

A CONSERVATION PLAN FOR THE  
BASILICA OF EREROUK

ANI - PEMZA, ARMENIA



SUBMITTED TO THE THE GETTY GRANT PROGRAM, LOS ANGELES  
BY THE WORLD MONUMENTS FUND, NEW YORK

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*cover image:* structural shoring installed by architect Vitali Gevorkian in November 1992 following WMF mission to Ererouk basilica and continued widening of masonry fissures.

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## FOREWORD

This report is the result of a long and laborious series of site visits, planning meetings, discussions, and fund raising ventures related to the uncertain future of the Basilica at Ererouk. The genesis of the current effort dates to the devastating 1988 earthquake in northwest Armenia (New Gumri), centered some 15 kilometers north of Ererouk<sup>1</sup>. An offer of assistance was extended by the United States Information Agency (USIA) to the Soviet government in Moscow to send an expert team to assess recent earthquake damage to historic buildings throughout the country.

Nearly two years later this offer was accepted, and the USIA contacted the World Monuments Fund (WMF) for technical advice regarding the composition of the reconnaissance mission team. WMF recommended a scopic view of damaged historic buildings throughout the country to be led by an American restoration architect working under the aegis of the Armenian Ministry of Culture. Architect Anthony Crosby of the U.S. National Parks Service was selected for the task and the result proved highly successful. His report was enthusiastically received in New York at a roundtable of experts convened by WMF project consultant Arlene Fleming.

A subsequent mission occurred in October 1992, where more detailed analysis was made of the highest priority conservation projects in Armenia, one of which was the half ruined basilica of Ererouk—the subject of this report. It was decided after the second mission that the structurally unstable basilica represented the most urgent situation of all the sites examined.

In November 1992, Vitali Gevorkian went to Ererouk to supervise emergency repairs that were identified by the previous mission team to counteract fissures caused by the 1988 earthquake; these had widened considerably in the five year period since the disaster and at that time threatened the structural stability of the monument. A proposal for emergency stabilization was jointly prepared by the 1992 American team and their Armenian counterparts at the Commission.

Emergency structural shoring was erected to protect the basilica until comprehensive conservation treatment can be undertaken. Steel supports set in concrete footings to buttress the cracked walls were placed at critical locations along the perimeter of the east end and at the northwest tower. The system was designed to prevent the braced portions from moving away from the interior building core.

This emergency stabilization work at Ererouk was facilitated by a grant from the local currency fund resulting from the sale of food commodities provided to Armenia by the U.S. government during 1992.

All of the above occurred against a background of Armenia's ongoing military conflict with neighboring Azerbaidjian and general political instability in the wake of its separation from the former U.S.S.R. At that time, the gesture of interest and good will constituted by these conservation activities may have been as valuable as any physical intervention.

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<sup>1</sup> On Wednesday, December 7, 1988 at 11:42 a.m. local time, an earthquake measuring 6.9 on the Richter scale shook northwest Armenia for 40 seconds, leaving over 25,000 people dead, thousands more injured, and some 500,000 homeless. Within seconds, buildings and structures in 58 villages and four cities were reduced to heaps of rubble and ash.

Fortunately, peace and prosperity gained a foothold in Armenia in 1993, and WMF also succeeded in identifying new sources of funding through the Getty Grant Program, the Samuel H. Kress Foundation, and IREX. After raising additional monies, a third major technical mission to Ererouk occurred in August 1995 which involved three restoration experts from the U.S. and Italy, with assistance from our Armenian counterparts and others. This mission generated many new questions and solutions regarding the long-term stabilization of Ererouk, as well as its public presentation.

This report summarizes these investigations and conclusions without suggesting a definitive conservation strategy for the site. It is hoped that the information and ideas collected here will be of use to the planning officials at the Armenian Ministry of Culture who are responsible for the maintenance of Ererouk's basilica. The study and planning process at Ererouk has been long and arduous, but we remain optimistic that some significant conservation project to insure its long-term protection may come to fruition as a result of these efforts.

*John H. Stubbs*

*Vice President for Programs, World Monuments Fund*

## ACKNOWLEDGMENTS

The World Monuments Fund owes a large debt of gratitude to the several institutions which acted as sponsors for this phase of project identification and planning. Dr. Koriun Ghafadarian of the Commission for the Protection and Use of Historic and Cultural Monuments (CPHM), Yerevan, routinely received the various international participants involved with WMF's Armenian missions and always offered valuable technical and logistical support.

The steadfast support of Mr. Timothy Whalen and the Getty Grant Program was essential to the project, providing matching funds met by contributions from Samuel H. Kress Foundation and IREX. The foresight, patience, and generosity of these funding agencies has again allowed a collection of outstanding professionals to concentrate on the conservation challenges of a site which otherwise would have received scant attention due to political and economic constraints at the local level.

Several private donors have also supported WMF's work in Armenia, especially at Ererouk in particular: Mr. Michael Erkelegian of Alexandria, Virginia; the Yankelovich family of New York, and the Parsegian family of Troy, New York. Generous advice on fund raising and logistical matters was provided by Mr. Sahan Azruni of New York and Dr. Lucy Dermanuelian of Tufts University.

In addition, it is necessary to acknowledge the tireless contributions of Mr. Vitali Gevorkian of Washington, D.C., whose advice and skillful editorial eye have been a boon to the project since its beginnings. Mr. Gevorkian was responsible, most significantly, for the implementation of emergency shoring measures which may have saved the structure from total collapse. Throughout the life of the project, Mr. Gevorkian has provided his services as an architect, translator, and diplomat without compensation in the interests of the project's success. Mr. Gevorkian has proven indispensable as an interlocutor between World Monuments Fund representatives and the team of Armenian professionals.

The report is based on numerous previous historical, architectural and archaeological studies, including those of Nikolai Marr and Josef Strzygowski, and the more recent work of the Commission for the Protection and Use of Historic and Cultural Monuments under the direction of Vahagn Grigorian, and Dr. Adriano Alpago-Novello of the Centro Studi della Cultura Armena, Milan (now based in Venice).

The hard work and thoughtfulness of both chief expert consultants to this project—Mr. Vahagn Grigorian of Yerevan and Mr. Gionatta Rizzi of Milan—have propelled it forward through many difficult and complex passages. Their ingenuity and unflagging spirit of cooperation are greatly appreciated.

Finally, the determination and efforts of John Stubbs of WMF to help with conservation of Armenian heritage sites in both Armenia and Turkey must be noted. His guidance and selection of the international participants in this project have been both essential and wise. The production of this report was carried forward by Ms. Hilary Dunne, expert consultant on medieval Armenian architecture, and overseen at WMF by Felicia Mayro and Jon Calame.

## INTRODUCTION

The basilica of Ererouk, located approximately 100 kilometers northwest of Yerevan, is considered one of the most important of the various conservation challenges faced in Armenia today. Ererouk is of primary architectural and historical significance among the great wealth of architecture in the country. Since the emergence of Armenia as a free-trade country, Ererouk has been more widely recognized as one of the marvels of early Christian architecture which deserves more recognition as an artistic achievement of world historical importance.

### WMF involvement

In July 1991 American restoration architect Anthony Crosby took special notice of Ererouk while conducting a general survey of the architectural remains of Armenia for an overview report sponsored by USIA, the World Monuments Fund and the U.S. National Parks Service. As a result of this survey and with the urging of CPHM, Ererouk was selected as one of three representative historic monuments in Armenia for urgent and serious conservation consideration. The World Monuments Fund subsequently convened an advisory group to recommend further action and explore potential funding sources for the preservation of Armenia's monuments. As described in the WMF's March 1993 grant application to the Getty Grant Program (see appendix), the advisory group identified the priorities of architectural conservation and cultural heritage management in the then newly-independent state of Armenia.

A second mission to Ererouk in October 1992 resulted in emergency stabilization measures being undertaken at the basilica in November 1992. The southwest corner and north facade of the basilica were braced in order to forestall further failure of the structure. A contribution from a private donor enabled Mr. Vitali Gevorkian, an architect from Yerevan who has been working in Washington, D.C. for the past six years, to oversee the project.

The Getty Grant Program's award of a \$35,000 matching grant contributed greatly to a successful third mission to Ererouk in early September 1995. Matching funds were also awarded by the Samuel H. Kress Foundation and IREX. The mandate of the mission was to create a Project Preparation report which would include: final development of a definitive plan to preserve and present Ererouk and its surrounding site; field testing of masonry repair, pointing and structural stabilization methods; and determination of related construction costs, builders and job management systems.

### The Report

This document, *A Conservation Plan for the Basilica of Ererouk* addresses the history of the monument, its present situation, and proposes a plan for the conservation and presentation of the monument. It functions both as a presentation of recommended conservation strategies for the site and as a final report of the 1995 mission, jointly authored by Gionata Rizzi and Vahagn Grigorian. It is presented in two parts: the first establishes the site history, architectural significance, materials employed in construction and the condition assessment; part two outlines the conservation strategy agreed upon by the mission team. The World

Monuments Fund has reviewed the submission in light of the basilica's historic and architectural value and agrees with the plan for emergency and long-term conservation.

Most importantly, it is agreed that the Ererouk basilica must be conserved as a ruin. Historic documentation and above grade archaeological evidence clearly does not support significant reconstruction of the building as originally put forth by the Commission for the Preservation and Use of Historic Monuments. Subsequently, representatives of the Armenian government have agreed to this approach with the hope that the basilica will eventually be used as a tourist destination.

## MISSION PARTICIPANTS

The expert team assembled by the World Monuments Fund for the third mission to Ererouk in early September 1995, with primary support from the Getty Grant Program, included:

**Gaiane Casnati** (Venice, Italy)

Restoration architect of Armenian descent, former student of Dr. Alpago-Novello.

**Vitali Gevorkian** (Washington, DC and Yerevan)

Architect with special interest in architectural preservation.

**Dr. Koriun Ghafadrian** (Yerevan)

Architect and Director of the Department for the Protection and Use of Historic and Cultural Monuments.

**Vahagn Grigorian** (Yerevan)

Architect and Assistant Director of the Department for the Protection and Use of Historic and Cultural Monuments.

**Gionata Rizzi** (Milan)

Restoration Architect and materials conservation expert.

**John Stubbs** (New York)

Vice President for Programs, World Monuments Fund.

**Giovanni Vercelli** (Torino)

Structural engineer and architect.

*It was realized after WMF's second mission to Armenia that there were major archival and technical resources in Italy which would be useful to ongoing research. To this end, the project team was enhanced by a team of Italian architectural conservators. Milan and Venice are historically cities of the Armenian Diaspora. The Centro Studi Della Cultura Armena, formerly located in Milan, is based in Venice. Premier scholars of Armenian Architecture such as Dr. Adriano Alpago-Novello and Dr. Paolo Cuneo (deceased) were part of the community there, had documented aspects of Ererouk previously and were familiar with conservation projects on other Armenian monuments. For this reason it proved practical to broaden the team to include professionals who had worked or studied with Drs. Alpago-Novello and Cuneo.*

## PART I : BACKGROUND MATERIAL

Site Description

Site History

Architectural Significance of the Basilica

Threats & Conservation Challenges

Conditions Assessment

## SITE DESCRIPTION

### Site & Context

The basilica is situated to the west of Yerevan in a place known as Ererouk. It was erected on a rocky plateau, with views of mountains in three directions, close to the Akhourian river which forms the Turkish border in the Aprarat province. Near to the remains of the basilica is the settlement of Ani-Pemza, in the northwestern part of Armenia (Region of Shirak), on the left bank of the Akhourian River, on the borderland of Turkey and Armenia.

Many generations of scholars assumed the basilica had originally existed as an independent structure. Recent excavations suggest that it was part of a larger architectural complex probably including a fortress and a town-sanctuary within a quasi-urban area of 25,000 m<sup>2</sup> situated on a lofty, flat rocky outcropping in the western part of the Ani-Pemza settlement.

Both the settlement and the Ererouk complex lay within the former USSR. The settlement was also called Zagha. It had been a part of the Alexandropol Region, Province of Yerevan, since 1849. It became a town-like settlement in 1938 and had 558 inhabitants in 1979. It is treeless; the only green area of apple orchards lies within the preservation belt of the complex, in its northern and north-eastern parts. Drinking water is brought in by trucks from Talin. The settlement is buried in the dust from the mines brought by the north winds. The largest mine of technical pumice-stone and pumice-tuff in the former USSR— "Ani-Pemza" integrated works, established in 1926—is located here.

The development of the Ererouk fortress complex cannot be understood fully apart from the neighboring historic settlement of Ani<sup>2</sup>. Ani became Armenia's renowned capital in the Middle Ages and lies only 7 km north-west of Ererouk. These two sites together constitute a wealth of archaeological information related to the early Christian development of the Armenian culture as well as the rich cross-cultural influences which shaped it. Ultimately they might be joined within a single cultural-ecological visitation zone.

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<sup>2</sup> In 961, Ashot II Bagratuni moved his capital from Kars to Ani where he built a palace and a walled city. The Catholicosate was also moved to the burgh of Arkina near Ani, where in 990, the architect Trdat completed the building of the Catholical palace and Cathedral.

Trdat was the greatest architect of his time. His fame spread outside of Armenia. In 989 it was he who restored the dome of the Cathedral of St. Sophia in Constantinople which was destroyed by an earthquake. His restoration stands to these days. Trdat designed and built the Cathedral of Ani (989-1000). In building the Cathedral of Ani, he used the old domed-basilical layout, but he widened the central nave, used clustered pillars of soaring proportions supporting concentric arches and pendentives, and imparted to the inner space of the cathedral a sense of solemn grandeur. The exterior facades are decorated with an arcade of sculptured columns, decorative arches, crosses and narrow light slits.

European scholars have noted that many structural features of the Ani Cathedral are innovations which later on have been borrowed and further developed by Roman and Gothic architects. -- *Baghtassar Arzumanyan, 1970*

## **Ererouk Basilica**

Although the basilica has lost substantial portions of its architectural form, its imposing remains testify to the grandure of this monument. Ererouk is one of the earliest Armenian churches that survives to the present day.

The basilica of Ererouk is a rectangular hall measuring internally 11.5m x 26.5m along an east-west axis, with double chambers flanking the eastern and western sides and three exterior halls lying in between. The structure is set on a six-stepped plinth measuring 29.6m x 42.3m at the base. The main entrance is on the west. There are also two entrances on the southern side. There may have been another entrance on the north, in the place of the wall repaired in 1930. All four chambers can be entered only from the prayer hall.

The measurements of the basilica and the presented drawings, which evidence its state in 1907 and are made from repair considerations, present the state of the basilica in every detail. It should be noted that Toros Toramanian, one of the first researchers of Ererouk and the leader of the first repair work, had an opportunity to examine the infill of the walls where they had been destroyed. He concluded that the masonry of the basilica was of a high quality which might have remained standing for many centuries. Today, because of the damage caused by man, the southwestern corner of the basilica, the southeastern portion of the southeastern chamber and the northern wall of the northwestern chamber are under the threat of collapse. These are the portions which were temporarily stabilized in 1992 with metalwork supports.

## **Materials & Structure**

The monument is built of local orange and black tuff stones, smooth-faced and large-blocked, the lengths up to 3m in the lower rows. It was carried out in masonry called "midis", and mortar was used as a bonding agent. Thick walls of tuff blocks face a coarse corework of tuff rubble and lime mortar. Pumice is quarried nearby; actually the village of Ani-Pemza itself bears the name of this stone, since Pemza mean pumice. Finely worked along the joints, the ashlar of the facing is wedge-shaped so that the back of each stone is well embedded into the corework; the walls owe a good deal of their strength to this core.

The mortar is comprised of lime and pumice-stone in a ratio of 1:3, with a porosity of 26% giving the mixture a strongly hydraulic character. The light weight of the mortar (approximately 1200 Kg/mc) combined with the light weight of the tuff (1200Kg/mc) allowed the builders to construct the basilica as an extraordinarily light masonry system—almost twice as light as an ordinary one. A lighter structure is less vulnerable to seismic trauma than a heavier building of equal strength since the horizontal forces to which a building is submitted during an earthquake are proportional to its own weight. This may explain the exceptionally good seismic behavior of the ruin; in its present condition it may be that Ererouk survived thanks to its lightness. For more information related to the basilica's seismic performance, please refer to Appendix I of this report.

As far as the layout is concerned, one can observe a clear intention to strengthen the corners with architectural elements working as buttresses—the lateral apses on the rear and the square towers on the front—to give extra stability. The stability of the longitudinal walls was originally ensured by the aisles that, having disappeared, no longer brace the north and south elevations.

## **Other Historic Structures at Ererouk**

### *Fortification Wall*

Owing to the excavations of 1986, the northern part of the fortification wall and its eastern portions of about 250m of general length, were opened. On the northern and western sides, the extending fortification wall has turns of different angles in the plan, while in the east, it is straight. On the exterior side, along the whole perimeter, the fortification wall has rectangular pilasters, arranged in a rhythmic sequence. On the eastern side, the wall is interrupted by towers, which are semi-circular or rectangular in plan from the inside and rectangular from the outside; the distance from one tower to another is about 17m. It is probable that the site was called Kisilkula in connection with these towers, and not those of the western chamber of the basilica, as Nikolai Marr had assumed. Basically one or two rows are extant, and foundations are preserved here and there only. It is built in large, smooth-faced stones of local orange tuff. Mortar was used as the bonding agent.

It is not possible to confirm the date of the wall. However, the latest possible date is the beginning of the 4th century, when the basilica was first reconstructed. Double walls of 2.5-3.0m in height extend for 120m between the two hills, about 200m to the southeast of the basilica. Both Marr and Sahinian presented them as an artificial lake dam; they even called it a hydrotechnical structure. Before excavations only a small portion of the wall was observed and even the tower, semi-circular in plan, was perceived as the remains of a "matour", a small church.

### *Steles*

Dating from the fourth century, they are located on the southeastern part of the basilica, adjoining the steps. Their many-stepped plinths with cubic, ornamented pedestals, and vertical steles square in section, have been preserved. The upper steps of the plinth are destroyed; the steles are preserved up to the height of 1.5-1.8m and their pedestals are extant, almost undamaged. They are built in local black and orange tuff.

### *Single-Naved Structure*

Dating to the 10<sup>th</sup>-13<sup>th</sup> centuries, the single naved structure is located north of the basilica, at a distance of 100m. It is a single-naved hall, rectangular in plan, without the eastern apse. The structure is vaulted, with a double-sloped roof, built in tuff tiles. The structure is built of smooth-faced local tuff and mortar. The monument is extant, but the roof tiles are completely ruined. Some portions of the interior walls are also damaged. The monument is partially buried under approximately 4m of earth. In the 1980s, the walls of the structure were excavated, but before reaching the foundation, the earth was filled back. It will be possible to turn back to the questions of stability, structural repair and preservation of the monument only after new excavations and after clearing the whole terrain once under the water surface. For this, it is necessary to destroy and remove about 30,000 m<sup>3</sup> of earth.

### *Rock-Cut Structures*

One of the three rock-cut structures is found to the north of the basilica, the other two are found a little to the east of it. The first rock-cut structure is half-destroyed, and only the entrances are ruined in the other two. Inside, there are cracks on the "ceiling". The rock-cut structures have not been studied, and no excavations have been made. A series of roughly cut caves exist to the northwest of the site and a semi-ruined structure, referred to as the "chapel" is located in a basin to the northeast of the site.

### *Residential area*

As far back as 1842, Shahkhatounians saw ruins of houses built of smooth-faced stones "on the territory between the basilica and the canyon", i.e. to the south of the basilica; the Turks lived in tents in the central part of these ruins. According to Marr, there was a Kurdish village here in 1907 and the Kurds built their houses using the stones of the basilica and the fortification wall. Owing to the excavations, the small portion, lying on the western side of the basilica, was first opened and has been measured. Later, the whole territory lying between the fortification walls was excavated to a depth of 1 meter.

In light of scanty material of the excavations and the insertion of an ornamented capital used in a lower row of a building, it may be reasonable to conclude that these buildings date from the late Middle Ages. It is possible that an older layer might be discovered under it. Today, it is necessary to continue the excavation work (about 6000m<sup>3</sup>) to reveal a complete picture of the residential area.

## SITE HISTORY

### Chronology

The Ererouk basilica was probably founded in the pre-Christian period, prior to the 4th century. After Armenia adopted Christianity as a state religion the ruined 'heathen' temple was rebuilt as a church. Peculiar details of pre-Christian architecture which are found in the Ererouk basilica include the tower-like, three-tiered chambers placed near the western entrance of the basilica, the many-stepped plinth and in this connection, the arrangement of steps in the exterior halls leading to the prayer-hall, and the round columns of the arcades in the exterior halls. Assuming that Ererouk basilica was originally a component of the main city or a pre-Christian sanctuary, and bearing in mind the historical data, its founding probably took place in the period between the 2nd century B.C. and the 2nd century A.D.

There is sufficient reason to believe that the site in question is ancient Ervandavan, founded by Artashes I, who reigned in the region around 189 B.C. and who succeeded king Ervand. The site was first referred to as Ererouk in writings dating from the 10th to 13th centuries, as evidenced by the Queen's inscription of 1038 (published by H. Shahkhatouniants). The basilica was variously called Sourb Katoghike Martyry, Sourb Katoghike, Holy Church, Sourb Karapet and the Protomartyr.

According to an inscription of priest Yakob dating from the late Middle Ages (see Appendix IV), the site was previously called Esevk, or Esevi. This site was in the Region of Eriakh in the period of the Ararat (Urartu) kingdom, then it was a part of the Shirak region, a royal estate, in the Province of Ayrarat, during the kingdom of Mets Hayk. Starting from the 4th century, it was the hereditary property of the Kamsarakan feudal dynasty, and in the 8th century, it became the estate of the Bagratounis. As late as the 16th century the monument was a church in function.

### Local Economics

Armenia's important trade routes crossed here, extending from the north to the south and from the east to the west. Ervandashat, the capital founded by Ervand the Last (220-221 B.C.), and the town-sanctuary called Bagaran lay on the bank of the Akhourian river, about 50 km south of Ererouk.

This central portion of the Shirak Region, divided into two parts by the Akhourian River, recurrently experienced great economic and cultural upsurges, as during the Christian period. Bagaran, Mren, Ervandashat, Erasgavors, Shirakavan, Kars and other centers were widely known and famous. The territory is rich in architectural and particularly, worship monuments, involving almost all types: Bagaran, Mren, Aragats, Shoushanik, Shirakavan, Kars, Ani ("thousand and one churches"), etc. A sanctuary-field of the developed Iron Age was discovered in Ani-Pemza, where arms and decorations have been found, dating from the end of the 2nd century to the beginning of the first century B.C.. A small statue of a lion made of Egyptian paste has been found on site as well.

### Structural Modifications to the Basilica

The fragmentary state of the basilica does not allow the original shape to be understood with certainty. Lack of archaeological records represents a major obstacle for the hypothetical restoration of the upper structure and the architectural evidence cannot solve all the problems raised by the surviving portions of the building. Additional difficulty is due to the basilica's multiple construction phases which are only partially understood: the narthex, for instance, was obviously added subsequent to the main volume, and the whole basilica may be a late re-use of an ancient pre-Christian temple.

In light of the inscription of priest Yakob (published by Marr), it is probable that the structure had been repaired. The inscription clarifies the name of the site as *Esevk* and the name of the basilica as *Sourb Katoghike Martyry*. This name had been current when priest Yakob came to the basilica. After the reconstruction, the basilica was dedicated to St. Karapet and the Protomartyr.

It is commonly supposed that the eastern and western chambers of the basilica along with the exterior halls are additions constructed in different periods. Other recent surveys suggest that the four chambers, as well as the exterior halls, existed concurrently as part of a unified composition and have not undergone any major alterations since the basilica's founding.

All the walls of the monument, the eastern facade in particular, exhibit distinct upper and lower masonry which vary in stone type, color, and masonry character. This characteristic may indicate construction work which proceeded over lengthy intervals, the exhaustion of a quarry, or an early reconstruction.

Throughout the building, masons laid an entire lengthwise row of the basilica's walls, and when mortar became firm, the next row was constructed. This was a common construction rule for "midis" type masonry. A three-row difference in height, observed to the right and to the left of the central window of the eastern facade, strongly suggests that the monument was reconstructed. Furthermore, the capitals, cornices, stone ornaments, and the three-arched window of the western facade give grounds to assert that this reconstruction took place in the 4th century. During this same campaign, it is likely that two rows of cruciform triple pillars were installed, along with timber coverings for the prayer hall and stone vaults over the northern and southern porches.

Besides the reconstruction in the 4th century, other restorations are evidenced on the monument:

- a) the western wall was supplemented with arcades, and the hall was covered with a vault. The colonnade and the prevailing part of the vault do not exist now; however, there is evidence that four supports were used instead of the previous two columns, in the new colonnade.
- b) the upper rows of the northern and southern walls were reconstructed. The serrated cornice, extending all along the southern facade, was also restored. It is clear that during this reconstruction, the vaults had been destroyed. In all likelihood, the vaults were reconstructed, and six columns were used instead of the three.
- c) window apertures were closed in the southern facade, leaving round openings above them; to provide light, the upper parts of the windows were hewn and enlarged from the inside.
- d) a new tiled floor was made over the one in the northern exterior hall; a new flooring was made in the southwestern chamber as well.

According to the style and character of the inscription of priest Yakob, made on the occasion of the repair of the basilica, it appears likely that the second reconstruction of the Ererouk basilica took place at end of the 13th century. The monument bears no other traces of reconstruction or repair until the well-documented restoration campaigns of the 1930s and 1950s.

Many scholars have studied the basilica at Ererouk in the past, and various hypothesis have been formulated which often contradict one another: Was the basilica roofed or vaulted? What was the original height of the west towers? What were the side porches like? Was the narthex single-tiered or double-tiered? How did its roof lay? Among all the theories proposed to explain the original shape of the basilica, a very interesting one was formulated by the architect Grigorian who, based on an old etching, restores a triforium above the aisles (see Appendix III).

### **Excavations**

Excavation work was carried out in the basilica and around it, in 1907 (the wall built by the local inhabitants inside the monument was also destroyed), in the 1930s and 1950s. In 1968 only clearing work was actually carried out. However, all the stones in the basilica and around it, were numbered and removed to the territory, lying to the north of the basilica. Together with the fragments of steles and tombstones, they are about 900 in number.

Among the preserved stones are: round columns of the arcades, their bases and most of their capitals, bases and capitals of cruciform pillars and pilasters, serrated arch stones, window lintels, the cornice stones crowning the monument and numerous fragments of tiling. There are also stones with dressing which have not yet been recognized. Only one sculpted capital was discovered during the excavations of the residential area. These fragments have not yet been classified, measured and thoroughly examined.

## ARCHITECTURAL SIGNIFICANCE OF THE BASILICA

Soviet and European scholars have devoted numerous volumes to the problem of interpreting the style of the Ererouk basilica, comparing it with similar monuments, and determining the influence and interaction among contemporary builders at the time of its construction. The epochs of major architectural design innovation in Armenia relevant to the basilica of Ererouk are briefly described below.

### **Pre-Christian Architecture (13th-fifth centuries B.C.)**

Urban architectural traditions, as well as other forms of art in pre-Christian Armenia, were developed under the influence of ancient Hellenistic and Roman art.<sup>3</sup>

Building techniques and architecture as such reached a high degree of development during the period of the Urartian Kingdom (13th-sixth centuries B.C.). The Urartians built palaces and temples characterized by intricate friezes and interesting construction in the capital, Tushpan (Van), and other parts of the country. They founded the fortress cities of Arkishtikhinil and Ereboundi on the plains of Ararat. Arkishtikhinli was later to become Armavir, one of the first capitals of the Armenian state, while Ereboundi is now Yerevan, the present capital of Armenia.

After the fall of the Urartian Kingdom, the newly formed Armenian nation inherited and carried on the building art of the Urartians and other local tribes. During this period, the ancient cities (Ani, Kamakh, Van Armavir) were rebuilt and new cities, fortress and castles were constructed (Arshamashat, Arkatiokert, Yervandashat, Yervandakert, etc). From the second to first centuries B.C., during the period of an organized and powerful nation, the cities of Artashat (166 B.C.) and Tigranakert (77 B.C.) were built. Ancient historians attest to the size, grandeur and beauty of these cities, dotted with massive construction, temples, palaces and Hellenistic-type theaters.

During this period Armenia had become one of the greatest centers of Hellenistic culture in the Middle East particularly in the field of architecture. More than two thousand years of calamities have completely obliterated the architectural monuments of pre-Christian Armenia. A few fortunate exceptions can be found at Garni, Armavir and Artasht.

### **The Christian Period (4th to 7th centuries A.D.)**

Armenia entered a new phase of architectural development with the adoption of Christianity as state religion in 301 A.D. City building and other forms of architecture entered a new and long-lasting developmental phase, while persevering older traditions.

In the early Christian period in Armenia (5th through 7th centuries), church architecture proceeded with the creation of various basilical domed houses. Armenian architecture carved its national style with the construction of the cathedrals of Echmiadzin, Ererouk, Hripsime, Zvartnots, and Geghard monastery.

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<sup>3</sup> excerpted from the scholarly essays of Baghtassar Arzoumanian, 1970.

The conditions for the development of architecture were quite favorable during the Arshakouni Kingdom which came after the fall of the Artashesian Dynasty. King Khorsoy Kotak (332-338 A.D.) founded the capital city of Dvin. The construction of churches gained tremendous impetus when in 301 A.D. St. Gregory the Illuminator and the Armenian King Tiridates (Trdat) proclaimed Christianity as the official religion of state.

At the very outset of the formal adoption of Christianity as the official religion, St. Gregory the Illuminator founded the first churches and houses of prayer at Ashtishat, Vagharshapat, Sevan and other parts of Armenia. These buildings were simple, single-nave and tri-nave basilicas, often built upon the foundations of former pre-Christian temples. In some cases, pre-Christian temples were converted to churches, relocating the apse from the west to the east side of the building. Comparatively well-preserved specimens are Tekor, Kasagh, Tsiranavor in Ashtarak and Tsitsernavank.

The most typical architectural formula of the period was, of course, the basilica, but a clear distinction should be made between the Hellenistic type and the Armenian type<sup>4</sup>. The building is light, spanned by columns, and has three or five naves, a split-slope facade, truss roofing, large windows, and rich mosaics, although the exteriors are generally poor and bare. The Armenian basilica is vaulted, and the interior is closed in by massive walls articulated by stout piers; the lighting is generally poor, and the interior articulation is often concealed under a double-pitched roof or a barely outlined sloping roof. So there are great differences between the Hellenistic basilica and this typology, which may be called Eastern and may well have affinities with certain examples in Mesopotamia or in the region of present day Georgia. The entrance is often set in the south wall, canceling out the rhythmical perspective of the basilicas' longitudinal layout in favor of a 'centralized' type of space arrangement.

Much has been said about precise contacts between Syrian and Armenian basilicas, especially the well-known example of Ererouk. Points in common are the wall closed between towers, as with Qalb-loze, Der Turmanin, and Ruweiha; to this list can usefully be added the basilica of Deir Soleib in Northern Syria, where the side entrances are marked by a kind of prothyrium and the large windows, highlighted by 'omega' cornices or linked with the 'Syrian band'—continuous decorative stripes. Although there is no firm agreement about the roofing, the writer tends strongly to liken this building to autochthonous Armenian examples of the 'Eastern' type, such as Tzitzernavank' at Ashtarak and Abaran/Kasagh, with Syrian influences restricted to additional features and the decoration.

The basilica at Ererouk is a good example of the tri-nave form typical of this period; this form has traditionally raised many questions—and provided a handful of debatable answers—regarding the structural evolution of the church from its Romanesque (Hellenistic) roots towards the formal typologies of the early Gothic period. In this light, Ererouk can be considered a transitional structure, bearing many trademark features commonly associated with both periods.

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<sup>4</sup> excerpted from A.A. Novello's "Armenian Architecture from East to West", 1986.

## THREATS & CONSERVATION CHALLENGES

Sadly, many of the monuments on the right bank of the Akhourian River have not survived to the present time. One good example is the domed basilica of Tekor, reconstructed in the 4th century, which is in the vicinity of Ererouk and has always been compared to Ererouk in art historical literature. Having lost the basilica of Tekor to earthquakes and neglect, the preservation of Ererouk becomes an ever more urgent task.

A number of questions remain as to exactly how Ererouk was roofed and what its interior architectural detailing and finishes were. Despite extensive historical and archaeological study some of these details remain, and probably always will remain, elusive.

### Human Causes of Decay

#### *Use as a Quarry*

The basilica and other structures of the complex served as a quarry for the inhabitants of the complex territory and nearby villages, for many years. Not only the lying stones were taken to build houses and ancillary buildings, but also most of the plinth stones were destroyed, and a large share of the southern wall was demolished from the inside and outside, up to the height available for human hands. There is no doubt that the pillars were also pulled down. Even the round columns of the exterior hall were used as tomb-stones. In the 1930s, monument stones were torn away and used to build ancillary buildings of the frontier-post. Only the two lower rows of the fortification wall, having a perimeter of over 600 m, are extant.

#### *Intentional Destruction*

Besides taking away stones as building material, the local inhabitants also demolished the infill of the wall to ruin the monument. Indeed, if this had been done for the purpose of using the stones, there would have been no need to exert unnecessary efforts to destroy the rather solid "concrete" of mortar and thereby destroy a portion of the wall; furthermore, it would have been logical to continue this work until the entire building disappeared. The small quarried portions of the basilica are located in all the facades and corners at structurally important points. In the final analysis, it is not entirely likely that the comparatively small concave-faced stones removed from the main and northern hall apses were taken with the sole purpose of using them as building material. As Toramanian rightly noted, the cracks of the south-eastern chamber resulted from this very intentional destruction.

#### *Explosions*

For 70 years the ore from the mines of the "Ani-Pemza" integrated works—only 1-1.5km north-west of the Ererouk basilica—has been obtained by the explosion method. One or two explosions of excess charges are made weekly instead of small-charged, frequent explosions. The consequences of these shocks are clearly seen on the monument. In the past ten years, stones have fallen from the southwestern corner wall of the basilica, from the western hall vault and from the vaults of the chamber, adjacent to the main apse. The northern wall portion of the northwestern chamber leans more to the outside. The increase of cracks in the walls of the south-eastern chamber is more substantial, therefore that portion of the wall is at greatest risk.

After the temporary consolidation undertaken by Armenia's Commission for the Preservation of Monuments and The World Monuments Fund, which prevented the increase of cracks, it was undoubtedly due to explosions that a good deal of new cracks came forth on the neighboring stones of the previous cracks. The consequences of explosions are clearly observed on the dwelling houses of the settlement of Ani-Pemza as well.

#### *Delay in Repair-Restoration*

Of all the forces that have contributed to the deterioration of the basilica, none is as great as the neglect it has suffered since it was abandoned. Indeed, the delay in addressing the repair and restoration needs at Ererouk were at one time not even considered an option: in 1986 it was proposed that the southeastern portion of the southeastern chamber be destroyed and rebuilt.

### **Natural Causes of Decay**

#### *Exposure*

Lack of maintenance and repair allowed the structural weakness of the remains to be worsened by natural decay, mainly associated with water and frost: disintegration of the mortar becomes a structural problem where large portions of corework are eaten away and on the extrados of the vaults; deterioration of tuff can also be observed in the areas affected by rising damp resulting from the melting of snow, and this represents a serious problem where the corework is left exposed. In addition to this, the continuous explosions in the nearby quarries of pumice are certainly bad for the conservation of the basilica and should be stopped as soon as possible.

In the absence of a structural system (pillars, colonnades and vaults) and roofings, the basilica suffers from intense natural decay.

#### *Seismic Characteristics of the Site*

For centuries Armenia has recurrently suffered shocks and tremors, which have resulted in the destruction of many settlements and big towns. The Region of Shirak is considered to be one of the main centers of earthquakes in the Armenian Highlands. Devastating earthquakes were recorded in the towns of Kars (1868, 1899), Ani (1045, 1132, 1319) and Gyumri (1840, 1900, 1926, 1988), lying to the north and north-west of Ererouk.

Taking into consideration the above-mentioned data on the intensity of earthquakes in close vicinity, also the fact that the basilica has been reconstructed, it is difficult to state unambiguously that the basilica had been destroyed by an earthquake. The basilica of Ererouk and the settlement of Ani-Pemza did not suffer directly during the devastating earthquakes of Gyumri in 1926 and 1988, though many more subtle destabilizing influences may have affected it.

## CONDITIONS ASSESSMENT

The basilica of Ererouk is presently a ruin in an advanced state of deterioration due to the various hazards of time, in particular earthquake and water damage. It stands today as a roofless shell and the structural integrity of its walls are essentially in good condition, except for some dangerous fissures likely resulting from the 1988 Spitak earthquake. Some 620 stones from the basilica structure have been spread out along the north and east sides of the site and little is known about their various original positions. Most of these stones minor damage.

All of the above-mentioned man made features are in ruin and are no longer in use except for visitation by occasional sightseers. Ererouk, like nearly all of the functional and ruined religious structures in Armenia, is considered a holy place by area residents.

Structurally speaking, the architectural remains of Ererouk show several signs of distress:

- Both the rear elevation and the longitudinal walls are tilting outwards and have caused the rear corners of the basilica to open up; furthermore, the line of pressure in the east wall must have moved away from the core and this explains the vertical cracking and spalling of the stone facing.
- The arcades of the first tier, the second and the third tiers of the main volume, also the upper two tiers of the western chambers are destroyed.
- The north apse is severely damaged, both in the semi-dome and in the base where a large breach can be seen.
- The north-west tower has lost an entire corner and its north wall, detached from the rest, is moving outwards.
- The remains of a dam constructed in stone, long out of use, is located at the head of the now empty water basin at the southeast corner of the site. The ruined dam does contain sufficient information to allow its reconstruction, which would, in turn, regain an important site feature, namely the reservoir of water along the north and east edges of the immediate Ererouk site.
- The south-west corner, where the tower no longer exists, is highly unstable and a dangerous bulge can be observed on the internal face of the wall.
- Both barrel vaults of the north-east chamber have lost a few voussoirs and that of the south-east chamber is missing the key-stone so that the vault holds together simply because of the adhesion of the mortar. Indeed, although the basilica suffered no damage during the major earthquake of 1988 (the latest recorded collapse is actually a portion of the south-west tower which still existed in 1907), the structural condition of the ruin raises many reasons of concern and it certainly represents the central problems for its preservation.

## PART II: CONSERVATION STRATEGY

Conservation Philosophy

Proposed Project

## CONSERVATION PHILOSOPHY

In consideration of the above-mentioned conditions of the site of Ererouk, the symbolic significance of the place, and other practical matters, it is the conclusion of the conservation planning group that Ererouk basilica be conserved essentially "as is" using the most appropriate methods and technologies known in the field, and that it be featured as a "stabilized partial ruin." Reconstruction of original forms is ruled out by a well recognized paucity of authoritative historic documentation. The caves and chapel which do contain their respective roofing systems can also be easily conserved as accessible, if not usable, structures. Relatively minor conservation work is needed at each.

### Approach

The conservation approach or "conservation philosophy" for the principal architectural elements of the site are, in the opinion of the project planning group, further substantiated from a theoretical point of view because each intervention proposed:

- is physically conservative and visually discrete;
- designed to support the conservation of Ererouk basilica as a ruin, maintaining the unique evocative power of the remnant structure as it has been passed down through time;
- incorporates materials and processes which are compatible with the original ones, and all non-historic materials and structures proposed are reversible;
- avoids any attempt at reconstruction due to a widely acknowledged dearth of reliable documentation related to the structure's original aspect and configuration.

These approaches are mindful of the tenets of the Venice Charter and the restoration standards of the CMPH and various other international standards and guidelines for archaeological site presentation.

### Models for comparison

The basilica of Ererouk still needs a thorough examination and would benefit from continuing comparative analysis. Of course, this should require turning afresh to Ererouk-type basilicas of Tekor, Tsitsernavank and Dvin, which, in our opinion, were founded in the heathen period and then reconstructed. Roman basilicas should be turned to in respect of the two-tiered compositions of the aisles of the basilica and Syrian basilicas, especially El Hosn (dating from the 5<sup>th</sup> century), regarding the basilica, reconstructed in the 4<sup>th</sup> century.

## PROPOSED PROJECT

### Conservation strategy

#### *A Structural Approach*

Structural consolidation of historic buildings has only recently developed as a specific field and this has entailed a new approach to the problem. On the one hand, more sophisticated analytical tools have allowed a better understanding of the behavior of historic structures; on the other, traditional buildings have been acknowledged as statically undetermined structures which cannot be forced to work as modern buildings do. In other words, there is a growing tendency to respect the structural authenticity of a building avoiding those massive interventions which not only can disfigure its original aspect, but also can prove harmful for its long term conservation.

In recent years structural engineers who understand traditional masonry structures have abandoned the aim of making buildings capable of withstanding an earthquake; more frequently they work to improve a historic building's seismic response without upsetting its appearance or original structural behavior. With this principle in mind the following consolidation scheme for the basilica of Ererouk is offered.

#### *The South-West Tower*

The missing tower on the south-west corner represents a weakness in the remains of the basilica for nothing is left to brace the area where the west and the south walls meet. Indeed there are three good reasons why the mass of the tower ought to be restored:

1. Structural: the walls need to be braced at the corner and it is beneficial for the overall structural behavior to restore the symmetry of the basilica.
2. Functional: It is vital for the presentation of a roofless ruin to have a room where visitors can look at a few drawings and read some information about what they are going to see.
3. Visual: To restore the tower would allow the facade to be read correctly, framed as it was between two protruding masses

However, the idea of restoring the tower *ad identicum* would involve the reconstruction of an entire incompletely documented element and would eventually be perceived as a fake. Based on these considerations, two alternatives are discussed hereafter:

- the tower rebuilt with the same material based on the photograph previous to the collapse;
- the tower reconstructed as a reversible structure of modern material so as to suggest the original mass and volume without diluting the authenticity of the remains.

## **Structural analysis and structural repair**

The structural analysis carried out by Mr. Vercelli with the method of Finite Elements provides a better insight of the structural behavior of the building. A mathematical model of the basilica has been developed and subjected to simulated earthquakes of the same intensity on four directions; therefore, the stresses that the masonry undergoes in each event have been observed and compared to the compressive strength and to the modulus of elasticity of the actual stone and mortar (see Appendix 7).

Interestingly enough, dynamic analysis (a sophisticated analytical tool which takes into consideration the vibration mode of a given structure) reveals that the building is more stable than it appears from the ordinary static analysis. Further, the seismic response of the basilica improves considerably if the maximum deformations occurring on the wall-tops are taken by a ring beam (see plates). An additional improvement can be observed if the symmetry of the building is restored by adding an element performing the structural role of the Southwest tower.

It is suggested therefore that the basilica is provided with a ring beam the mechanical properties of which should not be too different from those of the original masonry (no need is felt for the vertical core drilling proposed by Locatelli). Furthermore, a new element should be built at the south-west corner to buttress the weak point where the two elevations meet. In addition to this, the east corners should be stitched (see plates) so as to prevent further movement and the whole building should undergo ordinary masonry repair (pointing, grouting, re-integration, treatment of the extrados...) in order to restore the structural continuity that made Ererouk survive for over eight centuries. In doing so, ordinary concrete and Portland cement should be avoided both for the amount of salts which can be disastrous for the conservation of the tuff, and for its hardness and rigidity which would prevent the repair-work to cooperate structurally with the original fabric.

