dismantling of blocks, limited fillings of new marble and many joins—strengthened with iron joining elements (clamps and dowels). Dismantled also were the blocks at the two corners of the pediment, the central orchestre of the tympanon, the exterior blocks of the entablature and the two metopes above this. Characteristic is the way in which four fragmentary column capitals were filled in with new marble. The blocks were wedged into the ancient pieces, the broken surfaces of which were trimmed accordingly. Balanos cannot, indeed, be called accurate in his use of new metal joining elements. More than 100 exterior joining elements have been counted, and it is certain that more of these clamps and dowels were placed in surfaces, not now visible, of stones that were dismantled.

At the end of the decade of 1940, works of stabilization were carried out under the supervision of A. Orlandos. At that time fragments of the south central orchestre of the tympanon and the pedimental cornice of the south angle of the pediment were incorporated in the monument. In 1977, the remaining pedimental sculptural group of Kekrops in the north angle and of Kallirrhoe in the south were replaced by copies.

State of preservation – pathology

In 2007, in the framework of general programing of the Parthenon interventions, examination of the state of preservation of the west side of the monument was begun. In order to approach the west side, yet avoid the unesthetic use of scaffolding, it was decided to rent a self-lifting platform, which was installed in May, 2007. The superservice of the west side held surprises in store, as inspection revealed the degree to which the surfaces and most of the external metal joining elements had suffered corrosion.

Examination of the entire entablature is impressive in showing a notable gradation in the preservation of the ancient surfaces. In especially bad condition are the surfaces of the central area, which appears to have suffered more during the ancient fire. The plinting off of projecting parts of the figures of the metopes is overwhelming and has caused acceleration in the erosion of the surfaces. Unlike the corresponding architectural members of the central area, at the two angles all the characteristic architectural details of the members can be discerned, such as the astragal crowning the top of the triglyphs and metopes, the gurtine on the moulures of the cornice blocks and in some cases the painted decoration of the metsopes and pediments at the base of the corine. Even so, it is the areas of the two corners that have the most acute structural problems. Dismantle are breaks in the architrave blocks, shifts and protrusions of architectural members, open joints and unfinished beddings.

As might be expected, of great importance for evaluating the structural damage of the west side is the condition of the architrave blocks and the column beneath them. A typical form of failure in the architrave blocks is their breakage especially around the clamps and dowels. More serious problems are seen in the exterior blocks of the two corners, where there are breaks that run right through the block, the penetration being due to the architrave blocks, in the inner side of the south architrave blocks, at the SW corner. These breaks are consonant with the general picture of deformations in the entire columnade, which indicates that the corners have shifted outwards.

As for the columns, the problems lie mainly in the notable lack of mass evident in a number of column drums, and in cracks that penetrate the drums. The capitals have suffered damage of various sorts from the overlying blocks. Breaks in the mass of their especially fine marble, caused by the ancient dowels of the architrave blocks, are observable in all the column capitals.

The addition of exterior iron joining elements by Balanos, along the full length of the entablature and the pediment, have caused extensive cracking and breakage, as has been noted frequently in the earlier interventions on the Acropolis monuments.

Deformations

So that the proposals for the rescue interventions needed would be coordinated with a more general review of the problems, it was considered necessary to correlate the structural damage, found chiefly in the sections restored by N. Balanos, with the general deformations shown by the monument in that particular area.

As has been observed in earlier studies, the courses of the entablature have suffered significant horizontal displacement in an east-west direction, with characteristic outward shifting of the corners, forming a concave curve in plan. This deformation has been verified with new measurements made at the level of the architrave and the horizontal cornice blocks (a deflection in the nature of 7 cm and 1.2 cm respectively) was measured and it is analogous with the deformation verified in the ophiolithe.

Horizontal shifting of the blocks in a north-south direction is shown by the opening of the thrust joints, evident for the most part in the architrave and the cornice. The total shift along the length of the façade is calculated at some 6 cm.

Aim of the restoration

Repair of earlier damage, including damage brought about as a result of the proceeding intervention, is dictated in accordance with the established methodology followed in the Acropolis works. Note on the problems and general proposals for confronting them had been proposed as early as 1983 by Professor M. Korres.

The purpose is not to repair all the damage, since this would entail interventions on a grand scale, thus reducing the authenticity of the monument. The conception of the monument as a ‘monument’; moreover, has been accepted as a value that is expressed in the principle tendency to retain the present appearance of the monument. The goal is thus to preserve the building with the least possible intervention, such as restoration of broken members and their joining elements, especially the restoration of the basic members of the load system, the architrave and the column capitals. Likewise, the repairs should respond to pathological developments expected in the future, rather than serving only a momentary image and structural strengthening.

The areas to be dismantled in the west side

Restoration of broken architectural members is technically feasible with partial dismantling of the blocks of the west side. The extent of the area to be dismantled, which should be as small as possible, depends on many parameters, such as:

- the seriousness of the structural problems
- economy in the extent of blocks to be dismantled (since most of these areas have been undisturbed since antiquity)
- the advantage to be gained in stability (improvement of response to structural and stress loads) and in extending preservation of the monument into the future
- time in which the work can be completed and the monument made accessible to the public.

Dismantling will be limited and will stay within the boundaries of ‘Balanos’ interventions for the restoration of the exterior plinth of the central architrave block and the tympanon of the pediment. There is therefore no problem about the extent of the area of
The areas of the programmed intervention on the Parthenon west side showing the blocks to be dismantled. Study-drawing by V. Elefantinos, V. Manolidis, A. Vronos, 2008

The study proposes that the dismantling of the two corners, SW and NW, be dismantled down to and including the architrave blocks.

Any further dismantling of the entablature, of whatever sort, is ruled out. The structure of the building itself and the principle of economy of intervention place limits on the dismantling of architectural members beyond the point where there is no justification for any improvement to their structural condition. The pedimental orthostates and the backing wall, all undisturbed in their positions from antiquity, except for the central orthostate, place a serious limit on any intervention in the central area and, in fact, orient us toward making repairs in situ.

