THE RESTORATION OF THE ERECHTHEION

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THE RESTORATION OF THE ERECHTHEION (1979-1987)

SUMMARY

The Erechtheion on the Athenian Acropolis was crumbling because of rusting iron clamps employed in previous reconstructions; atmospheric pollution was eating the marble. The temple was dismantled, the architectural members were conserved and reset in the original positions. The Caryatids were transferred to the Museum and were replaced by copies.

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The Erechteion is a classical Ionic temple dedicated to the worship of the goddess Athena and the chthonic divinites of Attica, built on the Acropolis of Athens between 421 and 409 B.C. The plan of the rectangular prostyle temple with porches projecting from the ends of the two sides is the only one of its kind in classical architecture. The ceiling of the South Porch is supported by six statues of women, the famous Caryatids.

In the course of its long history the Erechtheion has been subjected to many changes in both form and function and has suffered severe damage. The building was partly destroyed by a conflagration in ancient times, heavily repaired in the Roman period, later converted into a three-aisled Christian basilica, used as living quarters and as a powder magazine during the period of Turkish rule and reduced to a ruin in the beginning of the 19th century.

The first attempts to rebuild the temple were carried out directly after the Greek State was established. In 1835-1847 parts of the north, south and west walls were rebuilt under the direction of K.Pittakis who used scattered architectural blocks of marble for the purpose. In 1846-1847 the French architect Paccard had a fragmentary Caryatid found in the excavations restored in marble and reset in its original position. A copy of the Caryatid was set up in the place of the one which Lord Elgin had wrenched from the building together with other architectural members.

From 1902 to 1909 N.Balanos carried out a major reconstruction project which gave the Erechtheion the form it was known by until recently. The following parts of the building were restored using both original material and, to some degree, new material: the ceiling of the Caryatid Porch, the ceiling of

of the North Porch, the south wall up to the height to the crowning moulding, the west wall up to the height of the cornice and a large part of the north wall.

About sixty years after Balanos'restoration G.Dontas, the Director of the Acropolis, and a mission of consulting experts from Unesco found that the building was beset by extremely severe problems. The iron clamps and beams that had been used in the old restoration for attachments and consolidation had rusted and expanded, fracturing the marble blocks they had been meant to hold together; air pollution was eating the surface of the marble, especially the Caryatids.

In 1975 the Ministry of Culture and Sciences founded the Committee for the Preservation of Acropolis Monuments (C.P.A.M.) (Appendix 1) responsible for organizing and supervising the studies and work of saving the monuments. The first study concerning the preservation of the Erechtheion was worked out by the Technical Office of the Acropolis, (Appedix 2); in 1977 this study was presented to and approved by the international meeting of specialists held in Athens. It was decided that the sections of the building with the worst problems inevitably had to be dismantled and repaired and that the only way to save the Caryatids from further damage was to remove them to the Museum.

The Erechtheion restoration project began in 1979. A.Papanikolaou, architect, and K.Zambas, civil engineer, were in charge of the work, supervised by Professor Ch. Bouras of the National Technical University of Athens on behalf of the C.P.A.M. From the preliminary studies to the end of the project we adhered strictly to the principles enunciated in the Charter of Venice and we adopted additional principles of reversibility, of altering the appearance of the temple as little as possible, and of

increasing its value as a historical document. Before the project was started and while it was being carried out an effort was made to inform the international public on all levels by means of publications and exhibitions (Appendix 3).

All the sections of the building where rusting and expansion of the iron elements installed during Balanos'restoration had caused structural problems were dismantled and also a small badly damaged section still in its original place over the door of the North Porch. Special measures were taken to move the Caryatids safely to the Acropolis Museum where they went on display enclosed in a sealed chamber with nitrogen atmosphere. The iron attachments and bearing members were removed without damaging the marble blocks which were safely lowered to the ground. Each phase of the work was systematically recorded with plans, drawings, photographs, monitoring and a detailed log-book.

The architectural fragments were put together with white cement with low content of soluble salts and with titanium reinforcements. This is the first time that titanium, a virtually non--rusting metal, has been used in a preservation project, following a proposal put forward by Prof. T. Skoulikides. Titanium was also used to replace all the iron clamps and other iron strustural elements. In many cases new marble was used either to complete ancient fragmentary blocks in order to maintain structural stability or to replace ancient marble from other buildings which N.Balanos had incorporated in the Erechtheion. The Erechtheion was built of Pentelic marble; we used the same marble so that the supplementary material would have the same mechanical and physical behaviour as the original. The new material was exactly joined to the old without the slightest damage to the original surfaces. Plaster casts of the original broken surfaces were made and copies were produced, using either the traditional

sculptor's pointing device or an automatic pantograph.