### **Ring beam and capping**

The ring beam will serve the purpose of absorbing the stresses and the deformations, particularly on the longitudinal walls; it will also help to prevent further outward movements and to restore the structural continuity of the walls. It is crucial, however, that such a ring beam is capable of working together with the existing masonry and, in order to do so, it must not be built of material with an entirely different mechanical behavior. Indeed, the purpose of this element is to create a course of reinforced masonry along the wall-tops rather than a reinforced concrete collar-beam. Finally, the ring beam (a lime/cement-mortar with a modulus of elasticity of 60-70.000) will have to follow the perimeter of the basilica at approximately the same level and therefore will have to be connected through core-drilling across the facade.

### **Corner stitches**

The corners will be consolidated with metal stitches inserted into core-drilled holes and simply grouted with mortar; the holes will be finally sealed with a stone plug.

## **Semi-domes and vaults**

The extrados of semi-domes and vaults will be strengthened by means of stainless steel cables set both horizontally and vertically into the joints and embedded into the mortar of the re-pointing.

## **Grouting**

Where necessary, grouting will be carried out in order to fill the voids of the masonry in order to restore their structural continuity and to prevent water penetration and further decay of the corework. A lime-fly ash based grout is suggested so as to avoid the formation of hard cement zones inside a lime mortar masonry.

## **Wall Bases**

All wall bases must be re-integrated for they have a crucial structural role to play in case of a seismic event. Particular attention should also be paid to the re-integration of the pilaster bases which can provide the longitudinal walls with some bracing

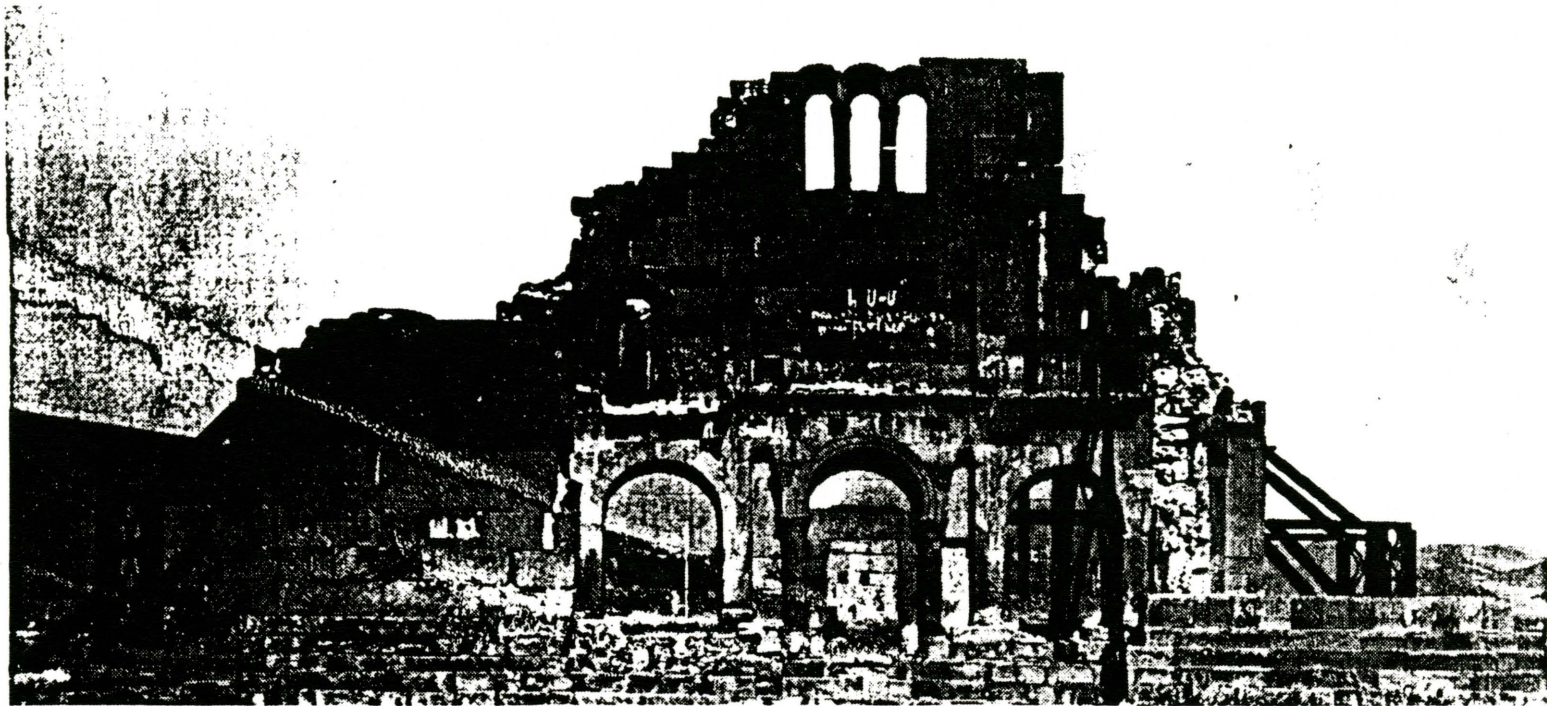
## **Necessary re-integration**

Re-integration of the walls should be kept to a minimum and carried out only for structural reasons as in the barrel vault of the east chambers or in the holes and the breaches of the north and west wall; in these cases, masonry repair should be made with the same material and building technique.

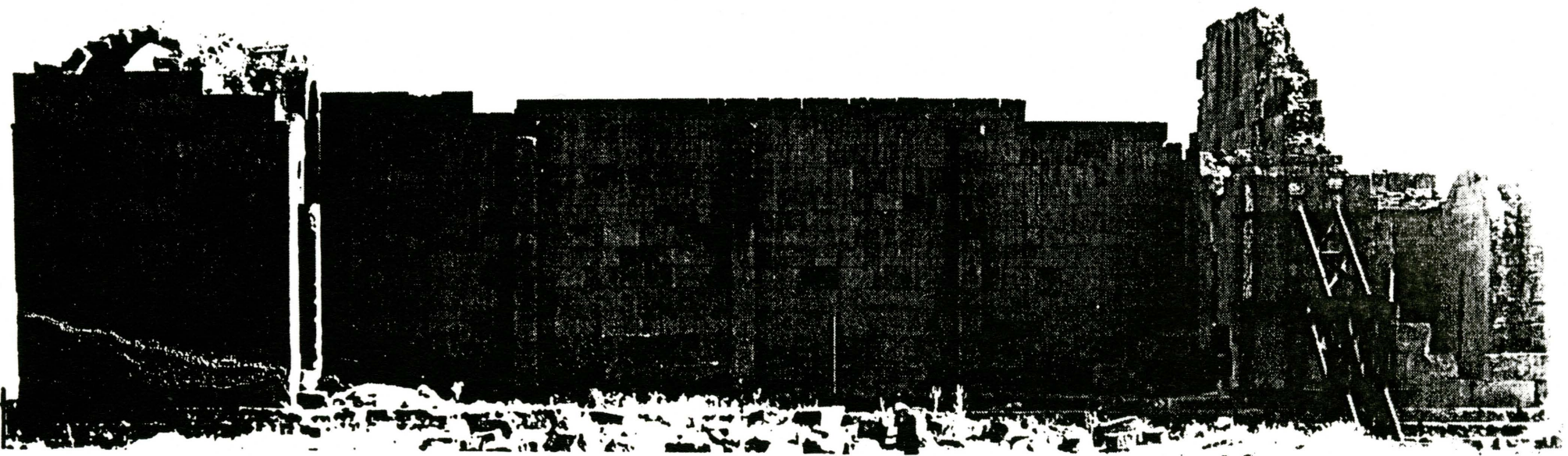
## **North-west corner**

The north-west tower requires two major interventions to restore the continuity of the structure and to allow the building of the ring beam at the same level. For this large re-integration it is suggested that a slightly smaller stone blocks are used so as to discreetly indicate the extent of the repair work.

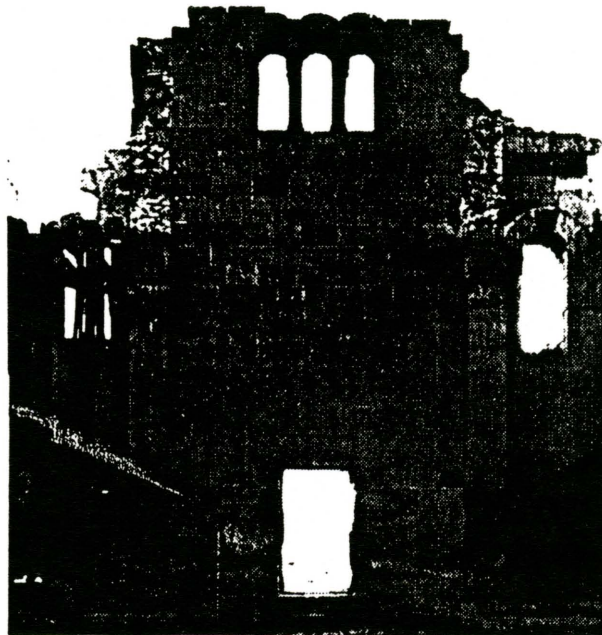
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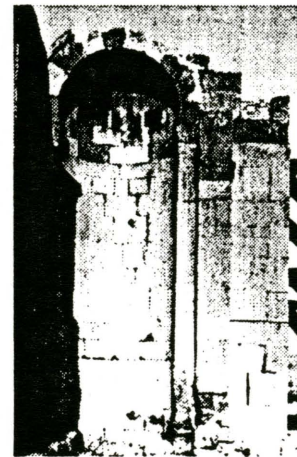
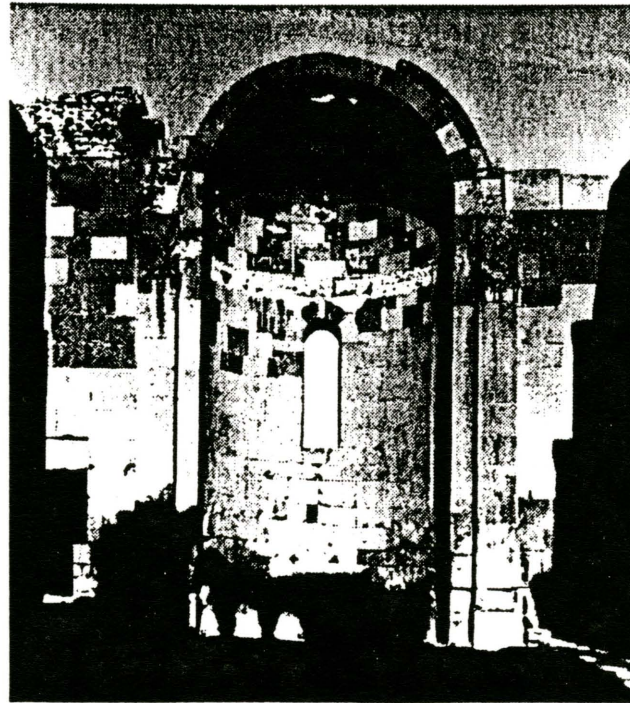
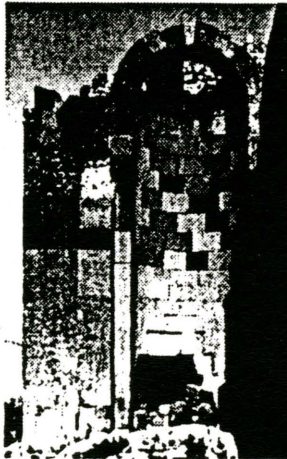
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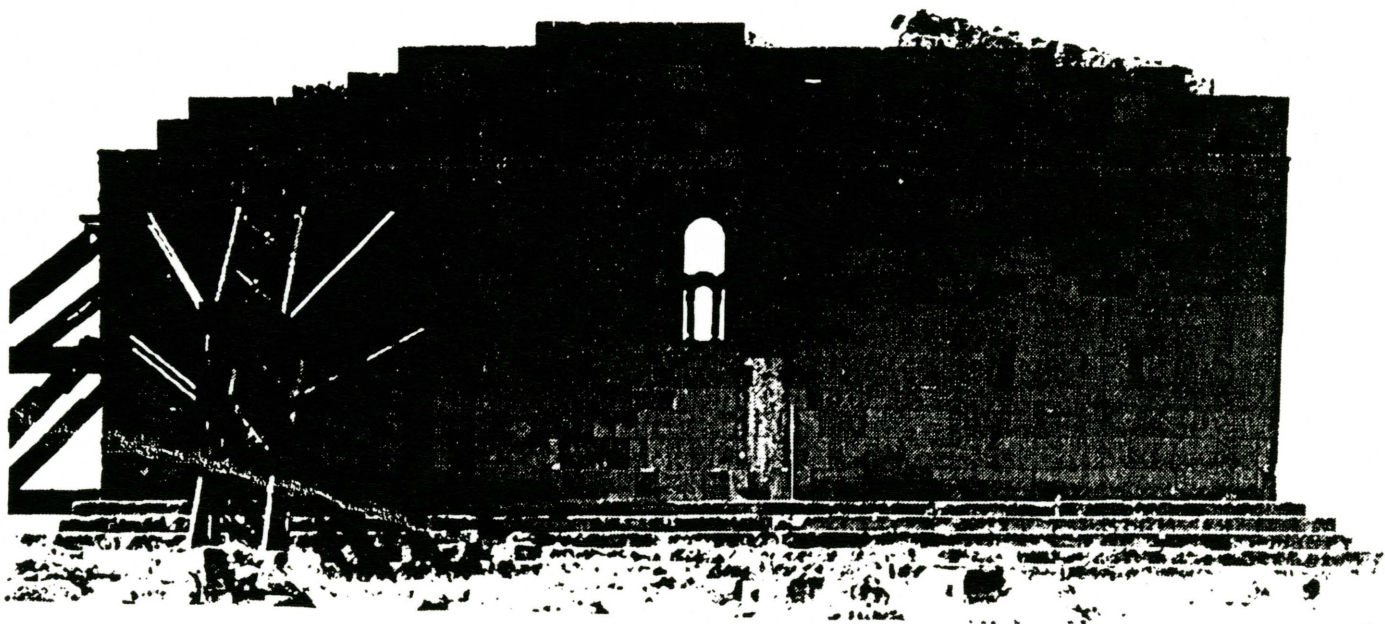
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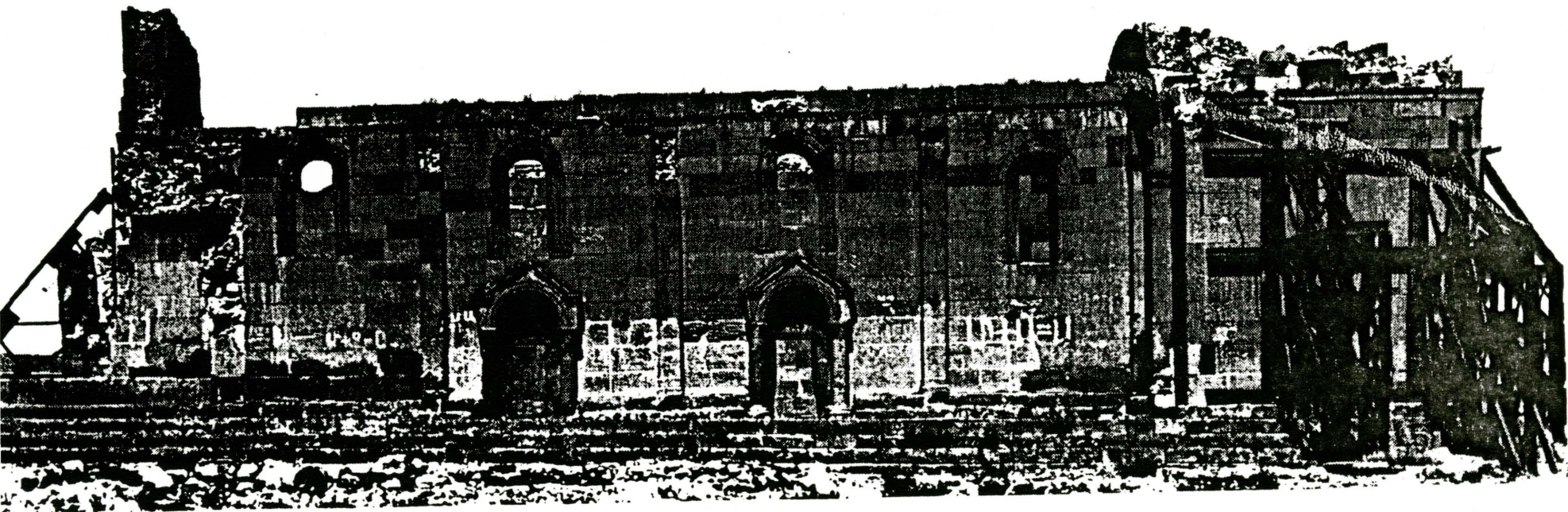
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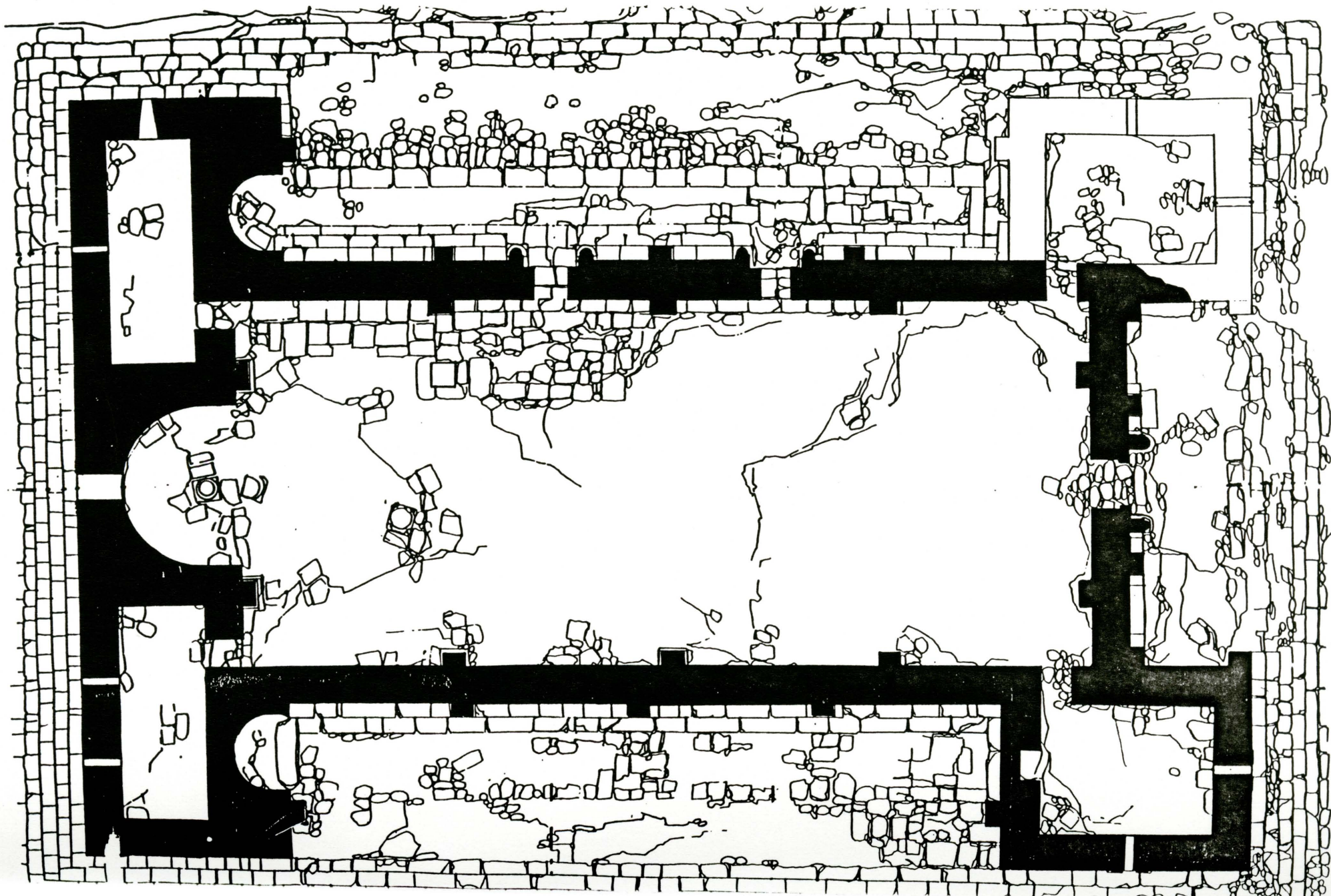


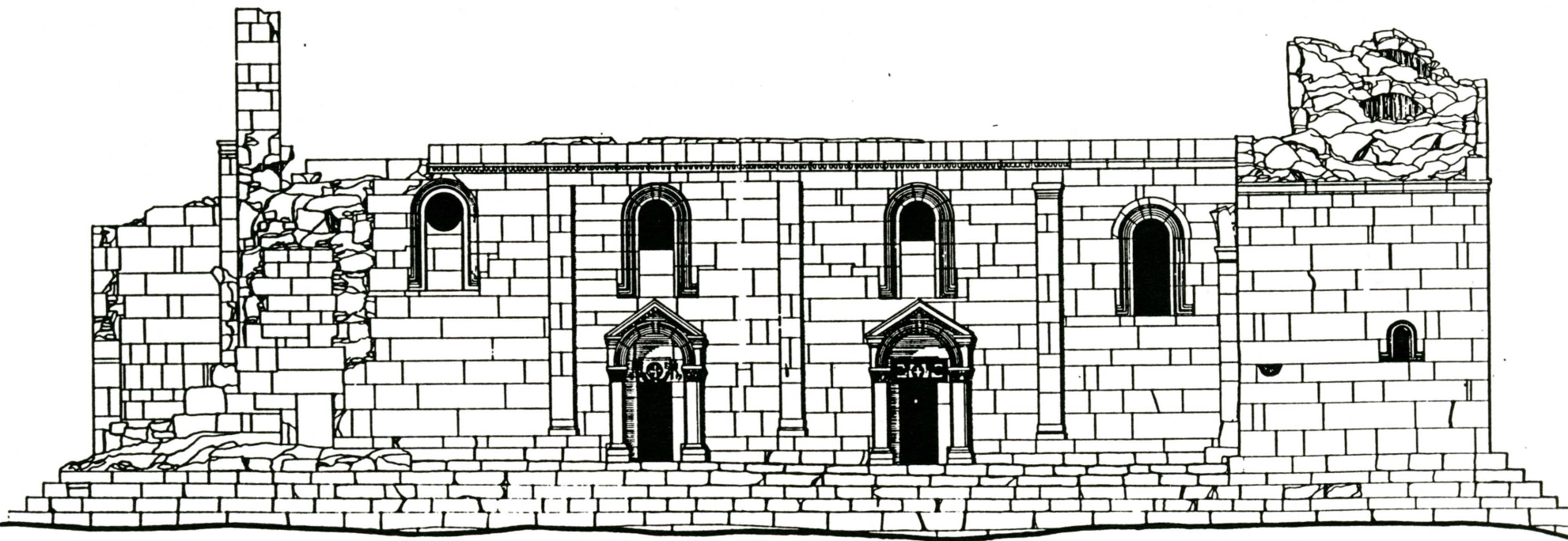
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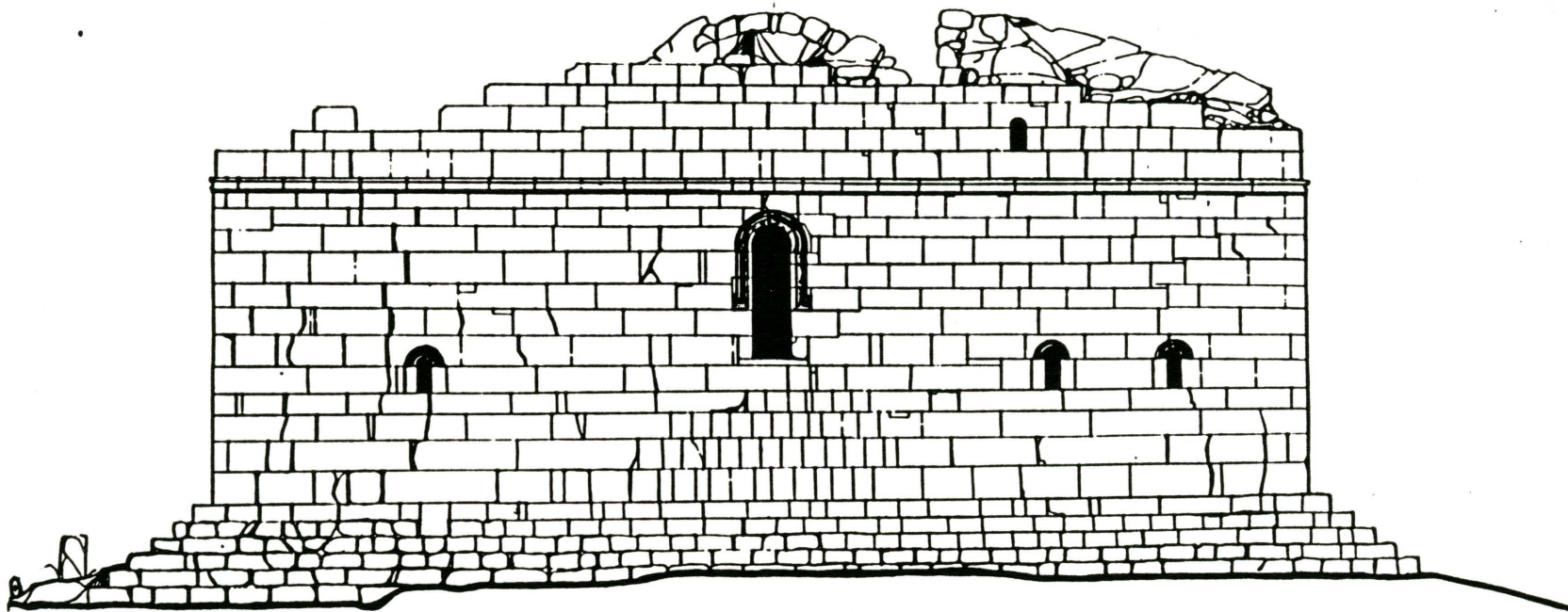


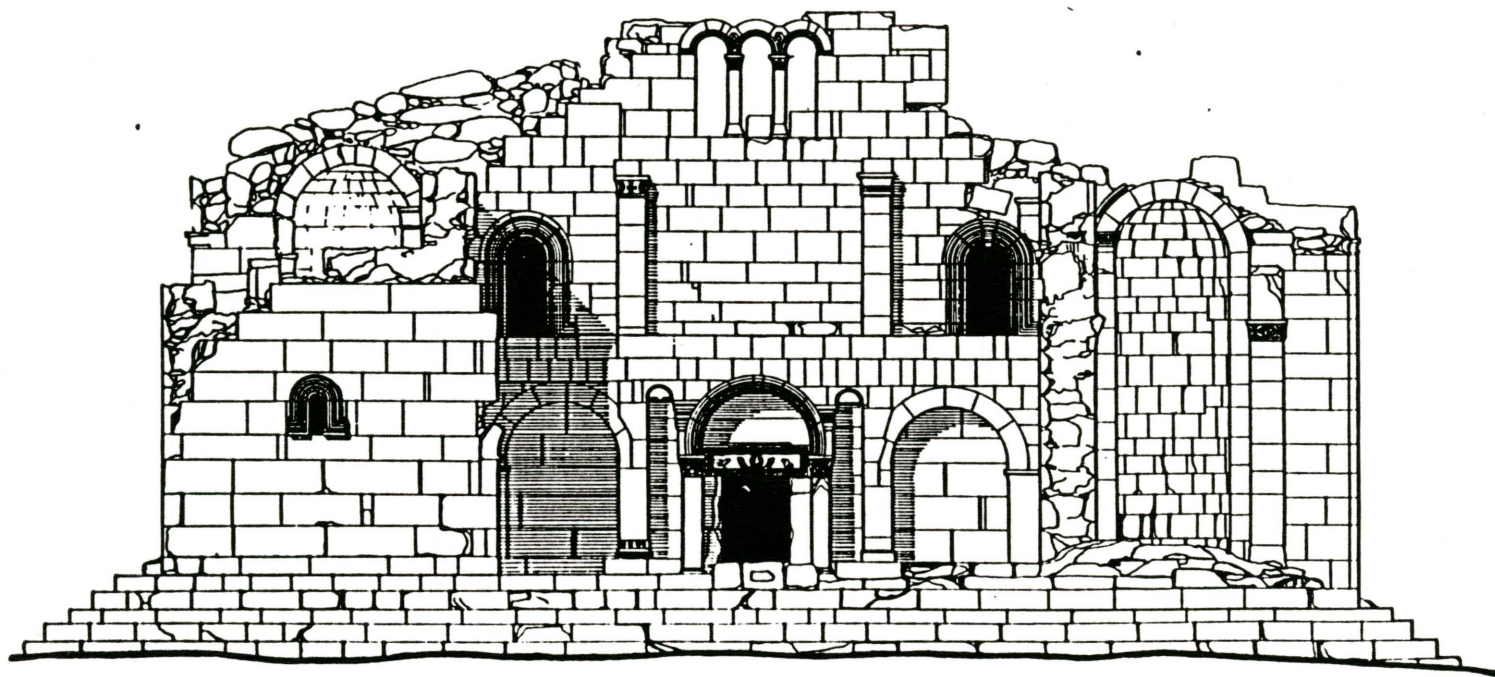
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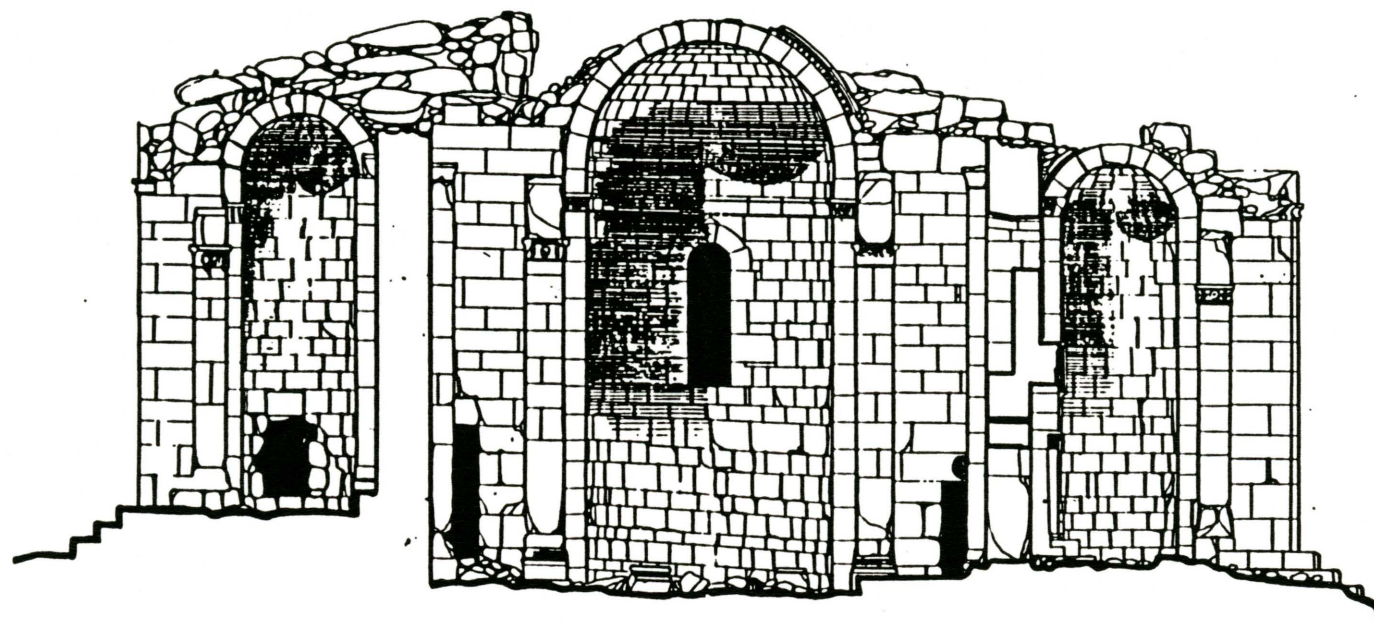