The sub-programmes of the interventions

It is proposed to divide all the works into the following 8 sub-programmes:

1. Restoring the architrave blocks of the corners together with their overlying members. The total number of members to be dismantled from the SW corner is 42, from the NW corner 37. This intervention has many advantages because, apart from the restoration of the broken architrave blocks, it allows other important improvements to be made to the structural condition of the corners, such as:
   - Resetting of the architrave blocks in their original position in relation to the adjoining architrave blocks and considerable reduction of the marked deformation of the façade. It is feasible to close the joints of the corners that have opened and to correct by some 50% the horizontal deformation of the entablature.
   - Improvement of the stability of the corner columns, since relieving them of their load allows them to be returned to their original state of equilibrium, improving the resting surfaces of the drums between each other.
   - Enabling a fragment of the NW corner column capital to be correctly joined; its resetting had been made difficult by the existing change in the inclination of the corresponding column.
   - Improvement of the bedding of the architrave blocks and overlying members, thus decreasing the opening of the horizontal joints, such as, for example, the opening between the triglyphs and architrave blocks visible at present.

2. Replacement of the particularly damaging domelike of the architrave blocks that have penetrated the column capitals.

3. Enabling a fragment of the NW corner column capital to be correctly joined; its resetting had been made difficult by the existing change in the inclination of the corresponding column.

4. Improvement of the bedding of the architrave blocks and overlying members, thus decreasing the opening of the horizontal joints, such as, for example, the opening between the triglyphs and architrave blocks visible at present.

5. Replacement of the particularly damaging domelike of the architrave blocks that have penetrated the column capitals.

The dismantling proposed, moreover, permits the corner metopes of the monument to be transported to the museum and replaced on the monument by casts, a choice in keeping with the principles followed for the sculptured architectural members in restoring the Acropolis monuments. The specific 6 metopes (4 metopes from the west side, the westernmost on the north and the westernmost on the south side) are among the best preserved metopes of the entire Doric frieze. It should be noted that when the proposed work is finished, the result will be that copies (at the corners) and authentic metopes will be beside each other on the same façade.

Addition of new marble to the west pediment

As in the past (Study by M. Korres in 1983), it is proposed to set two new raking cornice blocks on the north wing of the tympanon and two underlying blocks of the backing wall, which are necessary for their support. The raking cornices and all the orthostates of the tympanon were preserved in situ to the end of the 18th century and are illustrated in drawings of the period (for example, in Fauvel’s watercolour of 1790). The addition of the above new members will greatly improve the morphological continuity of the pediment by restoring the characteristic ridge-line of the monument.

It is proposed, in addition, to fill in the frontal sections of the four broken horizontal cornice blocks, in order to improve the ability of the entablature to protect itself from rain. At present, because of these voids the underlying construction is more exposed to erosion. The restoration of the continuity of the horizontal cornice, together with filling in of gaps and hollows here and there, allows the rain to run off as it should and contributes to the protection of the underlying metopes.

The position of the crane for the intervention on the west side

Exaining the ergonomics (in order to provide the best possible service for all the works being programmed for the west side), and to have the least possible disturbance from the aesthetic standpoint, the installation of the Potain crane of the Parthenon work site at the west side is planned. Its rails will be laid parallel to the west side, with a small extension to the south, so that when it is in rest position its boom can be folded parallel to the south side of the Parthenon. In this position the crane will be less annoying to visitors to the Acropolis. Moreover, this arrangement is more efficient ergonomically as well as providing direct connection with the area of the work-site bridgecrane.

The Study for the proposed interventions on the corners of the west side of the Parthenon has been discussed in the ESMA and will be submitted directly to the Central Archaeological Council of the Ministry of Culture for approval. With approval of the necessary funding, the work is expected to begin, when the restoration of the north colonnade is completed during the coming year.

Illustrations of the Parthenon west side by W. Gell in 1801 (left) and S. Fournel in 1790 (right)


The Study for the proposed interventions on the west side of the Parthenon has been discussed in the ESMA and will be submitted directly to the Central Archaeological Council of the Ministry of Culture for approval. With approval of the necessary funding, the work is expected to begin, when the restoration of the north colonnade is completed during the coming year.

Visual Elefantinos, Vasso Manolidis Architects
Antigone Vronos
Civil Engineer

Parthenon West Side Restoration Programme

The Study for the proposed interventions on the corners of the west side of the Parthenon has been discussed in the ESMA and will be submitted directly to the Central Archaeological Council of the Ministry of Culture for approval. With approval of the necessary funding, the work is expected to begin, when the restoration of the north colonnade is completed during the coming year.

Illustrations of the Parthenon west side by W. Gell in 1801 (left) and S. Fournel in 1790 (right)


The Study for the proposed interventions on the west side of the Parthenon has been discussed in the ESMA and will be submitted directly to the Central Archaeological Council of the Ministry of Culture for approval. With approval of the necessary funding, the work is expected to begin, when the restoration of the north colonnade is completed during the coming year.

Illustrations of the Parthenon west side by W. Gell in 1801 (left) and S. Fournel in 1790 (right)


The Study for the proposed interventions on the west side of the Parthenon has been discussed in the ESMA and will be submitted directly to the Central Archaeological Council of the Ministry of Culture for approval. With approval of the necessary funding, the work is expected to begin, when the restoration of the north colonnade is completed during the coming year.
The first step in restoring a monument is its precise geometric documentation. Photogrammetry is the technology for obtaining reliable information about physical objects and the environment, through a process of recording-measuring and interpreting photographic images. It is one of the quickest topographical methods of geometric documentation, and it was in use very early for recording monuments, historical buildings and complexes. Yet, while it achieves the prerequisite and particularly the unique precision desired for the entire subject, use of the final photogrammetric-topographical base was not always ‘sufficient’ for the ultimate customers (architects and archaeologists). This is primarily because the topographer is as a rule not fully prepared for a specialised archaeological and architectural recording/drawing. The result is that the final product appears to the eye of the specialist as ‘cold’ and misunder-
standings and ambiguities are often evident in the rendering of forms and characteristics of the subject.

In recent years the use of digital techniques in photogrammetry has provided the possibility of producing illustrative materials, orthophotomosaics and 3D models with texture, which form today the usual photogrammetric hand-outs.