After the damaged blocks had been given conservation treatment, they were set back in place. Systematic study of the ancient blocks both showed that many of them had been set in the wrong positions during previous restorations and produced a quantity of data making it possible to determine the correct positions. A computer was used for this work. On the basis of this new information the blocks of the Caryatid parapet, the ceiling of the North Porch, and much of the north and south walls were reset. New marble blocks were substituted in the cases where N. Balanos had reset Erechtheion blocks in the wrong positions and the original blocks were not preserved. The new blocks and the new pieces used to fill out ancient fragments were given a distinctive surface treatment quite different from those of the ancient blocks, so that ancient material is clearly distinguishable from modern; the artificial patina applied to the surface of the new marble tones down the glaring difference in colour.

The original Caryatids were replaced by copies made of cement mortar carried out by the sculptor S.Triantis and his team. The northern column of the East Porch and the architectural members above it, now in the British Museum, were replaced by copies made of cement mortar.

The project was completed in the spring of 1987 and the scaffolding was taken down; the building has been given back to the Acropolis and its visitors. The Greek Government funded the project. Both traditional methods and modern technology were employed to remove the dangers threatening this splendid ancient temple. Now that the ancient architectural blocks have been reset in their original positions, the building is much more readily intelligible, not only in regard to the ancient phases but also in regard to all of the traces of later times.

The guiding spirit of the entire project was boundless respect for the original material and the original form so that the Erechtheion would be preserved as a work of Art and as an historic document.

October 1987

Alexander Papanikolaou
Kostas Zambas

Appendix 1.

COMMITTEE FOR THE PRESERVATION OF THE ACROPOLIS MONUMENTS

Chairman:

CH. BOURAS

Architect, Professor at the National Technical University

Members:

S.ANGELIDES

Civil Engineer, Em.Professor at the National Technical University.

G.DESPINIS

Archaeologist, Em.Professor at the University of Thessaloniki

I.DIMAKOPOULOS

Dr., Architect, Director of Restoration Service for Ancient Monuments, Ministry of Culture

G.DONTAS

Dr., Archaeologist, Hon.General Ephor of Antiquities

G.LAVVAS

Architect-Archaeologist, Professor at the Univesrity of Thessaloniki

V.LAMBRINOUDAKIS

Archaeologist, Professor at the University of Athens

V.PETRAKOS

Dr., Archaeologist, Ephor of Antiquities, Director of the 2nd Prehistorical and Classical Ephoria of Antiquities

TH.SKOULIKIDES

Chemical Engineer, Professor at the National Technical University

EVI TOULOUPA

Dr., Archaeologist, Ephor of Antiquities, Director of the Acropolis Ephoria

J.TZEDAKIS
Dr., Archaeologist, Ephor of Antiquities, Director
of Prehistorical and Classical Antiquities, Ministry of Culture

Former Chairmen of the Committee
+ J.MILIADES
Dr., Hon. General Ephor of Antiquities
G.E.MYLONAS
General secretary of the Archaeological Society of Athens
Member of the Athens Academy
N. PLATON
Archaeologist, Em.Professor at the University of Thessaloniki

Former Members of the Committee
C.KERAMIDAS, Electric Engineer, Ministry of Culture
J.KNITHACIS, Architect, Ministry of Culture
C.KONOFAGOS, Civil Engineer, Em.Professor at the N.T.U.
+ D.LAZARIDES, Archaeologist, Prof. at the University of Crete
A.OIKONOMOPOULOS, Architect, Ministry of Culture
D.RAFTOPOULOS, Mechanical Engineer
C.SYRMAKEZIS, Civil Engineer, Professor at the N.T.U.
+ J.TRAVLOS, Dr., Architect-Archaeologist

APPENDIX 2

TECHNICAL OFFICE OF ACROPOLIS (1977)

A.Lazaridou,	Architect
E.Moutopoulos	Architect
A.Papanikolaou	Architect
A.Tzakou	Architect
M.Ioannidou	Civil Engineer
D.Monokrousos	Civil Engineer
C.Zambas	Civil Engineer
D.Charalampous	Chemical Engineer
N.Beloyannis	Chemical Engineer
P.Papakonstantinou	Chemical Engineer
M.Brouskari	Archaeologist
F.Mallouchou	Archaeologist