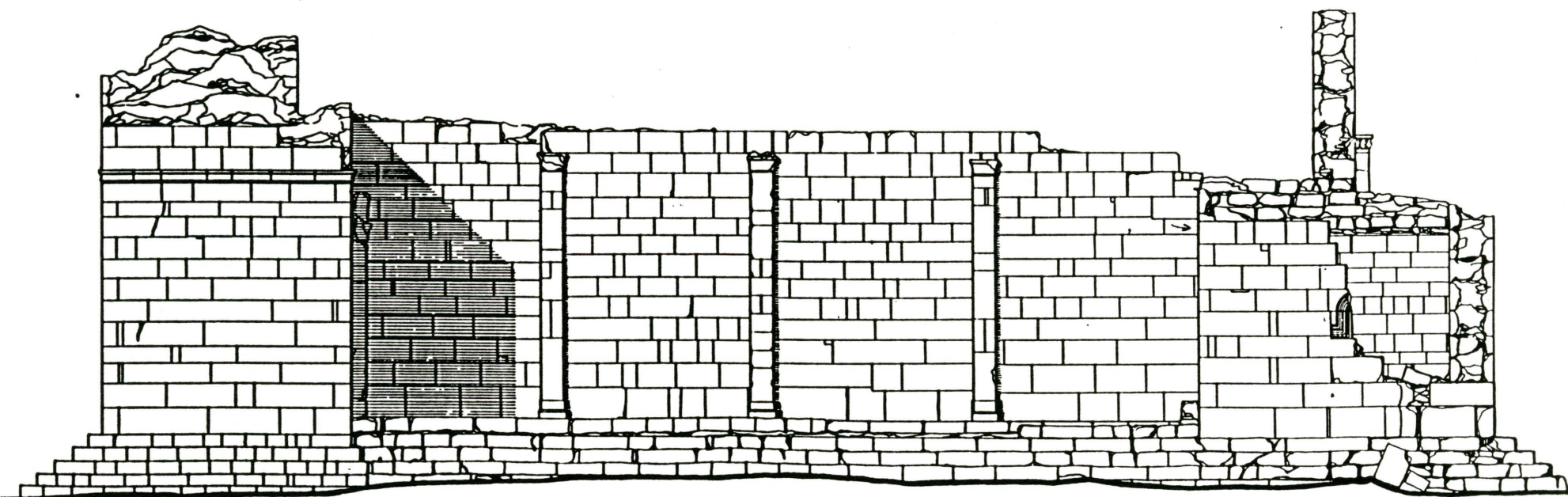


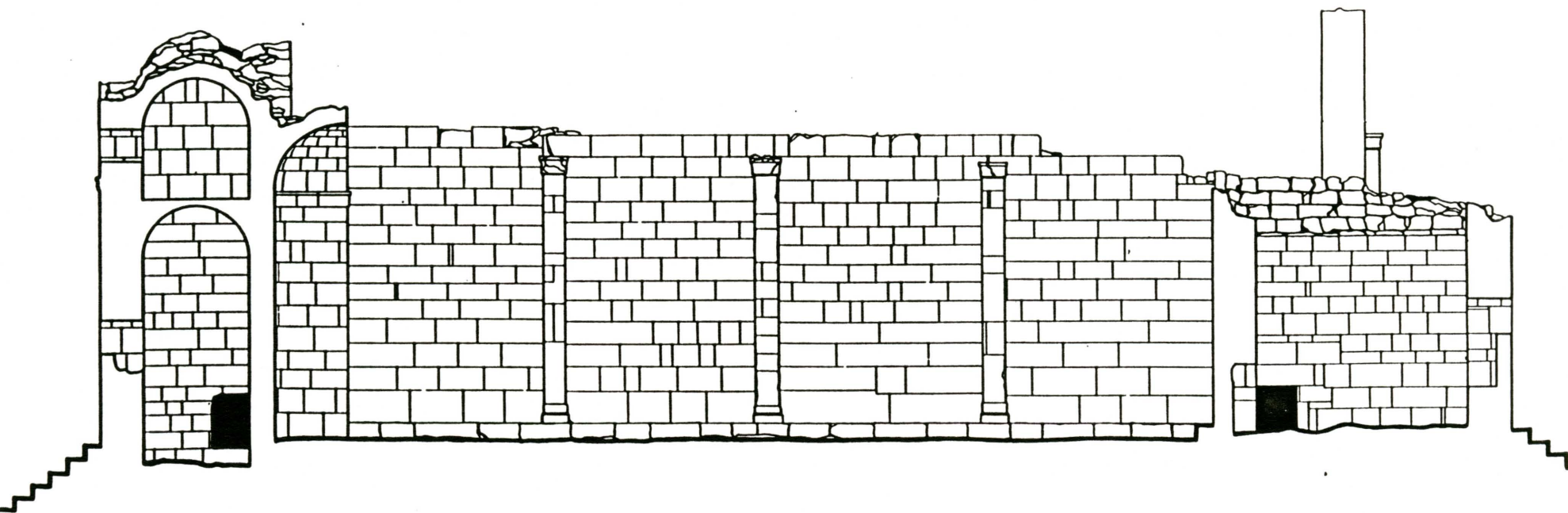


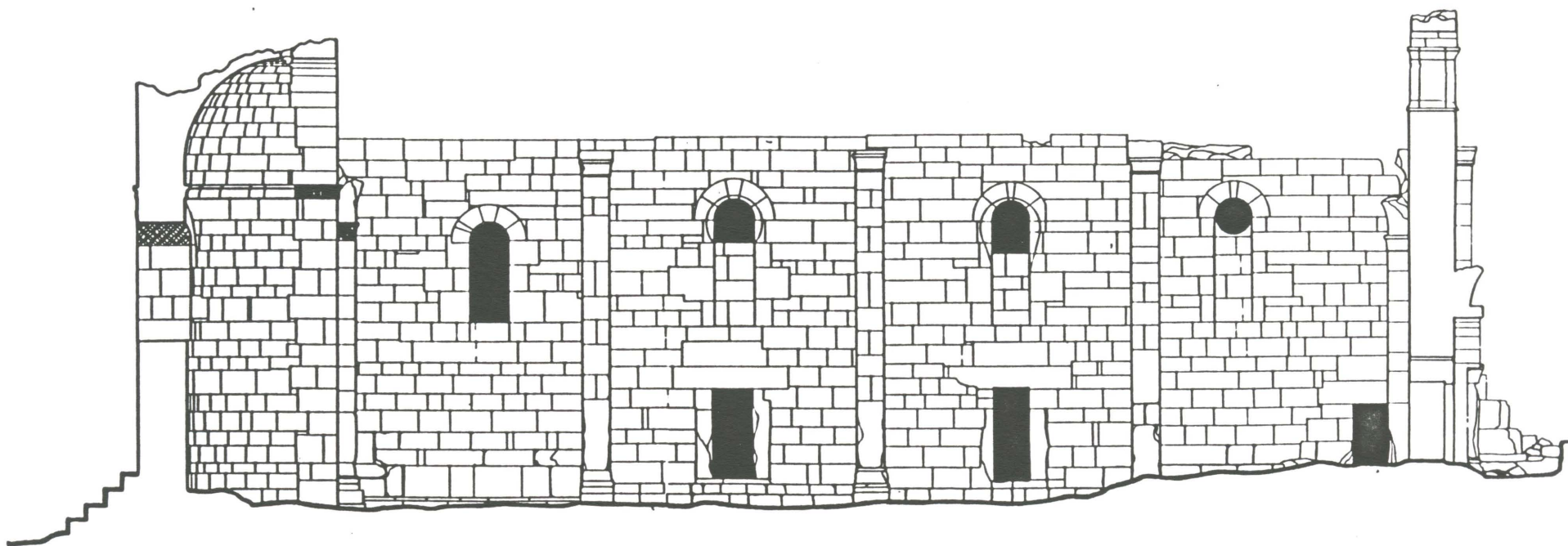


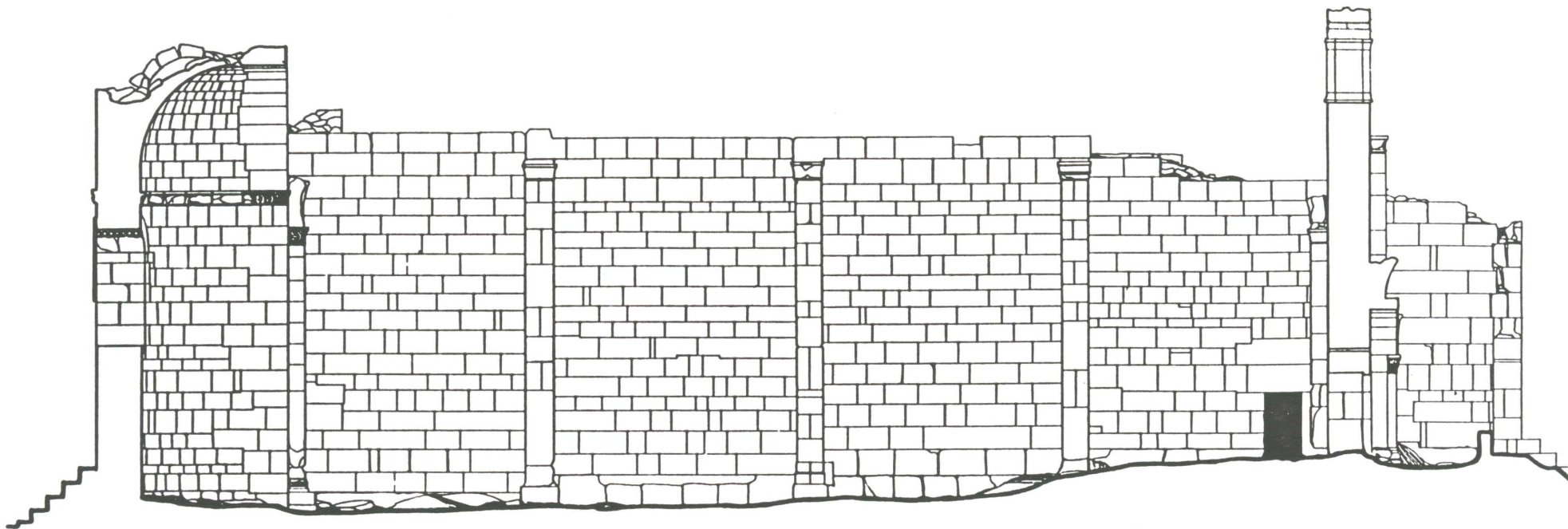


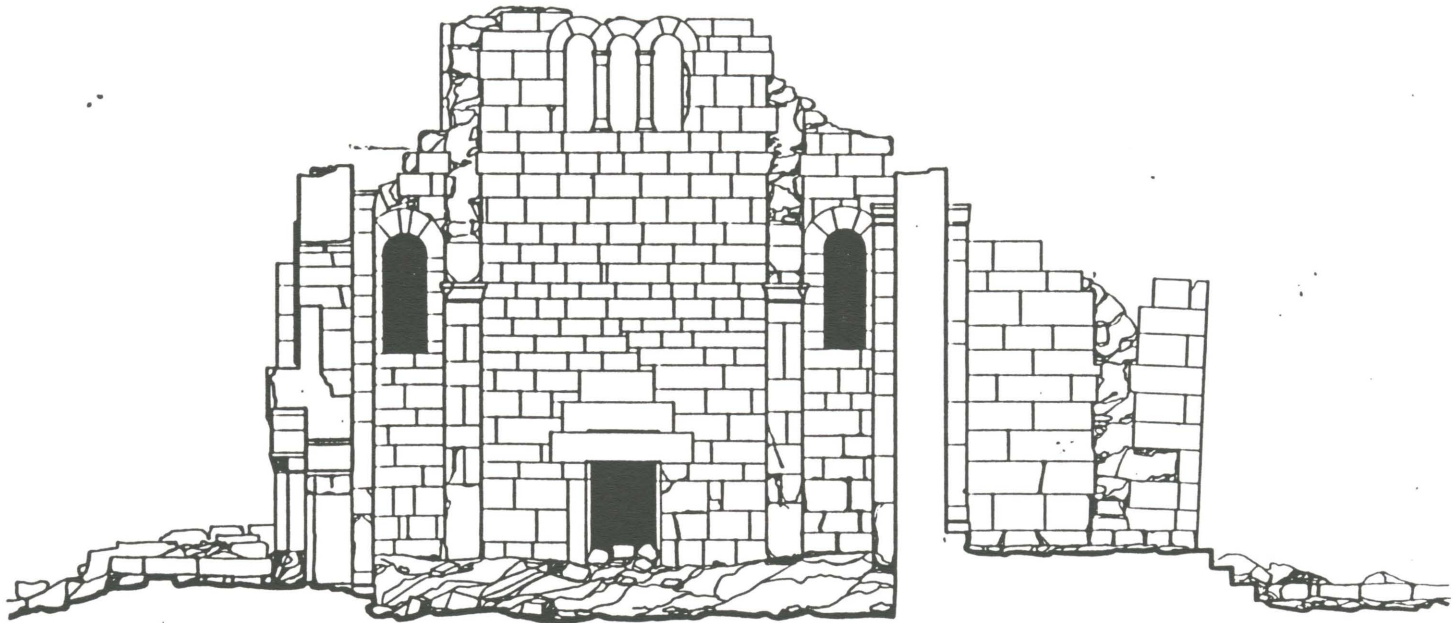


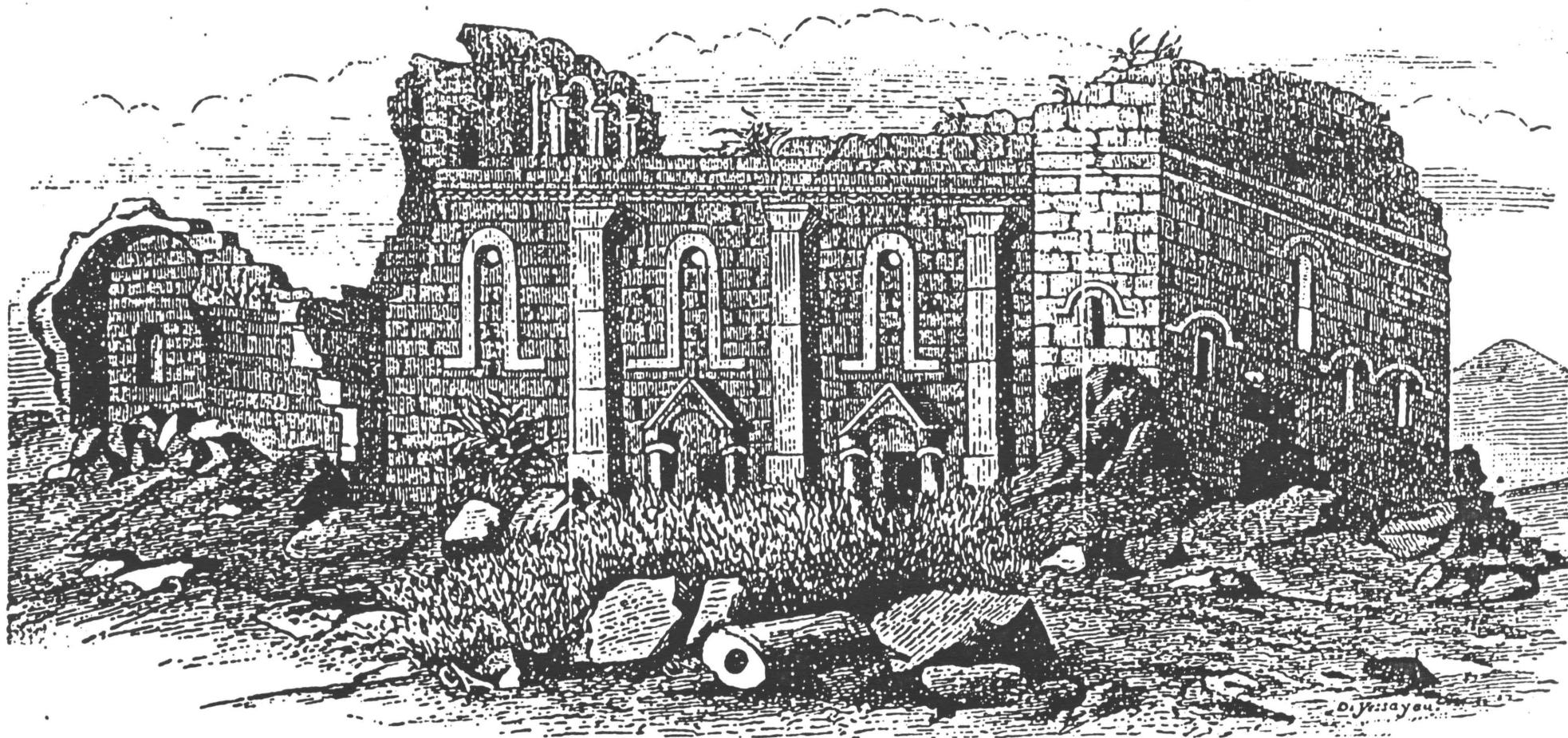


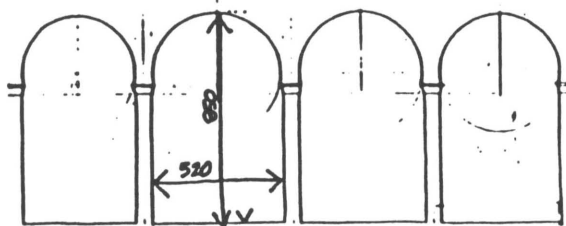
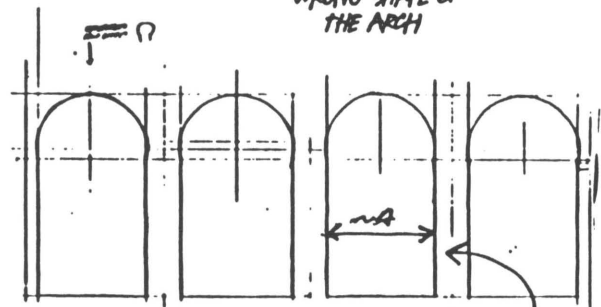
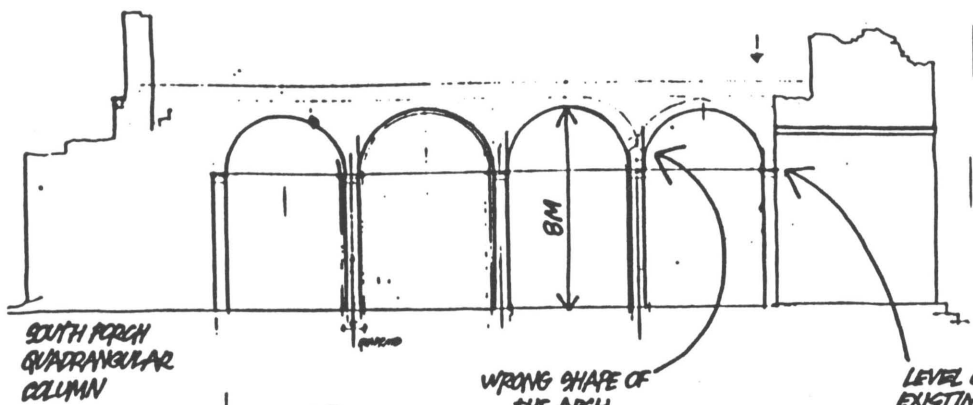












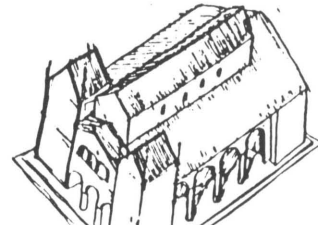
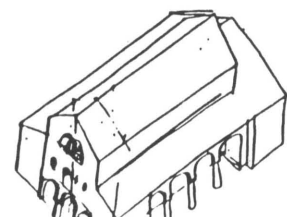
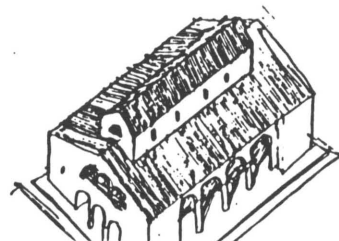
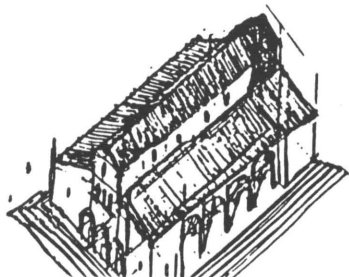
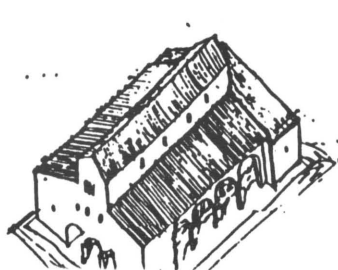
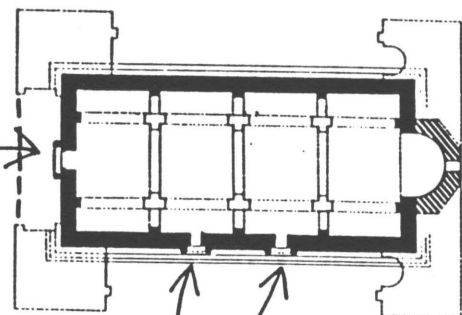
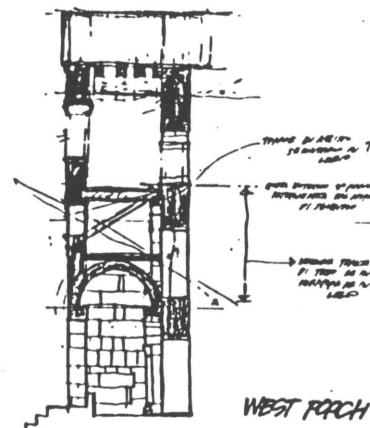
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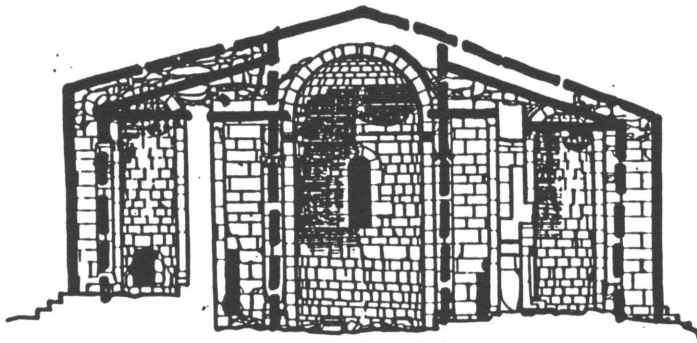
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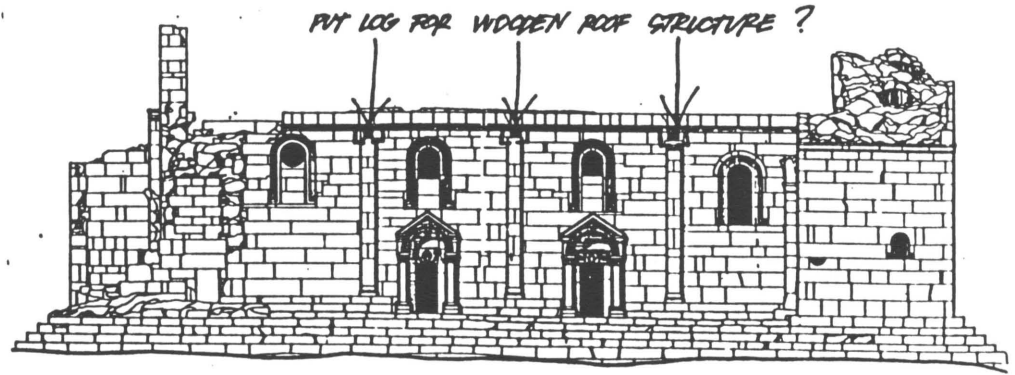
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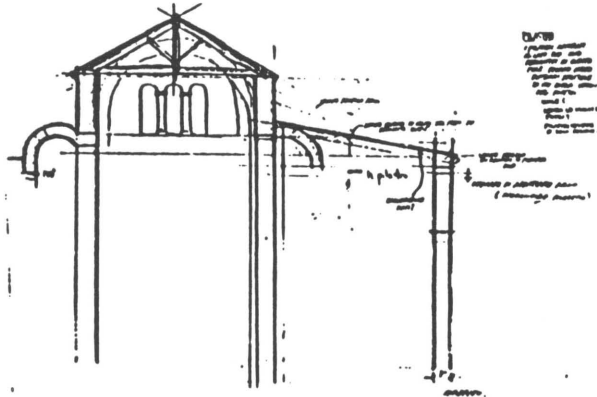




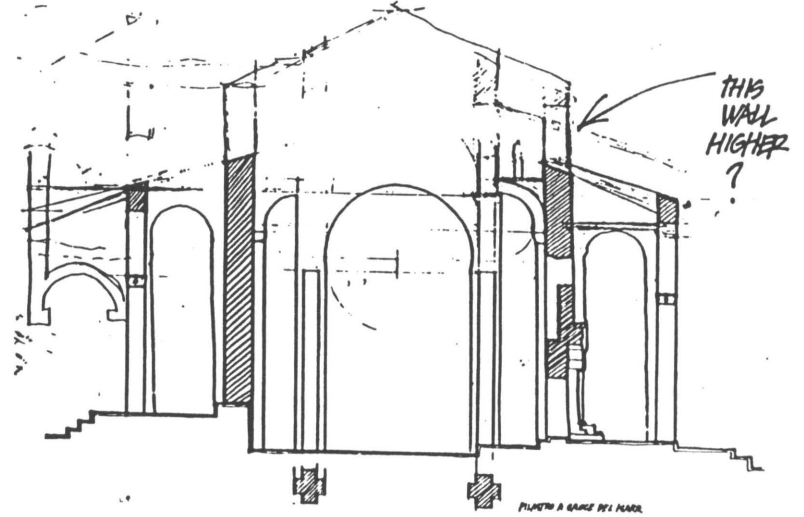
WOODEN ROOF



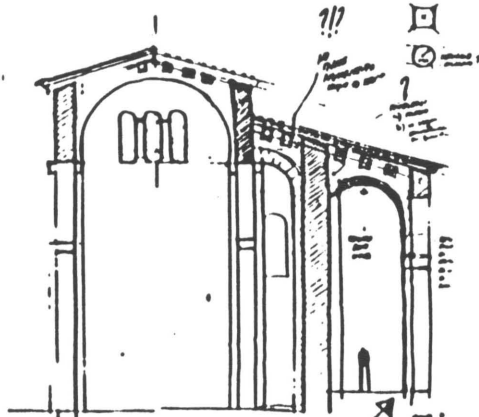
PUT LOG FOR WOODEN ROOF STRUCTURE ?



STONE ARCHES  
+  
WOODEN TRUSS



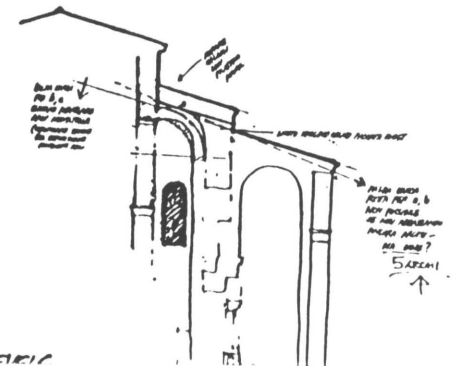
THIS WALL  
HIGHER ?



STONE BARREL VAULTS  
OR  
STONE ARCHES  
SUPPORTING WOODEN  
RAFTERS

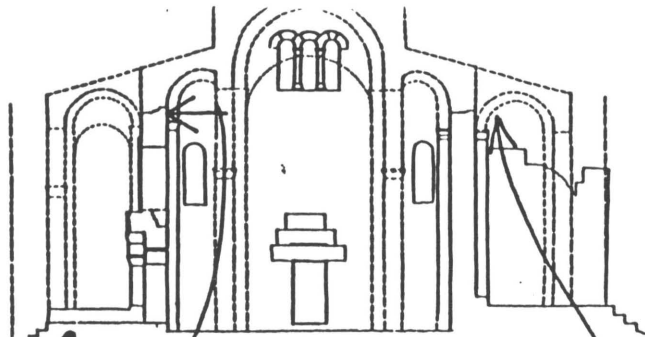


3. 1/2  
10 1/2  
10 1/2  
10 1/2



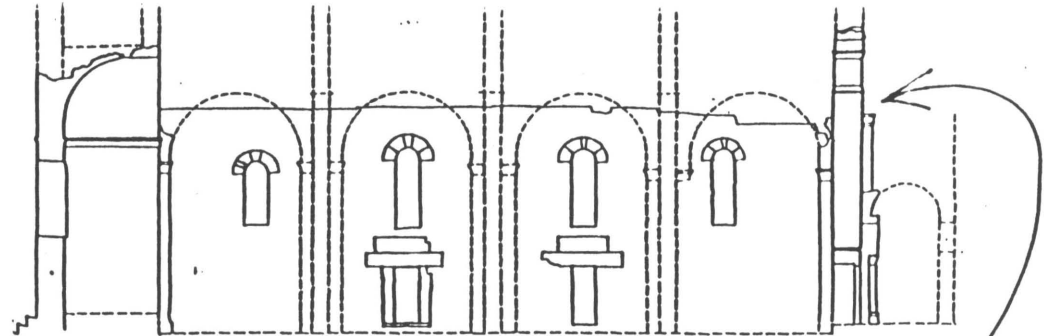
5 ARCHES  
↑

HYPOTHESIS AND PROBLEMS



**A** NO TRACES OF THIS ARCH

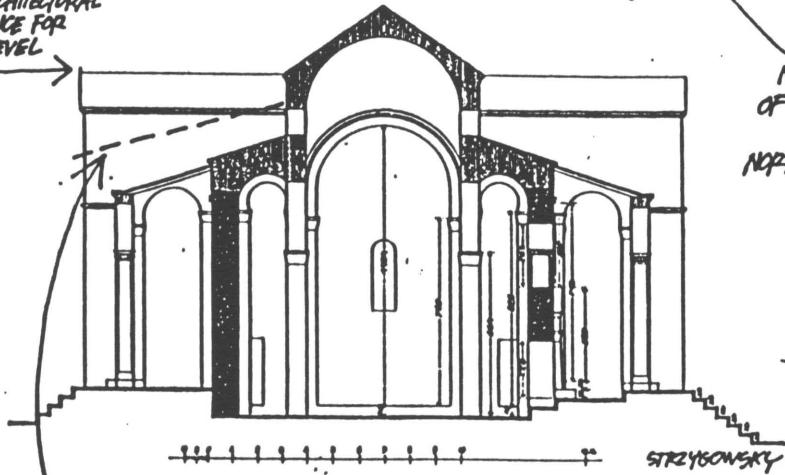
ALFONSO NOVELLO  
PAROUDJIAN



**F** NO EVIDENCE FOR THE ROOF -  
WHICH POSITION?

**B** NO ARCHITECTURAL  
EVIDENCE FOR  
THIS LEVEL

**C** NO TRACES  
OF THIS ARCH  
ON THE  
NORTH ELEVATION



STRZYBOWSKY



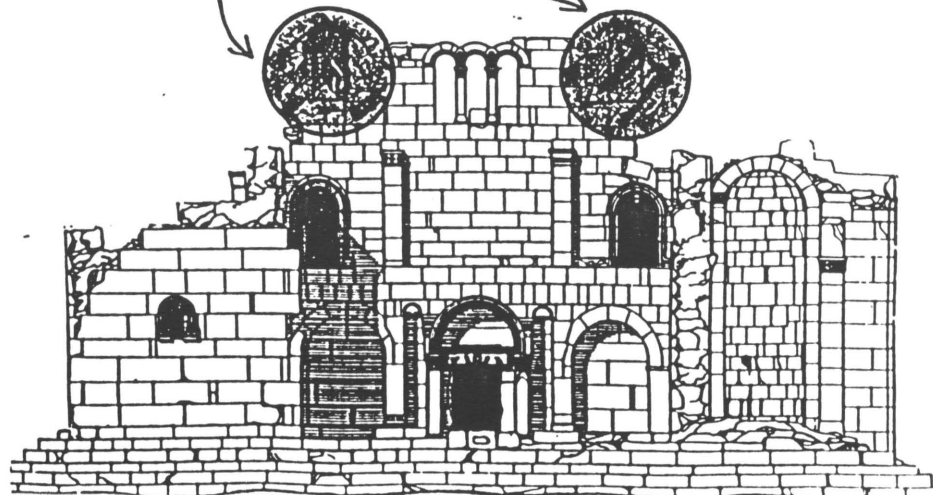
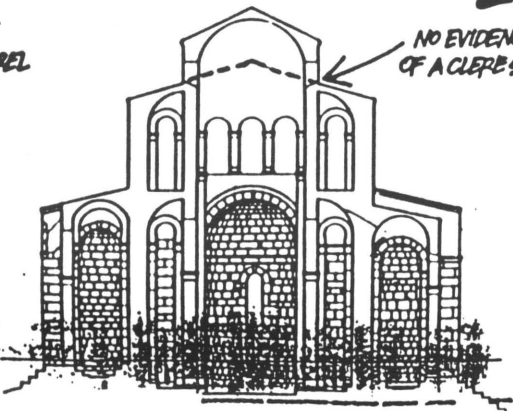
TOKAREVSKY