The reason that orthophotomosaics constitute today the most widespread basis for architectural-archaeological recordings is fairly clear: they combine geometric graphic accuracy with the optical-quality information of the photograph. Thus, the final specialised interpretation and drawing of the particular characteristics of the subject is done by the ultimate receiver, the architect and the archaeologist. Indeed, the production of orthophotographs for purposes of archaeological documentation, in addition to the large scale of the final product, presents significant figures that come primarily from the form and complexity of shape of the subject, its position (where it is, for example, difficulty of access) and, usually, from the extremely low budgeting for studies of this sort.

All the above has led to the conception and use of a versatile and simple means of taking photographs (i.e. platforms), which must be of low cost, little weight, easy to transport, suitable for both vertical and horizontal image acquisitions, and designed for both distance and close-up photographic shoes.

A solution to the problem of hoisting photographic equipment, employed by the Directorate of Topography, Photogrammetry and Land Register of the Hellenic Ministry of Culture, is a small meteorological balloon.

The use, however, of such an unstable platform, even though it is in communication with the computer, does not allow full control over photographic shots, and results in an irregular geometry of the strips of the blocks of the images. The images, therefore, frequently come out in varying scales, with significant rotations and sometimes with a coverage different from that originally planned. Moreover, a platform of this sort cannot be used for heavy equipment, but only for light, non-metric cameras of small or medium format. Precise modelling of the surface of the subject is likewise a determining factor both for geometric precision and for the optical quality of the final orthophotography. This modelling is done with the breaklines and spot heights.

Inaccurate recording or topical mistakes in recording the surface result both in geometric errors and in deformations.

The most usual problems in the collection of the digital surface model of most of the ancient monuments, characterised by abrupt changes in relief, are the modelling of surfaces that are parallel to the direction of projection and full control over stereo models for determining the areas that ‘should’ be projected.

To date, the following applications of the method of orthophotography have been carried out for the geometric documentation of the Parthenon:

Plan view of the west part of the entablature of the north colonade of the Parthenon

This study included the production of the orthophotomosaic of the plan view of the west section of the entablature of the north colonade of the Parthenon.

The photographs were taken from a distance of 5m with an analogue camera of medium format (60mm x 45mm) with a 45mm wide-angle lens, by S. Yesaphidis and A. Santrouzanos (Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture). A total of 210 images were used with overlapping that surpassed 75%.

A total of 150 ground control points were measured by E. Portelidon, A. Kambychaki, P. Petropoulos and V. Kyriakopoulos (Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture) and the photo-triangulation of 20 images was accomplished with a Route Means Square (RMS) error of 3.5mm in the ground control points. The scale of the final orthophotomosaic was 1:10.

Elevation of the entablature of the north side of the Parthenon

This study included making the orthophotomosaic of the elevation of the entablature of the north side of the Parthenon.

The photographs were taken from a distance of 10 m with an analogue camera of medium format (60mm x 45mm) with a 45mm wide-angle lens by S. Yesaphidis and A. Santrouzanos (Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture). Eight images with an overlapping over 60% were used.
A total of 130 ground control points were measured by E. Portelanou, K. Galazoulas and V. Kymakopoulou (Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture) and the photo-triangulation of the images was accomplished with a RMS error of 6mm in the ground control points. The scale of the final orthophotomosaic was 1:20.

Elevation of the entablature and the pediment of the west side of the Parthenon

Included in this study was the production of an orthophotomosaic of the elevation of the entablature and the pediment of the west side of the Parthenon.

The photographs were taken from a distance of 10m with an analogue camera of medium format (60mm x 45mm) with a 45mm wide-angle lens by S. Yesaphidis and A. Satroutzanos (Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture). A total of 23 images were used with overlapping more than 75%.

A total of 184 ground control points were measured by E. Portelanou, A. Kambouraki, E. Tsakou, Ch. Vasilopoulou and V. Kyriakopoulos (Directorate of Topography, Photogrammetry and Land Register of the Ministry of Culture) and the photo-triangulation of 23 images was accomplished with a RMS error of 5.5mm at the ground control points.

Conclusions

The successful combination of various contemporary recording technologies, accomplished in a short time without undue cost, produces the desired result that underlies the intervention studies.

Interdisciplinary collaboration is a prerequisite, so that the final product is trustworthy for all the researchers—of various specialties—who are involved with restoration of the monuments. Indeed, in every case the requirements of the ultimate recipients must be considered a priori.

Given these prerequisites, the use of new technology is suitable for recording the monuments at large scale and the results of the recordings can be utilised in accordance with the requirements of every researcher.
The purpose of inventorying the Scattered Members of the Acropolis has for the past 31 years been to make use of and to display all the remains, mainly architectural, from all historical periods of the Acropolis, that are no longer in their original position but lie as isolated blocks or fragments, separated from their original context and mixed with others as disiecta membra, all over the Acropolis rock.

Because of its great variety and diversity, this numerically vast amount of material can demonstrate in a unique way the history, the multiform building and, in a more general way, the cultural activity on the Acropolis rock throughout the ages. To an extent it can demonstrate the same for the city of Athens too, since part of the material came not from the Acropolis but from the lower city itself, transported either as building material for the construction of mediaeval and Ottoman buildings on the Rock, or when Kyriakos Pittakis, after 1833, in the first, rudimentary Archaeological Service, arranged for the unidentified antiquities, plentiful in Athens, to be collected and brought up to the Rock, in order to save them from likely destruction or theft. From the members of the archaic buildings of the Acropolis to the re-used blocks in the mediaeval additions and alterations of the Propylaea and the characteristic crowns of the grave stelai of the Ottoman cemetery, originally on the Acropolis west slope, more than 2,400 years passed without a break and the more than 20,000 scattered members unwind in extraordinary fashion the thread of history of this holy place and to an extent of the areas surrounding it.

The imperative need for documentation, arrangement and display of this material was recognised immediately with the establishment of the Committee for Conservation of the Acropolis Monuments (ESMA) in 1975. When the anastelosis works on the Acropolis monuments began, in 1977, the Committee launched systematic research and utilisation of the scattered material, forming a separate group to work exclusively on this specific programme. From 2000 on, the Work on the Scattered Members has been included among the programmes of the Acropolis Restoration Service (YSMA), being funded by the 3rd Community Support Framework.