APPENDIX 3

Selected bibliography on the restoration of the Erechtheion

1. Proceedings of the 2nd International Symposium on the deterioration of building stones: "The Acropolis. Problems - Measurements - Studies - Measures to be taken" Athens 1976, p.96

2. Working Group for the Preservation of the Acropolis Monuments, "Study for the Restoration of the Erechtheion" (in Greek with a summary in French) Athens 1977, p.622

3. Working Group for the Preservation of the Acropolis Monuments, International Meeting on the Restoration of the Erechtheion, Reports, Proposals, Conclusions, Athens December 8-10, 1987, p.45

4. H.Kienast, "Der Wiederaufbau der Erechtheion" in Architectura, 12, 1982, pp. 89-104, figs. 1-20

5. A.Papanikolaou, "The small wedge-like openings in the Erechtheion (In Greek with a summary in English) in Deltion, vol.33 (1978) A.[Athens 1984] pp. 191-197, pl.59-62

6. C.Zambas, "Rearrangement of stones in the South Wall of the Erechtheion" (In Greek with a summary in English) in Deltion, vol.33 (1978) A [Athens 1984] pp.168-190, pl.45-58

7. C.Zambas, M.Ioannidou, A.Papanikolaou, "The use of titanium reinforcement for the restoration of marble architectural members of the Acropolis Monuments", Preprints of the Contributions to the the Bologna Congress, 21-26 September 1986, p.p.138-141