**G** NO HISTORICAL  
EVIDENCE FOR  
THIS LEVEL -  
IT'S IMPOSSIBLE  
TO DEFINE IT -

**H** NEW SUGGESTION

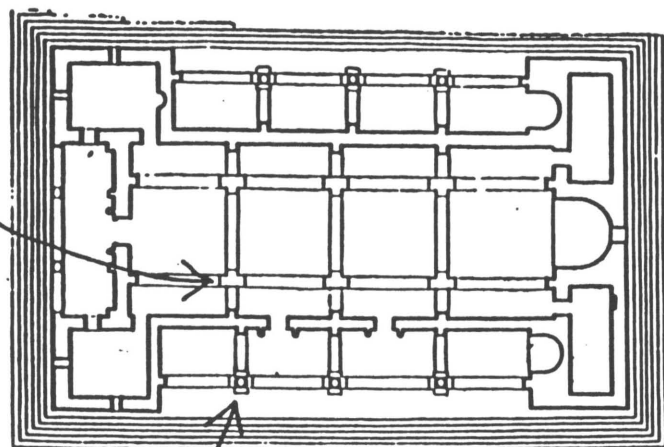
**D** HOW TO EXPLAIN  
THE SLOPING BARREL  
VAULT

**E** NO EVIDENCE  
OF A CLERE STORY



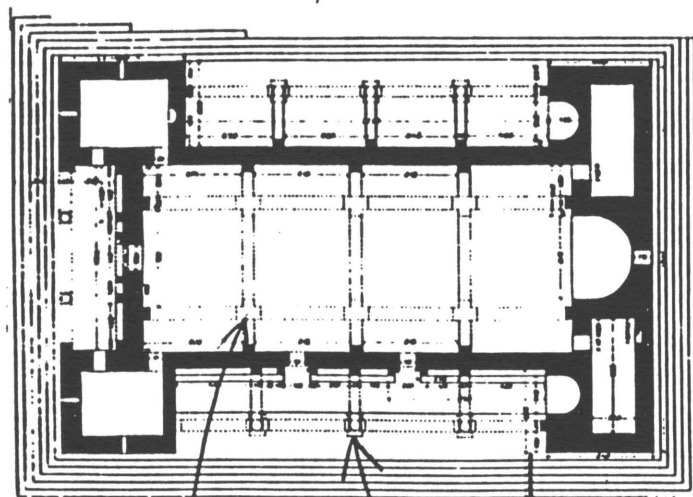
GRIGORIAN

**A**  
T  
PIER



STRZYKOWSKY

**B**  
CRUCIFORM BASE

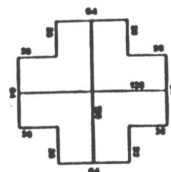


THRAMANIAN

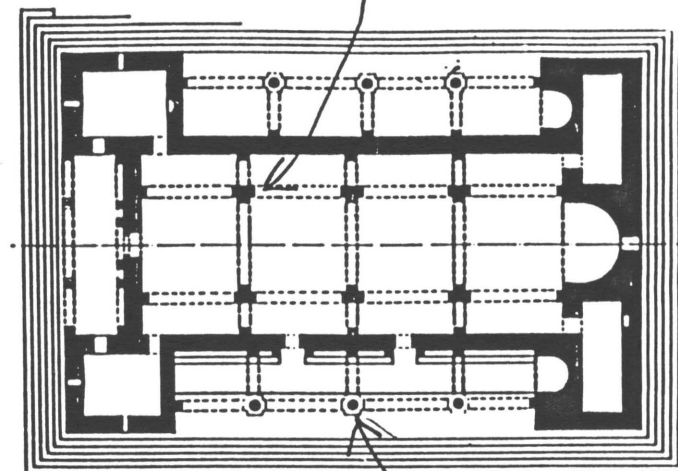
**C**  
T  
PIER

**D**  
CRUCIFORM BASE

**I**  
CRUCIFORM PIER  
ACCORDING TO  
MARR'S  
DESCRIPTION

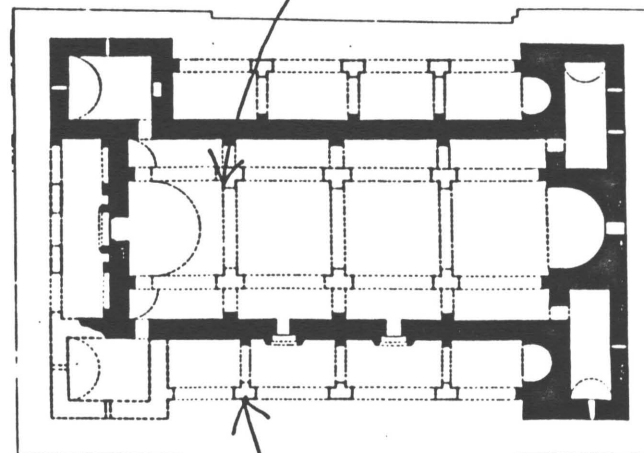


**L**  
C  
COLUMN  
OF THE SOUTH  
PORCH  
ACCORDING TO  
MARR'S  
DESCRIPTION



SAHINIAN

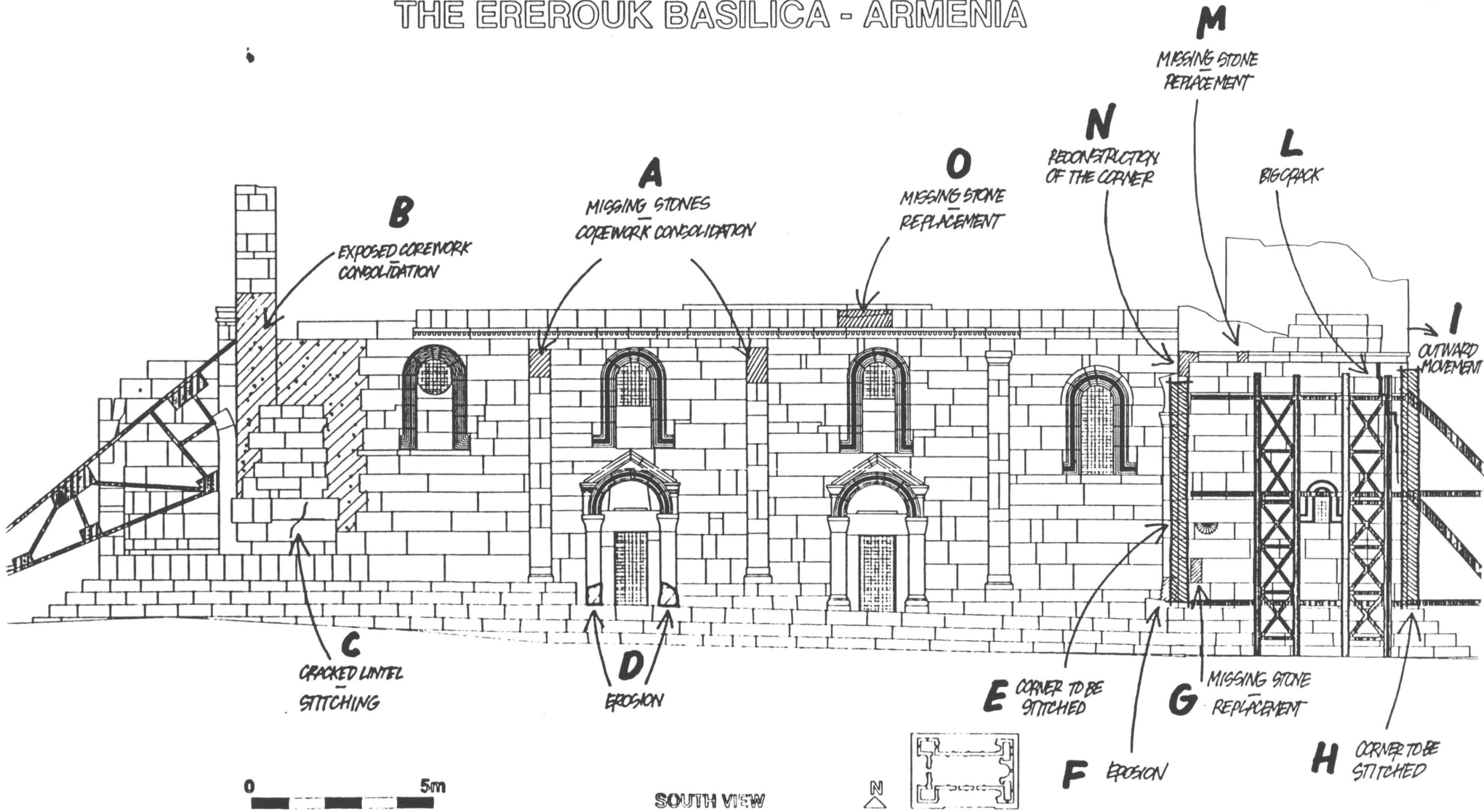
**F**  
CRUCIFORM BASE



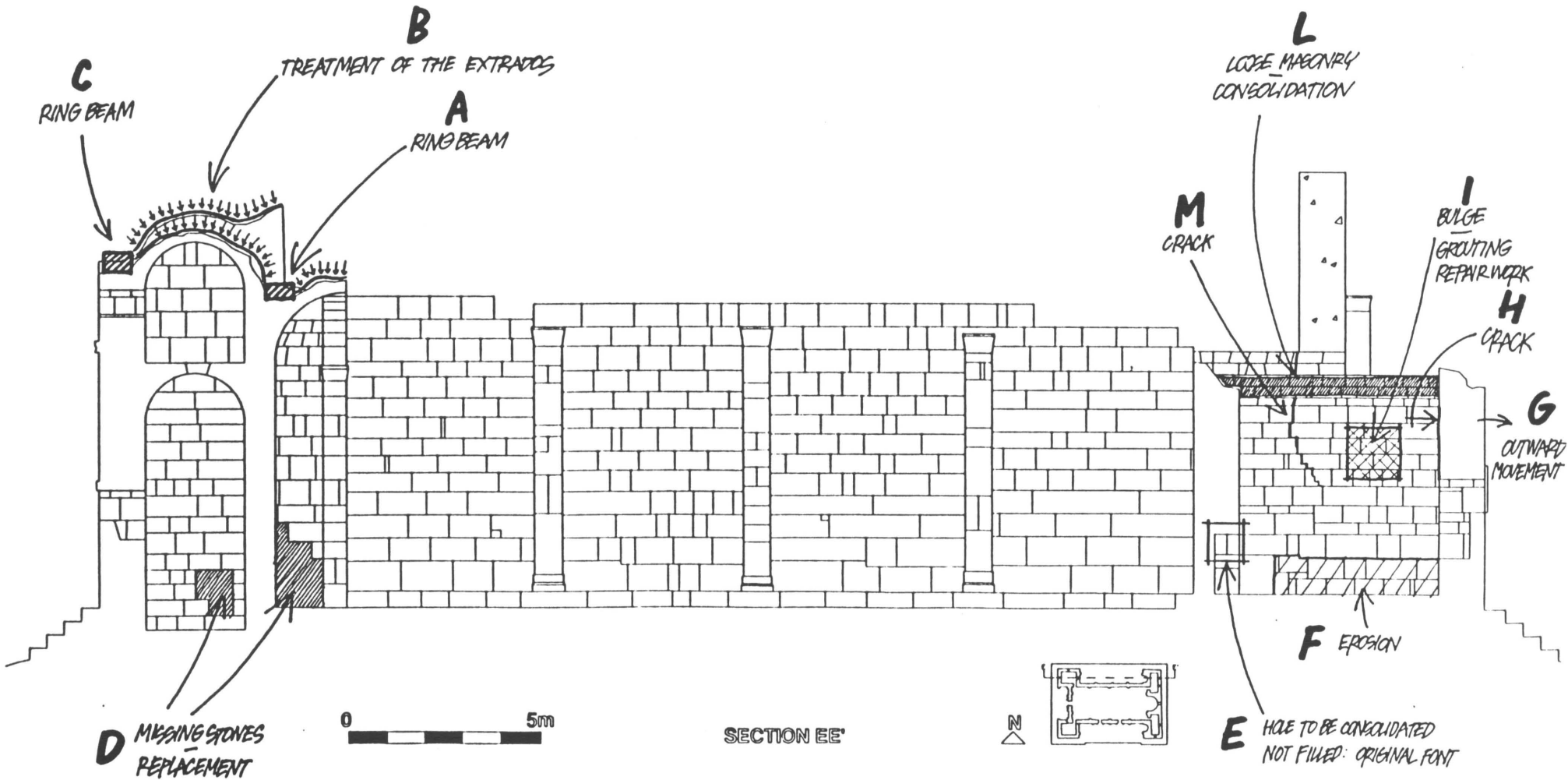
ALTAGO NOVELLO

**H**  
T  
PIER

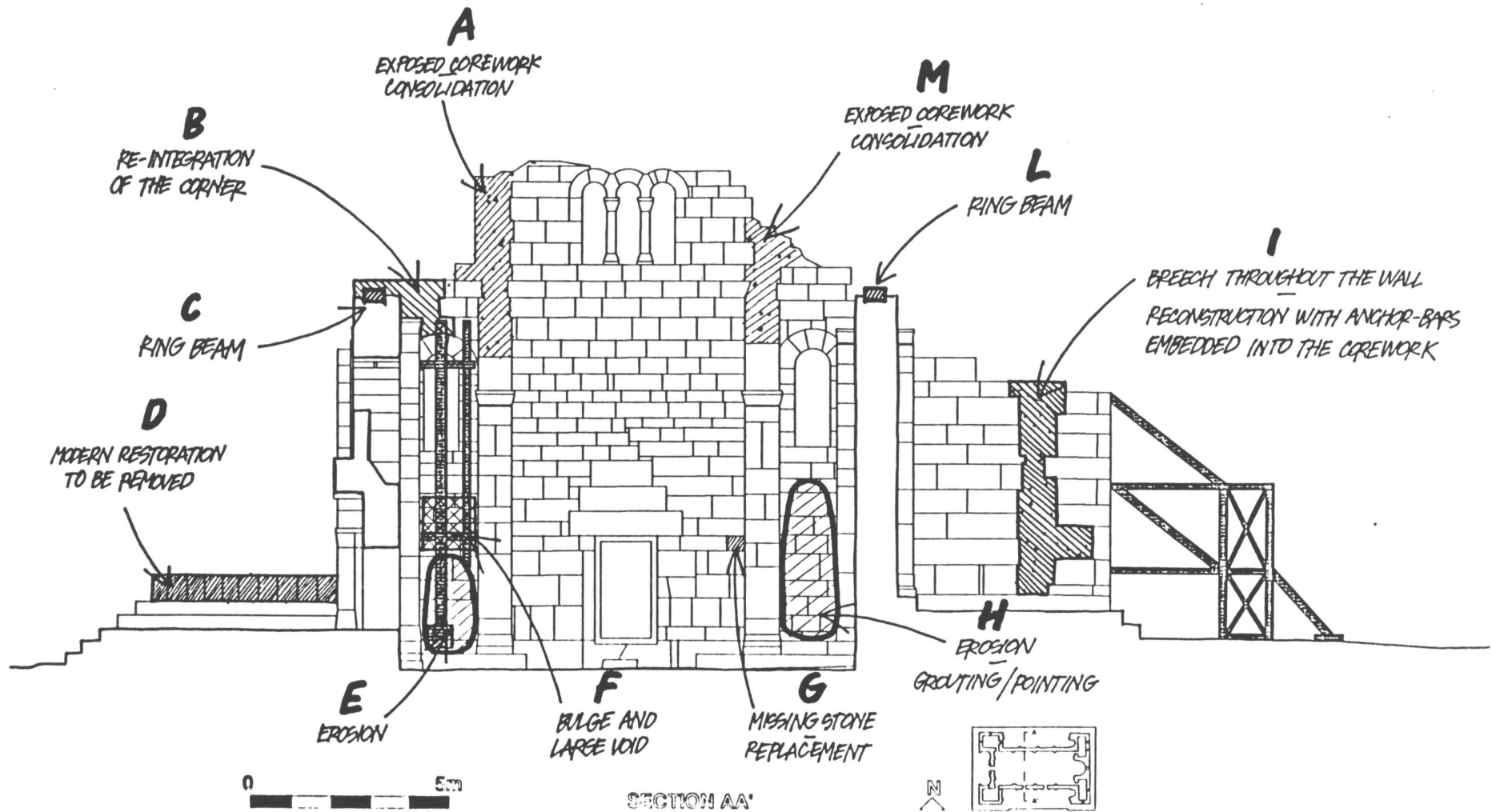
# THE EREROUK BASILICA - ARMENIA



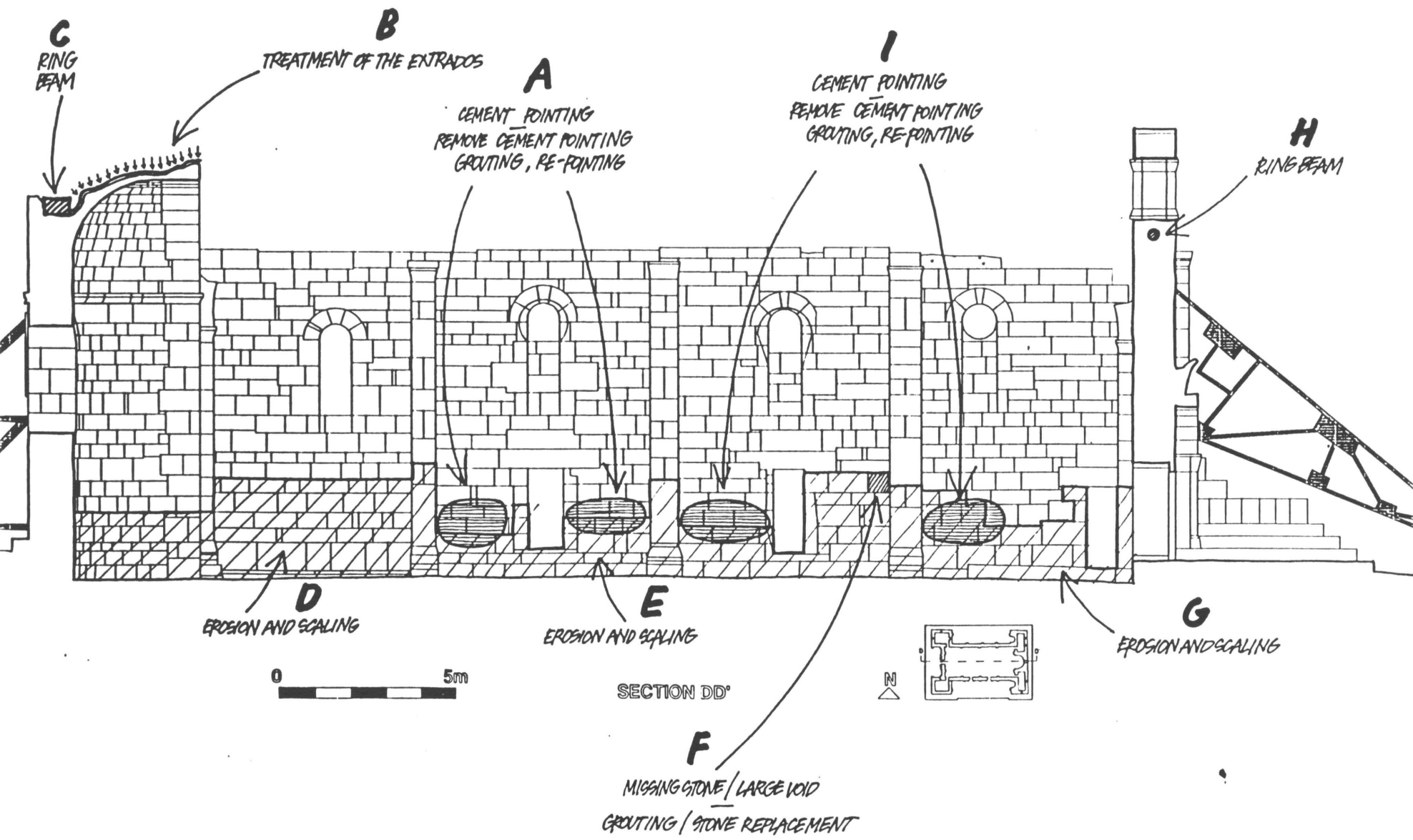
# THE EREROUK BASILICA - ARMENIA

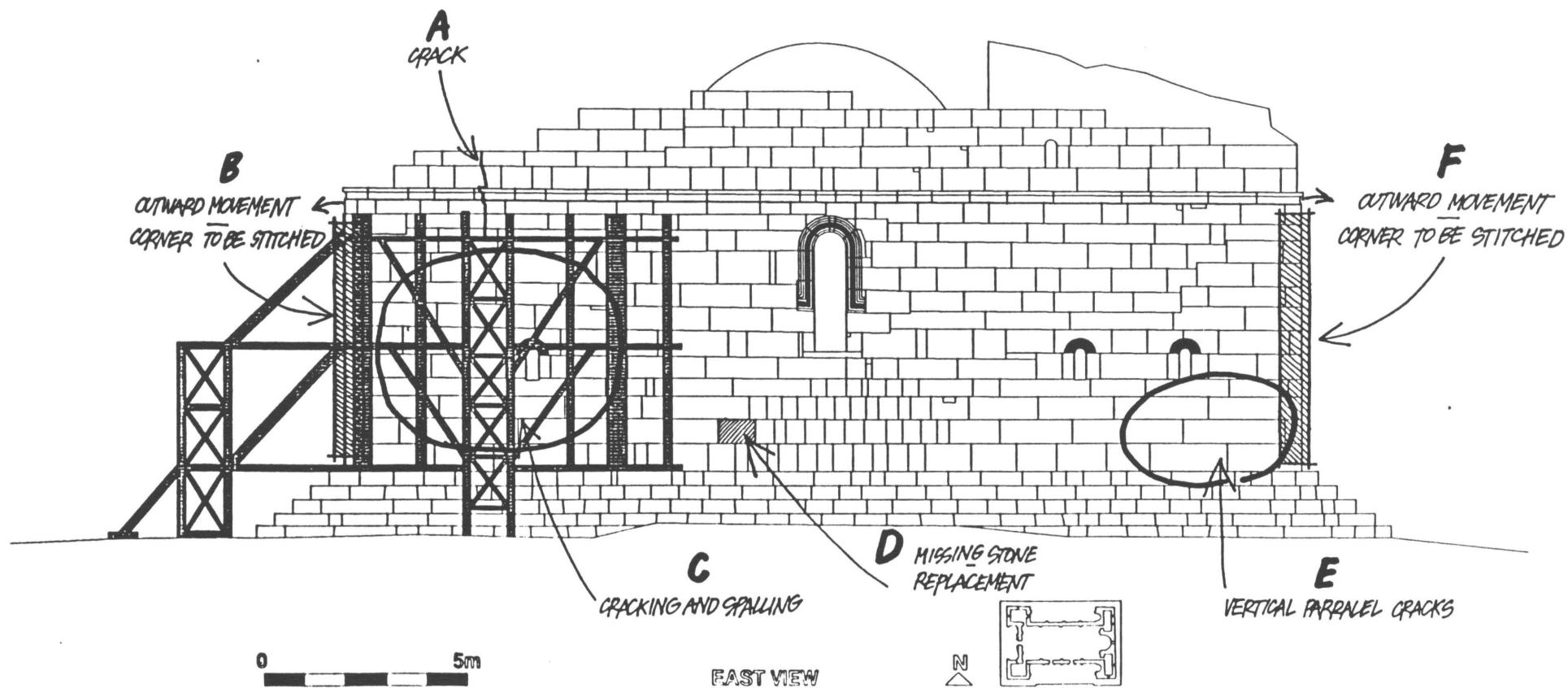


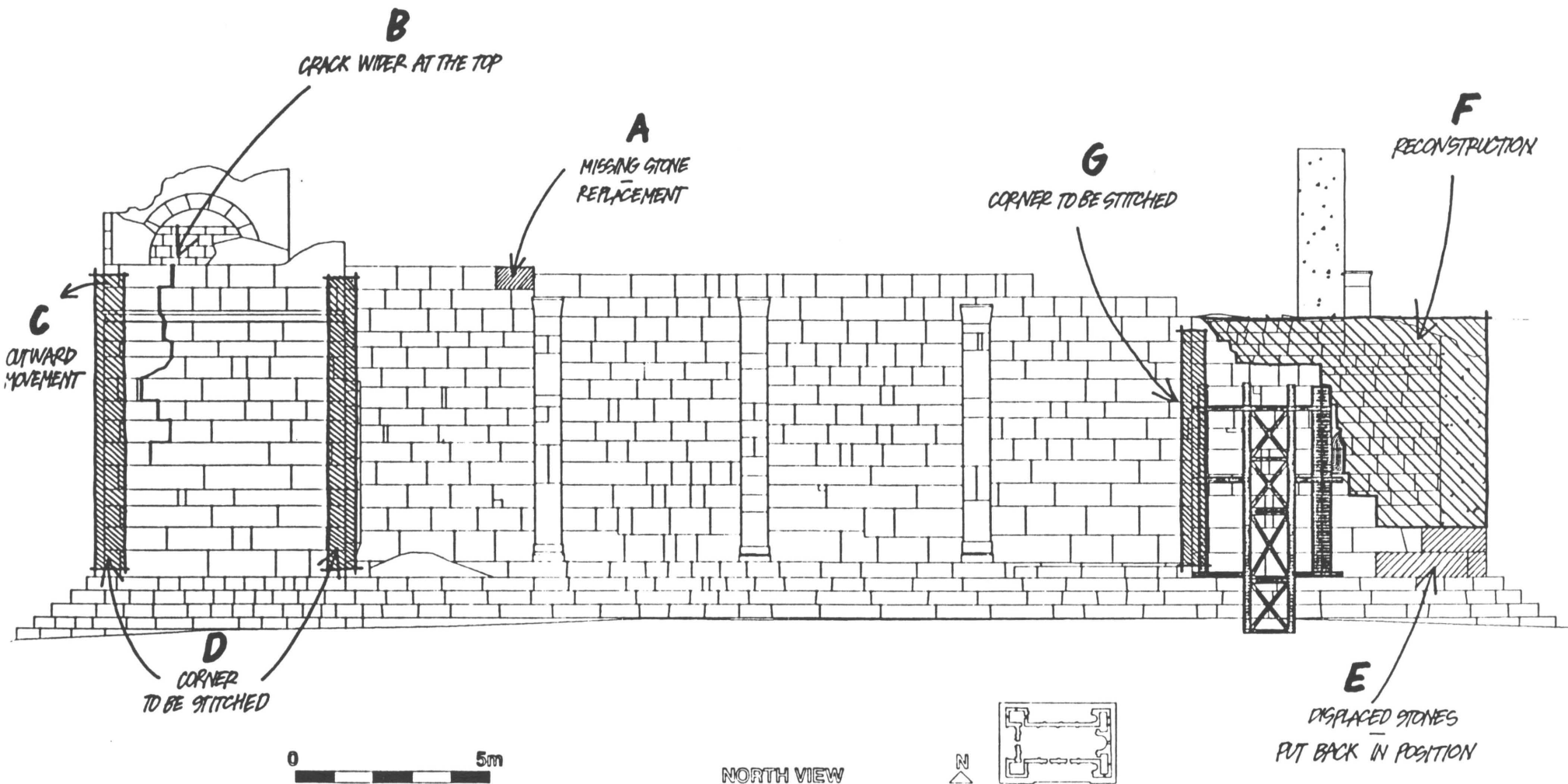
# THE EREROUK BASILICA - ARMENIA



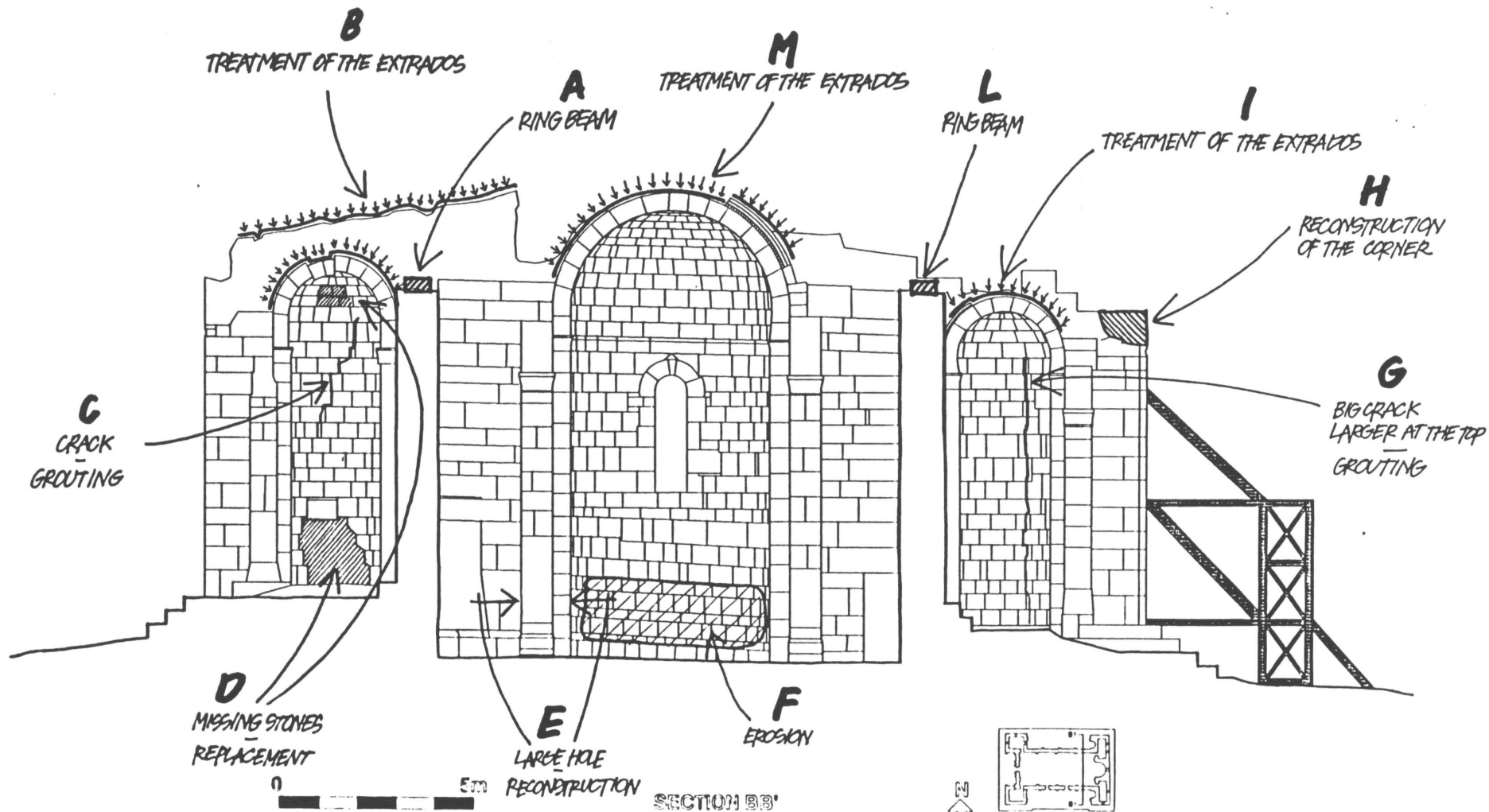
UNITED STATES DEPARTMENT OF THE INTERIOR

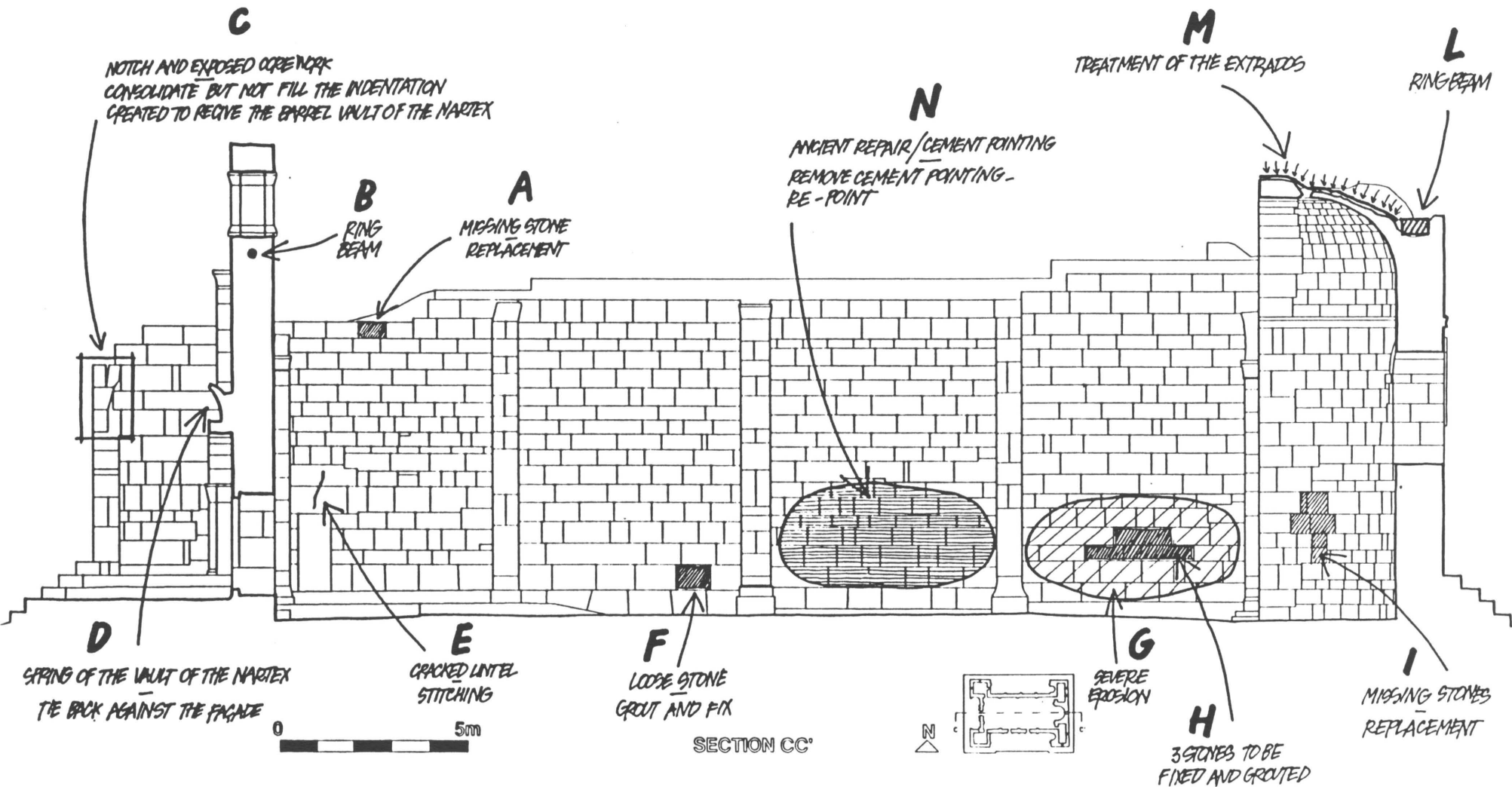


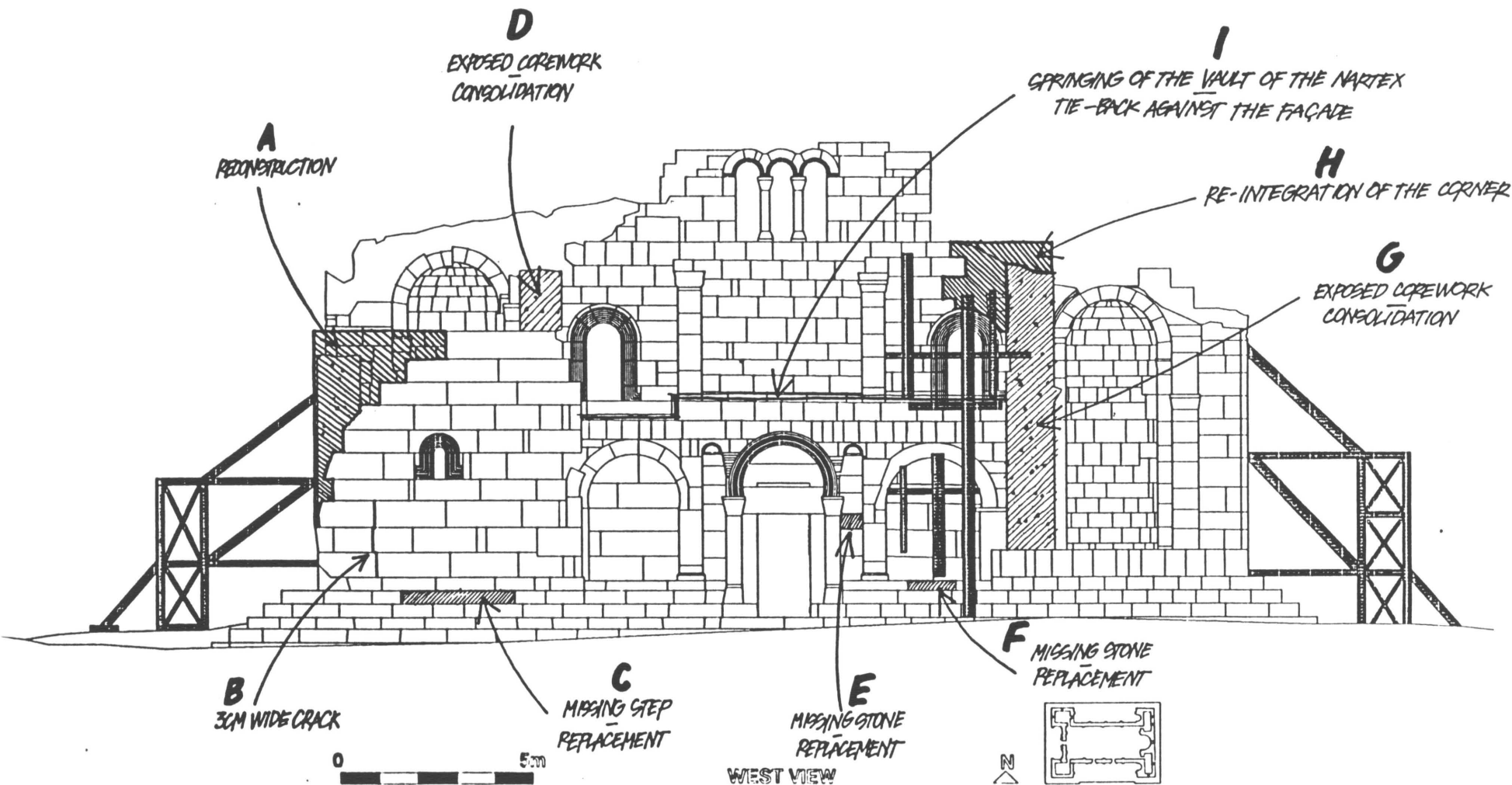


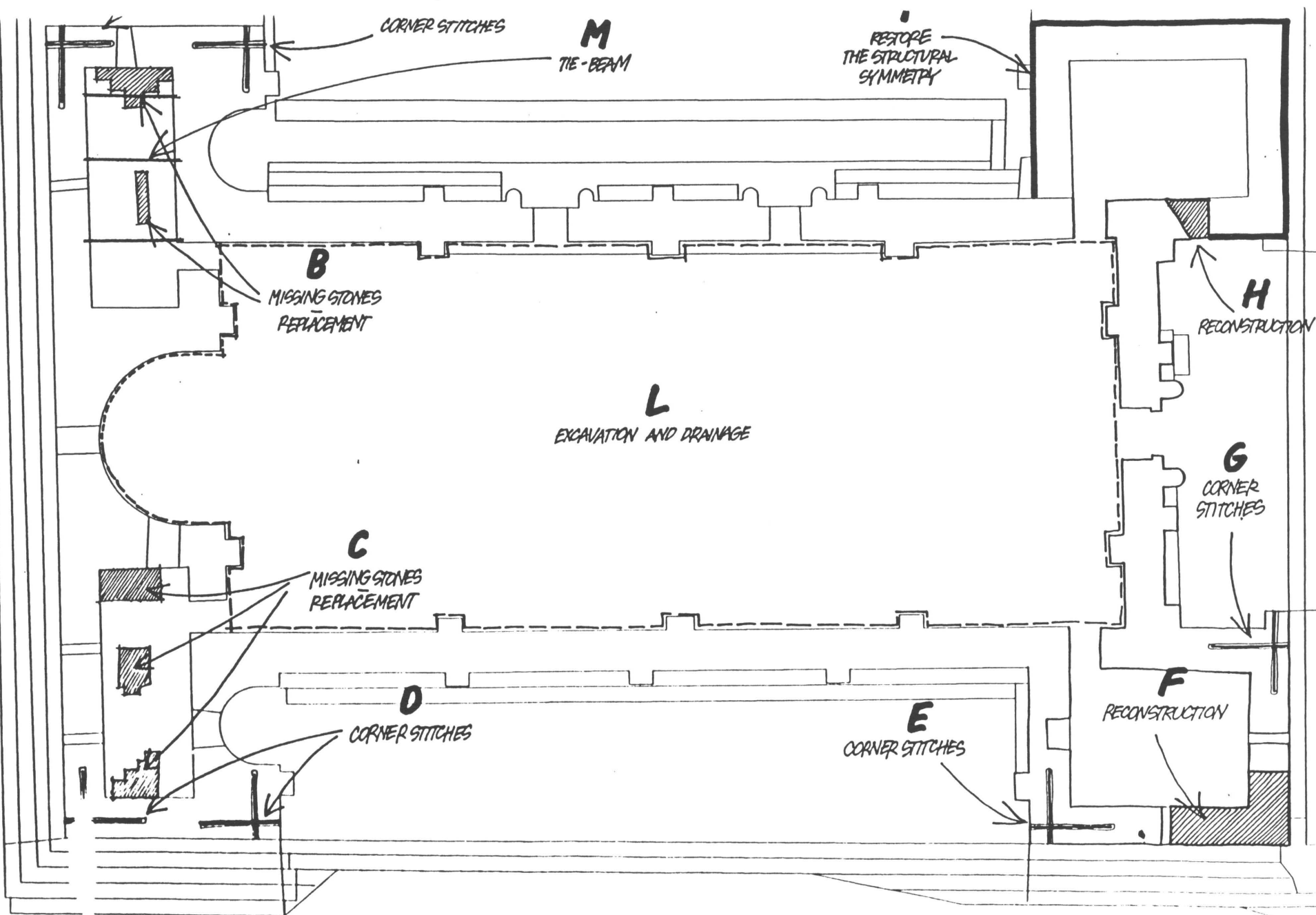


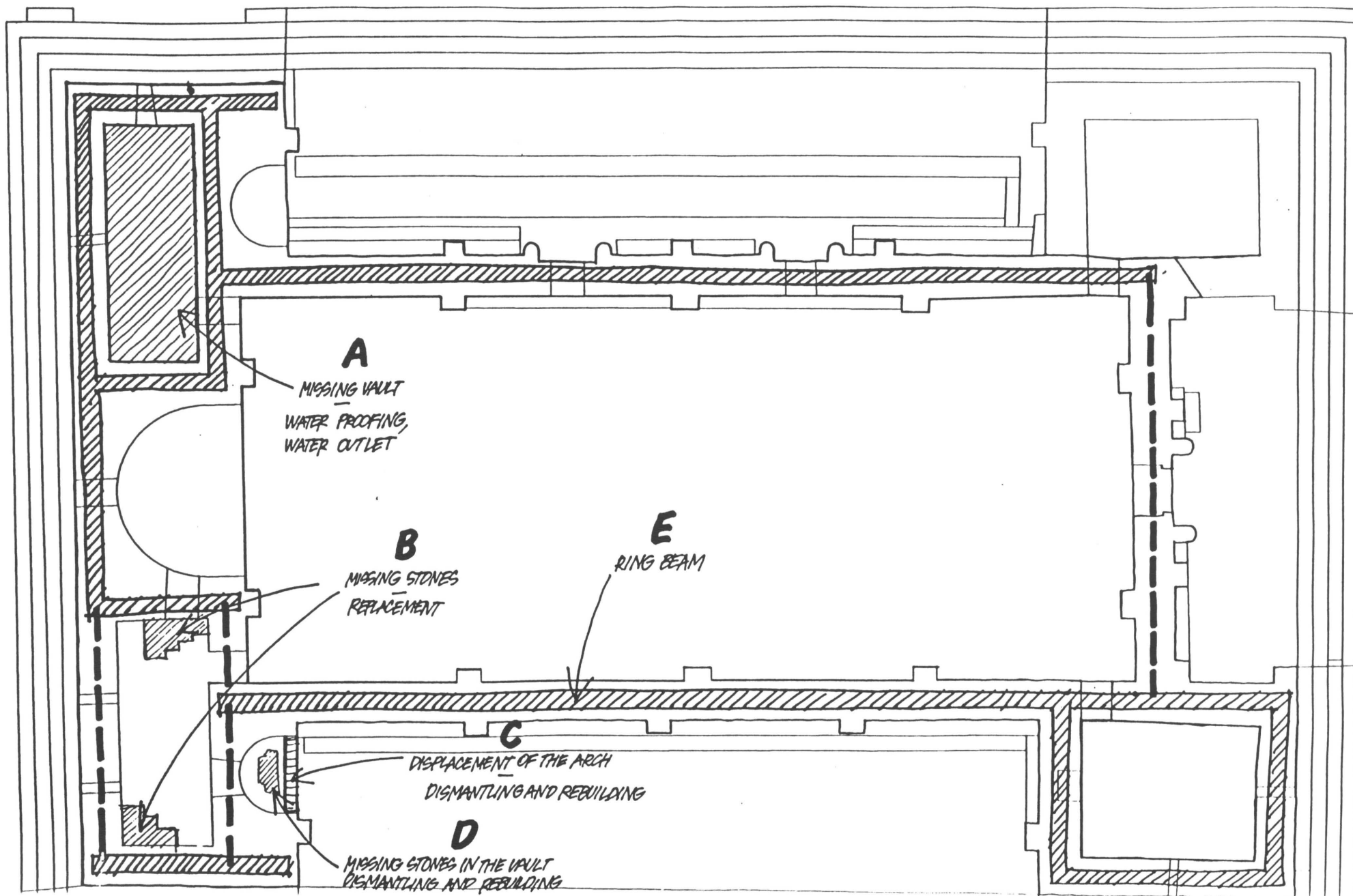
# THE CHEROKEE BASILICA - ARMENIA

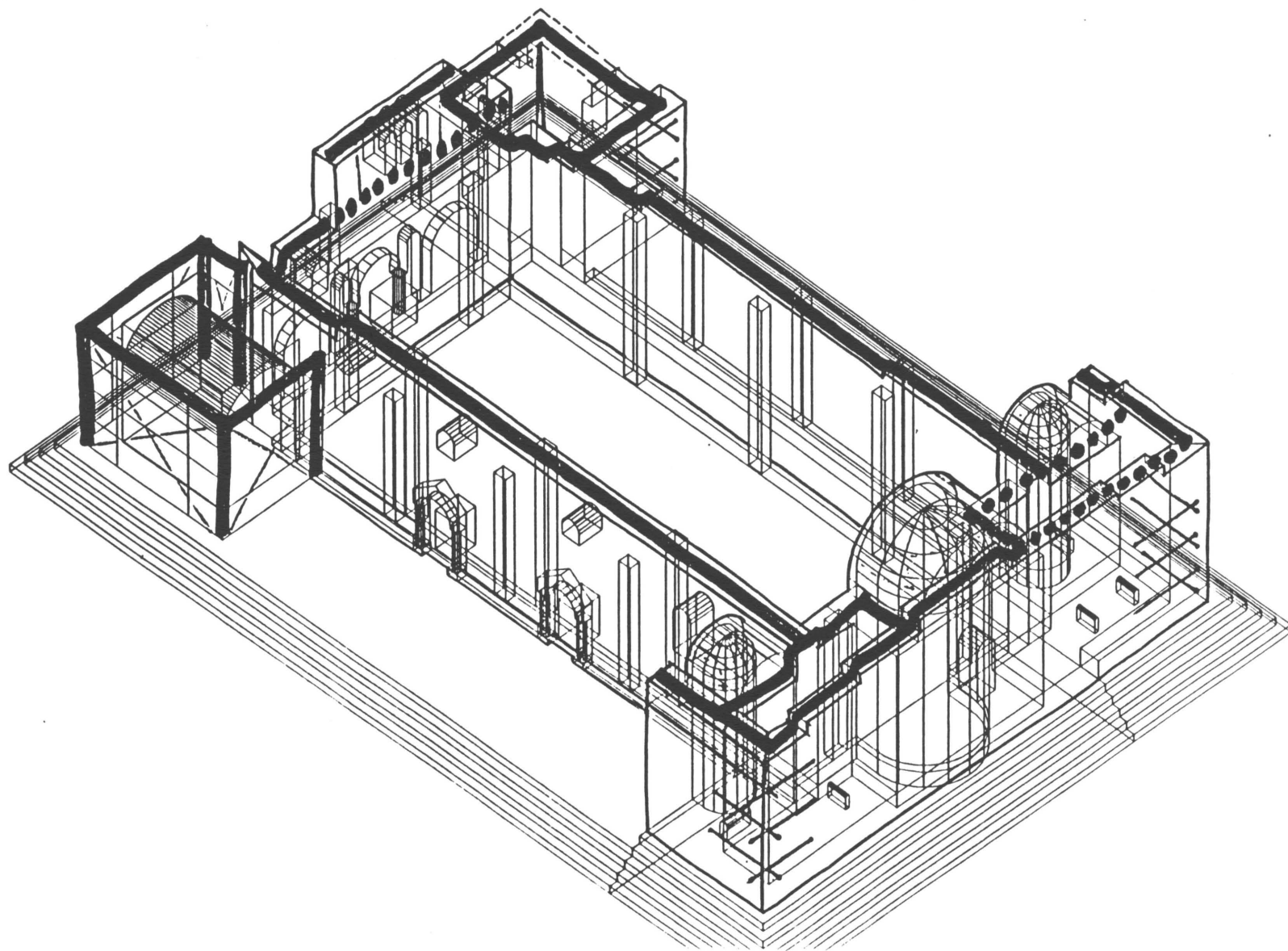


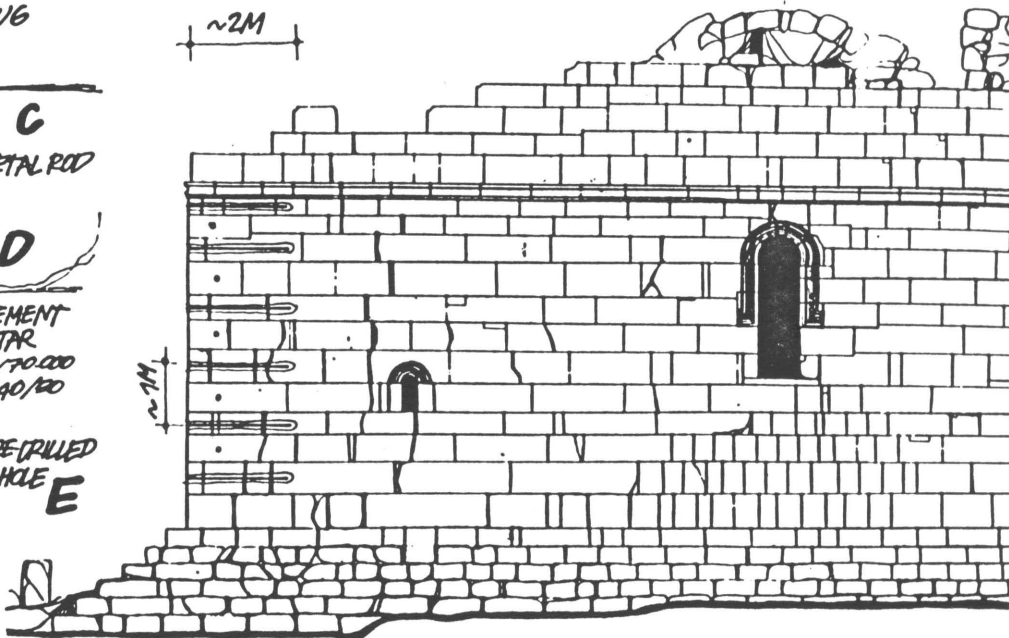
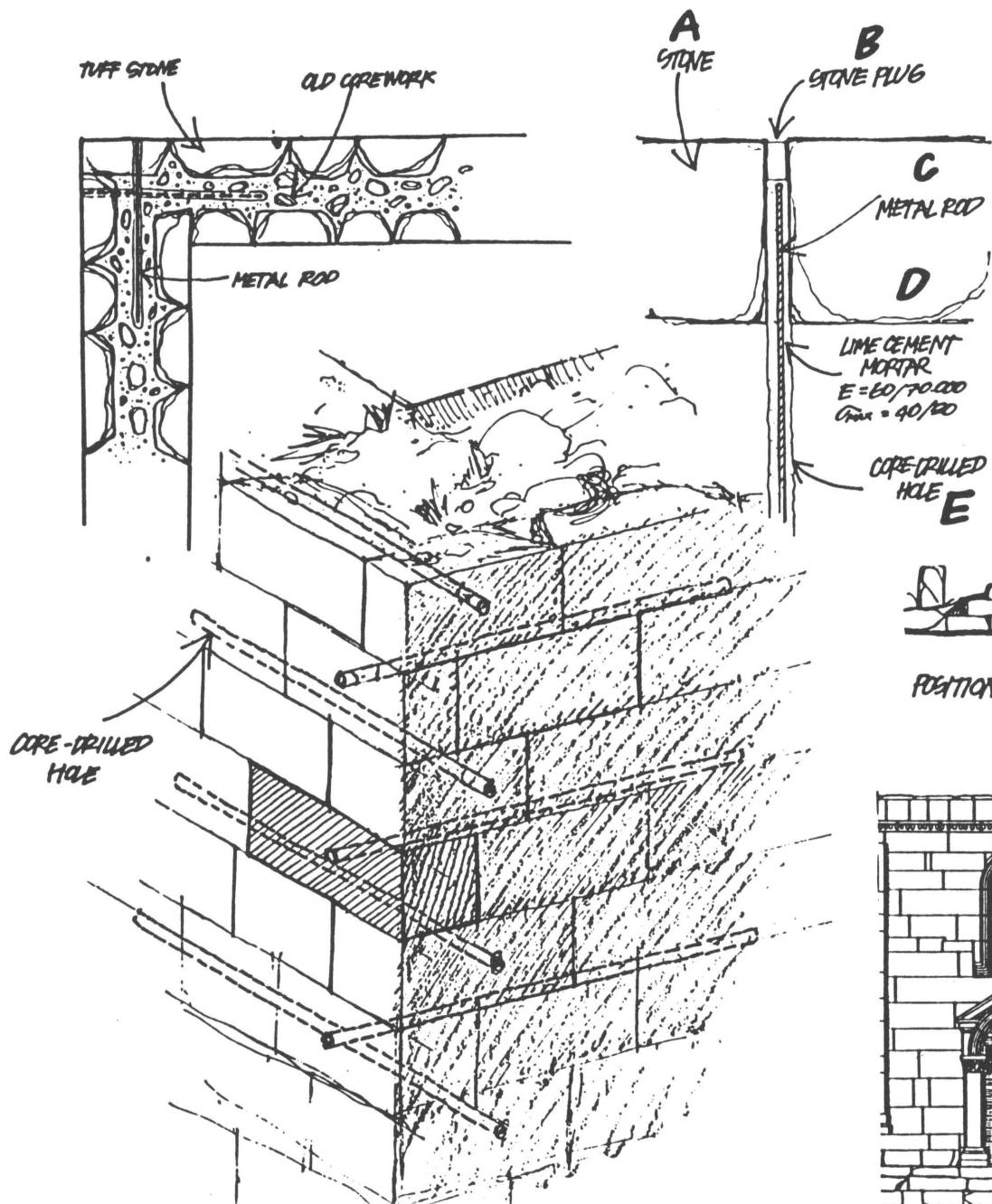




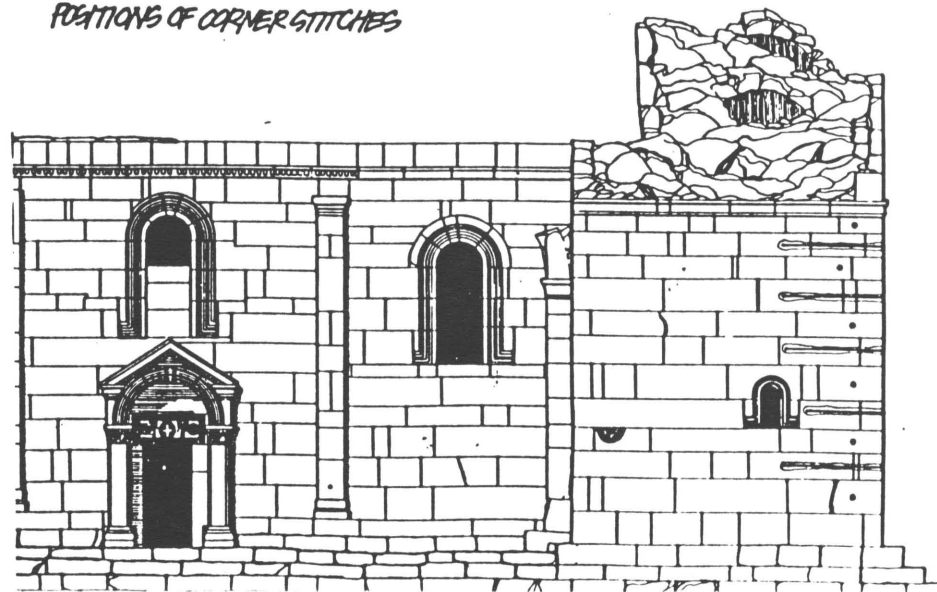


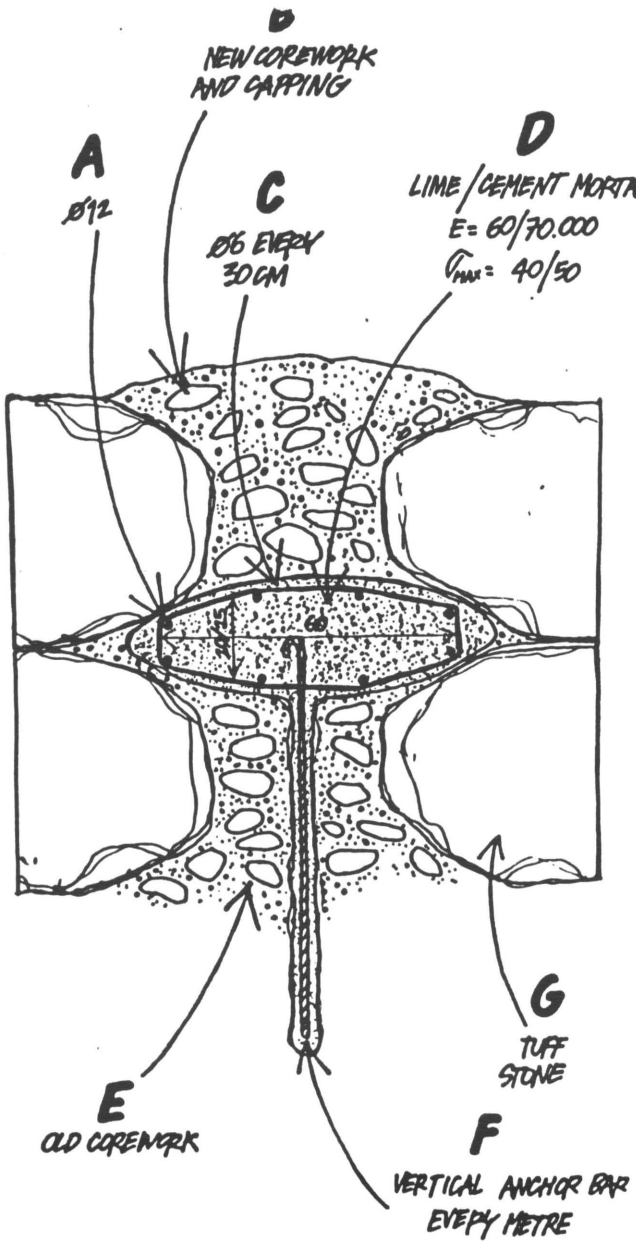




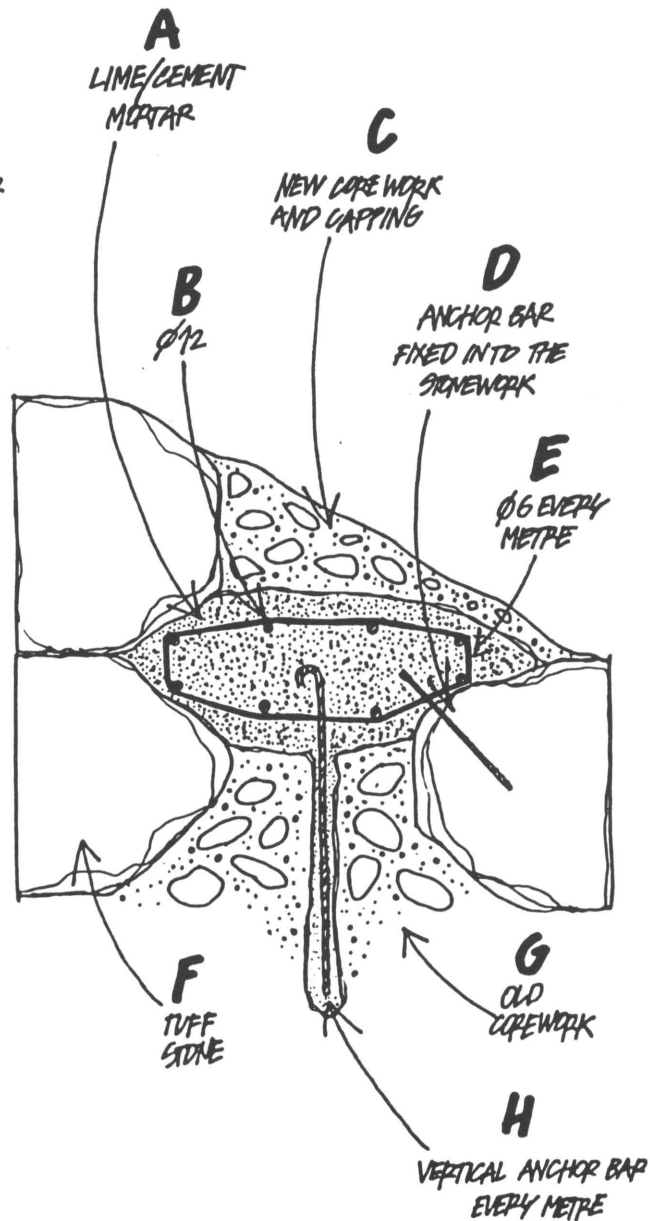


POSITIONS OF CORNER STITCHES

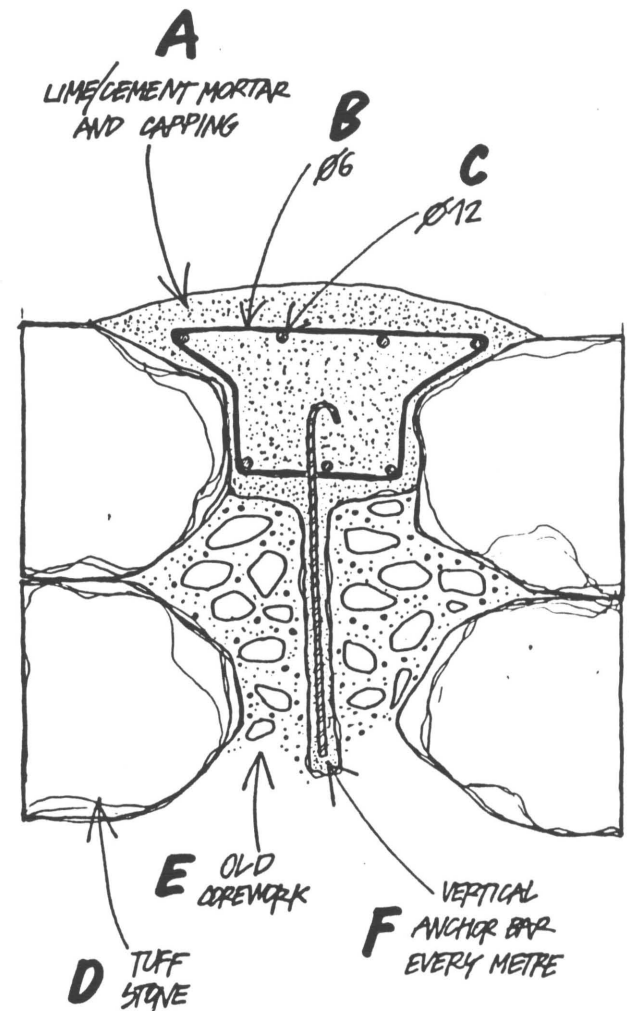




RING BEAM CASE "A"

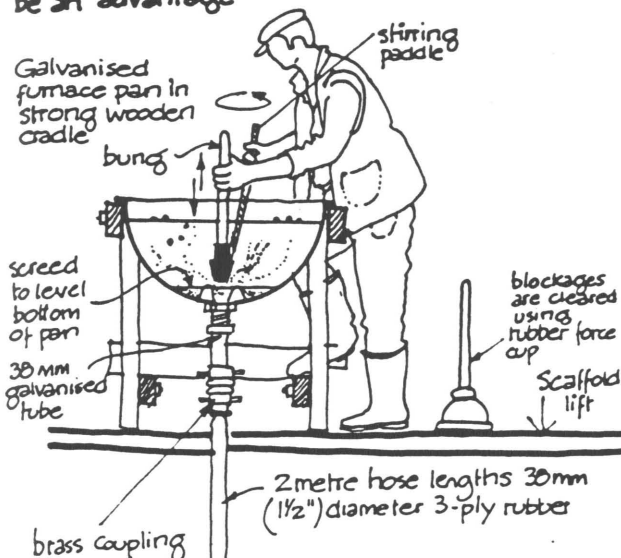


RING BEAM CASE "B"



RING BEAM CASE "C"

A traditional gravity grout assembly can be constructed at low cost. Although slow, its "low technology" can be an advantage



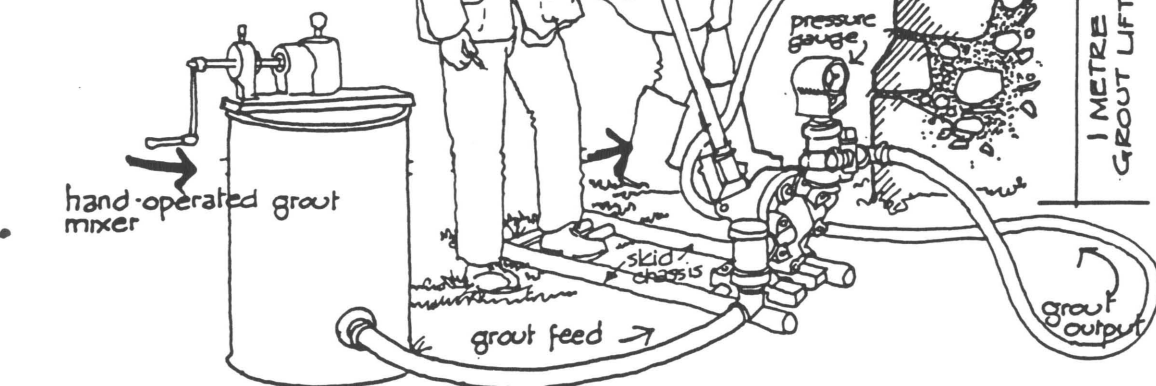
### GRAVITY

Gravity grout assembly with grout pan on scaffold 4m. above grout point produces a pressure at the nozzle of approximately 10 - 12 psi

### PUMP

A hand-operated diaphragm grout pump such as the Reader ER 100 can produce a pressure at the nozzle of up to 100 psi but the operator has direct and immediate control. Useful and safe grouting in weak walls can be carried out at 5-10 psi

Gravity system based on post-war Ministry of Works detail



### GROUT : Properties desirable in masonry walls

It is important that the final strength of the grout should not exceed that of the masonry units, that its permeability should be similar, that it should have good flow properties at low pressures and that its shrinkage should be low. Traditional cement grouts do not meet these requirements and, in addition, transfer soluble salts, largely sodium salts, into the stones.