Work on the Scattered Members is carried out by an architect or archaeologist at the head of a small team of specialised technicians. From 1977 to 1994, the scholars responsible for the work were, consecutively, the architects Taous Tanoulas, Demosthenes Giraud and Theodore Tiritidis, the archaeologist Konstantinos Krasas and, from 2008, the undersigned.

The purpose of the work on the Scattered Architectural Members of the Acropolis is first of all to inventory and catalogue, to document photographically and graphically, and to classify and arrange all the scattered material found at present on the Rock. The material comprises for the most part architectural members, preserved complete or fragmentarily, but also all kinds of archaeological stone remains, such as inscribed stones, fragments of sculpture or relief, dedicatory bases, marble vases, little altars, tables of offering, perrhateria, sarcophagi, etc.

A primary aim of the work on the Scattered Members is to identify and ascribe fragments...
of architectural members to monuments of the Acropolis and its environs, and to connect them, by mending them with known members of the various monuments, so that this material can be utilised in the Unistasis being carried on and around the Sacred Rock. The same principle holds also for the other categories of ancient works of art, such as the association of fragments to sculpture that is already known. The final goal of the work is to arrange the scattered members, and to make use of them in the display of the architectural members to monuments of the Acropolis.

After being inventoried, the fragments of sculpture, of inscriptions, of numerous chosen architectural members and all the archaic marbles architectural members are handled over to the 1st Ephorate of Prehistoric and Classical Antiquities, where possibilities of joining them with already known and/or published works are explored. Following this, the members are grouped and relocated in stone piles according to type (for example, Doric, Ionic, Corinthian, column capitals, column bases, pediments, metopes, etc.).

The remaining members are collected in newly formed stone piles. Finally, the inventory notebooks, photographic and graphic records are given to the Y.SMA documentation Office, where the conventional archive entries are compiled. The conventional archive of the Scattered Members is now being digested in the framework of the digital management of the documentation of the Y.SMA interventions by the Documentation Office.

Completed from 1977 to date are the inventorying, description, photographic and, for selected members, graphic documentation of over 20,000 worked pieces, preserved fragments and complete members, which had lain scattered around the monuments of the Acropolis in 25 large stone piles created already by the end of the 19th century, at various places on the Rock. More than 10,000 amorphous pieces have likewise been recorded and separated from the rest of the material.

The arduous task of recognising and attributing the scattered stones to known monuments and works of art, in short «identifying» all those stones, takes an endless amount of time in trial arrangements and in many «puzzle-mosaic» in connection with the already existing knowledge of the monuments and works. All together these efforts are rewarded not only by the number and variety of the joins but chiefly by the increase in knowledge about the monuments and the works of art through these new identifications and joins, indicative of the identifications and attributions of some of the Scattered Members to architectural monuments, we may note, to date, the attribution of over 710 stone pieces to the Parthenon, 265 to the Propylaea, 106 to the Erechtheum, 91 to the Pre-Parthenon, 30 to the temple known as the Ækatópetros, 50 to the Aschoa Neos, 64 to the Stoa of Eumenes, 7 to the Stoa of the Ancient Agora and 7 to the Odeon of Herodes Atticus. A great number of these have been joined along breaks and they fill in architectural members that have been in wood in the context of the above monuments. We may note also that new fragments have been joined to unique bases of archaic acroteria preserved on the Acropolis as well as to the corner sima block with the ram’s head from the Aschoa Neos of Athens.

The scholarly research conducted in the framework of the programme of the scattered architectural members of the Acropolis, beginning with the earliest, includes among others the study of Konstantinos Kissas on the archaic architecture of the Acropolis, the study of Byzantine members and sculptures by Demosthenes Giraud and the study of Gothic poros architectural members from the Frankish medieval buildings on the Acropolis by Tsao Tonoulas.

As examples of joined sculptural pieces, we may note the finding and joining of a fragment from the back of the horse of the Persian Rider (Acropolis Inv. No. 606), thus restoring the length of the horse’s back, the joining, by Alexander Mantis, of a fragment from the Scattered Members with the late archaic relief of the gorgomachy (Acrop. Mus. Inv. No. 120) showing the goddess Athena reaching out her hand to seize the giant by his helmet, the joining of a fragment to the relief-decorated base of the Pyrrhic dancers in the Acropolis Museum (Inv. No. 1338) and the joining of many fragments to dedicatory bases or to the dedications themselves, thus making them comprehensible.

Included in the work of the Scattered Members of the Acropolis was also the inventory and cataloguing of ancient stones from the buildings of the Old National Printing Press and the Araksaon (first girls school in Greece). These stones had been built into the walls of these buildings after 1835, when some of the Acropolis members had been sold as building material and used for constructing public buildings, mainly in the lower city of Athens. Found built into the walls of the Printing Press building-used building material were 128 fragments, which were removed and brought to the Acropolis where they were recorded. The importance of this operation is evident in the attribution of 27 of these pieces to the Parthenon. In the Araksaon, where removal of plaster from the exterior walls revealed theeme remains of ancient material from the Acropolis monuments, 482 blocks were photographed to scale, after visible surfaces and their perimetral joints were carefully cleaned.

It is expected that the inventory, cataloguing and arrangement of the most important poros architectural members on the Acropolis rock will be finished by the end of 2008. This material, comprising over 1000 fragments of architectural members, comes, for the most part, from the archaic buildings of the Acropolis. Part of the material, indeed the best preserved, is exhibited in the Acropolis Museum; this includes the pedimental sculpture of the archaic buildings. Other pieces are kept in the museum storerooms. These poros pieces, together with those still remaining on the rock, offer incontestable evidence of the intensive building activity of archaic times in the most important sacred place of Athens. Such remains of lost build-
The Acropolis Circuit Wall is the only monument on the Acropolis that has not yet been studied sufficiently. Over the past 25 years, problems of deformation and severe weathering of the surface have been noted many times at various areas. Yet, systematic observation and monitoring of its structural efficiency has begun only relatively recently, in 2006. This is understandable given the draining of personnel and the YSMA funds by the archeological work on the other monuments because of their urgent need of restoration. Another reason lies in the special difficulties presented by intervention on a monument the size and extent of the Circuit Wall, as well as the difficulties of access in order to document and study it.