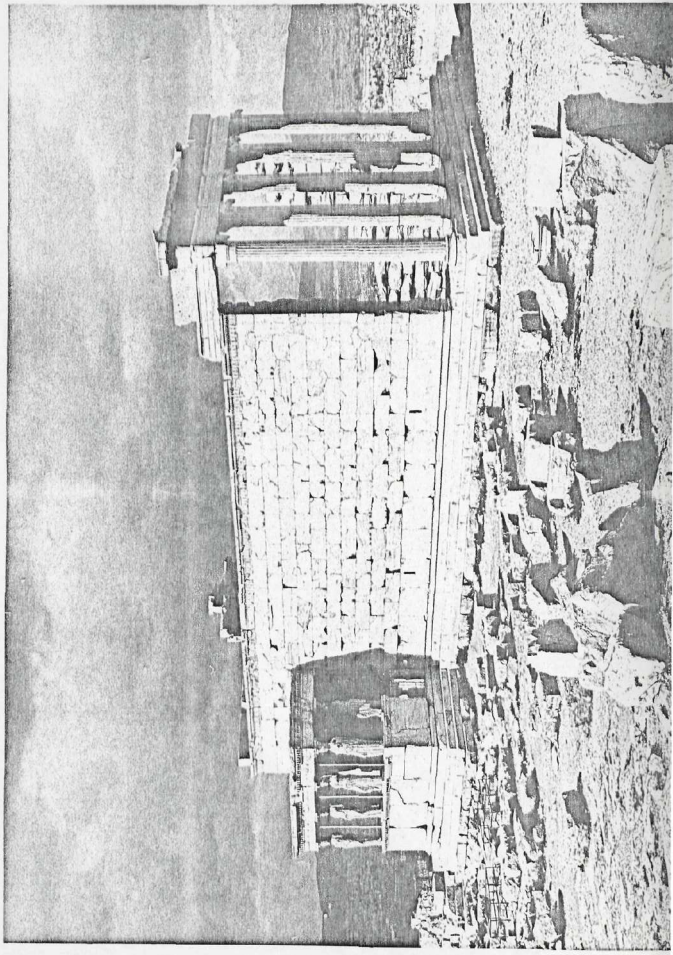


Photo: N.Kondos

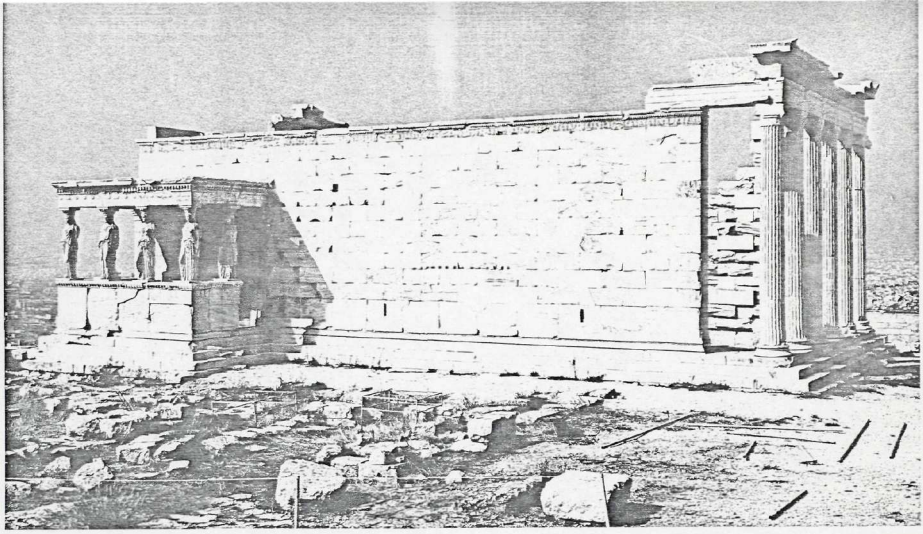


Photo: S.Mavrommatis

View of the Erechtheion from the southeast before (above) and after restoration

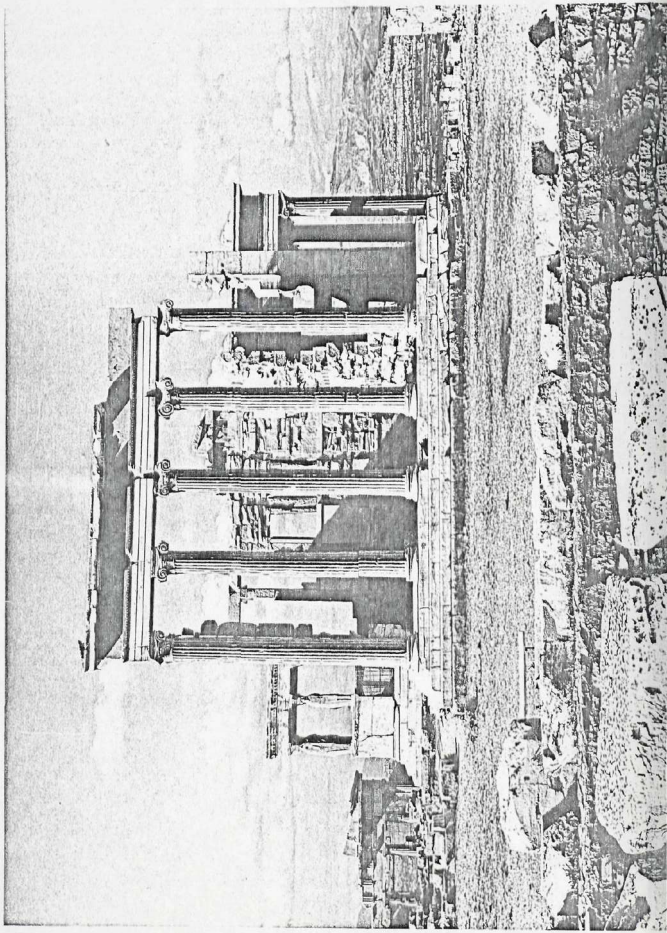


Photo: N.Kondos

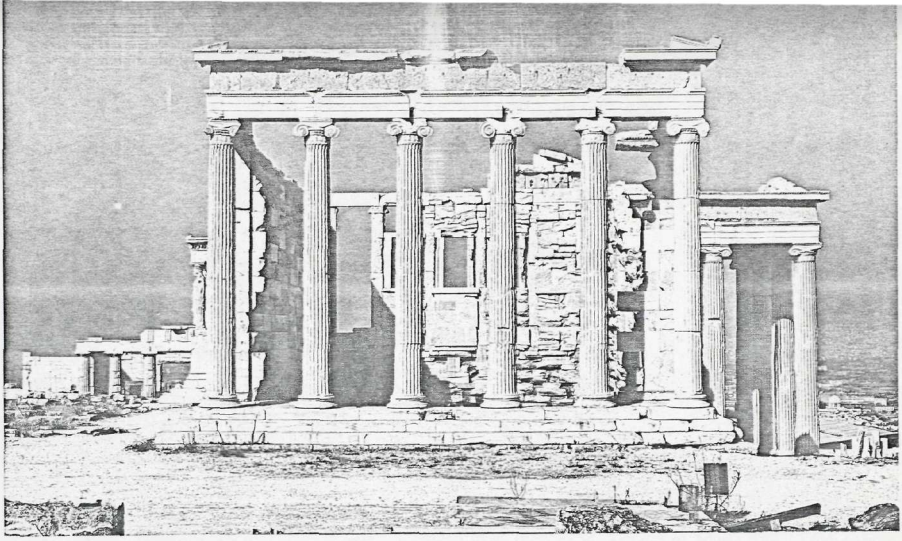