### TYPICAL MIXES RECOMMENDED FOR GENERAL MASONRY ARE :-

LIME	PFA*	WHITE CEMENT	SAND
1	2	-	8
1	2	1/2	4
1	13	1/2	-**

Water : Solids ratio to be at least 0.4

\* PFA - pulverised fuel ash - not more than 20% to be retained on a 45 micron sieve

\*\* Pozament produced this grout including 0.03 calcium lignosulphate as a workability aid - the "St Paul's mix"

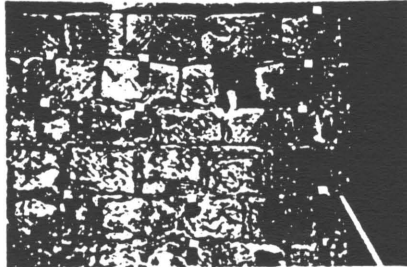


Figure 1.12 Replacement of mortar in wall cores to achieve structural integrity of double skin, core-filled walls is achieved by grouting. In this illustration a wall which has lost core and bedding mortar is being prepared for grouting. The blocks are being levelled and secured by oak wedges driven into the joints. The bottom four courses have been plugged with tarred hemp, pushed in with a pointing key as a temporary seal



Figure 1.13 The grout (liquid mortar) is being introduced by a gravity system. The grout pan, hung in a timber cradle, is located on a scaffold about four metres above the grout points. A hose conducts the grout from the bottom of the pan to the grout point. A wooden plug closes and opens the grouting line. The solids in the grout are kept in suspension by continuous stirring. The force cup standing on the cradle is used to clear any blocking in the line



Figure 1.14 Below the grout pan at the base of the wall the hose delivers the grout into the wall through a galvanised feed pipe fitted with a stop cock. When the pan plug is lifted and the stop cock opens the grout flows into the wall and rises up to proving holes left at one half metre height. The dark patch is left by escape of water during the preliminary flushing out process which must always precede the introduction of grout

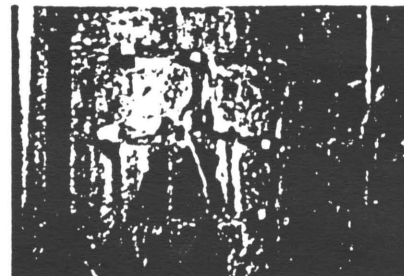


Figure 1.15 The grout has filled the voids of the first lift of masonry and is escaping from the proving holes, which are immediately stopped up with tarred hemp

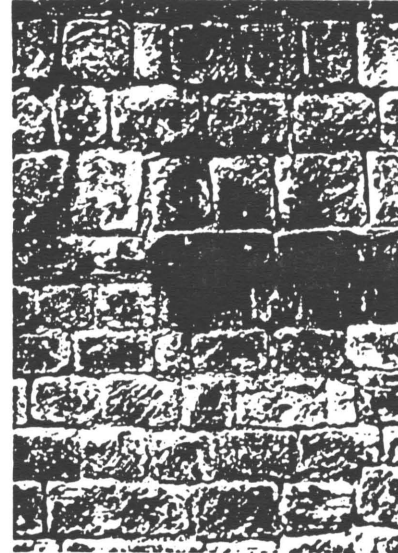


Figure 1.16 Grouting proceeds in lifts of between one half metre and one metre height. When grouting is complete, the tarred hemp is pulled out and the joints pointed up back to the grout line. This illustration (left) shows the bottom section grouted and pointed

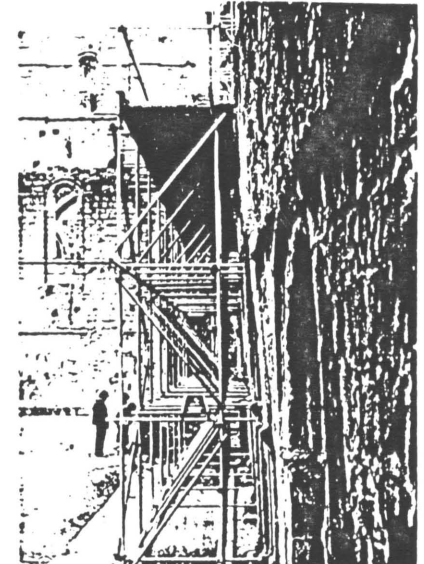
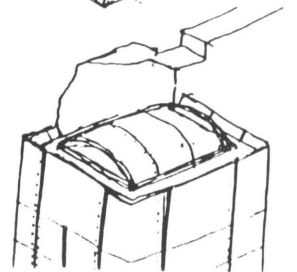
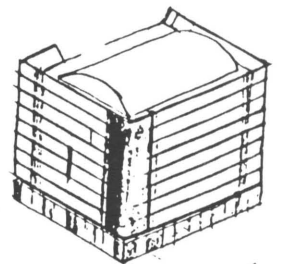
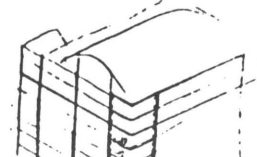
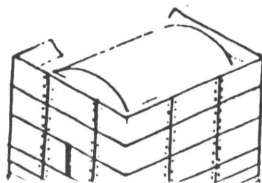
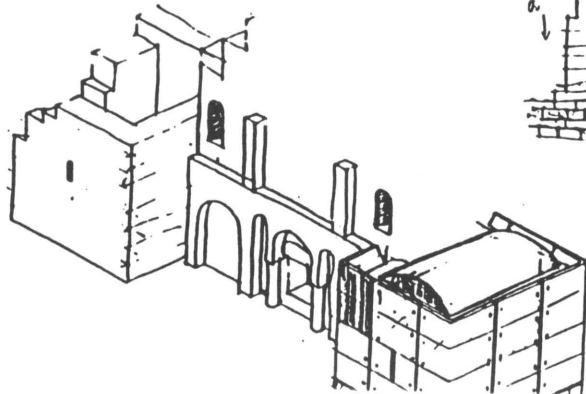
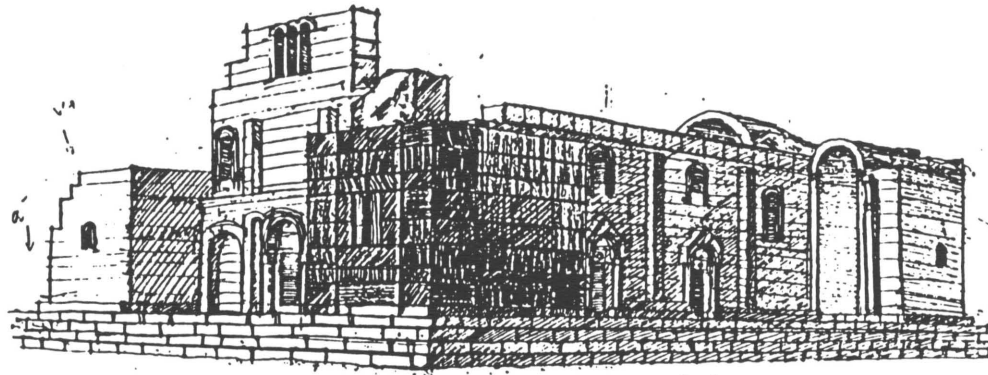
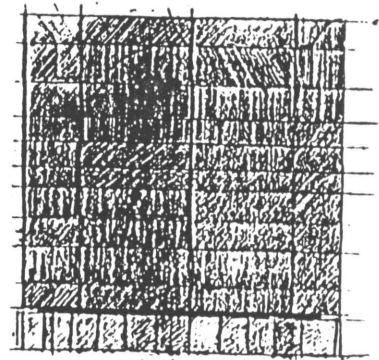
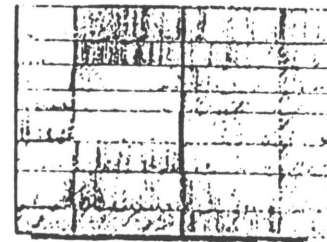
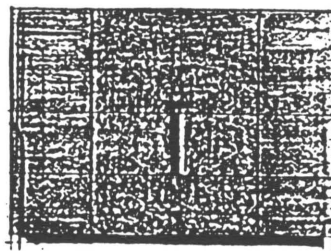
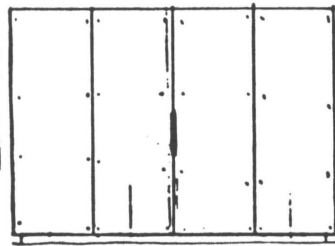
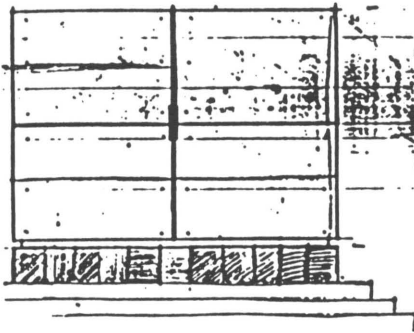
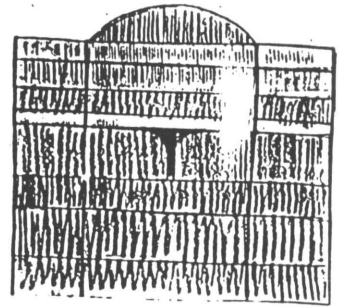
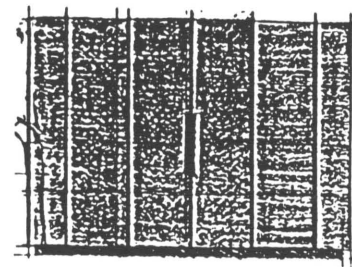
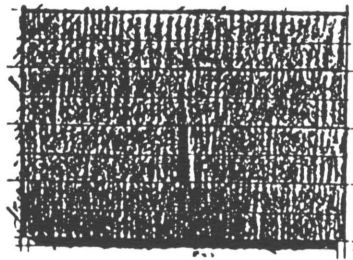
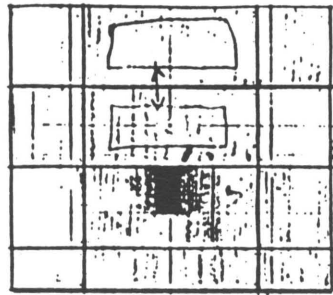
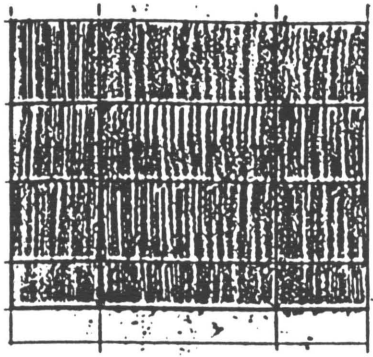
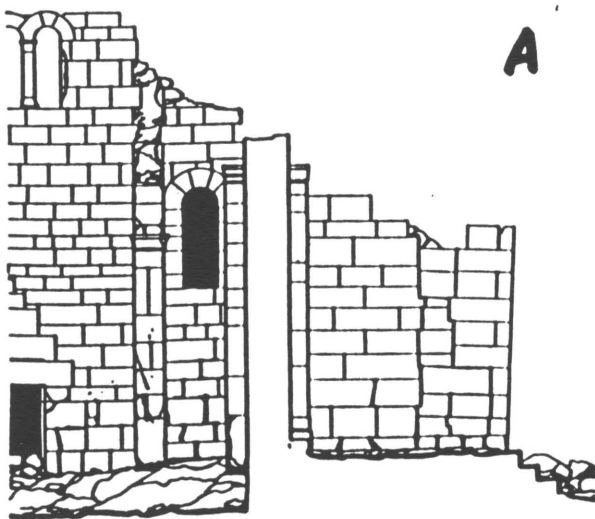
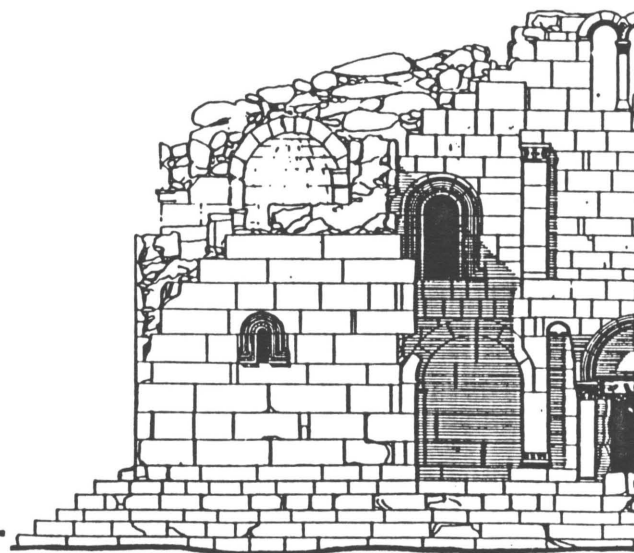
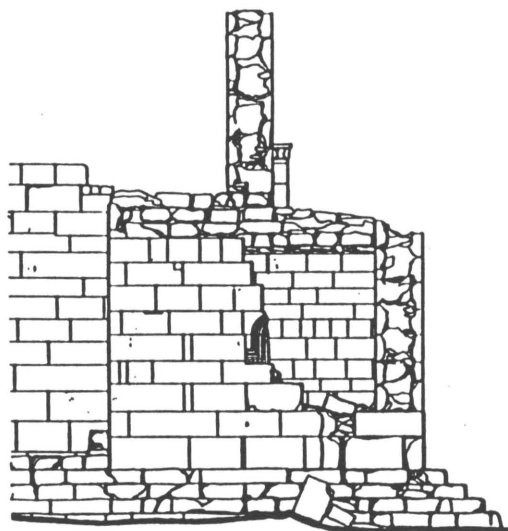
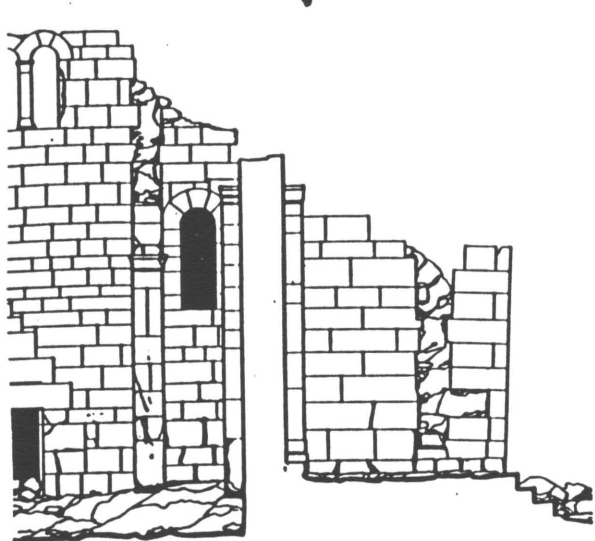


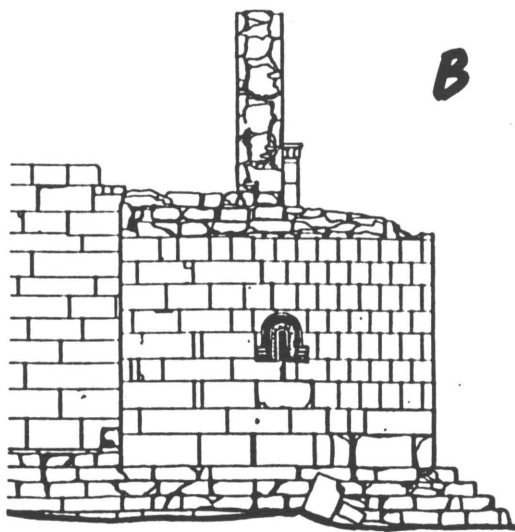
Figure 1.17 When structural intervention is necessary, the aim should be to provide the assistance to the wall in as unobtrusive a manner as possible and without imposing new stresses on the wall being repaired or on associated masonry elements. The wall in the illustration above shows distinct bowing at its head, as indicated by the vertical line of the scaffolding. To prevent further movement, a wall head beam is inserted into the wall, spanning between two cross walls

Figure 1.18 A view of the top of the wall shows several stages in the process of installation of the beam. First, all vegetation must be cleared from the wall top. Second, the wall is photographed and the stones numbered as found. Third, the stones are lifted off the top of the wall and the core work between the two lines of facing stones is excavated under archaeological supervision. Fourth, a lime mortar 'cushion' is placed to isolate the tails of the stones from the new concrete. Fifth, the reinforcement cage is placed, section by section. Sixth, concrete is tamped around the reinforcement. Finally, the wall head stones are replaced, from the records, exactly as found. The wall head beam reinforcement is turned into the heart of the cross walls to provide anchorage and restraint

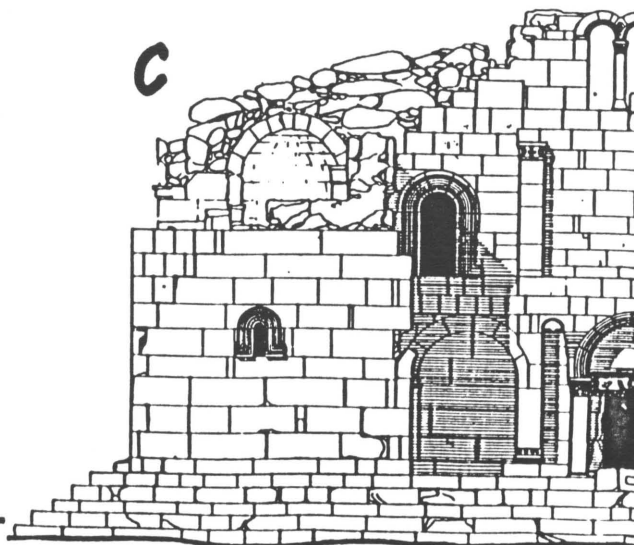




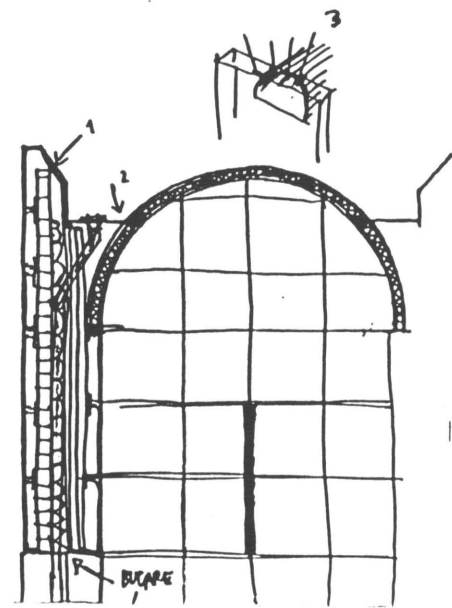
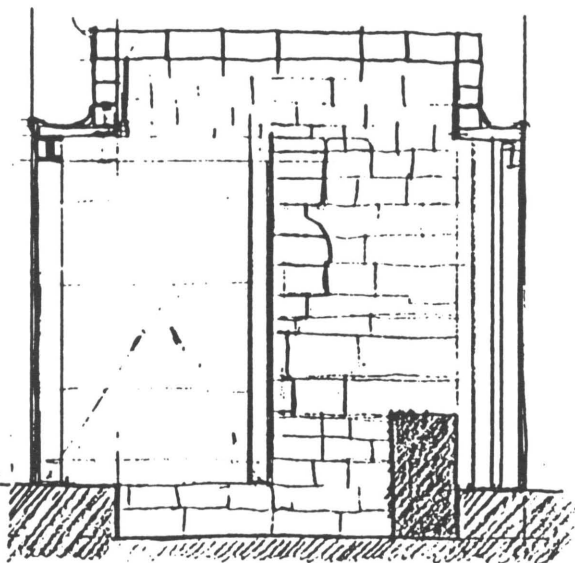
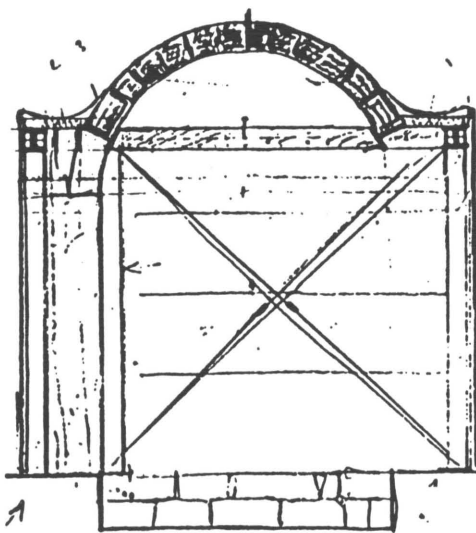
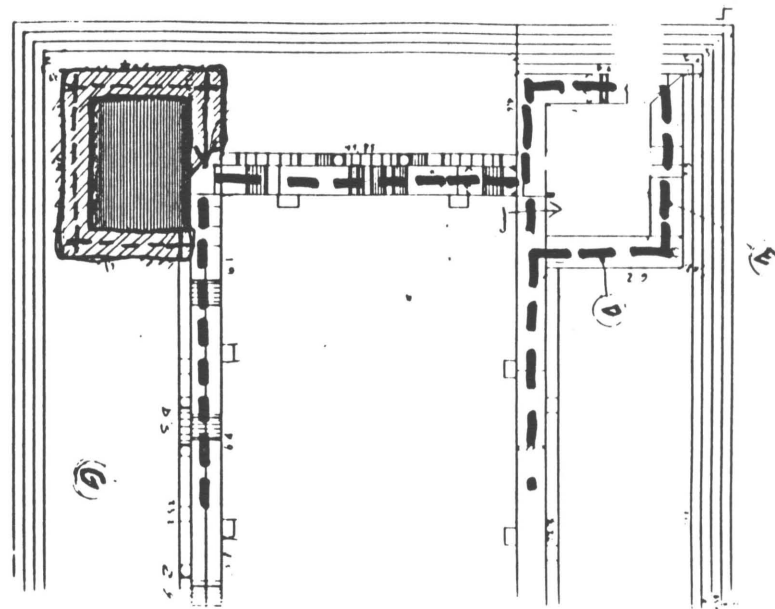
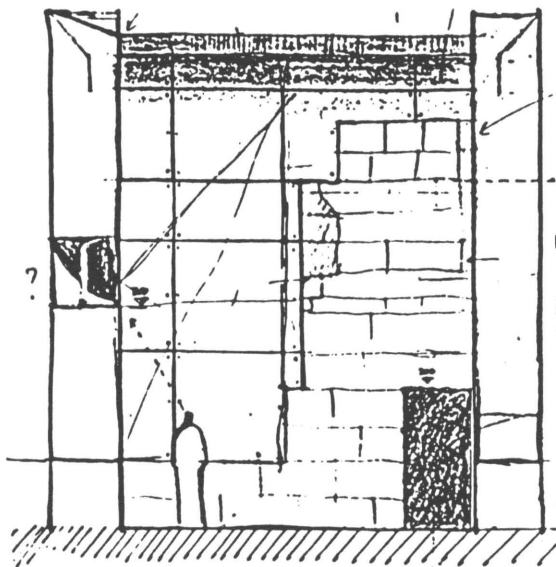
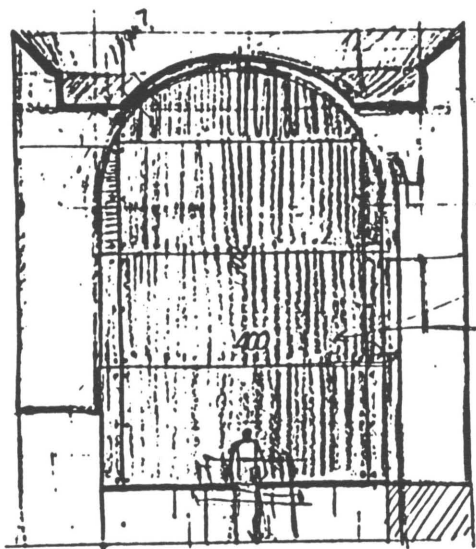
**A**



**B**



**C**



VERTICAL METAL POSTS  
FORMING THE RIGID FRAME

30/40 CORRUG SLABS

DOWN PIPE

CORRUGATED  
SANDWICH

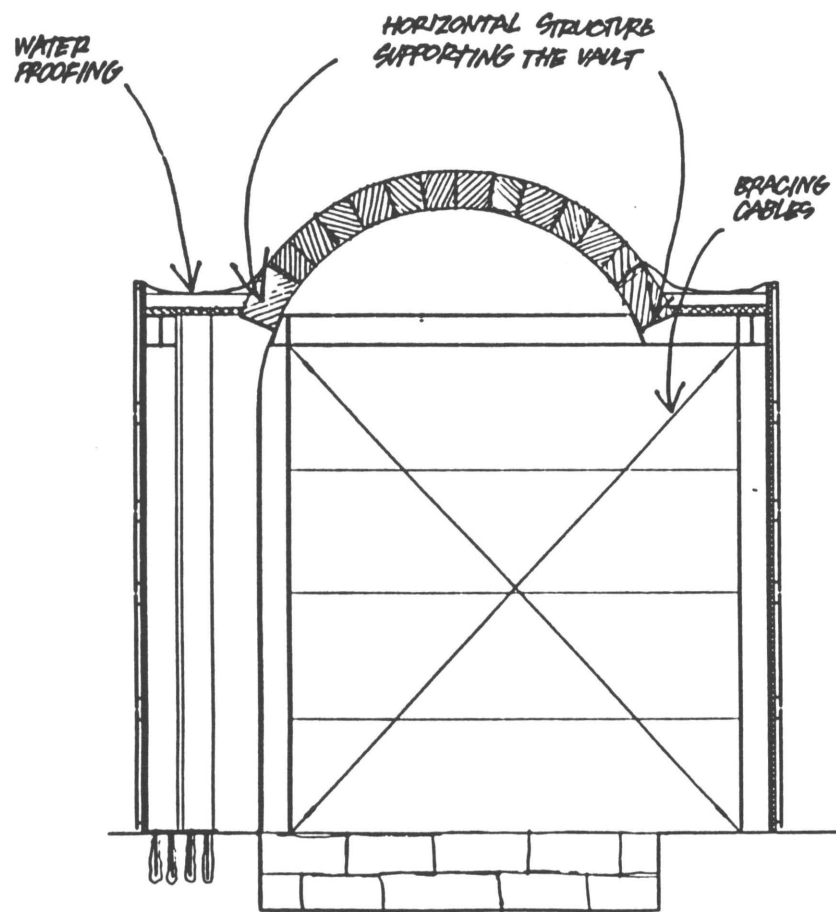
STONE BARREL VAULT  
RECONSTRUCTED BETWEEN  
THE ORIGINAL SPRING AND  
THE NEW METAL FRAME

A  
↑

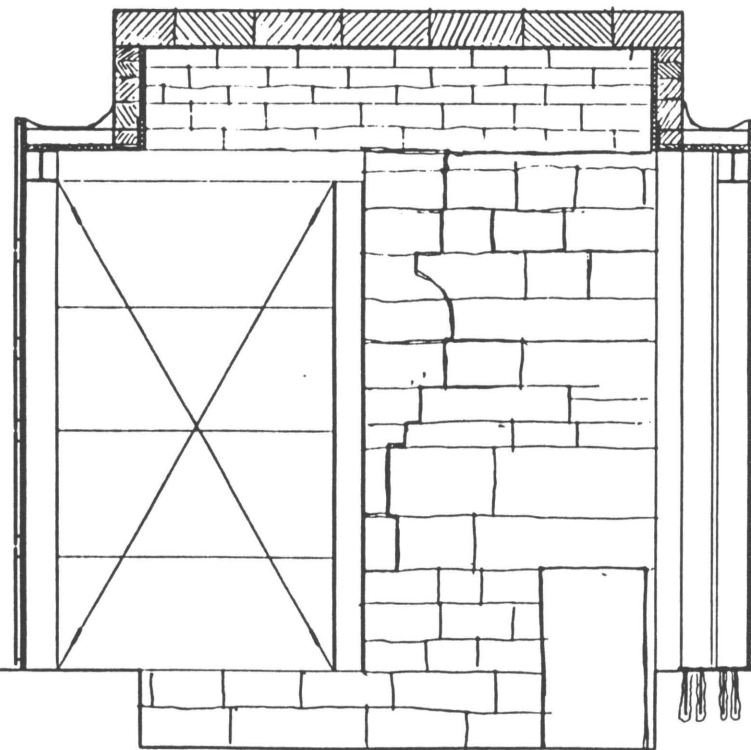
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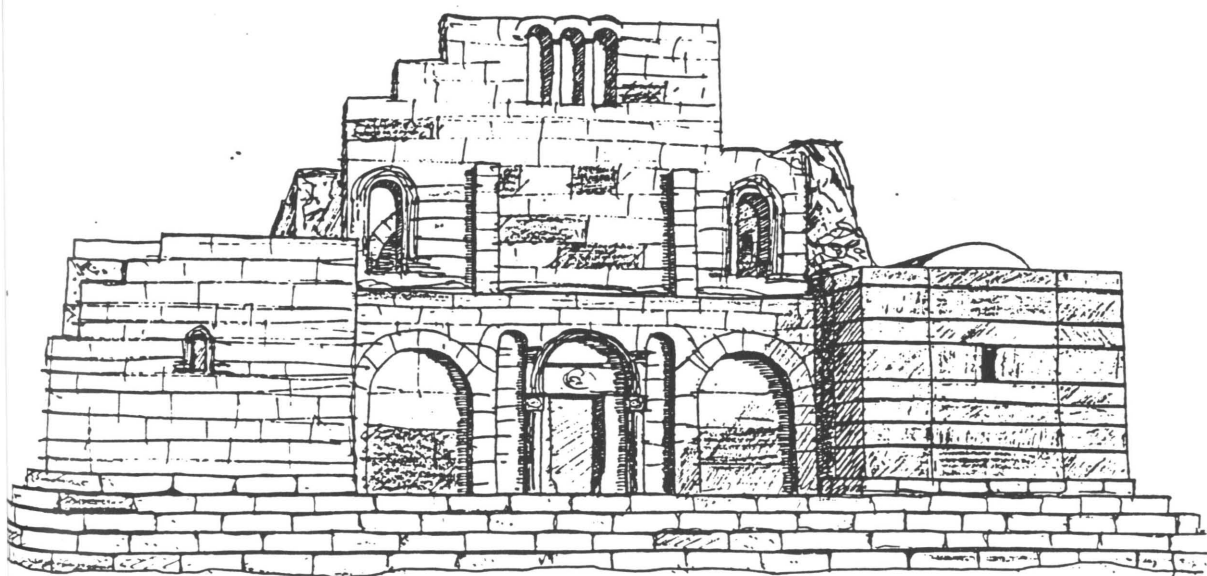
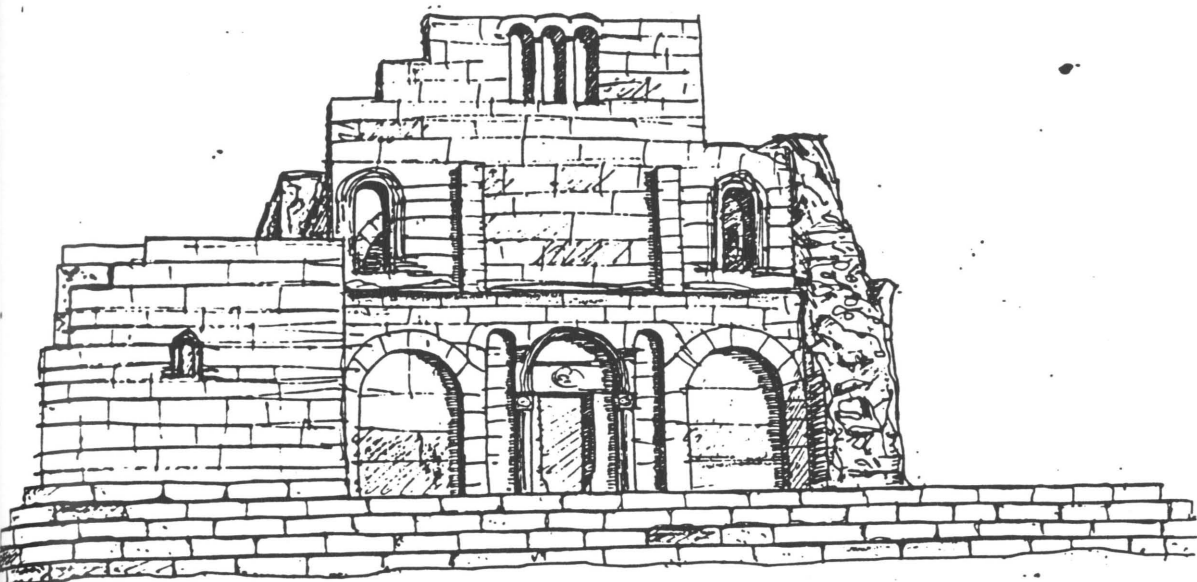
PLAN 1:50

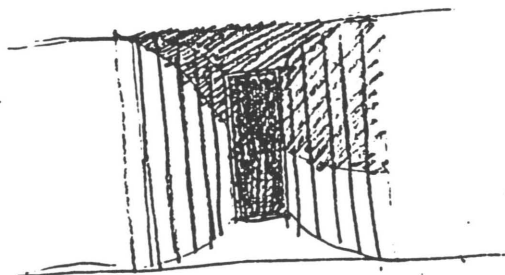
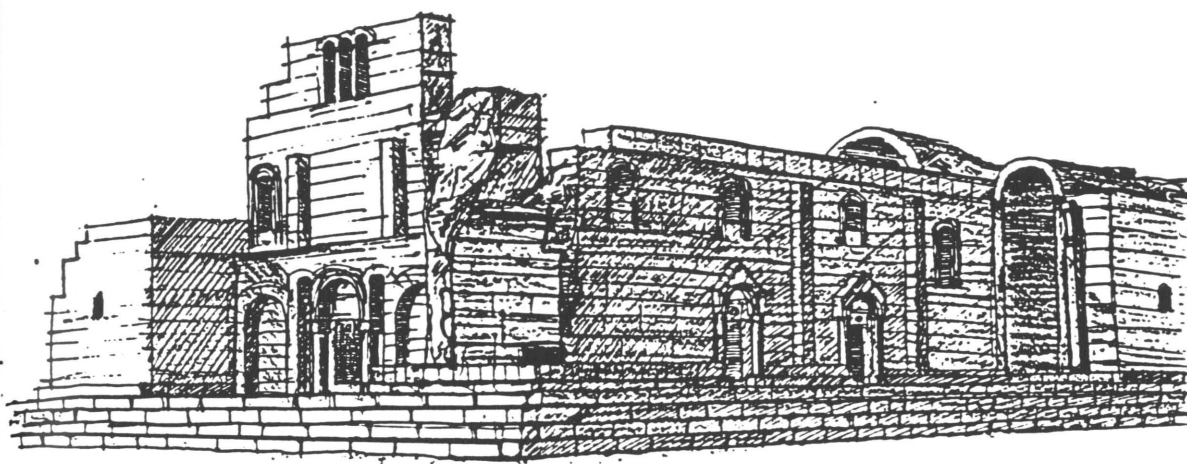
WEST ELEVATION

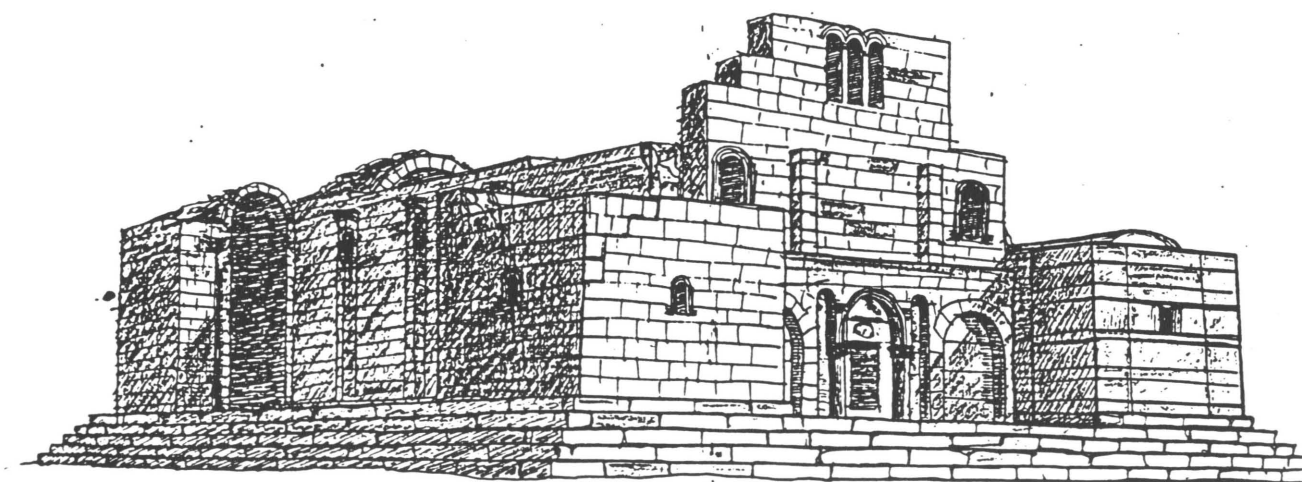
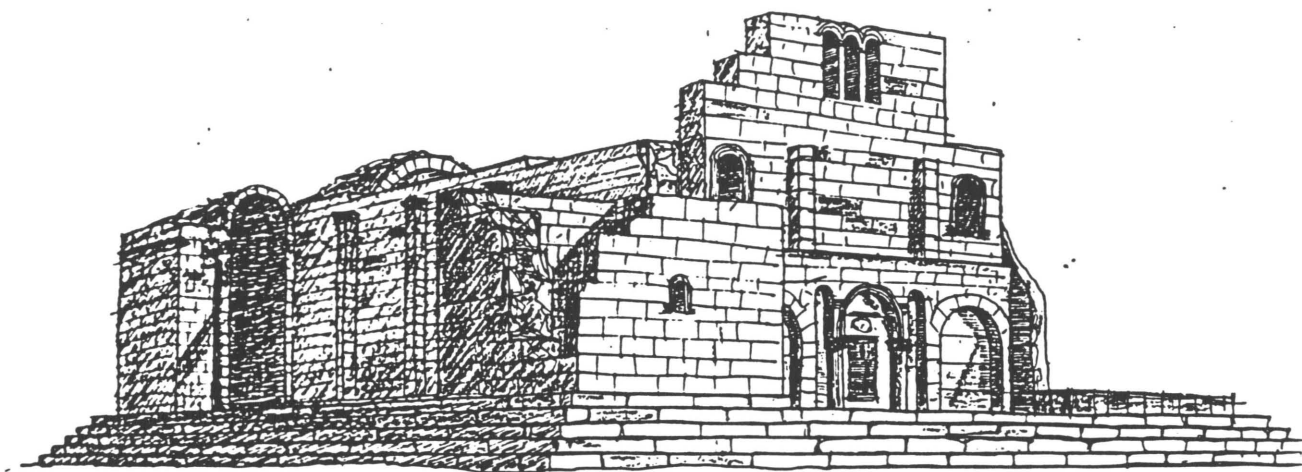


SECTION AA









## APPENDICES

- I. Seismic Analysis
- II. Material Analyses
- III. V. Grigorian's Context Planning & Design Scheme
- IV. Inscriptions
- V. References
- VI. General History of Armenia
- VII. *Armenians*, by D.R. Papazian
- VIII. Location Map
- IX. Project Income and Expenditures

*In order to support the conservation plan, Architect Rizzi has submitted the results of tests conducted by consultant Dina D'Ayala which provide insights concerning the effect of an earthquake on the basilica. Dynamic and static analyses defend the decision to reinforce the basilica as described in the following conservation plan.*

## **Structural Assessment and Feasibility Study**

Dina D'Ayala

### **Introduction**

This report presents a qualitative preliminary assessment of the state of conservation of the Ererouk Basilica, in Armenia, and investigates the possible options that a structural restoration work could undertake. The considerations presented hereafter follow a kind request for advice on the present work by Arch. Gionata Rizzi and they are based on preliminary information provided by him and on some more general data regarding the performance of Armenian stone block masonry constructions. They should be therefore considered only as a first outline of the problems that can be encountered in defining the safety level of this monument and the possible measures to upgrade and preserve it. For each point discussed the further investigations required will be indicated.