The state of preservation of the Wall today

The appearance of the monument today is due to the effect of time, to human intervention, to the physico-chemical environment and to permanent or transient loading of the monument in the course of its life. As a result of the above factors, the monument shows in places a series of typical problems of a structural nature, which compose its “pathology”.

Generally speaking, the structural problems can be divided into two basic categories: a) those of a geometrical nature, which are connected with change in the form of the structure, without failure of the structural members, such as displacement, indications relating to the vertical axis, bulging, etc. and b) those of a mechanical nature, connected with strains and failures of the structural members without change to the form, such as cracks, breaks, detachments of stones, weathering, etc. The above structural problems have created areas of weakness locally, and, to begin with, they raise concern as to the capability of the structure to respond satisfactorily to increased transient loading (such as hydrostatic pressures from heavy rainfall, earthquake, etc.). The basic conclusion is that an overall and rational plan of action is needed so as to undertake extensive interventions for preserving the monument.

Earlier studies and works (1975-2006)

A rational plan for overall intervention for the protection of the monument clearly must utilise the scientific information gained in the framework of earlier works. In fact, from 1975 to 2005, a number of works and studies were carried out that directly or indirectly may prove to be of use in forming proposals for interventions on the monument. It is worth noting that these studies and works were not necessarily drawn up with protection of the Wall as criterion; they thus refer to the Acropolis monuments in general or they are partial. They are the following:

1. The «Geological-Geotechnical study of the Athenian Acropolis» was carried out in 1976 by the Institute for Geological and Metallurgical Research (IGME). The study marked the need to state with sufficient information – at least for areas where stabilization of the Wall is needed, but also for the underlying foundation of bedrock.

2. Studies and works of stabilization of various areas of the rocky slopes, carried out by the Committee for Conservation of the Acropolis monuments. The various works were carried out up to 1993 under the supervision of the civil engineer D. Mouloukos. It should be noted that there are unstable areas that have not been studied and supplementary studies are therefore needed to monitor and stabilise them.

3. Photogrammetric recording of the south Wall at a scale of 1:50 (2002-2004) by an outside collaborator under the supervision of the YSMA (supervision: V. Manidakis). A rectified photomosaic was made with the planar rectification method.

4. A Geophysical Study for determining sections of the Wall (2005-2006) by an outside collaborator (Aristotle University of Thessalonike – Technological and Research Foundation of Crete) under the supervision of the YSMA (V. Manidakis). Surface investigation of underground layers was carried out using the method of vertical and horizontal tomography.

5. Crack gauges (2004) were set by the YSMA itself (supervision: V. Manidakis). The purpose of the monitoring was to bridge and measure the behaviour of the existing cracks. A total of 18 crack gauges were set and 12 series of measurements were made using the suspended working platform or by means of photography by a special team of climbers.

6. Setting of an INVAR extensometer (2005) by the YSMA (supervision: V. Manidakis). The purpose is to monitor change shifting in the middle of the south Wall.

Current works and studies (2006-2008)

1. Study and work on backfilling the Archeophorion (2006, supervision: D. Englezos). The purpose of the relevant studies, architecutural and geotechnical (by: V. Manidakis, D. Englezos, respectively), was to document and to backfill the foundations of the monument for protective reasons, and to reduce thrust on the north Wall. The work has been finished and the effectivness of the intervention is being monitored systematically by means of sensors.

2. Creation of a unified system of coordinates for the Acropolis hill and monuments and its entry into the National Coordinate System of Territorial Protection of the YSMA (D. Mavromatis - D. Mou- lou). The work is being carried out by an outside collaborator and will be completed in 2008.

3. Study for photogrammetric recording of the wall and Acropolis hill in elevation and plan (supervision: D. Mavromatis - D. Moulou). The purpose of the study, which has been entrusted to an outside collaborator, is to produce true orthophotomosaics as photo texture background, at scales of 1:50 for the elevations of the Wall, 1:25 for areas of the Wall that are of particular archaeological interest and 1:100 for the plain view of the hill. These orthophotomosaics will be used in compiling the documentation and consolidation studies of the Wall. The study will be completed in 2008.

4. Three-dimensional (3D) scanning of the Wall and hill (supervision: D. Mavromatis - D. Mou- lou). The purpose of the work, being performed by an outside collaborator, is to create a 3D model of the Wall and Acropolis hill, to be used as a basis for further studies. The work will be finished in 2008.

5. Development of Geographical Information Systems (GIS) and data base for the Wall (supervision: D. Mavromatis - D. Moulou). The purpose of the work is to enter all existing information about the height of the Wall into the data base and to make thematic maps for their fuller use. The logistics are expected to be ready in 2008. There will be, no doubt, continuous updating of information for the data base during the course of the works on the monument.

6. Clearing and weeding of the rocky slopes of the Acropolis hill and the Circuit Wall, by an outside collaborator (Dec. 2007-Jan. 2008, supervision: D. Englezos). The purpose was to protect the Wall and the rocky slopes from the destructive action of plant roots and to reveal possible unstable areas of the Wall that had been hidden by plants. Such systematic clearing is scheduled on a periodical basis until the damaging plant system has been eliminated.

7. Structural restoration, in collaboration with an outside collaborator (supervision of the work: D. Englezos), of a number of stone blocks from the crest of the south Wall in the area of the temple of Athena Nike, that had lost their cohesion because of weathering and disolution of their bonding mortar. The intervention, which included the removal of unstable stone blocks, the cleaning of their joints, their resecuring and staining with cre-
The first recording of a seismic event on acceleration at 6 mg. It is worth noting that has already been recorded, with the greatest earthquake of Andravida (8/6/2008, 15:25). The seismic motion of the rock during the response of the hill and the monuments on it. The surface where limestone emerges, on the schist stalled in the backfill, at other points on the involved in an overall approach and analysis should be noted that the Acropolis Circuit will be noted, without in any way overlooking the contribution made by each separate project in the acquisition of information. It should be noted that the Acropolis Circuit Wall, because of the great number of factors involved in an overall approach and analysis such as the size of the Wall, the difficulty of access for direct observation, the variety in its building techniques and materials, the diversity of geological and geotechnical conditions that have affected it, etc., from the standpoint of confrontation, presents a complex technical and scholarly problem. There is urgent need, therefore, for an overall plan of management of the Wall, on the basis of interdisciplinary collaboration, so that the required actions will be rationally performed. In particular, while the work is basically in the domain of the civil engineer, it must be supported systematically in every circumstance by various fields of knowledge (for example: Archaeology, Architecture, Technical Geology, Topography, Seismology, Mechanics, Conservation) in the framework of a broad interdisciplinary collaboration.