Photo: N.Mavrommatis

View of the Erechtheion from the east before (above) and after restoration

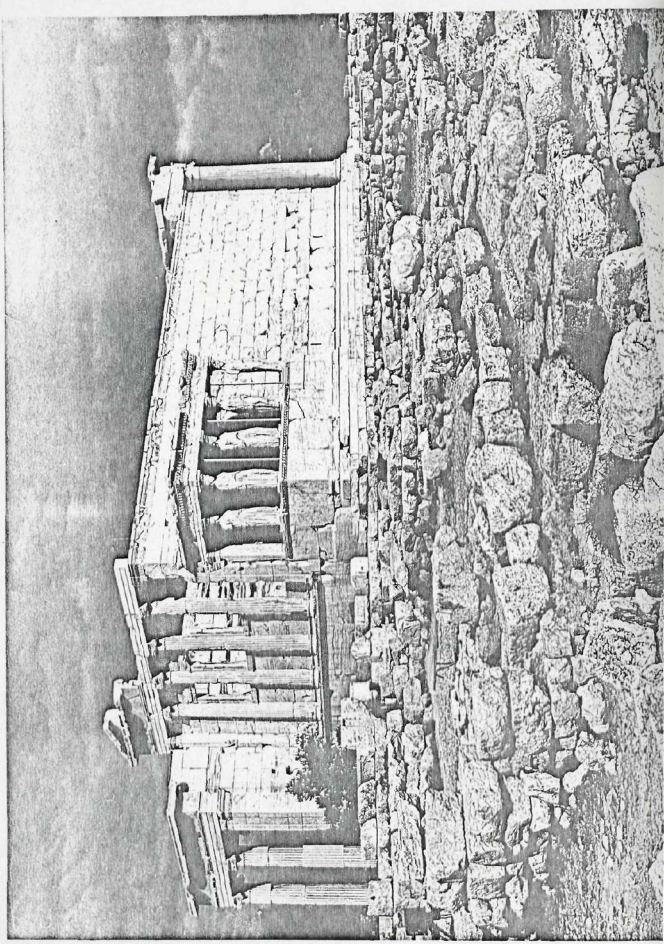


Photo: N.Kondos

Photo: S.Mavrommatis

View of the Erechtheion from the southwest before (above) and after restoration

Photo: N.Kondos

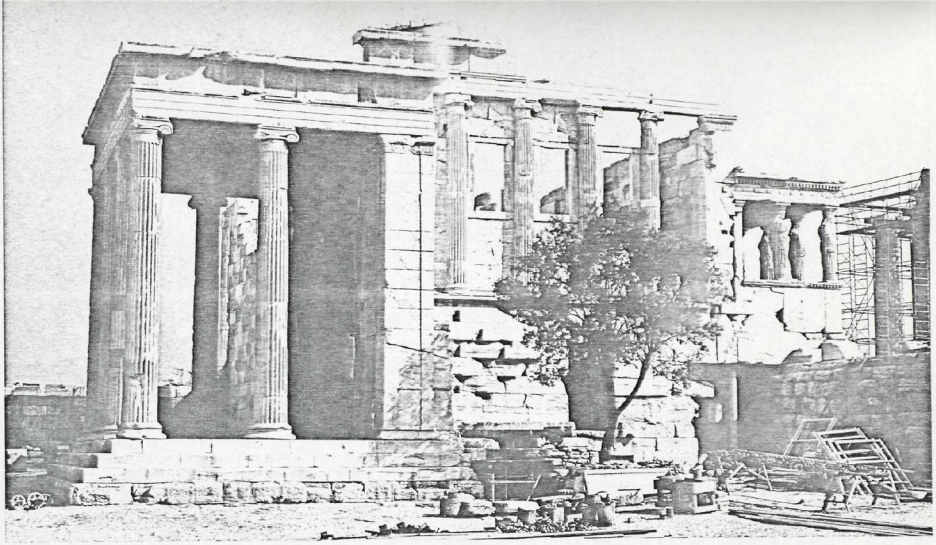