### **Assessment of safety level and upgrading design**

The definition of the safety level and the design of the most appropriate measures of strengthening should consider both the action related to vertical loads and the environmental actions, i.e. snow, earthquake, wind. In order to reduce to the essential minimum the obtrusiveness of any upgrading work the analytical model used should be the closest possible to reality so to be able to exploit at best the reserve of strength of the structure in its present state, and at the same time accurately locate a weaker portion and concentrate the intervention only where necessary. Prior to the analytical phase and in order to give a reliable judgment, the following further data are required:

- detailed survey resulting in drawings indicating position, extension, width and depth of the major cracks, holes and out of verticality of all the walls • detailed photographic survey of the monument to accompany the drawings.
- survey of the type and state of the foundation at different location, and collection of available geotechnical data of the area
- the mechanical characteristics of the materials, including thermal behavior, assessed with flatjack test in situ, and a number of laboratory tests carried out on samples taken from the walls.

Moreover the level of connection between the inner and outer leaf of the tuff wall and the level of degrade of the in-fill need to be estimated throughout the whole building, possibly by taking of undisturbed cores.

With reference to the action of vertical loads, the state of conservation of the basilica is rather uneven and from the photographic evidence (confrontation of shots taken 70 years apart) it appears that although there is probably no danger of immediate collapse, there is definitely need to ensure the stability of a number of precarious situations. Those are represented by:

- the remaining portions of the vaults and arches in the chapels and in the apse
- some vertical cracks that severe the continuity from bottom to top of the walls of the main nave
- the connections between the walls of the chapels and the walls of the nave
- some cases of non-verticality
- the west facade.
- the lintels above the openings in all the walls

To design the strengthening interventions, provisional and definitive, aimed at the conservation of the present state, once a proper loads analysis has been carried out, it should be possible to use relatively simple analytical models extended to the single portions of the structure. In the event of proposing the reconstruction of a proper roof, instead, a global analysis of the basilica has to be considered.

With regard to the seismic action, from the photographic evidence available, it is very difficult to establish whether and to which extent the monument suffered the most recent earthquakes of Erzincan and Spitak. However several authors have been indicating that in Armenia the seismic risk has been so far underestimated.

It is reasonable to assume that repeated earthquakes in the past might have been the main cause of destruction of the monument, especially if the archaeological hypothesis of a heavy stone roof is to be accepted. The damage caused by the earthquakes would have been subsequently enhanced by the lack of maintenance and repair, the weathering process, and the total abandon of the basilica. Any historical documentation or record about the performance of this, or similar, monument in past earthquakes would be crucial to support the assumptions for the analytical model, and therefore should represent an essential part of the study.

In the present state, a very simple static equivalent calculation, carried out assuming that the walls will behave as rigid body and tilt around one of the vertex indicates a very low level of safety.

However, the characteristic of the masonry, allowing for local dissipation of energy among the stone blocks, and the presence of buttresses can increase this level, although not quite to the present required standards. To enhance the behavior of the basilica, reducing the risk of further failures, it is essential to ensure the collaboration between orthogonal walls and before designing any upgrading measure the performance of these connections should be checked.

In this perspective a non linear three-dimensional finite element model appears to be the most appropriate tool. The analysis will be carried out using a special procedure elaborated by the A. and based on a commercial package, successfully used in previous work as referenced in bibliography. Simpler analyses of portions of the building will be also carried out to study more in detail the behavior at the local scale.

## Conclusions

The preliminary analysis of the structural conditions of the Ererouk Basilica points out the need for a more thorough study which can be carried out in subsequent steps representing increasing levels of accuracy. The interventions would be calibrated to different extent in relation to the general level of architectonic restoration proposed. Prior to proper structural interventions, in order to reduce the weathering process, it is essential to seal the upper surface of the walls and eventually install a covering light structure. Local structural failures and crack also need to be sheltered to prevent further deterioration. The first step would tackle the safety with respect to vertical loads. It needs to be carried out as soon as possible, completing the collection of the data required and designing some provisional and definitive interventions. The consultancy cost can be estimated in the range of 1800 to 3000 £ according to whether the data required have to be collected by the A. or provided otherwise.

After this first step, the improvement of safety, not only with respect to gravity loads, but also to the earthquake, can be evaluated. Subsequently, a more accurate analysis of the seismic behavior of the structure can be carried out and further upgrading can be designed, with the aim of satisfying the criteria of minimum obtrusiveness of the original structure and reversibility. This analysis will also allow to define the behavior with respect to wind loads. The consultancy cost for this phase, comprehensive of the analysis with sophisticated non linear models, pre- and post- upgrading works, would be approximately 5000 £.

A proper estimate of the type and cost of the design of the upgrading works can be only formulated at a latter stage when more data on the present state of the monument from the structural point of view would be available, and according to the overall budget of the project. The design would also be tailored to meet the availability of the local building industry and the skills of the contractors.

## APPENDIX II : MATERIAL ANALYSES

Included in this appendix are copies of the following analytical reports as provided by project consultant Gionata Rizzi:

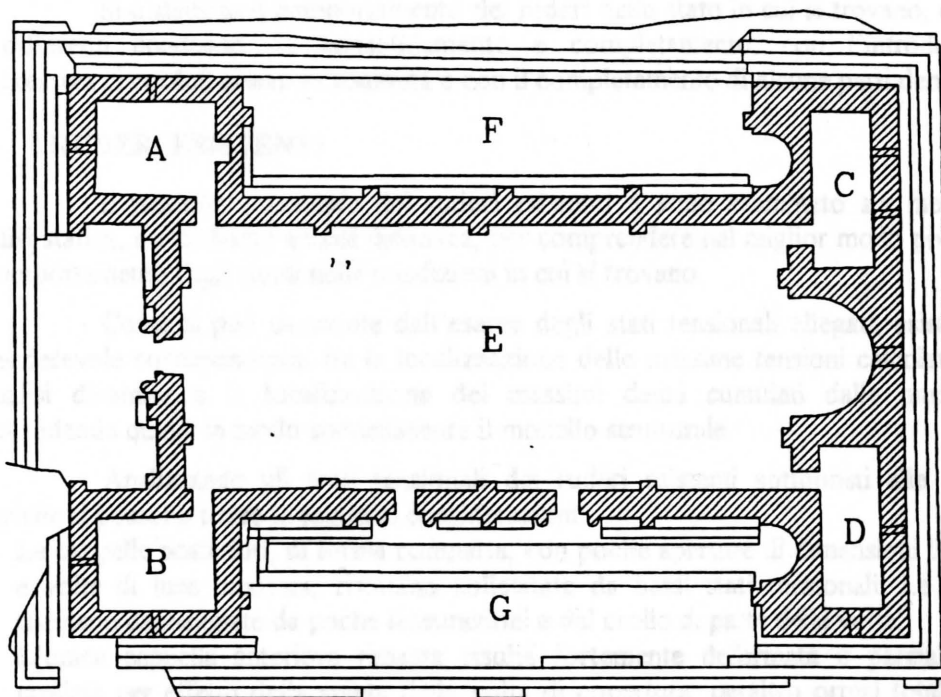
1. Computerized seismic analysis of dynamic performance of Ererouk basilica under stress (by G. Vercelli, Torino)
2. Geological description of the Tuff used in Ererouk (by R.Bugini - Centro Gino Bozza)
3. Physical characteristic of Ererouk Tuff compared with other stones (Centro Gino Bozza)
4. Physical analysis of tufa weight, mass, and porosity (by Francesca Gerli)
5. Mortar Analysis (Gionata Rizzi & Francesca Gerli)
6. Petrographic and diffrattometric analysis of the mortar (by Luisa Folli)
7. Mechanical properties of tuff and mortar (Polytechnic of Milan Laboratory)

Studio Associato  
 arch. Demetria OBERMITTO  
 e ing. Giovanni VERCELLI  
 via Torquato Tasso, 5  
 10122 TORINO  
 (p.i. 06647760013)  
 (tel. e fax: 011/436.28.54)

Preg. arch.  
**Gionata RIZZI**  
 via Ottone ROSAI, 8  
**20151 MILANO**  
 (fax 02/40.91.00.41)

Torino, 20 agosto 1996

**Oggetto:** BASILICA DI EREROUK.  
 Miglioramento del comportamento sismico dell'edificio.



## 1. PREMESSA

I resti dell'edificio in oggetto risultano costituiti oggi da una parte considerevole delle murature originali, anche se parzialmente demolite e parzialmente ricostituite in occasione di precedenti interventi di restauro. In particolare risulta ancora completo il sistema delle fondazioni, mentre risulta completamente mancante una delle cappelle anteriori.

Lo stato di degrado delle murature indica sia l'effetto di invecchiamento prodotto dall'erosione del tempo che un processo di rottura delle murature dovuto al

raggiungimento di tensioni superiori a quelle sopportabili dalla muratura in corrispondenza di eventi sismici.

Lo scopo del presente studio è quello di studiare il comportamento sismico dei ruderi nello stato in cui si trovano e stabilire l'effetto di opere di consolidamento che conservino e rispettino quanto più possibile i resti.

Lo studio dell'edificio è stato condotto mediante simulazione della struttura muraria con l'impiego del programma di calcolo "SuperSap" elementi finiti "Plate/Shell" di tipo isotropo e omogeneo, di spessore pari a quello delle murature e caratteristiche meccaniche corrispondenti ai valori desunti dalle prove effettuate sui campioni di muratura e di malta.

L'edificio è stato analizzato sotto l'azione del peso proprio e di un sisma corrispondente alla I categoria prevista dalla normativa italiana, agente separatamente nelle due direzioni principali dell'edificio e corrispondenti ad un sistema di forze orizzontali pari a circa 1/10 delle masse strutturali presenti.

Si è studiato il comportamento dei ruderi nello stato in cui si trovano, quindi in differenti condizioni di consolidamento e completamento, con l'introduzione progressiva di cordoli armati in sommità e con il completamento di alcune parti demolite.

## **2. I RUDERI ESISTENTI**

Il modello strutturale dei ruderi esistenti è stato esaminato sia mediante analisi statica, sia mediante analisi dinamica, per comprendere nel miglior modo possibile il comportamento degli stessi nelle condizioni in cui si trovano.

Come si può desumere dall'esame degli stati tensionali allegati, esiste una considerevole corrispondenza fra la localizzazione delle massime tensioni calcolate con l'analisi dinamica e la localizzazione dei massimi danni cumulati dalle murature, convalidando quindi in modo soddisfacente il modello strutturale.

Analizzando gli stati tensionali dei ruderi esistenti sottoposti alle azioni sismiche si possono trarre le seguenti considerazioni:

- Le cappelle posteriori, di forma compatta, con poche aperture di dimensioni limitate e volte di luce modesta, risultano sollecitate da bassi stati tensionali. Le stesse risultano danneggiate da poche fessurazioni e dal crollo di parte delle volte.
- L'unica cappella anteriore rimasta risulta fortemente deformata e parzialmente crollata per effetto della spinta della volta di copertura, peraltro ormai totalmente mancante. I ruderi residui, di altezza ridotta ma fortemente slegati negli angoli, risultano sottoposti a tensioni superiori a quelle delle torri posteriori.
- La facciata principale, completamente slegata sul lato della cappella mancante, risulta sottoposta a forti stati tensionali, soprattutto in corrispondenza delle sezioni di incastro al piede e alle pareti ortogonali della cappella residua. Le sezioni più sollecitate risultano anche essere interessate dal maggiore degrado delle murature.
- La facciata longitudinale cieca risulta interessata dalle massime tensioni in nella sezione di incastro con la fondazione, soprattutto in corrispondenza delle lesene. Nella stessa sezione sono presenti i maggiori danni nella muratura.
- La facciata longitudinale con aperture, fortemente slegata in corrispondenza della cappella mancante, risulta sollecitata da forti stati tensionali, soprattutto nella

sezione di incastro nella fondazione e verso la cappella mancante. Anche in questo caso alle massime sollecitazioni corrispondono i massimi danni nella muratura.

Complessivamente, analizzando anche nel dettaglio l'entità degli stati tensionali, si può quindi concludere che le maggiori lesioni e crolli nelle murature sono originati dalle spinte delle volte, non adeguatamente dotate di elementi di supporto delle spinte e dal conseguente progressivo disgregamento degli ammorsamenti angolari fra le murature. A questo si aggiunge uno stato tensionale, soprattutto al piede delle pareti longitudinali, caratterizzato ciclicamente da compressioni superiori ai valori resistenti e trazioni incompatibili.

### **3. I MIGLIORAMENTI**

Il miglioramento del comportamento sismico dell'edificio può essere ottenuto mediante uno o più dei seguenti metodi:

- Modificazione della composizione della muratura con conseguente miglioramento delle caratteristiche meccaniche, ottenibile mediante operazioni di cuci-scuci o mediante iniezioni.
- Posizionamento di elementi strutturali integrativi quali incatenamenti, contrafforti, nuovi pilastri, ecc...
- Inserimento di cordolature in sommità ed eventuale ricostituzione delle murature in modo da modificare il comportamento strutturale delle murature a costituire un comportamento "scatolare" che permetta una riduzione degli stati tensionali.

Al fine di ottenere un buon miglioramento del comportamento sismico dei reperti archeologici presenti, senza peraltro comprometterne il valore storico e documentativo, dovranno essere realizzati solamente quegli interventi che risultino compatibili. In particolare potranno essere realizzati:

- inserimento di incatenamenti angolari fra le murature;
- iniezioni nella muratura a sacco;
- interventi di cuci-scuci in corrispondenza delle zone più degradate;
- ricostruzioni di murature in corrispondenza delle lesioni;
- ricostruzione della cappella mancante;
- realizzazione di cordolature armate sulla sommità delle murature.

Sono stati presi in esame i modelli strutturali di due possibili composizioni di intervento. La prima risulta sostanzialmente costituita dalla semplice realizzazione di un cordolo di sommità che migliori il comportamento scatolare della struttura. Il secondo prevede anche la ricostituzione delle parti mancanti delle murature, il riallineamento in altezza delle stesse e la ricostruzione della cappella mancante, sia pure con struttura metallica ma tuttavia in grado di ricostituire la simmetria dell'edificio.

Come risulta dall'analisi degli stati tensionali dei modelli rinforzati, si evidenziano considerevoli riduzioni delle tensioni nelle murature per effetto del migliorato equilibrio ottenibile con gli interventi di consolidamento, soprattutto se sufficientemente esteso da garantire il comportamento scatolare e la simmetria dell'edificio.

Gli stessi interventi possono realizzare il duplice scopo di migliorare il comportamento sismico e ridurre il degrado dovuto all'usura del tempo, predisponendo i

resti archeologici alla conservazione, soprattutto se abbinata ad un adeguato piano di manutenzione che si preoccupi di ripristinare in modo continuo le azioni del tempo e dei probabili futuri eventi sismici.

#### **4. ALLEGATI**

Si allegano alla presente relazione le visualizzazioni grafiche degli stati di tensione dei vari modelli strutturali presi in considerazione. Tali allegati risultano numerati secondo lo schema X.Y.Z in cui:

**X** rappresenta il modello preso in considerazione ed in particolare:

- 1: per i resti nello stato in cui si trovano, analisi statica;
- 2: per i resti nello stato in cui si trovano, analisi dinamica;
- 3: per la realizzazione del solo cordolo di sommità, analisi dinamica;
- 4: per la ricostituzione della simmetria, analisi dinamica.

**Y** rappresenta la combinazione di carico considerata ed in particolare:

- 1: per l'azione del sisma nella direzione longitudinale positiva;
- 2: per l'azione del sisma nella direzione longitudinale negativa;
- 3: per l'azione del sisma nella direzione trasversale positiva;
- 4: per l'azione del sisma nella direzione trasversale negativa.

**Z** rappresenta il tipo di stato di tensione preso in considerazione (valori di trazione positivi):

- 1: per le tensioni assiali orizzontali sulla faccia in vista;
- 2: per le tensioni assiali orizzontali sulla faccia nascosta;
- 3: per le tensioni assiali verticali sulla faccia in vista;
- 4: per le tensioni assiali verticali sulla faccia nascosta;
- 5: per le tensioni tangenziali sul piano medio della muratura.

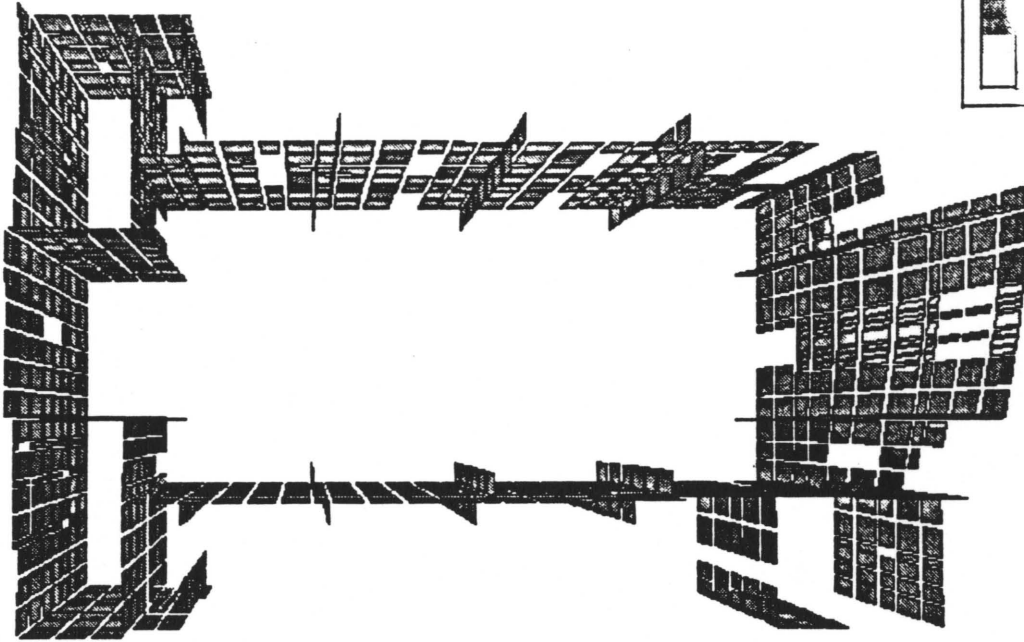
Tutti gli allegati sono forniti in bianco e nero, con evidenziazione degli stati di tensione con varie tonalità di grigio. Per migliorare la leggibilità ed evidenziare il miglioramento ottenibile sono allegati anche elaborati a colori, relativi alla sola parete longitudinale con aperture e limitatamente alle tensioni assiali verticali sulla faccia in vista.



Giovanni Vercelli

# STATIC ANALYSIS

Ererouk: Tensor S11 [Stress] - load case: 1 - 96/07/26 11:47

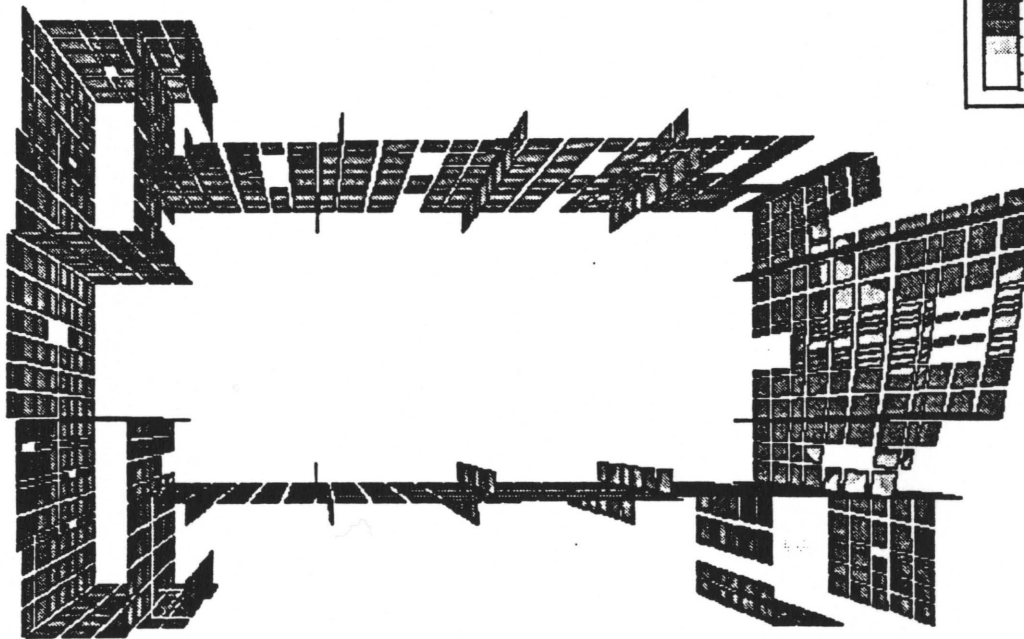
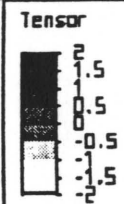


SVIEW 4.12 File:supercst 96/07/26 11:48 LC 1/ 5 Vu= 1 Lo= 0 La= 90 R= 0

7.7.1

# DYNAMIC ANALYSIS

Ererouk: Tensor S11 [Stress] - load case: 1 - 96/07/26 12:02

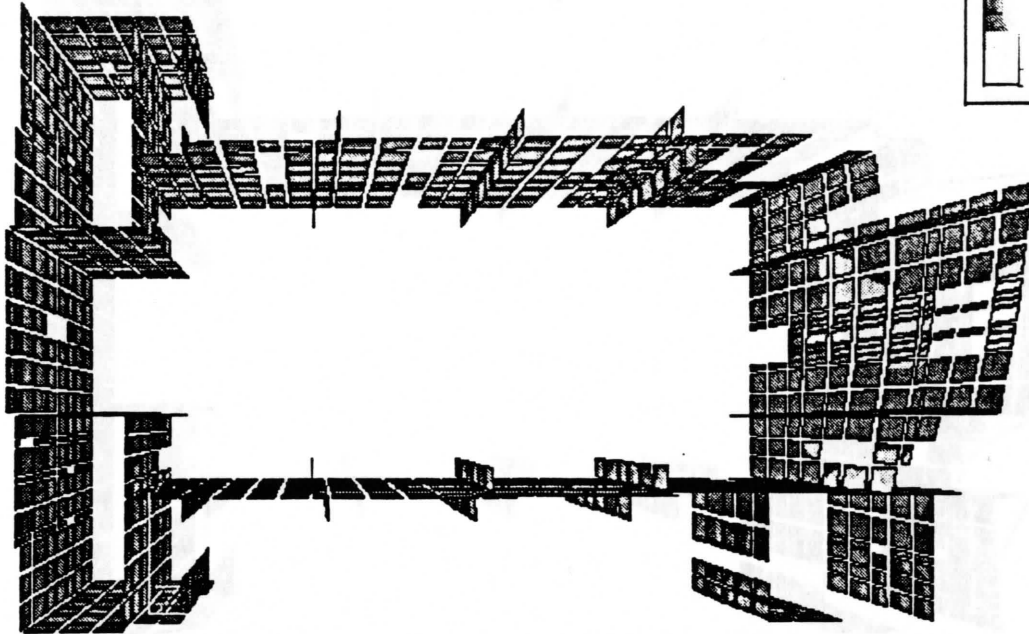
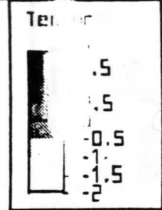


SVIEW 4.12 File:superco 96/07/26 12:03 LC 1/ 5 Vu= 1 Lo= 0 La= 90 R= 0

7.7.1

# WITHOUT RING BEAM

Ererouk: Tensor S11 [Stress] - load case: 1 - 96/07/26 12:02

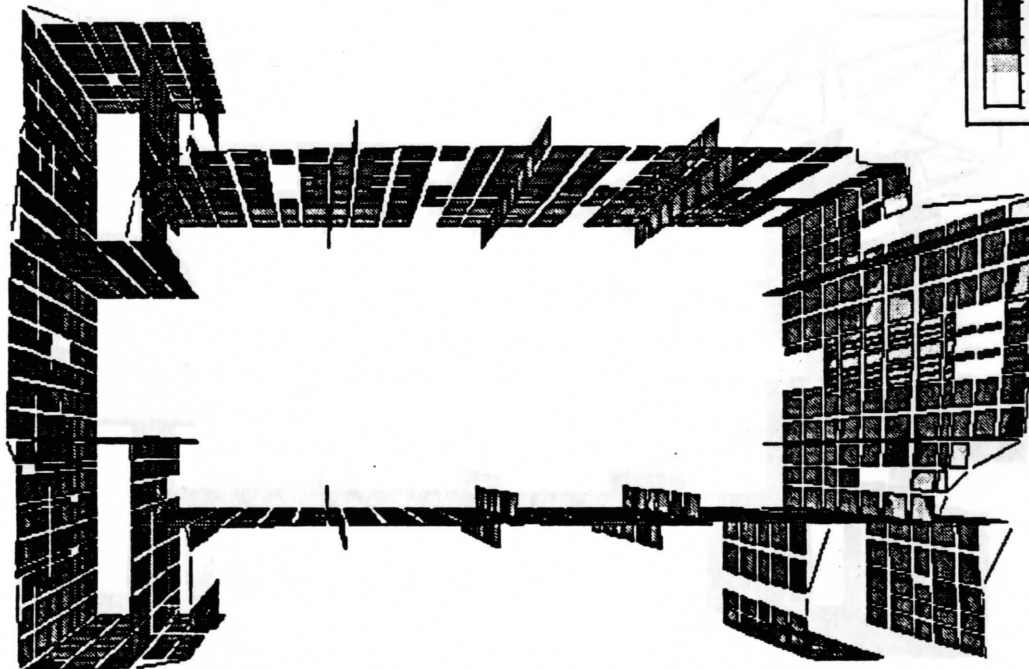
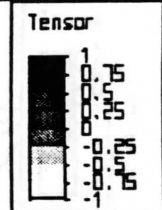


SVIEW 4.12 File:superco 96/07/26 12:03 LC 1/ 5 Vu= 1 Lo= 0 La= 90 R= 0

2.4.1

# WITH RING BEAM

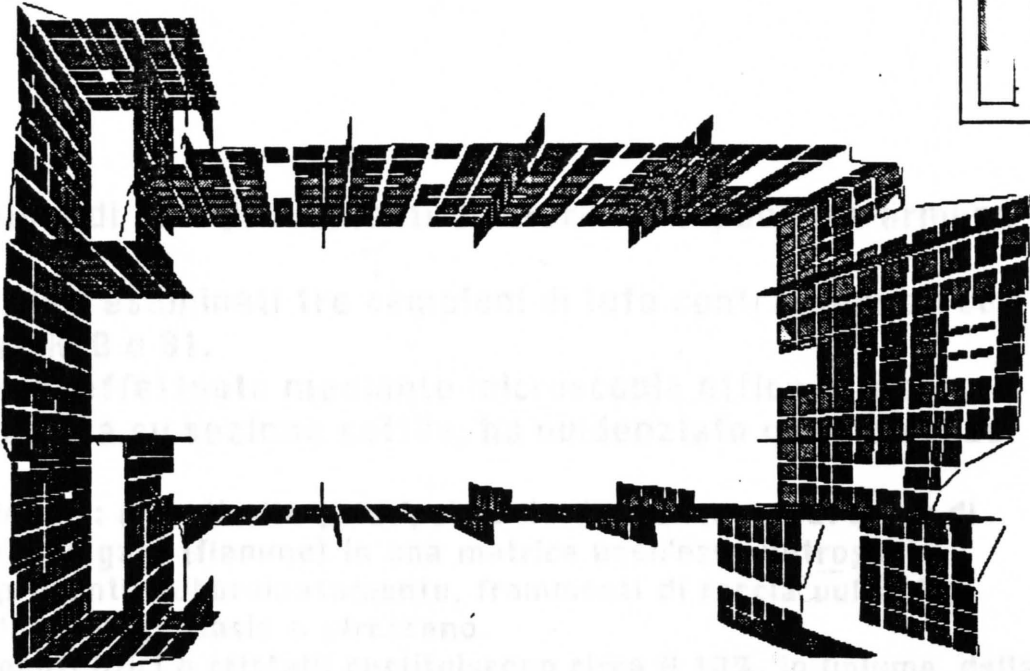
Ererouk: Tensor S11 [Stress] - load case: 1 - 96/07/26 13:03



SVIEW 4.12 File:superco 96/07/26 13:04 LC 1/ 5 Vu= 1 Lo= 0 La= 90 R= 0

3.2.1

Ererouk: Tensor S22 [Stress] - load case: 1 - 96/07/26 13:03

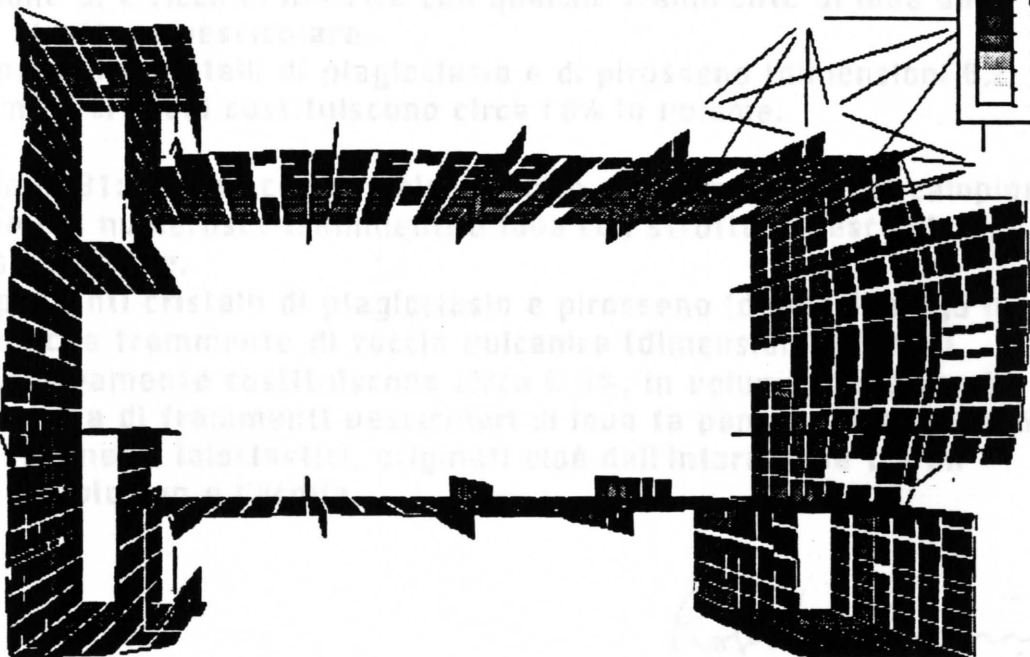
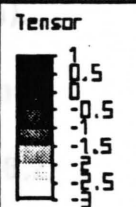


SVIEW 4.12 File:superco 96/07/26 13:04 LC 1/ 5 Vu= 1 Lo= 0 La= 90 R= 0

3.1.0

WITH SW TOWER

Ererouk: Tensor S22 [Stress] - load case: 1 - 96/07/26 13:06



SVIEW 4.12 File:superco 96/07/26 13:07 LC 1/ 5 Vu= 1 Lo= 0 La= 90 R= 0

4.1.0

## Campioni di tufo provenienti da Ereruk - Repubblica armena

Sono stati esaminati tre campioni di tufo contrassegnati con le lettere A, B e B1.

L'esame, effettuato mediante microscopia ottica in luce polarizzata su sezione sottile, ha evidenziato quanto segue.

Campione A: è costituito principalmente da frammenti di vetro di forma allungata (fiamme) in una matrice anch'essa vetrosa.

Sono presenti, subordinatamente, frammenti di roccia vulcanica, cristalli di plagioclasio e pirosseno.

Frammenti litici e cristalli costituiscono circa il 10%, in volume, della roccia.

Le fiamme presentano le caratteristiche superfici concave.

I frammenti di roccia, con la tipica struttura porfirica in cui spiccano cristalli di pirosseno zonato, hanno dimensioni ragguardevoli (2-3 mm); i cristalli singoli di plagioclasio, zonati, hanno abito prismatico (dimensioni non superiori a 0,5 mm); i cristalli singoli di pirosseno, anch'essi con abito prismatico, hanno dimensioni minori (0,2 mm).

Campione B: è ricco di matrice con qualche frammento di lava dalla tipica struttura vescicolare.

Sono presenti cristalli di plagioclasio e di pirosseno (dimensioni 0,2-0,3 mm). I cristalli costituiscono circa l'8% in volume.

Campione B1: ha una composizione molto simile a quella del campione B; sono più numerosi i frammenti di lava con struttura vescicolare, disposti a bande.

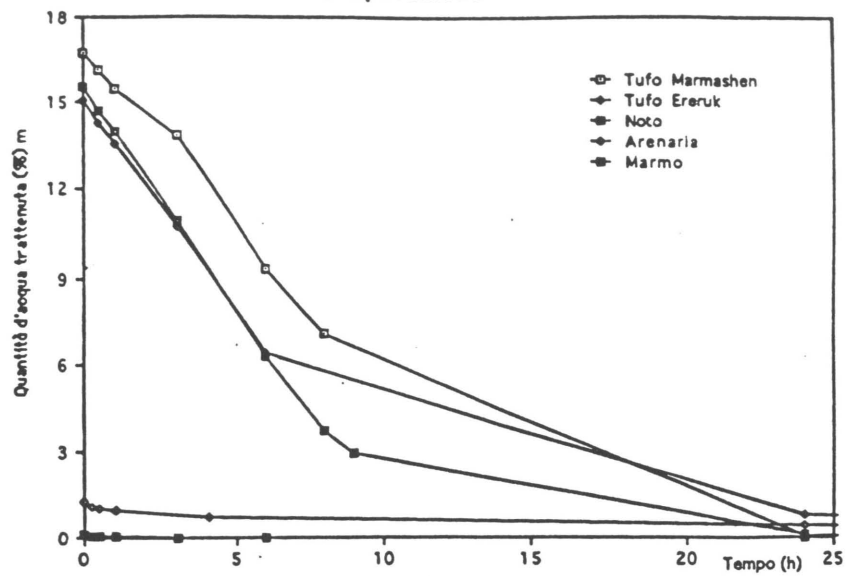
Sono presenti cristalli di plagioclasio e pirosseno (dimensioni 0,5 mm), con qualche frammento di roccia vulcanica (dimensioni 0,5 mm).

Complessivamente costituiscono circa il 5%, in volume, della roccia.

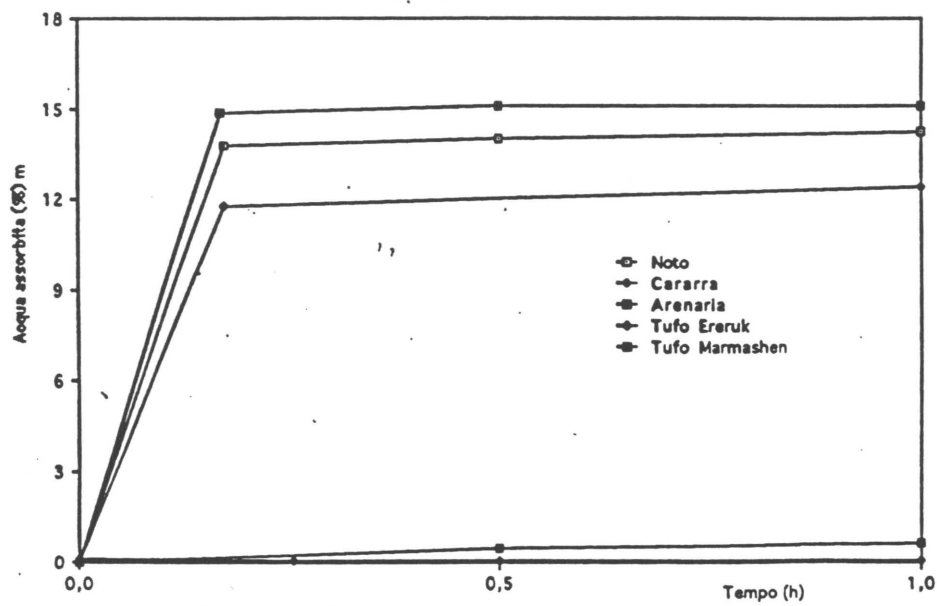
La presenza di frammenti vescicolari di lava fa pensare, (campioni B e B1) a sedimenti taloclastici, originati cioè dall'interazione fra un magma esplosivo e l'acqua.

Roberto Bugnini

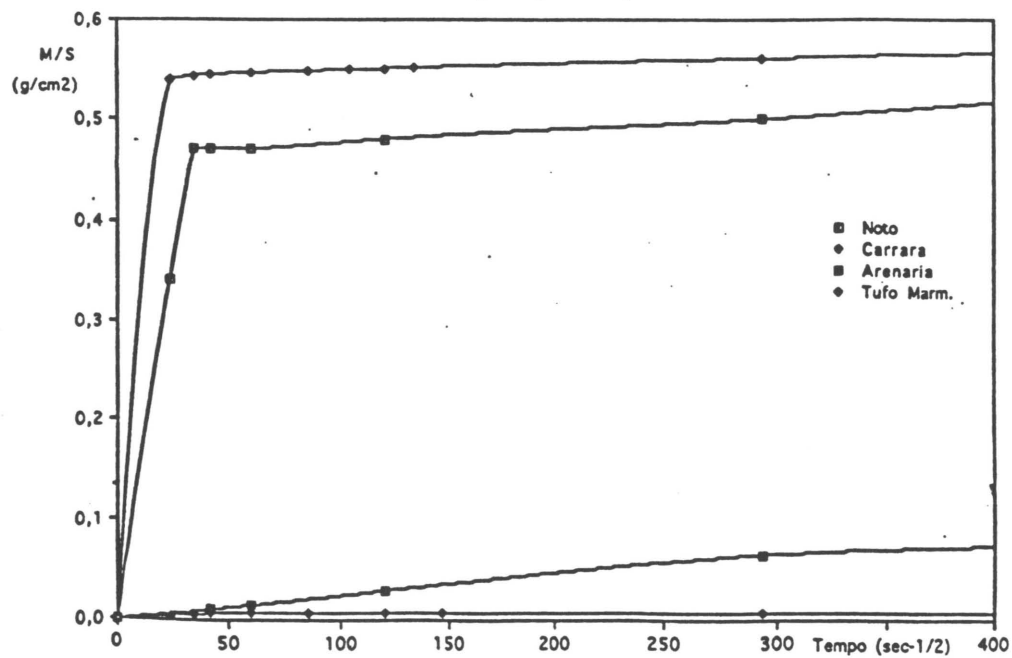
# Evaporazione



## Assorbimento d'acqua per immersione totale



## Assorbimento d'acqua per capillarità



## Tuff Analysis

Dry weight	Saturated weight	Mass=Volume of pores $M_p = V_p$	Apparent Volume $V_a$	%Porosity= $(V_p : V_a) 100$	Weight of Volume (W/V)
324.30g.	389.00g	65.30	260ml=cm <sup>3</sup>	25.11%	1.24 g/cm <sup>3</sup>

## Mortar Analysis

- Weight of Volume - Porosity

Dry weight	Saturated weight	Mass=Volume of pores $M_p = V_p$	Apparent Volume $V_a$	%Porosity= $(V_p : V_a) 100$	Weight of Volume (W/V)
101 g.	122.00g	21	80ml=80cm <sup>3</sup>	26.25%	1.2625 g/cm <sup>3</sup>

- Binder/aggregate ratio (digestion in Hydrochloric Acid)

Weight of the sample	g. 277.7	
Aggregates	g. 148.3	53.5%
Digested	g. 129.4	46.5%

Considering that the aggregates consist entirely of ground pumice (see appendix) weighing approximately 600Kg/mc. and that lime putty weighs about 1000Kg/mc, it is possible to calculate the binder/aggregate ratio of the original mix by volume:

volume of the aggregate: 148.3 : 0.6 = 247 (66%)

volume of binder: 129.4 : 1 = 129.4 (34%)

corresponding to a mortar made of one part of lime putty and two parts of pumice.

- Size particle distribution

Sieve	Weight retained	%
4.74mm	4g	2.7
2.36mm	13.4g	9.2
1.18mm	31.7g	21.7
0.60mm	53.5g	36.6
0.30mm	20.6g	14.1
0.15mm	10.3g	7
fines	12.5g	8.56

# STUDIO DI MALTE PROVENIENTI DA EREROUK (ARMENIA)

## 1. INTRODUZIONE

La muratura della chiesa di Ererouk è composta da un corpo centrale portante costituito da blocchi di materiale tufaceo allettati con malta e da due paramenti in tufo che rivestono tale struttura. La malta di allettamento è stata sottoposta a indagini scientifiche allo scopo di determinarne struttura, composizione e natura mineralogica del legante e dell'aggregato, porosità. E' stato inoltre considerato con particolare riguardo il rapporto volumetrico fra i componenti.

## 2. METODI DI STUDIO

ANALISI PETROGRAFICA. Microscopia ottica in luce polarizzata su sezione sottile: ha permesso di descrivere la struttura e la composizione mineralogica.

ANALISI DIFFRATTOMETRICA. Diffrattometria ai raggi X su polveri: ha permesso di determinare la natura mineralogica dei singoli componenti.

ANALISI POROSIMETRICA. Porosimetria a mercurio: ha permesso di quantificare la porosità.

ANALISI MODALE. Elaborazione digitale dell'immagine: ha permesso di valutare il rapporto volumetrico aggregato/legante.

## 3. RISULTATI ANALITICI

### 3.1 QUALIFICAZIONE PETROGRAFICA

Si tratta di una malta costituita da un legante carbonatico con tessitura microcristallina e struttura quasi omogenea (sono rari i grumi) e da un aggregato con pomice predominante, rari frammenti

di vulcanite, cristalli isolati di plagioclasio e alcune lamelle biotitiche, qualche minerale opaco.

La pomice presenta aspetto bolloso ed è interamente costituita da vetro; si nota un particolare fenomeno, denominato *lettaggio del vetro*, per il quale il vetro è depositato a letti.

Nettamente subordinati alla pomice sono: la vulcanite non pomicea costituita da fenocristalli o microliti molto piccoli di plagioclasio e di mica biotite immersi in una massa di fondo totalmente vetrosa; cristalli di plagioclasio e lamelle di biotite isolati provenienti dalle vulcaniti; minerali opachi più o meno limonitizzati.

### 3.2 NATURA MINERALOGICA DEI SINGOLI COMPONENTI

Calcite: predominante sugli altri minerali; è totalmente attribuibile alla frazione legante.

Plagioclasio: è discretamente presente ed è attribuibile alla frazione aggregato.

Mica: è presente in tracce ed è attribuibile alla frazione aggregato.

Vetro: Il vetro, sostanza amorfa, cioè priva di reticolo cristallino, non appare in un'analisi che permette l'individuazione delle sostanze cristalline, sostanze che posseggono un reticolo, caratteristico per ciascun minerale.

### 3.3 POROSITÀ APERTA INTEGRALE

La porosità totale è pari al 47,33%. La distribuzione porosimetrica presenta due massimi: il primo in corrispondenza di pori con un diametro fra 1 e 5  $\mu\text{m}$ ; il secondo in corrispondenza di pori con diametro compreso fra 0,025 e 0,1  $\mu\text{m}$ .

### 3.4 RAPPORTO AGGREGATO/LEGANTE

La valutazione del rapporto fra aggregato e legante è stata effettuata con elaborazione digitale dell'immagine microscopica. E' stata esplorata l'intera sezione sottile utilizzando immagini in successione. Nella tabella seguente sono riportati i dati in percentuale riferiti alle diverse immagini elaborate.