The studies and the works that come from the cooperative efforts of the above specialists should proceed in the following stages:

1. Archaeological documentation and description of the monument, particularly those parts that are hidden by artificial backfill, for the discovery of which excavation is needed. The excavations should be combined with other works, such as a) geometric documentation using both modern and traditional methods of recording so that the drawings required for supporting studies and consolidation studies can be produced; b) site investigation of prevailing geotechnical conditions, c) suitable instrumental monitoring, d) application of temporary or permanent measures of consolidation, e) conservation. The above should be carried out on the basis of a plan that is applicable to each area to be examined.

2. Studies: the studies for restoration of the monument comprise both supporting and consolidation studies. The supporting studies include successively updating the existing geological study of the hill in the areas of programmed intervention, the systematic geotechnical evaluation of the conditions in the area of the works, research on the natural and mechanical features of the building material of the structure with suitable in situ and laboratory testing, study of the drainage of the surface of the hill, study for instrumental monitoring of the monument and the evaluation of data from the proper sensor systems.

3. Interventions. They are basically the performance of the consolidation studies. The file of the work includes the relevant studies, description of the technical standards, the contract requirements (in cases where the work is given to outside collaborators), the technical means and personnel required, the precise budget for the work, the time schedule, the systematic documentation of the works, their quality control, instrumental monitoring during the execution of the work, the final record and the instructions for conservation of the works accomplished.

4. Monitoring. The instrumental monitoring of crucial parameters of interest to engineers offers important information at every stage of the interventions, the monument must be monitored on a continuous basis, in order to verify their efficiency.

5. Conservation. This includes interventions on a small scale on structural elements of the Wall during the course of structural restoration and after this work is finished, as part of a general programme of systematic conservation. The excavations should be combined with other works, such as a) geometric documentation using both modern and traditional methods of recording so that the drawings required for supporting studies and consolidation studies can be produced; b) site investigation of prevailing geotechnical conditions, c) suitable instrumental monitoring, d) application of temporary or permanent measures of consolidation, e) conservation. The above should be carried out on the basis of a plan that is applicable to each area to be examined.

In any case, for the full implementation of all the activity planned the time needed will be at least ten years, assuming the continuous and unobstructed funding of the work.

Programmed for future interventions
In the framework of a critical review of the studies and works that have been carried out to date, their partial character and lack of an overall conception for organising the restoration and protection of the monument must be noted, without in any way overlooking the contribution made by each separate project in the acquisition of information. It should be noted that the Acropolis Circuit Wall, because of the great number of factors involved in an overall approach and analysis such as the size of the Wall, the difficulty of access for direct observation, the variety in its building techniques and materials, the diversity of geological and geotechnical conditions that have affected it, etc., from the standpoint of confrontation, presents a complex technical and scholarly problem. There is urgent need, therefore, for an overall plan of management of the Wall, on the basis of interdisciplinary collaboration, so that the required actions will be rationally performed. In particular, while the work is basically in the domain of the civil engineer, it must be supported systematically in every circumstance by various fields of knowledge (for example: Archaeology, Architecture, Technical Geology, Topography, Seismology, Mechanics, Conservation) in the framework of a broad interdisciplinary collaboration.

The studies and the works that come from the cooperative efforts of the above specialists should proceed in the following stages:

1. Archaeological documentation and description of the monument, particularly those parts that are hidden by artificial backfill, for the discovery of which excavation is needed. The excavations should be combined with other works, such as a) geometric documentation using both modern and traditional methods of recording so that the drawings required for supporting studies and consolidation studies can be produced; b) site investigation of prevailing geotechnical conditions, c) suitable instrumental monitoring, d) application of temporary or permanent measures of consolidation, e) conservation. The above should be carried out on the basis of a plan that is applicable to each area to be examined.

2. Studies: the studies for restoration of the monument comprise both supporting and consolidation studies. The supporting studies include successively updating the existing geological study of the hill in the areas of programmed intervention, the systematic geotechnical evaluation of the conditions in the area of the works, research on the natural and mechanical features of the building material of the structure with suitable in situ and laboratory testing, study of the drainage of the surface of the hill, study for instrumental monitoring of the monument and the evaluation of data from the proper sensor systems.

3. Interventions. They are basically the performance of the consolidation studies. The file of the work includes the relevant studies, description of the technical standards, the contract requirements (in cases where the work is given to outside collaborators), the technical means and personnel required, the precise budget for the work, the time schedule, the systematic documentation of the works, their quality control, instrumental monitoring during the execution of the work, the final record and the instructions for conservation of the works accomplished.

4. Monitoring. The instrumental monitoring of crucial parameters of interest to engineers offers important information at every stage of the interventions, the monument must be monitored on a continuous basis, in order to verify their efficiency.

5. Conservation. This includes interventions on a small scale on structural elements of the Wall during the course of structural restoration and after this work is finished, as part of a general programme of systematic conservation.

Execution of the above described studies and works must be escalated in sections, because of the extent of the monument to be restored. In any case, for the full implementation of all the activity planned the time needed will be at least ten years, assuming the continuous and unobstructed funding of the work.