Photo: N.Mavrommatis

View of the Erechtheion from the west before (above) and after restoration

Photo: Deutsches Archäologisches Institut - Athen

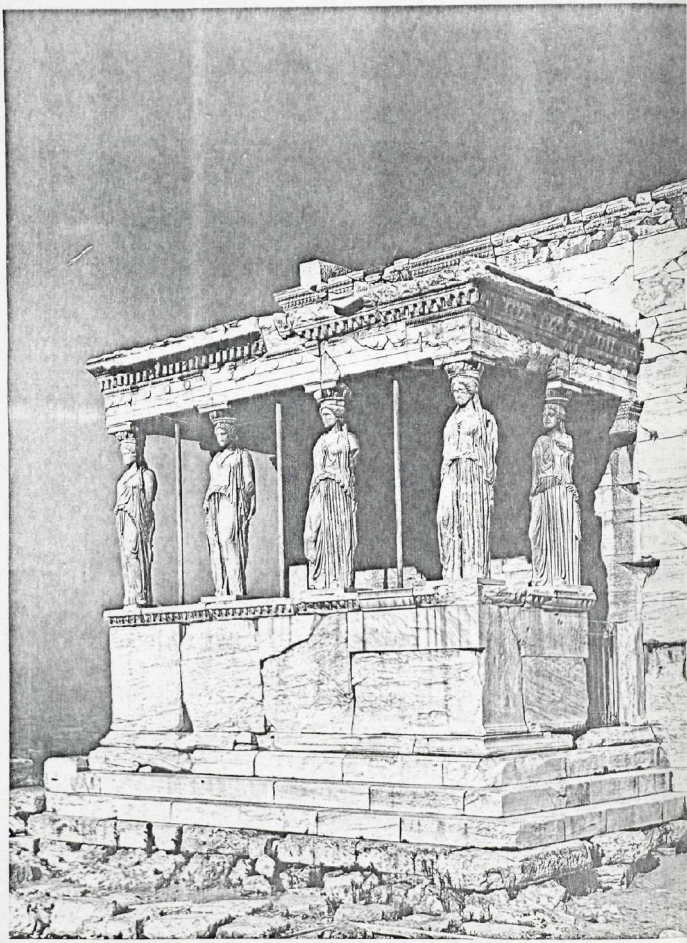
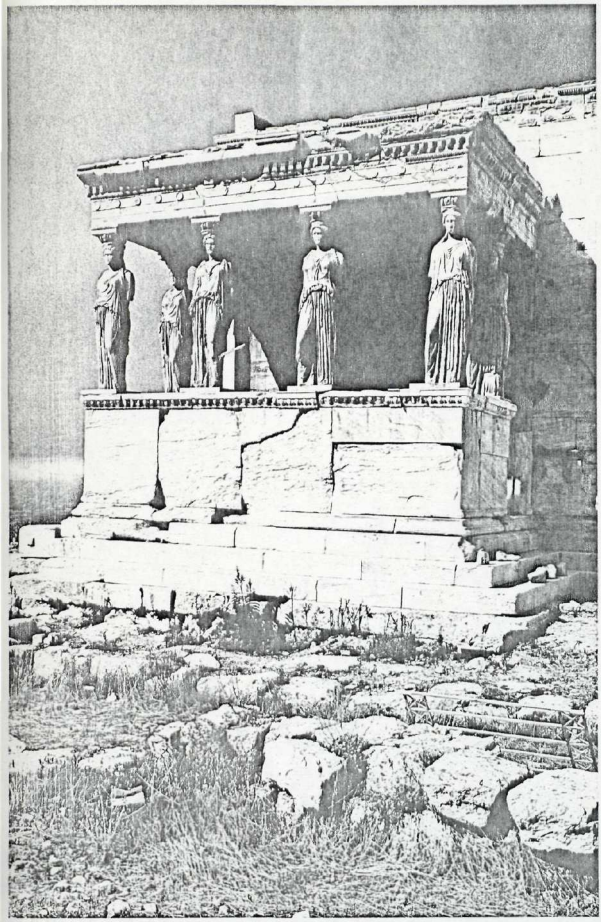


Photo: S.Mavrommatis



View of the Porch of the Caryatids before (left)
and after restoration