LEGANTE	65	41	33	53	27	29	58	49	36	35	32	22	32	26
AGGREGATO	-	39	31	30	55	37	14	22	34	49	54	55	55	55
CAVITÀ	35	20	36	17	18	34	28	29	30	16	14	23	13	19

La percentuale media ricavata dalle immagini elaborate è: legante 38%, aggregato 38%, cavità 24%.

Il rapporto legante/aggregato è circa 1/1.

#### 4. CONSIDERAZIONI CONCLUSIVE

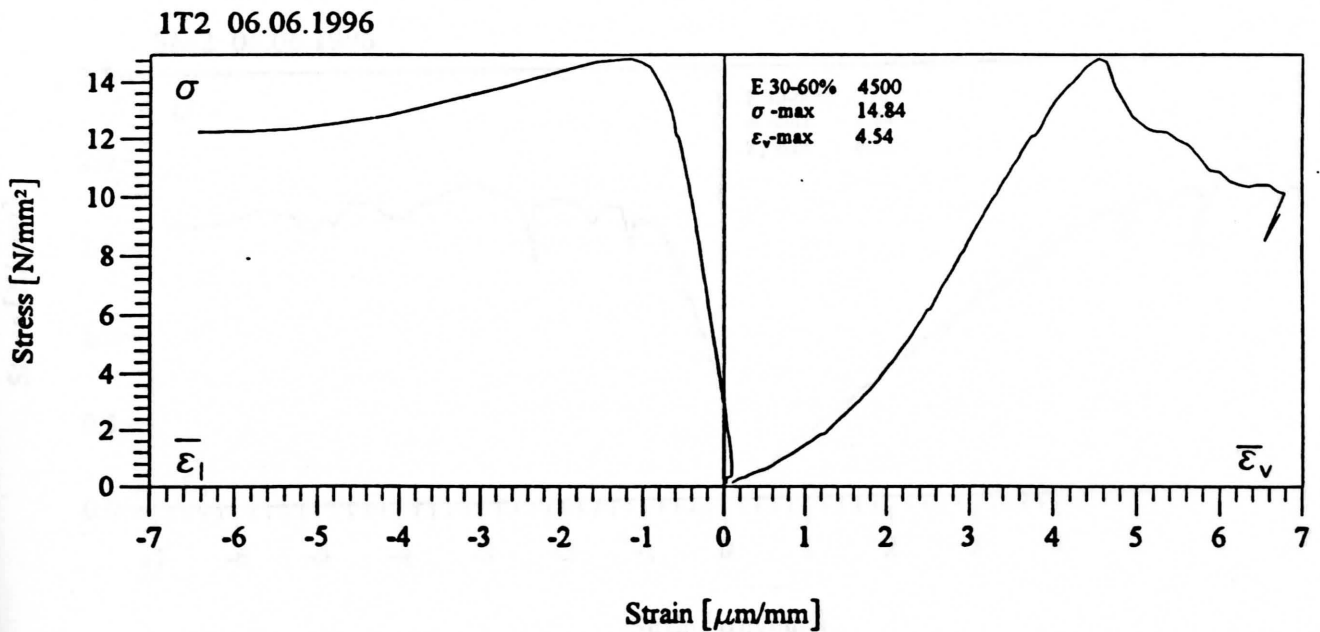
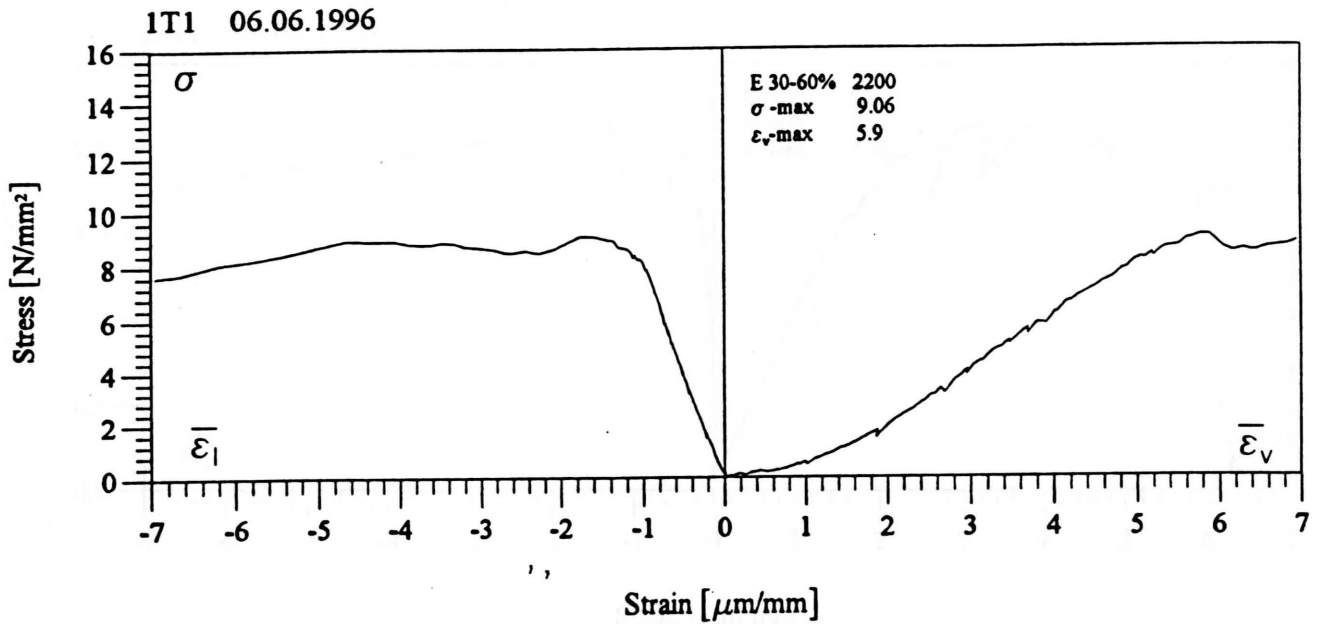
La malta di allettamento del corpo centrale della muratura di Ererouk é costituita da un legante calcitico e da un aggregato a base di pomice con rari frammenti di vulcanite, cristalli isolati di plagioclasio e alcune lamelle biotitiche, qualche minerale opaco. L'aggregato proviene da depositi piroclastici.

La porosità ha un valore di 47,3%; si tratta di un valore molto elevato anche per quanto riguarda i valori di una malta.

Il rapporto aggregato/legante è 1/1. Questo valore è in buon accordo con quello dei trattatisti antichi: Vitruvio (*De Architectura*, Libro II cap. 6, Libro V cap. 12) suggerisce un rapporto di due parti di "pozzolana" e una parte di calce; si ricorda che l'analisi volumetrica su sezione sottile porta ad una sottostima del valore dell'aggregato e quindi ad una sovrastima del valore del legante.

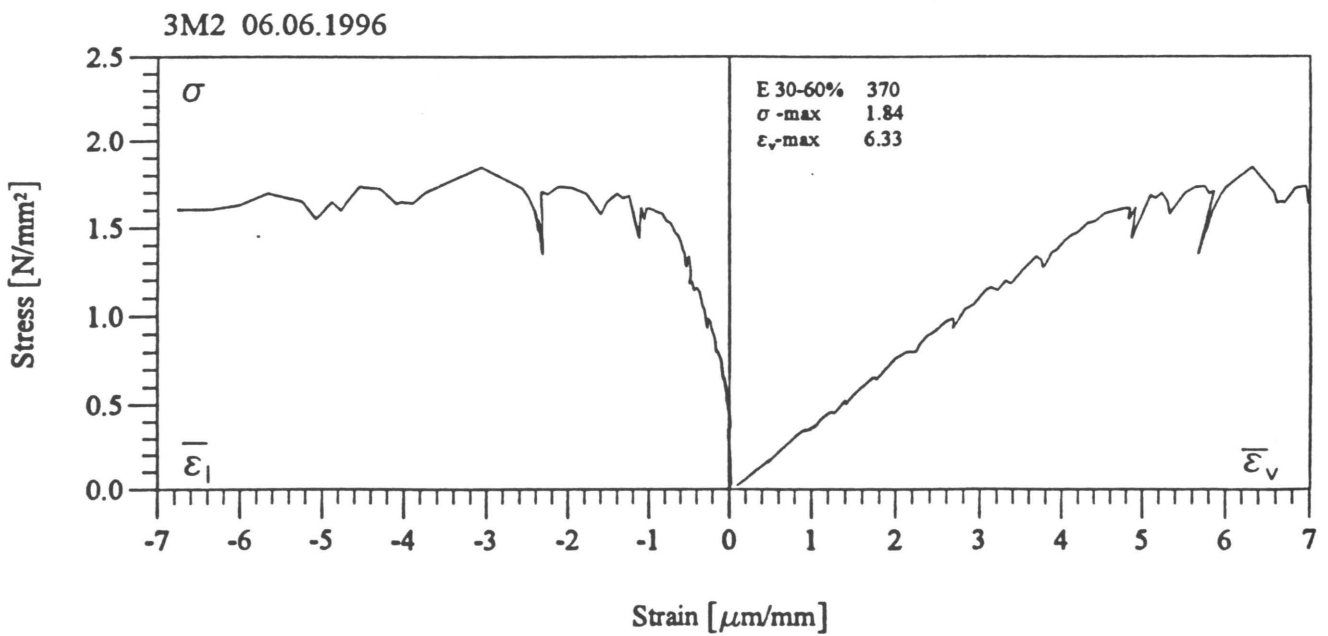
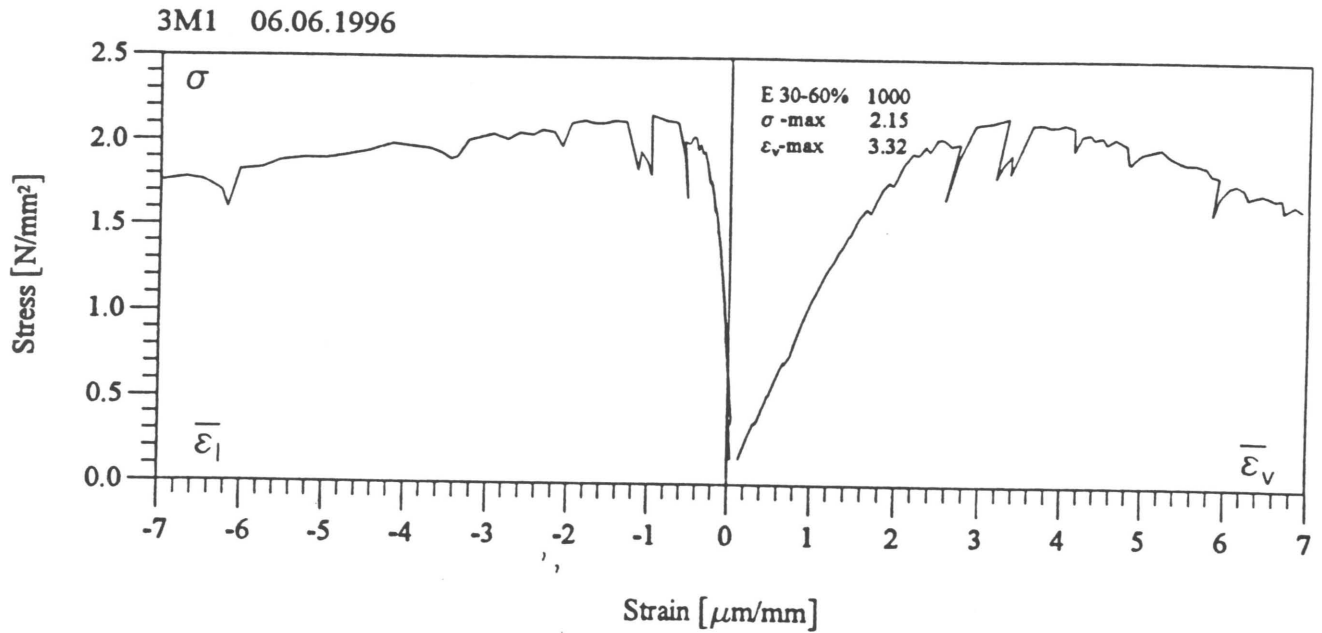
# MECHANICAL PROPERTIES: Compression Strength and Modulus of Elasticity

Tuff samples



# MECHANICAL PROPERTIES: Compression Strength and Modulus of Elasticity

Mortar samples



*Independently, Armenian project architect Vahagn Grigorian has undertaken a full assessment of the site. His study includes brief documentation of the following: fortification walls; steles; a single-naved structure; rock-cut structures; and, a residential area, in addition to the basilica. This information is a worthy supplement to the formal report which he prepared with Gionata Rizzi, consultant to the World Monuments Fund, in response to the Getty Trust's mandate.*

### **Structural Evolution of the Basilica According to Physical Evidence**

#### *The Pre-Christian temple*

The extant pilasters, which are sure not further additions, ascertain that there had been arcades in the prayer-hall (two rows) and exterior halls. If the number and form of the arcade columns in the latter ones are definite (it is likely that the round columns are original), it is difficult to make any assumption on the shape of pillars in the prayer-hall, perhaps on their number as well. Regarding the volume-spatial composition, during the 4th-century reconstruction the basic form of the original composition was probably preserved and the sole difference was that the timber covering was replaced by stone.

#### *The Christian basilica*

The preserved pilasters, the base of the southeastern pillar, the form and plan dimensions of the central pillars, and the arcade fragments together provide a reasonable accurate picture of the interior and exterior arcades of the first tier of the basilica. The monument offers no evidence attesting to the height of the western arcade, as these portions of the western chambers are destroyed. However, the preserved pilasters of the hall allow researchers to approximate the height of the arcade. The eastern portion of the monument can be accurately restored as well. The sloped composition of the vaults of the second tier of the chambers suggest the mark of the roof, its shape (single-sloped) and the degree of the roof slope. Most likely, the roofs of the northern and southern exterior halls had the same slope.

#### *Upper Volumes of the Basilica*

Taking the comparatively well-preserved monuments of Ashtarak and Kasagh as a basis, scholars have come to the conclusion that the three naves of Armenian basilicas were taken under a common double-sloped roof. Proceeding from this conclusion, they separate Armenian basilicas from basilical structures on the whole, as specimens of principally different solutions, calling them the "Eastern type".

A central piece of evidence in this argument the smooth-faced southward stone rib on the upper part of the western facade: this was considered proof that a smooth-faced wall rose above the basic volume from the longitudinal wall at the second tier. Since it was their own point of view that the three naves were taken under a common roof in Armenian basilicas, scholars considered Ererouk a rare example of the "regular" basilica, and for this reason they imagined the aisles and exterior halls to be covered by a single-sloped roof, and unhesitatingly assumed the upper part of the western facade with triple windows, to be the second and last

tier of the basilica taken under a double-sloped roof. Reconstruction projects by J. Strzygowski, N. Tokarsky, P. Baboudjian are expressions of this point of view. In spite of numerous discrepancies in these reconstruction projects, only one essential question will be discussed, which I think conditions the basic structure of the monument to a great extent.

As already noted, all the data are fully preserved in situ to precisely determine the height of the colonnade. If the cornice terminating the colonnade was directly placed upon the arch without intermediate masonry, and if the hall and the aisle were once under a general covering, then, at even a minimal slope, a portion of the smooth-faced wall—the supposed second tier of the basilica—remains completely under the roof covering. In reconstructions by J. Strzygowski and N. Tokarsky, the height of the arcade is much lower than evidenced by data preserved in situ, and a portion of the smooth-faced wall remains under the covering, while in the reconstruction by P. Baboudjian, where the height of the arcade is comparatively accurate, the smooth-faced wall is entirely covered by the roof. Thus, the basilica itself rejects these projects and the existing point of view, considered irrefutable, concerning its volume-spatial composition.

This means that the basic structural form of Ererouk, this exceptionally valuable monument, has been perceived and interpreted incorrectly for eighty years. This is not a separate mistake concerning only the composition of the church. Wrong dating of the monument, inappropriate comparisons, incorrect estimations of influences and interactions have originated from this mistake and become current among scholars. In view of this, it was not at all accidental that the hypothesis on Armenian basilicas proposed by these scholars led them to considering the basilica Hellenistic. The following premise underlies the presented project: the principle in the plan should have been revealed in the volumetric solution, without fail. And if Armenian basilicas are two-tiered as is evidenced by factual data, then the presence of exterior halls in Ererouk inevitably require a three-tiered composition. The above-mentioned fact that the covering of the hall and the side nave includes the supposed second tier indisputably attests to the fact that this tier rising upon the central vaulted pylons belonged to the interior, and not the exterior structure of the church. Hence, the important conclusion that the walls of the main volume of Ererouk were much higher than those still extant.

The same conclusion can be made while examining the joint of the smooth-faced wall on the western facade. In extant basilicas of Tekor, Tsiranavor, Tsitsernavank, as well as in the facades of medieval monuments of other types solved in tiers, the single-sloped roofs do not cover the smooth-faced wall, but simply rest upon its lower row. Even if halls at Ererouk were added later and that covering was placed over them in the manner previously mentioned, stones of the row holding the roof cornice were sure to have a section conformable to the slope covering. But these stones that are fortunately preserved on both southern and northern sides of the western facade are rectangular, i.e. they are the stones of a usual, continuing row.

This fact leads to the conclusion that openings, entrance or window, and not coverings were placed on either sides of the triple windows. The extant smooth-faced wall looking southwards on the western facade is actually the rib of the southern opening. Only the lower stone of the smooth-faced rib has been preserved on the northern opening. If this conclusion is correct, the side aisles of the church were two-tiered and formed the main volume of the building together with the fragment of the triple-windowed wall preserved. Above the basic volume, most probably, the central nave covered with double-sloped roof was elevated, i.e. the upper tier of the church. In spite of numerous reasons and arguments which are strong enough to corroborate the proposed standpoint, it may be said assuredly that the newly-

discovered extant basilica of Tsitsernavank, and especially that of Tsiranavor in Ashtarak are ponderous facts, making this conclusion indisputable.

To confirm what has been discussed, I shall bring forth another argument, though of a different nature. It is the engraving of Tigran Esayan, which was first published in 1881, in Ghevond Alishan's book "Shirak"; then in 1968, in the catalogue "L'Architettura medievale dell'Armenia", published in Rome, and in the article by Dickran Kouymjian entitled "Along Traces in the History of the Yereruyk Church". The volume solution of the basilica had always been considered so indisputable that scholars did not actually see two details of exceptional interest and importance, not present in the first photographs of the basilica, made by N. Marr in 1908.

Moreover, by comparing the engraving and the photographs they ascertained that the basilica did not undergo any change during the period from 1881 to 1908. With this new principle in volume solution, it is not difficult to see that the southward wall of the second tier of the northwestern chamber in the church had been still extant at the time of the engraving, and that an entrance had also been there, which is evidenced by the rectangular architrave in that opening. Several scholars have made a supposition that western chambers were two-tiered, and that entrances existed leading to the second tier of the western hall. This idea, however, was not reflected in reconstructions, being considered not useful from a practical point of view, and the sole reason for this was that in the case of the main volume proposed by them, the second tier of the hall was simply not attained.

Other important information in the engraving is that the southward smooth-faced wall fragment on the upper part of the western facade has a curviform ending. It is not difficult to surmise that this is the architrave stone of the window. Thus, being evidence of the existence of windows, the engraving makes the new proposed point of view concerning the main volume height of Ererouk not arguable. Moreover, in the case of the proposed volume-spatial composition, the western chambers are inevitably three-tiered.

## **Projections for Other Structures at Ererouk**

### *Fortifications and Walls*

Now it can be said with certitude that the double walls belonged to the fortress, and they had a defensive function first of all. In all likelihood, the eastern, perhaps even the main entrance, was located in this very place. In such statement of the problem, the odd fact of the inner masonry of the double walls being smooth-faced, which tormented researchers, becomes explicable. Of course, it is not excluded that similar to the fortress-cities of the pre-Christian or early-Christian periods, here too, the fortification walls were surrounded in this instance from the east to the north, by a ditch, which was filled with water in case of emergency becoming a "water barrier".

Most likely the southern and western fortification walls went up to the edge of the gorge of the Akhourian River, while there was no need of having walls on the southwestern side. To clarify the function of the double walls, as well as to specify the territory of the fortress, it is first and foremost necessary to excavate the following: a) the portion, comprising the extension of the eastern wall, together with the adjoining territory, about 2000 m<sup>2</sup>. b) other portions of the fortification wall, 3m wide (with the wall) and 150m long, i.e. 450 m<sup>2</sup>.

Putting aside the problem of preserving the fortification walls, the conversion of the basilica into a museum necessitates the enclosure of some portion of the complex. Thus, it is proposed to restore the existing one, of 2-3m in height. While in the southwest, all along the road Ani-Pemza - Yerevan and in those parts, where the wall has not been preserved, it is proposed to surround the territory with a metal enclosure.

### *Steles*

It is suggested that the steles should be restored, as on the one hand, they are in rather good state of preservation, and it is easy to restore them, applying comparatively simple measures to provide their stability, and on the other hand, traditionally, monuments are restored entirely. However, this contradicts our principle of preservation of the basilica, as it is impossible to determine exactly what stele belongs to which pedestal or which plinth of the three they had been placed upon. Eventually, steles found from different places could have been located totally in other spots of the territory.

It is recommended that the pedestals and steles are placed as museum exhibits in the three apses of the basilica, and that the names of all those organizations and individuals supporting the basilica's restoration in the twentieth century are engraved in matching stone blocks as new inscriptions in Armenian and English.

### *Rock-Cut Structures*

Of prime importance is the question of excavating and clearing the earth layer in front of the rock-cut structures (1,800 m<sup>3</sup>), especially at a distance of about 10m from the entrances. A portion of wall, perhaps fortification wall, is observed, buried in the earth. It is not excluded that new rock-cut structures will be opened to the east of the existing ones. Only after excavations the monument should be measured, followed by consolidation measures and then the project of preservation and use should be worked out.

### *Residential area*

The proposal is made on the basis of the measured portion of the residential area. The basic principle is as follows: the upper sections of the walls are consolidated with a new row, bringing it to almost the same level, if necessary, and white travertine tiles are placed upon them, corresponding to the thickness of the walls. Pumice is filled inside the walls, the upper layer being black earth, and grass is planted. As a result would be a green area, where the exact plan picture is contoured out with white tiles. Together with this, portions of definite value will be chosen and covered with glass, and will be shown in the form and state in which they have come down to us.

### **Special Design Projects at Ererouk**

In regard to site presentation and facilities, it will be necessary to protect the site visually, especially with respect to landscaping, circulation, facilities for visitors, access roads, electrical lines and parking. Our consideration referring to this point are presented in the master plan of the Ererouk complex. Previous sections of this report have addressed the tasks associated with the basilica's repair, along with recommendations for adaptive use and

presentation of the main elements of the site aside from the basilica, i.e. the fortress and all structures outside it. These measures would include the addition of entrances and an artificial lake, which existed at one time, along with new structures: an information centre, hotel, parking, roads and green zones, which did not exist formerly, but are either desirable or obligatory today, for the full utilization of the complex.

The results of excavations inside the fortress give grounds to assume that the territory within the fortification wall had been primarily residential. If further excavations confirm our assumption, our proposal for the conservation and presentation of this territory will not need any, even minor, specifications. The territory will be covered with grass-plot, on which the residential areas will be outlined in white felsite tiles. The road, envisaged for the visitors, will extend along the edge of the residential area, while the felsite tile net on the walls will serve as paths. The courts and rooms of the residential area will be used as roads.

We have mentioned above that some portions of the residential area should be taken under glass covers and shown in the state in which they have come down to us. A part of this very road may be covered with glass and serve as exposition halls. The former road mark will be left; it will not be filled with earth, and perhaps, the main drainage paths of the site will pass here. Three of the fortress entrances are known: in the east, in the north, and the main entrance, at the end of southeastern double walls. The latter two are envisaged for the visitors. In case of organized tourism, the visitors will be brought to the main entrance, and the cars will be taken to the parking lot, envisaged in the northeastern part of the complex.

After sightseeing the residential area and the basilica, the visitors will go out by the northern entrance. They will also see the caves, the single-naved structure and the artificial lake; if they wish, they can have something in the cafe or restaurant, or buy souvenirs in the souvenir-shop and leave the complex in their cars from the parking lot. The individual visitors can get the necessary information on the complex from the special boards placed in the parking lot and visit the monument independently. It is clear that they will use the northern entrance to approach the basilica and the residential area.

Two new structures are envisaged in the complex. The first one will comprise an information centre, offices and rest rooms for the staff of the complex, also a trading centre with national souvenirs and top priority goods offered for sale. The second structure will be a hotel to accommodate local and foreign tourists, staying up to a week. Building a hotel does not comprise our program, and locating the hotel in the preservation belt pursues two aims, the first being to guarantee the number of visitors.

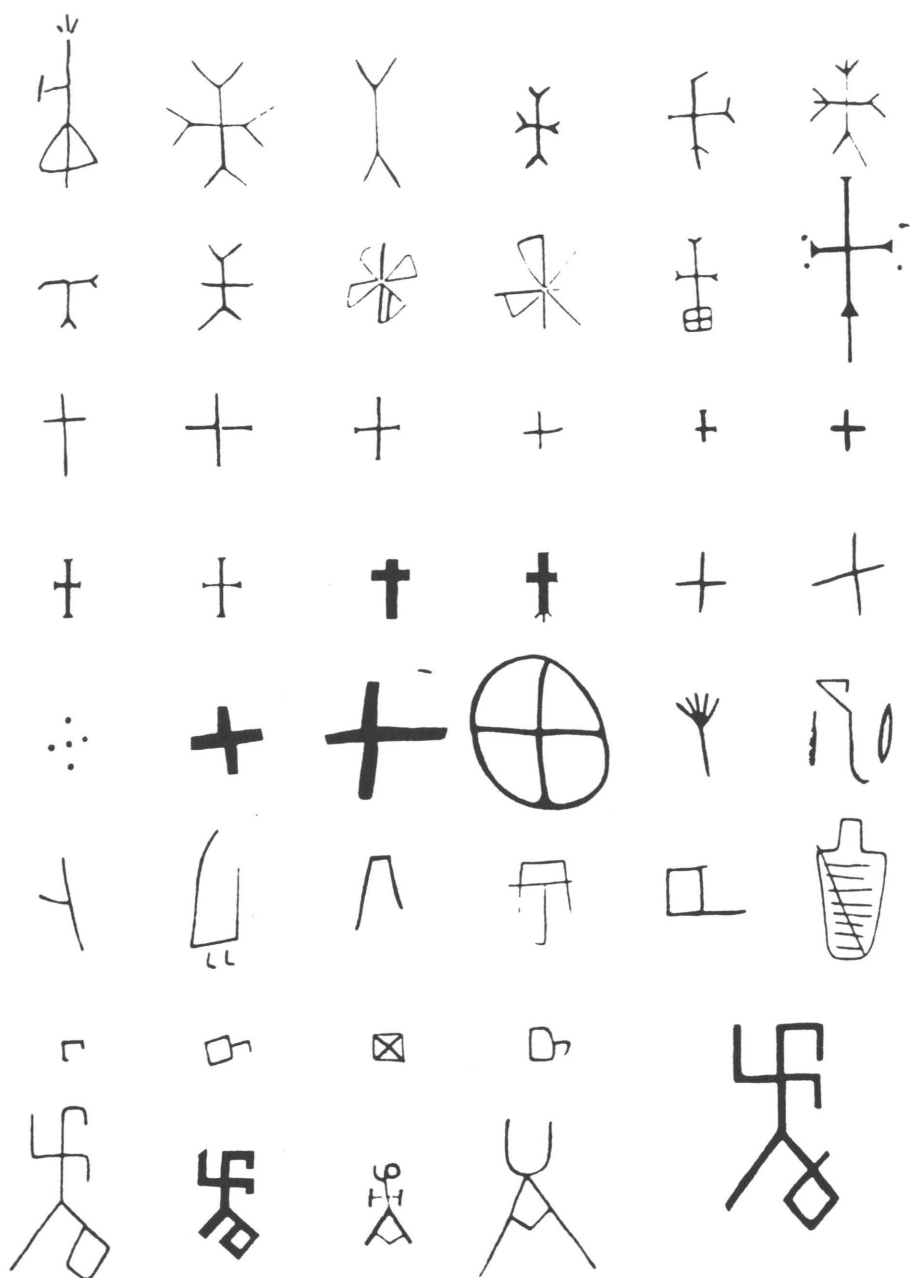
The second aim, which is more important, is to raise additional sums for the restoration of the monument. The permission to build a hotel is given on the condition that the hotel owner takes up all the expenses, connected with the restoration, presentation and exploitation of the caves (cafes), also a part of expenses to improve the facilities of the complex. It is not excluded that after excavations the place of the hotel will be changed, and it will be built on the territory of the single-naved structure, with the inclusion of the monument in the architecture of the hotel or its court ("winter garden"). This will be an ideal version for the preservation and presentation of the single-naved structure, and given that there is no need to restore the entire roof, the monument will be presented exactly the way it has come down to us.

Removing the earth in the northern and eastern sides of the complex, which were under the water mass at one time, will restore the site landscape. The only active interference that is necessary is the creation of the green belt, beyond the preservation belt, in the northern part

of the complex, with the purpose of preventing the penetration of the dust brought by the north winds, into the territory. It is understandable that the high voltage electrical line supports will be removed from the territory; the entire territory will be cleaned and non-active dendrological interferences will be made here and there, near the parking lot and on the shores of the artificial lake.

#### APPENDIX IV : INSCRIPTIONS

*Three inscriptions from the Ererouk basilica have been previously researched and published: the Queen's inscription of 1030 (south facade, near the eastern entrance), priest Yakob's (inside, on the right-side pillar of the apse), and the Latin-lettered inscription on the southern wall of the southeastern chamber. Together with these, 26 newly-found inscriptions are presented here for the first time, with their copies made in situ. It is clear that they require a thorough examination and a professional translation. The most important of them are presented in translation.*



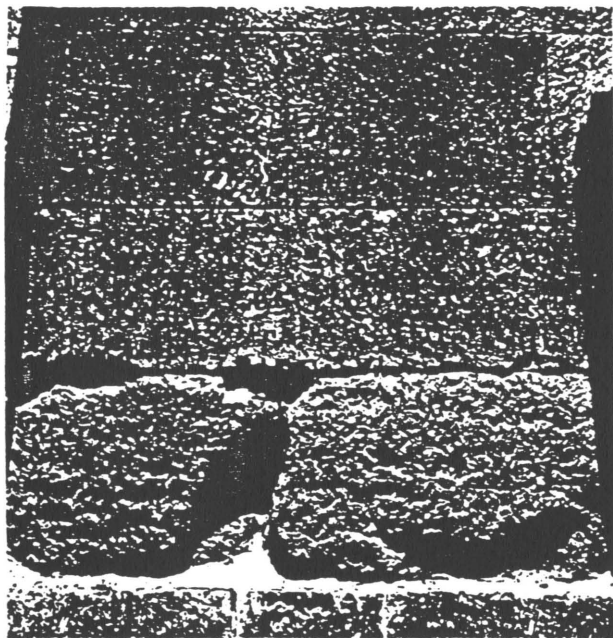
Ererouk's inscriptions

/1-26/

1. In the name of God, in the year 1038, I, the pious Queen, daughter of Abass, wife of Smbat Shahinshah and mother of Ashot, freed Erervats (people living in Ererouk) from tastak (tax), from son to son, for the longevity of mighty Smbat Shahinshah, for Ashot and for Tayots (province and people)... (the inscription cannot be read).
2. In 1038 of Armenian era, in the name of God, mighty and ...
3. I, priest Yakob, who came from city and field (the site of Zvart-nots) to the village town of Esevk, this Sourb Katoghike Martyry, for solicitation (benediction?) of true believers in Christ, repaired, for the sake of Karapet and Protomartyr.
4. I, priest Yakob, who came to Sourb Katoghike for service...
5. I, Yakob  
I, Yakob
6. I, Moushegh, son of Abass... remember my prayer...  
(supposedly 13th century).
7. ... holiness becometh thine house, O Lord, for ever.  
(The Book of Psalms, 93.5).
8. Dimitrios, Filipino, Poghos, 1682.
9. I, Nazar, came in the year 1000.
10. I, Chan, son of Dashtnetsi Arakel, in the year 1667.
11. I, Rmetsi... wrote in the year 1672.
12. I, Abraham, son of Anash, in the year 1652.
13. I, master Grigor, wrote in the year 1673.
14. In 18.7, October 28, of Alexandropol city...  
In 1838 Cossack stood...
15. I, Mada, servant of God...
16. I, Papik, servant of God, the lamp-lighter of Sourb Katoghike, and whoever reads this, pray for the sinful that I am...
17. I, master Stepanos, servant of God, who wrote this.
18. I, Smbat, servant of God and the holy church; whoever reads this, pray for me...
19. I, Soukan, servant of God, son of God, forgive me, the sinful...
20. I, Shara, I, Shara, servant of God... remember my prayer...
21. Simon, servant of God...

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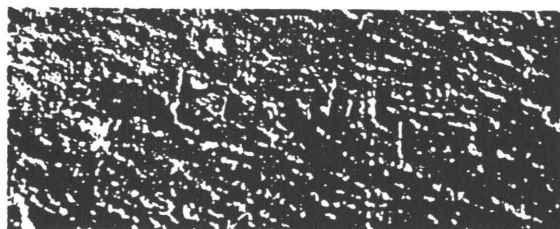
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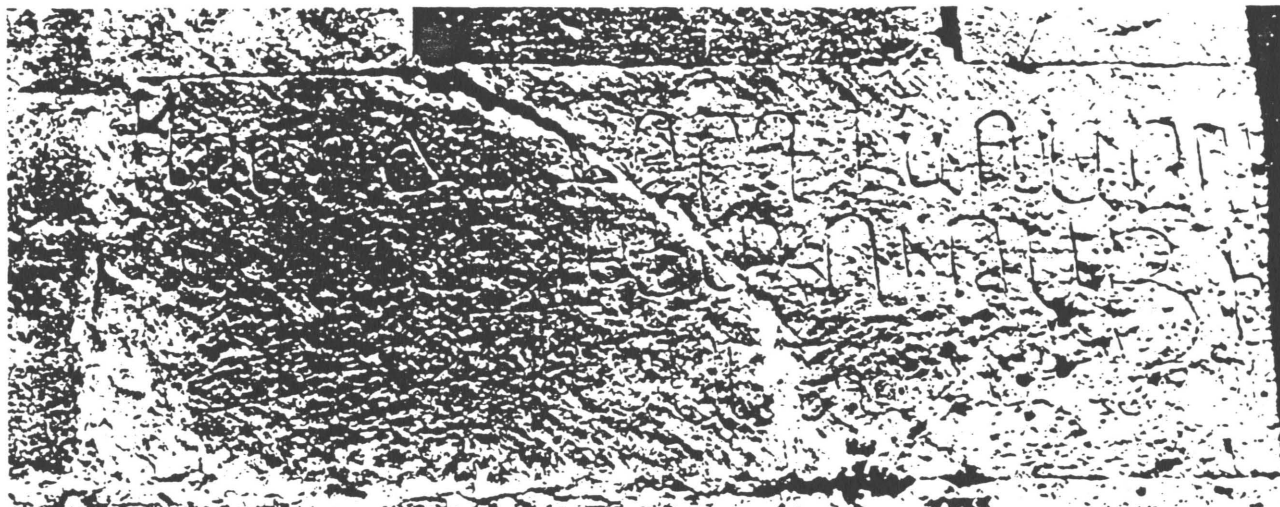


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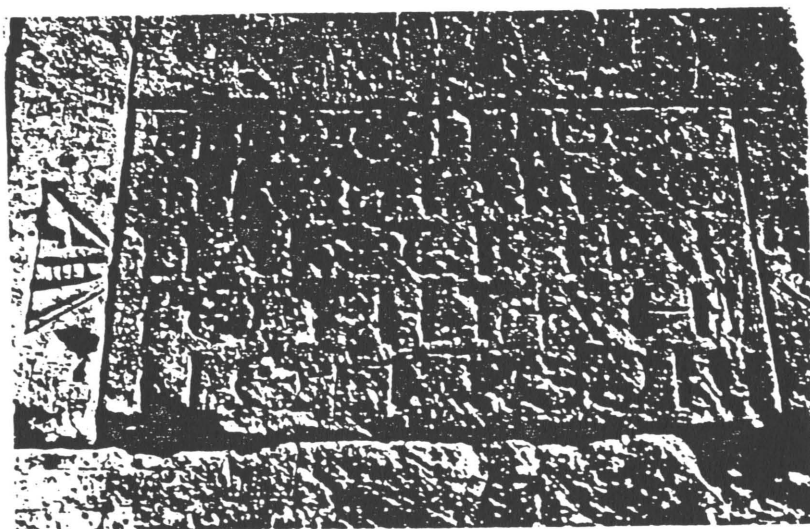


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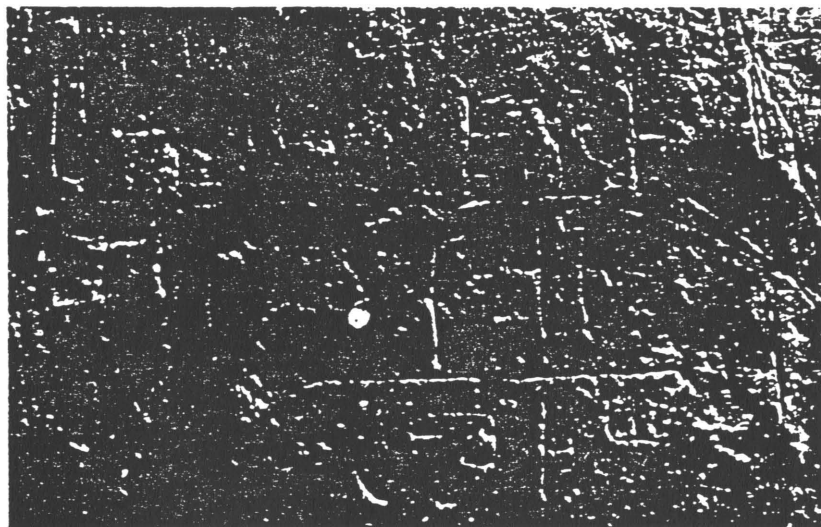
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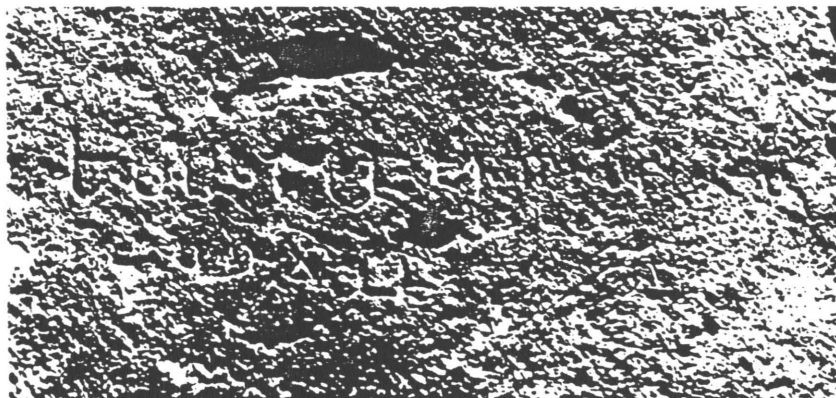
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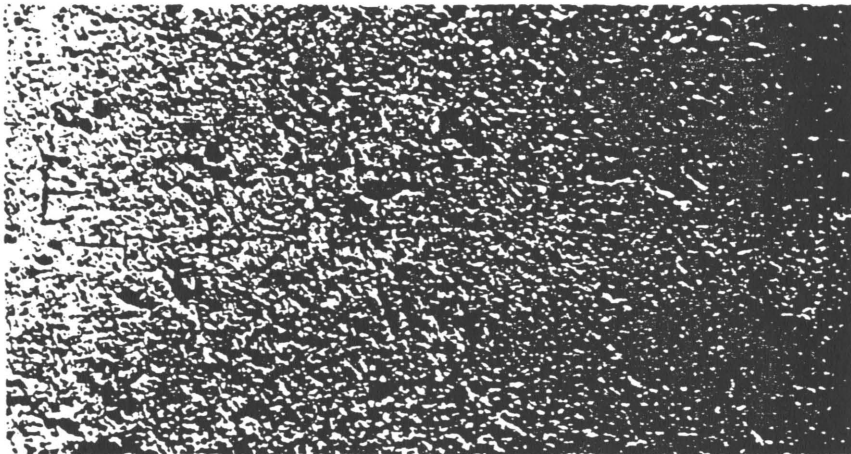
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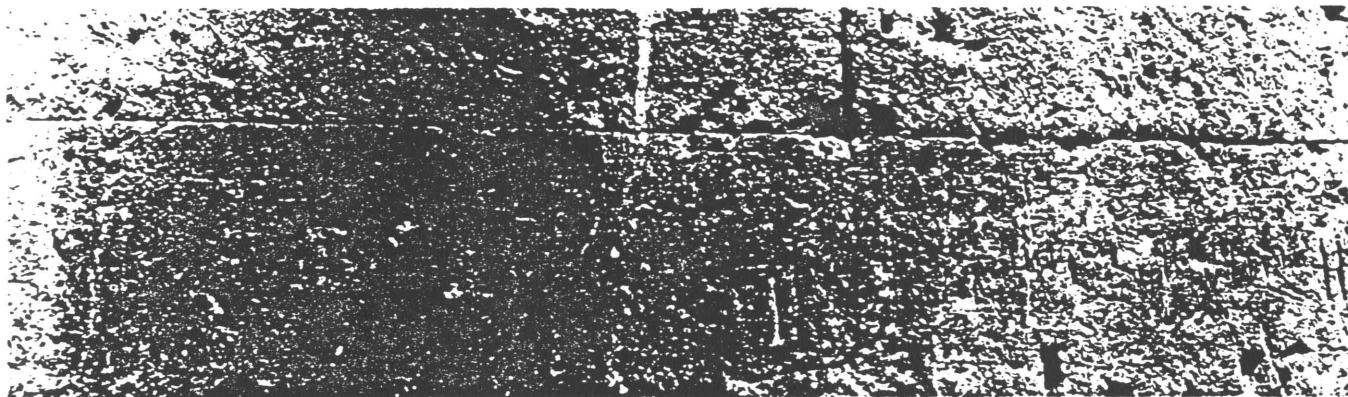
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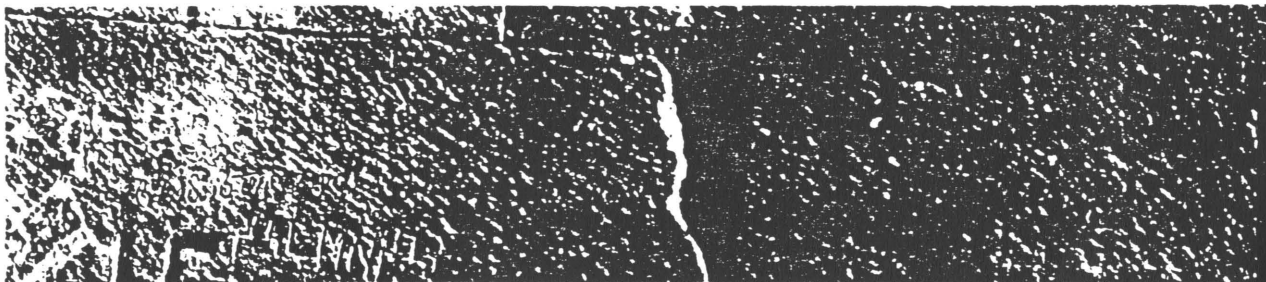
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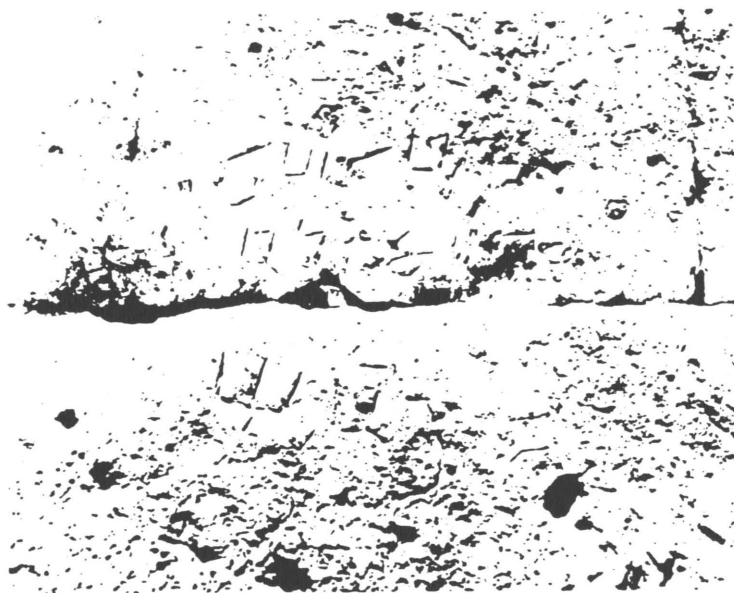