Programmed for future interventions
In the framework of a critical review of the studies and works that have been carried out to date, their partial character and lack of an overall conception for organising the restoration and protection of the monument must be noted, without in any way overlooking the contribution made by each separate project in the acquisition of information. It should be noted that the Acropolis Circuit Wall, because of the great number of factors involved in an overall approach and analysis such as the size of the Wall, the difficulty of access for direct observation, the variety in its building techniques and materials, the diversity of geological and geotechnical conditions that have affected it, etc., from the standpoint of confrontation, presents a complex technical and scholarly problem. There is urgent need, therefore, for an overall plan of management of the Wall, on the basis of interdisciplinary collaboration, so that the required actions will be rationally performed. In particular, while the work is basically in the domain of the civil engineer, it must be supported systematically in every circumstance by various fields of knowledge (for example: Archaeology, Architecture, Technical Geology, Topography, Seismology, Mechanics, Conservation) in the framework of a broad interdisciplinary collaboration.

The studies and the works that come from the cooperative efforts of the above specialists should proceed in the following stages:

1. Archaeological documentation and description of the monument, particularly those parts that are hidden by artificial backfill, for the discovery of which excavation is needed. The excavations should be combined with other works, such as a) geometric documentation using both modern and traditional methods of recording so that the drawings required for supporting studies and consolidation studies can be produced; b) site investigation of prevailing geotechnical conditions, c) suitable instrumental monitoring, d) application of temporary or permanent measures of consolidation, e) conservation. The above should be carried out on the basis of a plan that is applicable to each area to be examined.

2. Studies: the studies for restoration of the monument comprise both supporting and consolidation studies. The supporting studies include successively updating the existing geological study of the hill in the areas of programmed intervention, the systematic geotechnical evaluation of the conditions in the area of the works, research on the natural and mechanical features of the building material of the structure with suitable in situ and laboratory testing, study of the drainage of the surface of the hill, study for instrumental monitoring of the monument and the evaluation of data from the proper sensor systems.
from institutions, mainly in the provinces, schools borrowed and used the museum kits and Pyrgos. Another 3194 pupils from 82 poli, Chalkis, Volos, Messene, Serres, Kos 160 schools in Attica, Phokis, Trikala, Trikias, Chalkis Sanctuary, the ancient temples, the floor of the New Acropolis Museum, education and Information carried out an educational programme, Schools participating in the programme and funded by the ‘S stavros Niarhos’ Foundation) to institutions in Greece (329 museum kits), in America and in many countries of Europe. The seminars were held in 2007 by the Head of the Department and the staff, Cornelia Hatziaslani, architect-archaeologist and Irini Stepanidou, architect-archaeologist and architect. These were attended by 830 educators and pupils. In November 2007, they participated in a one-day conference for educators of the University of Thessaly on the theme of ‘Educational Material for Museums: Design, Use, Utilisation’.

Events abroad related to the Acropolis Works
During the past year the Acropolis restoration works were presented in various countries abroad, beginning with Australia, where, in October 2007, the YSMA organised events on the subject of the Acropolis in collaboration with the Organisation for the Construction of the New Acropolis Museum (OANMA) and the Departments of Modern Greek Studies and Architecture of the University of Sydney, participating also was the Association of Hellenism Overseas of Australia and the Far East. The events included the presence in the Nicholson Museum at Sydney, until December 2007, of a photographic exhibition of the Acropolis Restoration Works and the New Museum. It included also lectures about the Acropolis Works on the 24th of October at the University of Sydney, by the YSMA director, Maria Ioannidou, and by Nikos Toganidis, the architect in charge of the Parthenon restoration. A public discussion was held on the 28th of October, entitled ‘Who Owns the Cultural Heritage?’ with the subject of management and the restitution of monuments of cultural heritage in their own land. The national holiday of the 28th of October, celebrated with special brilliance by the Greeks Overseas, was dedicated, as ‘Family Days’, to informing families and school children about the Acropolis and in general about the importance of museums and the management of cultural heritage.

On March 13th, 2008, the Minister of Culture, Mr. Michalis Katsifas, opened the photographic exhibition of the Acropolis Restoration Works by the YSMA photographer Sokrates Matzouranis, at the Pergamon Museum in Berlin, in the framework of events held to present the New Acropolis Museum, organised in collaboration with the Foundation for Hellenic Culture. The exhibition lasted to the end of May and will be shown also in other cities of German speaking Europe.

A series of events related to the Acropolis Restoration were held by the YSMA also in Beijing, as part of the Olympic year of Greece in China. On the 8th of May 2008, the well-known photograhpic exhibition of the Acropolis Restoration Works was inaugurated at the Greek House in Beijing enriched with two additional units, one an introduction to the history, the diachronical events and earlier restorations of the monuments on the Rock, and another unit on the subject of the Parthenon Frieze. The exhibition continued until the end of June. During this time, visitors had the opportunity to see the films produced by YSMA, ‘The Works on the Athenian Acropolis: the People and the Monuments’, ‘Conservation and Cleaning of the Parthenon West Frieze’ (both directed by S. Marinopoulos), ‘The Fashion and Times’ (directed by A. Drakopoulos), ‘The Sacred Rocks’ (directed by M. Parachi), ‘The Saving of the Acropolis’ (directed by K. Vrti), ‘Parthenon: the Restoration of the East Side’ (directed by D. Vrtnikos), which were shown continuously. The designing of the exhibition was by Parthe Pudlit and Platon Konstantopoulos, and the accompanying catalogue (in English and in Chinese) was by Maria Ioannidou and Donia Moullou. Likewise on the 8th and 9th of May, a scholarily Two-day Conference on the Athenian Acropolis and the Forbidden City Restoration Projects was held by the YSMA in collaboration with Tsinghua University. The Conference was held in the Palace Museum of the Forbidden City and at Tsinghua University. The Conference was held in the Palace Museum of the Forbidden City and at Tsinghua University. Chinese specialists presented the works of conservation and restoration being carried out in the Forbidden City. For the Greek side, the Acropolis Works were presented by Maria Ioannidou (The Acropolis restoration project), Fanis Malatsou-Tufano (Principles of the Acropolis restoration project), Nikos Tsangaris (Parthenon restoration project), Taor Tzanos (Propylaia restoration project), Dionisia Michalopoulou (The Athena Nike restoration project), Evri Papadotserotzou-Zois (Acropolis monuments: surface conservation and research), Dimitris Efanidis - Dorina Moullou (Acropolis Circuit Wall: documentation and research), Yannis Akrakopoulos (Documentation data base of the Acropolis restoration project), Spyros Chlomomopouhos (Engineering technology of the Acropolis restoration project), Cornelia Hatziaslani (Acropolis restoration and education). The Conference, which was attended with great interest by a large audience, mainly students, ended with a general discussion in which, Maria Ioannidou, Taor Tzanos and Evi Papadotserotzou-Zois took part for the Greek contingent. Publication of the Proceedings of the Conference is planned.

The Symposium of the CIPA and the Acropolis

The YSMA was well represented in the 21st
International Symposium of the International Committee for Architectural Photogrammetry (CIPA), held 1-7 October 2007 at the Zappeion in Athens, on the theme of «Architectural Photography and the Future of the Cultural Past».

An entire session was devoted to the Acropolis. The papers presented focused on the «Digital management of the documentation of the Acropolis restoration» and «Photogrammetrical survey of the Athenian Acropolis».

M. Ioannidou gave lectures on «Principles and methodological aspects» and «The Acropolis: research and exhibition».

Among the accompanying posters of the Symposium, those about the Acropolis anastylosis were of particular interest (in fact, Pavlos Psaltis set up a small exhibition in the Zappeion). The orthophotograph of the ball-shaped west end of the north colonnade of the Parthenon by the rural and surveying engineer, Dionysia Mavromati, was indeed impressive.

The same exhibition was presented at the New Acropolis Museum on the occasion of the International Congress for the «Return of Cultural Properties to the Countries of their Origin», organized by the Hellenic Ministry of Culture and the Unesco, in March 17th-18th.

At an One-day Conference held in November 2007 at the Archaeological Museum of Thessalonike, the YSMA conservators Anastasia Panou and Yannis Frantzi presented, respectively, the cleaning of the Parthenon west frieze and the surface conservation of the Acropolis monuments.

At the symposium of the National Technical University of Athens in December 2007, the Head of the YSMA Conservation Department, Evi Papakonstantinou-Zoitis, spoke about Theodore Skoulikidis and his contribution to the conservation of the Acropolis monuments.

In the framework of festivities celebrating the 170 years of the National Technical University of Athens and the 50 years of the School of Chemical Engineering, on Tuesday May 26, 2007, the distinguished marble technician, Nikos Skaris, former marble technician of the Erechtheion restoration work (1979-1987), was honoured by the President of the Hellenic Republic, Karolos Papoulias, with the Gold Cross of the Order of the Phoenix.

YSMA Department of Surface Conservation of the Monuments, was awarded an Honorary Diploma by the Dean of the National Technical University Professor K. Mourtzou, on the proposal of the School. This was followed by an address given by the recipient of the award entitled «Surface conservation of the Acropolis monuments: research and intervention».

In this same framework, the «Theodore Skoulikidis» Hall was inaugurated at the School of Chemical Engineering, on May 19, 2007, as a dedication to the memory of the founding member of the ESMA and brilliant teacher and interventionist.

M. Ioannidou, head of the YSMA Conservation Department, was invited to give a talk on «Philosophical and methodological aspects» of the documentation and restoration of the Acropolis.


Photographic exhibition of the Acropolis restoration works in Beijing during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.

Photographic exhibition of the Acropolis restoration works in Zappeion during the CIPA International Meeting.
On May 26, 2008 at the Presidential Residence the President of the Hellenic Republic, Karolos Papoulias, decorated the Acropolis marble technician, Nikos Skaris, son of Evangelos Skaris, with the Gold Cross of the Order of the Phoenix. Nikos Skaris was head of the team of marble technicians of the Erechtheion restoration (1979-1987).

As written by the architect in charge of the restoration of the Erechtheion, Alekos Panpoulos, in the partly finished text he left on the subject of the work, the marble technicians were the stylists of the work, since it was through their devotion to the work and their professional skill that the entire enterprise was successfully completed. The span of their ages covered three generations. The first generation included technicians with proven experience in the large anastelosis programmes carried out in Greece in the decades 1956-1970. They are distinguished for their professional application, for the careful and thoughtful way in which they carried out the work and for their ethos. It is to this generation that Nikos Skaris, distinguished in his work, belongs.

Alekos continues. Nikos Skaris was the foreman of the crew of the Erechtheion restoration work and he was the teacher of us all. He is characterized by his high ethical standards, his kindness and civility, his humility and by his unique professional qualifications, equal to those of the ancient technicians.

Nikos Skaris was born in 1923 at Pyrgos in Tenos. At the age of ten he began to be instructed and to work in the art of marble cutting, first in the marble workshop of Dionysios Peaus, then with his uncle, the marble-carver Tsonis Skaris. Later he joined Dyoysis in Zakynthos, the monastery of Hosios Miletos, the church of the Soter Lykouden, the church of Ayios Demetrios of Thesalonike, the church of Ayios Andreas in Patra) and also the creation of columns, antae and wall capitals for modern buildings (such as that of the Chamber of Commerce in Piraeus or the Archaeological Society in Athens). He has vast experience in working on ancient monuments, for he has taken part in nearly all the most important post-war anastelosis interventions: restoring the marble caves of the Odeon of Herodes Atticus, restoration of the SW wing of the Propylaea, restoration of the temple of Aphaia, restoration of the Epidaurus theatre, restoration of the temple of Poseidon at Sounion, restoration of the Parthenon in the middle 1960’s. He returned to the Acropolis in 1979, where he worked as head of the restoration work of the Erechtheion until his retirement in 1987.

After his retirement, in 1989, Nikos Skaris worked with Professor Charalampos Boutras, President of the ESMA, on creating a little Sculpture Museum in the restored refectory of the monastery of Hosios Loukas. The work called for the joining, filling and restoring of a small number of middle Byzantine sculptures, all of which was carried out by Nikos Skaris with the quality of work and rapidity for which he is known.

The honour given to Nikos Skaris by the President of the Hellenic Republic reflects on all the marble technicians of the restoration works of the Acropolis monuments. They are continuing his work with mastery and ethos.
The restoration and conservation works of the Acropolis Monuments as well as the present issue are jointly financed by the European Union.

Community Support Framework 2000-2006
Operational Programme “CULTURE”
Community Contribution: 75%
National Contribution: 25%

Managing Authority for Operational Programme “CULTURE”

©YSMA, 2008