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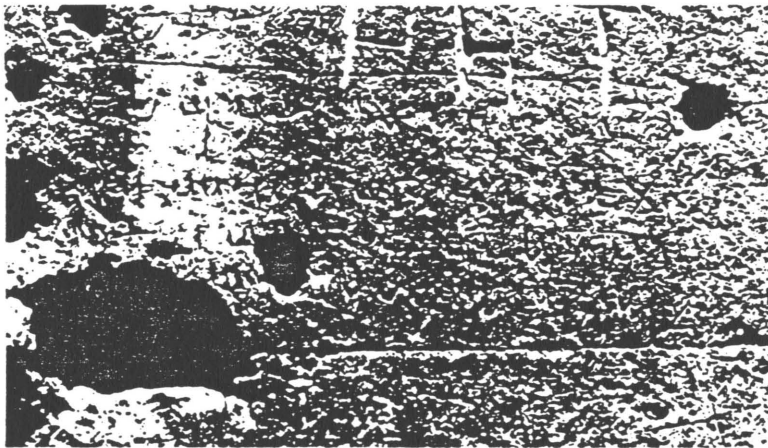
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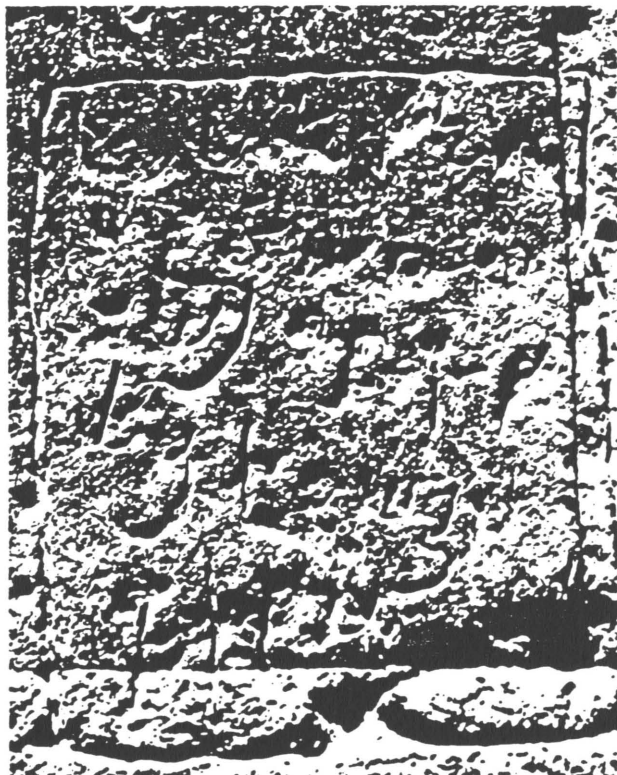
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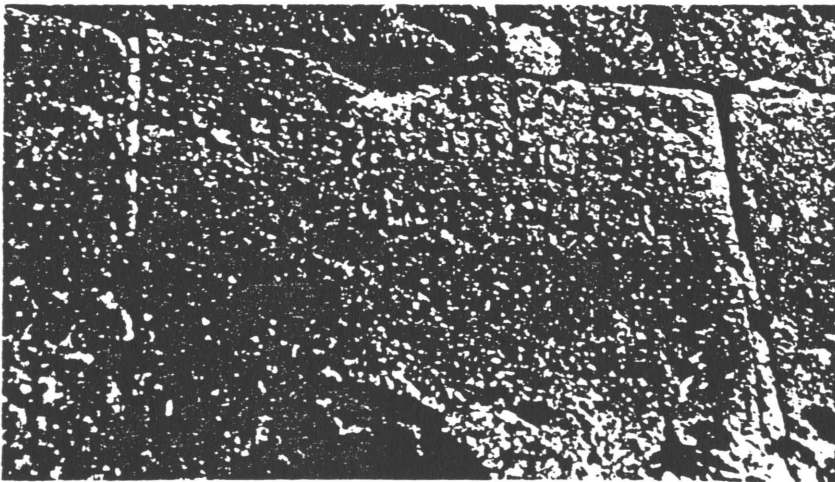
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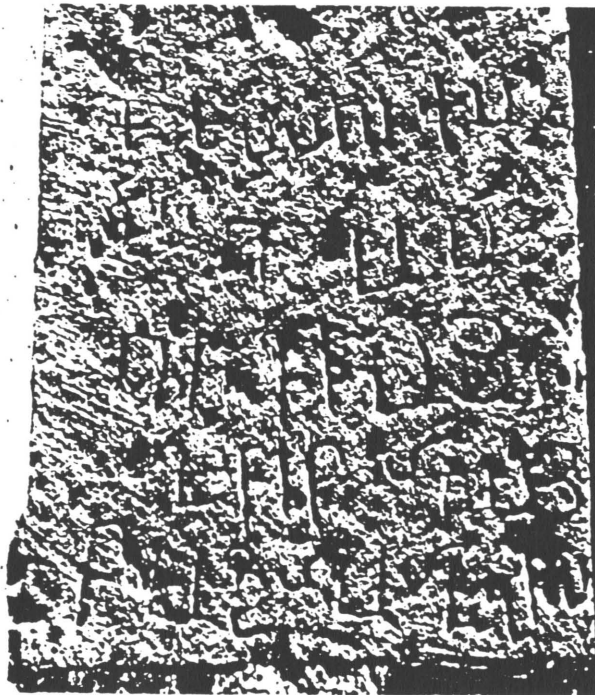
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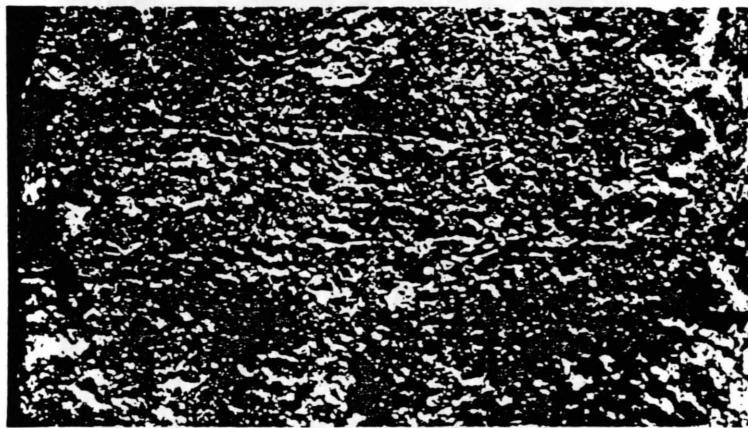
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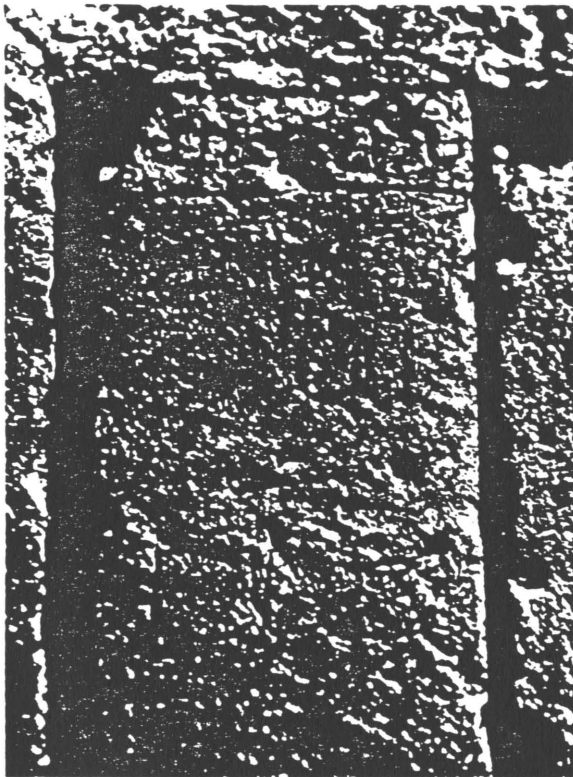


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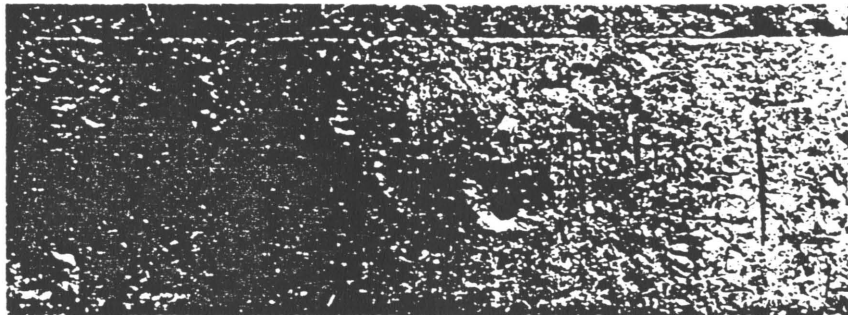
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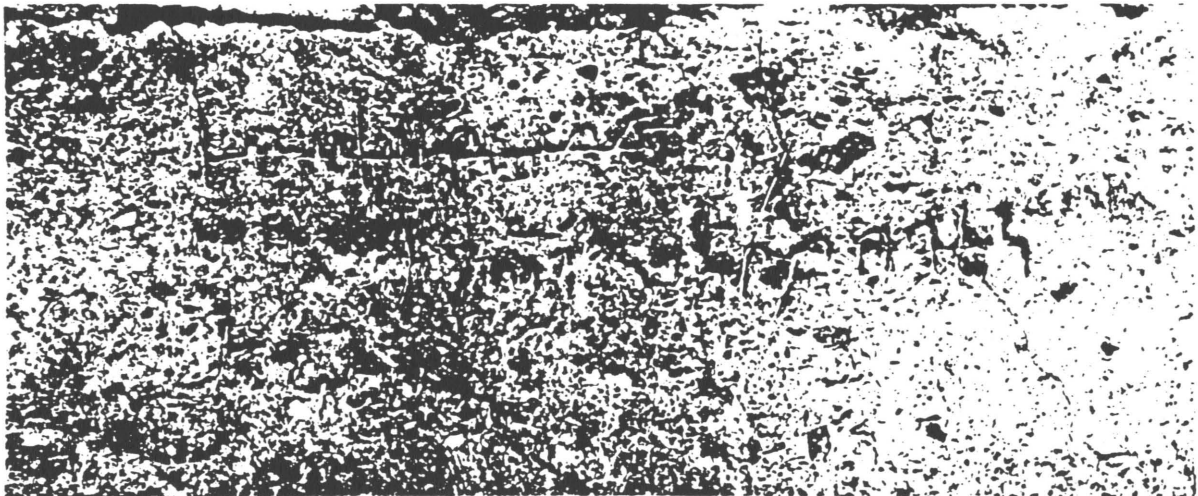
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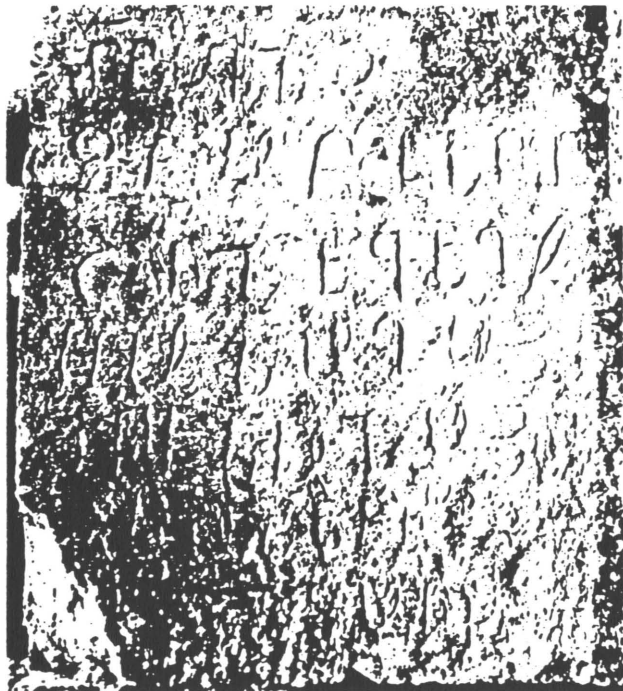
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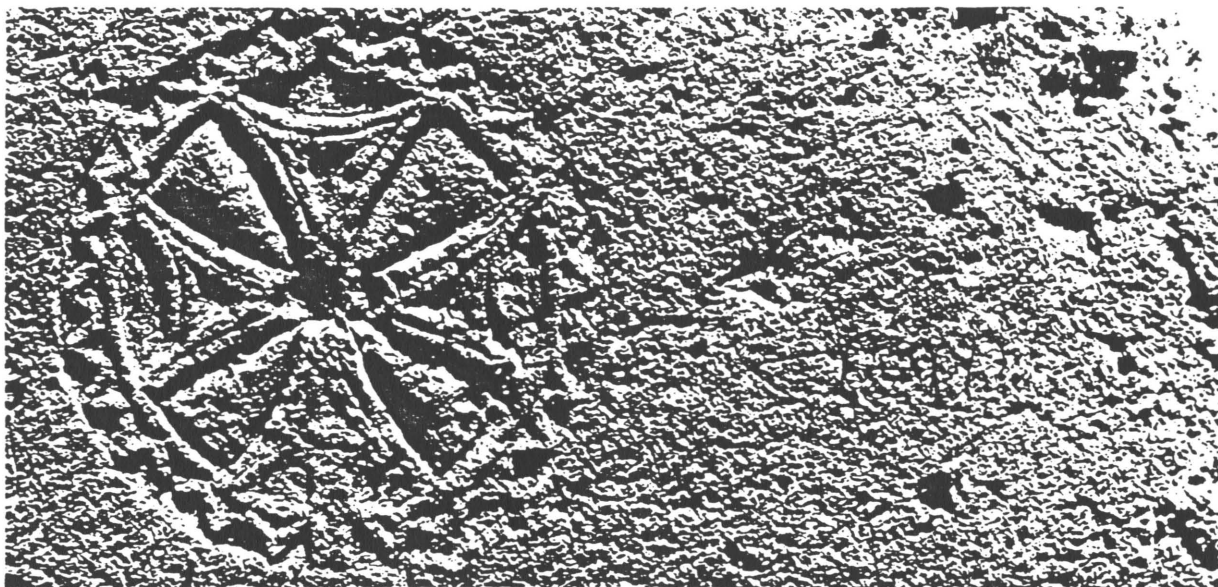
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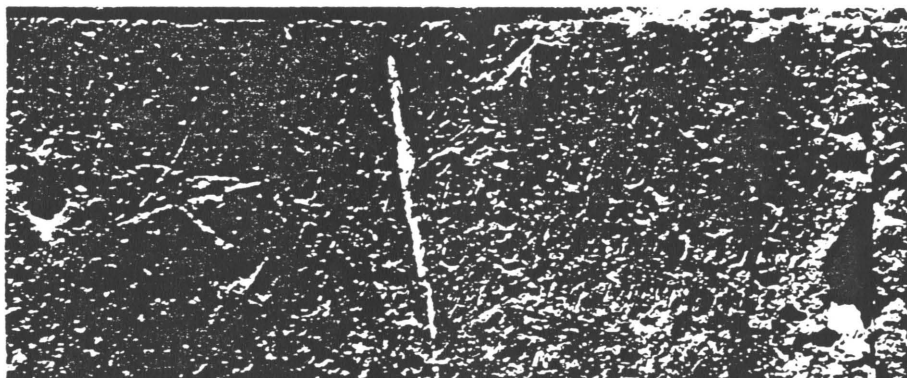
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## APPENDIX VI : GENERAL ARMENIAN HISTORY

### **Current Conditions**

Armenia is a landlocked, mountainous country located in the southern region of the Caucasus mountains. The smallest of the former Soviet republics, Armenia covers nearly 30,000 square kilometers and is bordered by Turkey to the west, Georgia to the north, Azerbaijan to the east and southwest (Nakhichevan) and Iran to the south. Continuing tensions between Armenia and Azerbaijan over the disputed enclave of Nagorno-Karabakh have led to a blockade of Armenia by its neighbors, making the country entirely dependent on Georgia for relief supplies and commercial goods. Continued civil unrest in Georgia has placed this vital link in a precarious position.

The Armenian plateau is a highland which rises directly above its surrounding regions. Geography undoubtedly played a key role in the history and culture of Armenia. Forming a highway of great value for trade and commerce between Asia and Europe, Armenia it seems was destined to be at grips with adversity. The land with its untold riches and its strategic position of primary import, stirred the ambitions of many "superpowers" of the region. For a succession of centuries, the Armenians were in constant warfare with invaders and conquerors - Assyrians, Romans, Byzantines, Parthians, Arabs and Turks - who rolled over their homeland, although certainly not without meeting the most stubborn resistance.

Throughout these turbulent centuries, the Armenians successfully asserted their historical identity and upheld their national heritage against great odds. Although on occasions overpowered by superior forces and reduced to the status of vassals, they nevertheless enjoyed a semblance of national autonomy. Yet, the very vicissitudes that troubled its existence contributed to the creation of a varied and original culture, held together by the constants of social, intellectual and religious institutions.

Approximately 68% of Armenia's 3.5 million people live in urban areas, with the remaining 32% percent living in rural areas. 300,000 Armenian refugees and displaced persons now live in Armenia. Since the massive earthquake of 1988, Armenia has been hit by a series of political and economic crises. The four year blockade by its neighbors, the breakup of the former Soviet Union, and the lingering problems of refugees and displaced persons have left the Armenian population in a state of shock.

Until there is less turmoil between Armenia and Azerbaijan, the crisis will continue to worsen—especially through the winter months when food and fuel shortages have a severe impact on the population. Critical imports include fuels, medical supplies and food, including cereals, butter, sugar, milk powder and vegetable oil.

The present day Republic of Armenia occupies but a fraction of the ancient Armenia, which extended from the lesser Caucasus Mountains south across the Armenian plateau to the Taurus Mountains. Frequent earthquakes emphasize Ererouk's proximity to the great geological fault between the Asian and African subcontinent plates.

### **Armenia's Historic Development**

Armenian tradition has preserved several legends concerning the origin of the Armenian nation. The most important of these tells of Hayk, the eponymous hero of the Armenians

who called themselves Hay and their country Hayk' or Hayastan. The historian of the 5th century, Movses Khorenatsi, also relates at some length the valiant deeds of Aram whose fame extended far beyond the limits of his country. Consequently, the neighboring nations called the people Armenians or Armenians. Archeology has extended the prehistory of Armenia to the Acheulian age (500,000 years ago), when hunting and gathering peoples crossed the lands in pursuit of migrating herds.

The first period of prosperity was enjoyed by inhabitants of the Armenian upland in the third millennium B.C. These people were among the first to forge bronze, invent the wheel, and cultivate grapes. The first written records to mention the inhabitants of Armenia come from hieroglyphs of the Hittite Kingdom, inscribed from 1388 to 1347 B.C., in Asia Minor. The earliest inscription to be found directly upon Armenian lands, carved in 1114 B.C. by the Assyrians, describes a coalition of kings of the central Armenian region referring to them as "the people of Nairi."

### *Ancient History*

By the 9th century B.C., a confederation of local tribes flourished as the unified state of Urartu. It grew to become one of the strongest kingdoms in the Near East and constituted a formidable rival to Assyria for supremacy in the region. The Urartians produced and exported wares of ceramic, stone and metal, building fortresses, temples, palaces and other large public works. One of their irrigation canals is still used today in Yerevan, Armenia's capital—a city which stands upon the ancient Urartian fortress of Erebuni.

In the 6th century Urartu fell to the Medes, but not long after, the Persian conquest of the Medes, led by Cyrus the Great, displaced them. Persia ruled over Armenia from the 6th century until the 4th century B.C. Its culture and Zoroastrian religion greatly influenced the spiritual life of the Armenian people who absorbed features of Zoroastrianism into their polytheistic and animistic indigenous beliefs. As part of the Persian Empire, Armenia was divided into provinces called satrapies, each with a local governing satrap (viceroy) supervised by a Persian. The Armenians paid heavy tribute to the Persians, who continually requisitioned silver, rugs, horses and military supplies.

The governing satraps of Armenia's royal Orontid family governed the country for some 200 years, while Asia became acquainted with invading Greeks from the west. With the fall of the Persian Empire to Alexander the Great of Macedonia in 331 B.C., the Greeks appointed a new satrap, an Orontid named Mithranes, to govern Armenia. The Greek Empire, which stretched across Asia and Europe, was one in which cities rapidly grew, spreading Hellenistic architecture, religion and philosophies. Armenian culture absorbed Greek influences as well.

As centers at the crossroads of trade routes connecting China, India and Central Asia with the Mediterranean, Armenian cities thrived on economic exchange. The Greeks also infused Armenia's version of Zoroastrianism with facets of their religious beliefs. After Alexander's sudden death in 323 B.C., the partitioning of his empire and warring among his generals led to the emergence of three Greek kingdoms. Despite pressure from the Seleucid monarchy, one of the Greek kingdoms, the Orontids, continued to retain control over the largest of three kingdoms into which Armenia itself had been divided: Greater Armenia, Lesser Armenia and Sophene.

Seleucid influence over Armenia finally dissolved when, in the second century B.C., a local general named Artaxias (Artashes) declared himself King of Greater Armenia and founded a

new dynasty in 189 B.C. Artaxias expanded his territory by defining the borders of his land and unifying the Armenian people.

### *Armenian Renaissance*

The "renaissance of Armenia" was accomplished during the reign of Tigran the Great (95-99 B.C.), who proclaimed himself "King of Kings." Under Tigran II, Armenia grew to a great degree of military strength and political influence. According to the Greek biographer Plutarch, the Roman general Lucullus said of this king, "In Armenia, Tigran is seated surrounded with that power which has wrested Asia from the Parthians, which carries Greek colonies into Media, subdues Syria and Palestine and cuts off the Seleucids." And Cicero, the Roman orator and politician, adds, "He made the Republic of Rome tremble before the powers of his arms."

Armenia's borders extended from the Caspian Sea to the Mediterranean. Tigran's victories were, however, destined to hasten his downfall, which occurred in 66 B.C. His son, King Artavazd II, governed Greater Armenia for 20 years until Anthony and Cleopatra had him brought to Egypt in chains. Artavazd refused to name Cleopatra as his queen and was executed.

### *Adoption of Christianity*

By 64 A.D. the new Arsacid dynasty, a branch of the Parthian Arsacids, came to power, and the country as a whole soon became a buffer zone over which the Romans and Parthians fought for domination. To appreciate the implications of the history of Armenia and grasp the soul of this people, a researcher must look to the beginning of the 4th century, which was momentous in its consequences for the growth of the nation. King Tiridates III (Trdat), having been converted by Gregory the Illuminator, proclaimed Christianity as the religion of the state in 301 A.D. Thus, Armenia became the first nation to embrace Christianity officially. This was 12 years before the Emperor Constantine's Edict of Milan which declared tolerance of Christians in the Roman Empire.

Gregory the Illuminator, later canonized, was elected Catholicos of the new Armenian national Church, the first in a long line of such clergy to be elected supreme head of the Armenian Church. The conversion to Christianity was inevitably to bring in its wake complications of a political nature and to arouse grave anxieties in neighboring Persia. The Sassanian Persians took advantage of Armenia's inner weakness and launched a campaign to stamp out Christianity there and replace it with Mazdaism.

Under this common threat, the princes, nobility and the people of Armenia rallied, and in 451 under the leadership of the Commander-in-Chief Vardan Mamikonian the Armenians heroically faced the Persians at Avarayr in defense of their faith and national heritage. Heavily outnumbered, they were defeated; Vardan Mamikonian and many valiant men fell fighting. But guerrilla warfare continued in the mountainous regions. Vahan Mamikonian, a nephew of Vardan, continued the struggle.

This time the Persians, realizing the futility of their policy, were obliged to come to terms with the Armenians. Freedom of religious worship was restored with the Treaty of Nvarsag. In the 7th century, the mighty Arabs stormed into Armenia and conquered the country. Beginning in the 9th century, Armenia enjoyed a brilliant period of independence when the

powerful Bagratid Dynasty asserted political authority. Resumption of international trade brought prosperity and the revival of artistic and literary pursuits.

The capital of Ani grew to a population of about 100,000, more than any urban center in Europe. Religious life flourished and Ani became known as the "city of one thousand and one churches." In the middle of the 11th century, most of Armenia had been annexed by Byzantium. The destruction of the Bagratid Kingdom was completed by raids of new invaders, the Seljuk Turks from Central Asia. With little resistance from weakened Byzantium, the Seljuk Turks spread into Asia Minor as well as the Armenian highlands. This invasion compelled a large number of Armenians to move south, toward the Taurus Mountains close to the Mediterranean Sea, where in 1080 they founded, under the leadership of Ruben (Rubenid dynasty), the Kingdom of Cilicia or Lesser Armenia.

### *Western European Influence*

Close contacts with the Crusaders and with Europe led to absorbing Western European ideas, including its feudal class structure. Cilician Armenia became a country of barons, knights and serfs. The court at Sis adopted European clothes. Latin and French were used alongside Armenian. The Cilician period is regarded as the Golden Age of Armenian Illumination, noted for the lavishness of its decoration and the frequent influence of contemporary western manuscript painting. Their location on the Mediterranean coast soon involved Cilician Armenians in international trade between the interior of Western Asia and Europe.

For nearly 300 years, the Cilician Kingdom of Armenia prospered, but in 1375 it fell to the Mamelukes of Egypt. The last monarch, King Levon VI, died at Calais, France in 1393, and his remains were laid to rest at St. Denis (near Paris) among the kings of France. While in the 13th century the Armenians prospered in the Cilician Kingdom, those living in Greater Armenia witnessed the invasion of the Mongols. Later, in the 16th and 17th centuries, Armenia was divided between the Ottoman Empire and Safavid Iran.

With the annexation of the Armenian plateau, the Armenians lost all vestiges of an independent political life. The Persian leader Shah Abbas I inaugurated a policy of moving populations of entire Armenian regions to his country to create a no-man's land in the path of the Ottoman advance, and to bring a skilled merchant and artisan class to his new capital, Isfahan. The Armenian community of New Julfa, a suburb of Isfahan, was held by Shah Abbas I in great esteem and became one of the economic bases of the Safavid state. Persians ruled Eastern Armenia until 1828, when it was annexed by Russia. However, it was the Ottoman Turks who governed most of the Armenian land and population (Western Armenia).

### *Armenia under Turkish Rule*

During the 19th century, Armenians under Turkish rule suffered from discrimination, heavy taxation and armed attacks. As Christians, Armenians lacked legal recourse for injustices. They were taxed beyond their means, forbidden to bear arms in a country where murdering a non-Muslim often went unpunished, and were without the right to testify in court on their own behalf. During the late 19th century, the increasingly reactionary politics of the declining Ottoman Empire and the awakening of the Armenians culminated in a series of Turkish massacres throughout the Armenian provinces in 1894-96.

Any illusion the Armenians had cherished to the effect that the acquisition of power in 1908 by the Young Turks might bring better days was soon dispelled. For in the spring of 1909, yet

another orgy of bloodshed took place in Adana, where 30,000 Armenians lost their lives after a desperate resistance. World War I offered a good opportunity for Turks to "solve the issue." In 1915, a secret military directive ordered the arrest and prompt execution of Armenian community leaders. Armenian males serving in the Ottoman army were separated from the rest and slaughtered.

The Istanbul government decided to deport the entire Armenian population. Armenians in towns and villages were marched into deserts of Syria, Mesopotamia and Arabia. During the "relocation" many were flogged to death, bayonetted, buried alive in pits, drowned in rivers, beheaded, raped or abducted into harems. Many simply expired from heat exhaustion and starvation. 1.5 million people perished in this first genocide of the 20th century. Another wave of massacres occurred in Baku (1918). Shushi (1920) and elsewhere.

#### *Armenian Independence: 1918*

The defeat of the Ottoman Turks in World War I and the disintegration of the Russian Empire gave the Armenians a chance to declare their independence. On May 28, 1918, the independent Republic of Armenia was established, after the Armenians forced the Turkish troops to withdraw in the battles of Sardarapat, Karakilisse and Bashabaran. Overwhelming difficulties confronted the infant republic, but amid these conditions the Armenians devoted all their energies to the pressing task of reconstructing their country. But due to pressure exerted simultaneously by the Turks and Communists, the republic collapsed in 1920.

#### *Armenia under Soviet Rule*

Finally, the Soviet Red Army moved into the territory (Eastern Armenia) and on November 29, 1920, declared it a Soviet republic. Armenia was made part of the Transcaucasian Soviet Federal Socialist Republic in 1922, and in 1936, it became one of the Soviet Union's constituent republics. The tumultuous changes occurring throughout the Soviet Union beginning in the 1980's inevitably had repercussions in Armenia. In 1988, a movement of support began in Armenia for the constitutional struggle of Nagorno Karabagh Armenians to exercise their right to self-determination. (This predominantly Armenian populated autonomous region had been placed under the jurisdiction of Azerbaijan by an arbitrary decision of Stalin in 1923.)

#### *Armenian Independence: 1990*

That same year, in 1988, Armenia was rocked by severe earthquakes that killed thousands, and supplies from both the Soviet Union and the West were blocked by the Azerbaijani Government fighting the Armenians in Nagorno Karabakh. Both of these issues have dominated Armenia's political arena since the first democratic election held in Armenia during the Soviet era. In 1990, the Armenian National Movement won a majority of seats in the parliament and formed a government. On September 21, 1991, the Armenian people overwhelmingly voted in favor of independence in a national referendum, and an independent Armenia came into being.

*text provided by the State History Museum Of Armenia*

## APPENDIX VII : *ARMENIANS*

By Dennis R. Papazian

Professor of History

The University of Michigan, Dearborn, September 8, 1987

### **Armenia and Armenians**

Armenia is one of the fifteen constituent republics of the USSR. The present-day Armenian SSR, located in Transcaucasia, represents only the eastern fringe of the traditional Armenian homeland which extends east from the Euphrates across the mountainous Armenian plateau in eastern Anatolia presided over by Mt. Ararat of Biblical fame. Historic Armenia has also been described as the land of the three major lakes--Van (presently in Turkey), Sevan (in present-day Armenia), and Urmia (presently in Iran).

Armenia has one of the oldest indigenous cultures of any of the peoples of the USSR. Armenia is also credited as being the first state to establish Christianity as its official religion.

Contemporary scholarship suggests that the Armenians are descendants of various indigenous people who meld (10th through 7th century BC) with the Urartians (Ararateans); while classical historians and geographers cite the tradition that the Armenians migrated into their homeland from Thrace and Phrygia (Herodotus, Strabo), or even Thessaly (Strabo). These views are not necessarily contradictory, since present-day Armenians are undoubtedly an amalgam of several peoples, autochthonous (Hayasa-Azzi, Nairi, Hurrians, etc.) and immigrant, who emerged as one linguistic family around 600 BC.

The Armenian language, like Greek and Iranian, is a part of the Indo-European family of languages that is spoken from north India, through Afghanistan, Iran, Armenia, and Greece into Europe and European Russia. The Armenian alphabet, devised early in the fifth century by St. Mesrob (Mashtotz)--who also produced a script for the Christian Georgians and Caucasian Albanians--is unique, although based in part on Greek uncials and the Armazi variety of Aramaic script. Armenia was located near the cradles of ancient civilizations--the Mesopotamian, bordering immediately to the south; the Egyptian in the southwest; and the Indus to the east--and was affected by each, but most significantly by Mesopotamian. The name "Urartu", in the form "Urashtu", occurs frequently in Babylonian inscriptions. The earliest known mention of the "Armenian" people (as the Armenoi), occurs in the writings of the Greek historian Hecataeus of Miletus (c. 550 BC), and of "Armenia" (Armina) in the Behistun [Bisitun] inscription of Darius I (c. 520 BC).

Present-day scholarship shows that Armenia experienced its Lower Paleolithic period from 500,000 BC or earlier. A change from nomadic to sedentary life occurred in the Neolithic period in Armenia (c. 6,000 BC) about the same time as in the lower valleys of the Tigris and Euphrates rivers, the headwaters of which rise in Armenia. Chalcolithic culture (4,000 BC) relates Armenia to the Caucasus, Iran and Mesopotamia; while the Bronze Age in Armenia began c. 3,200 BC and extended up to and coexisted with the era of iron smelting and working which was inaugurated c. 1,000 BC. Yerevan (Erebuni, Arin-Berd), the capital of the Armenian SSR, was founded before 782 BC--the date when it is first mentioned in historic sources.

The rise of Achaemenid Persia (c. 550 BC) brought Armenia into the Iranian socio-political-economic orbit, and it became a satrapy (number XIII) of the empire under the first semi-autonomous Armenian dynasty, the Orontids [Avestan *aurand*, mighty hero; *Pahlevi*, *arvand*; Armenian, *ervand*], related to the Persian royal house.

The Persian trade and defense system encouraged significant expansion of Armenian travel and commerce. The classical description of Armenia under the Achaemenids is that of Xenophon, who crossed it with his Ten Thousand (c. 400 BC). It is during this period that the Armenian nobility adopted Mazdaism and saw it merge with indigenous native beliefs.

## **Pre-Christian Religions**

The earliest Armenian pantheon was most likely similar to the pre-historic Indo-European pantheon; and, it probably included eponymous and other legendary heroes as well. It seems that the Armenians also had nature gods and, indeed, worshiped the elements.

During the fifth century BC, the Armenians adopted the Iranian form of these divinities and domesticated them. Ahura-Mazda, who assumed the status of father of the gods, was worshipped as Aramazd. Mithra, god of light and justice, was known as Mihr. Anahita, goddess of fertility and mother of all wisdom, became Anahit--the favorite goddess of the Armenians. Verethrangna, the god of war, was worshipped as Vahagn. Astghik was the goddess of love. Tir, the scribe of Aramazd, was the god of science and the recorder of man's deeds of good and evil. Barshamin and Nane, probably of Syrian origin, also formed part of the Armenian pantheon.

With the conquests of Alexander the Great (356-323 BC), and the successor Seleucid Empire, Armenia entered the Hellenistic orbit and identified its gods (as did the Romans and others) with the Greek pantheon. Thus Aramazd became Zeus; Mihr became Hephaestus; Anahit became Artemis; Vahagn became Heracles; Astghik became Aphrodite; Tir became Apollo; and Nane became Athena; only Barshamin retained his original form.

This characteristic syncretism also appears in Persia, where Ahura-Mazda became Zeus; Mithra became Apollo; and Anahita became Athena.

Pre-Christian Greek priests brought cult statues of the gods to Armenia and placed them in Hellenistic temples. Thus, an Irano-Greek form of pre-Christianism existed in Armenia, along with the worship of local spirits, up until the establishment of Christianity in the early fourth century. Some aspects of the old religion survived in folklore and customs for centuries thereafter.

The weakening of the Seleucids allowed the founding of the Armenian Artaxid dynasty (189 BC). Sometime later, the Artaxiad Tigranes II, the Great, (95-55 BC), along with his ally Mithradates VI (Eupator) of Pontus established a short-lived Armenian-Hellenistic empire which stretched from the Caucasus to Lebanon, and from Mesopotamia to the Pontic Alps. By this time the great Armenian feudal nobility (the *nakharars*) were well established. The empire of Tigranes was destroyed by the Romans, who were gradually expanding into the Middle East. Roman incursions were led in turn by Lucullus, Pompey, Crassus, Mark Antony (who captured Artavasdes II by ruse), and Caius Caesar (sent by his grandfather the Emperor Augustus). Western Armenia thus fell under Roman hegemony, while the eastern territories came to be dominated by the Parthians.

Trdat, the brother of the last important Parthian king, Vologases I (AD 51-77), was appointed by him as king of Armenia (AD 52). Trdat was also recognized by Rome (AD 66), and thus he became the founder of the Arsacid (Parthian) dynasty which ruled Armenia until AD 428.

With the rise of the second Persian empire (Sassanid, AD 226-651), eastern Armenia was drawn more deeply into the Iranian orbit, while western Armenia remained chiefly under Roman and then Byzantine influence. The two great empires, Rome and Persia, vied for centuries to establish dominance over Armenia, making Armenia the scene of almost constant warfare.

This struggle was carried on in earnest when the founder of the Persian Sassanid dynasty, Ardashir I, overthrew the Parthian kingdom in Iran (AD 226), invaded Armenia, overwhelmed the Armenian Arsacids, and attacked the Roman Empire. After over a century of warfare, peace was signed between the Eastern Roman Empire and Iran in AD 387, dividing Armenia into two vassal states--one controlled by Byzantium and the other by Iran. In Persian (eastern) Armenia, the Armenian Arsacids retained nominal supremacy until AD 428; but, after the natural extinction of the Armenian dynasty, the Iranians appointed a marzpan (margrave) to rule as governor.

## **Christianity in Armenia**

Christianity arose in Palestine and spread from there along trade routes, by land and sea, through cities which had Jewish colonies to attract and shelter the Apostles. Thus, Christianity took root early in Egypt and North Africa (as far south as Abyssinia [Ethiopia]), Greater Syria (the followers of Jesus were first called "Christians" in Antioch), Anatolia (especially in Cilicia, Phrygia, Cappadocia and Galatia, where St. Paul preached), parts of Iran and as far east as India, as well as in Asia Minor, Greece, Macedonia and Rome.

Armenian tradition maintains that Christianity was introduced there by Sts. Bartholomew (an Apostle) and Thaddeus (one of the Seventy). It is also known that small Jewish colonies, dating back probably to the period of the Babylonian Captivity, existed in Armenia and probably served as nuclei for the spreading of the Good News (gospel). Tradition also links Armenia with the semi-legendary Christian king Abgarus of Edessa. These traditions are the foundation of the Armenian church's claim to apostolic origin.

Armenian merchants and travelers frequented Antioch, one of the earliest sites of Christian teaching and practice, and had relations with the even closer Christian centers of Edessa and Nisibis (in northern Mesopotamia), where Christianity flourished in apostolic times. Tertullian (AD 155-222), in his Answer to the Jews (Chapter VII), includes the Armenians among the very first Christians from the day of Pentecost. Furthermore, Eusebius in his Ecclesiastical History quotes a letter from Dionysus of Alexandria to "Meruzhan [Mitrozan], Bishop of Armenia" (c. AD 254). There were persecutions of Christians in Armenia under King Artashes (c. 110) and King Khosrov (c. 230).

In any case, Christianity must have had many adherents and a formal structure in Armenia by the time of the official conversion of the king by St. Gregory (Grigor) the Illuminator, which by tradition took place in c. AD 301. The Armenians are the first people to have adopted Christianity as the official religion of the state. While some investigators now date the conversion of Armenia as late as AD 314, it would still make Armenia the first Christian state in history.

The Armenian chronicler Agathangelos gives the follow story of the conversion of the Armenians by St. Gregory. King Trdat of Armenia had begun anew in AD 287 the persecution of the Christians in his country. [St.] Gregory Partev [the Parthian], was the son of an Arsacid (Parthian) Armenian prince, Anak, who had killed the father of King Trdat. In punishment, Anak and his family had been annihilated. Only one child, Gregory, escaped. He was taken to Leontius, Archbishop of Caesarea, for protection, and was brought up as a Christian.

Gregory returned to Armenia to evangelize. He was discovered by the king and cast into a pit, where he survived for fifteen years. King Trdat continued his persecutions until he was stricken with lycanthropy. On the urging of his Christian sister, we are told, Trdat ordered Gregory released and brought before him. Trdat was duly healed and converted by Gregory. A mass conversion of Armenia followed.

Gregory, yet a layman, went to Leontius, Archbishop of Caesarea, his childhood protector and patron, for ordination and episcopal consecration. He returned to Armenia and was chosen catholicos (head) of the Armenian church. The term "catholicos" was used at that time by the Persian church. He and the king went about the country with great zeal; with extensive help from Greek and Syrian priests, they destroyed pre-Christian temples, including their treasuries, libraries, and archives, dispersed their soldiers and priests, and built churches in their place. Indigenous Armenian church architecture is one of Armenia's great contributions to world art. Yet, because of this destruction, we have scant knowledge of pre-Christian history and religion in Armenia. A cathedral was built in the then capital, Vagharshapat, at a site called Echmiadzin (meaning "The Only-Begotten [Son] descended"), which is a few miles outside present-day Yerevan, the capital of the Armenian SSR. Echmiadzin was made the Holy See of the Catholicos and Supreme Patriarch of All Armenians. Echmiadzin never ceased to be revered, even when owing to political changes the Mother See was temporarily moved to other locations. The See is now occupied by His Holiness, Vazgen I (1955- ).

As in other newly converted countries, pre-Christianism was not entirely wiped out by the initial Christian effort, nor was the established church to be free of dissenting sects. Primitive religious rituals were passed on in the villages by oral tradition; and heresies, particularly the Paulician and the Tondrakian, appeared over time. Yet, the predominant culture in Armenia became Christian and characterizes the nation until this day.

## **Doctrine**

In its teaching on the sacraments and church order, the Armenians do not differ from the Eastern Orthodox Church. Of the seven ecumenical councils, the Armenian Church accepts the first three, rejects the fourth (which its delegates could not attend), and has not pronounced on the remaining three. The Armenians accept the principle of the infallibility of the Church in ecumenical council. In doctrine, the Armenian church continues to follow the orientation of the church of Alexandria, principally as found in the teachings of the Cappadocian fathers.

The Armenian Church is frequently considered by the Roman Catholic and Eastern Orthodox churches to be monophysite, along with the Coptic, Abyssinian, Syriac, and Indian churches, which as a group are often called the Lesser Orthodox Churches. This is not correct even though the Armenians came to reject the Acts of the Council of Chalcedon (AD 451), a council which took place when the Armenians were at war with Persia. The Armenian

Church, with its sister churches, resented the growing political and ecclesiastical power of Byzantium and Rome and the fading prestige of Alexandria, Antioch and Caesarea as leading Christian centers. Thus, it held to the earlier Christological definition of St. Cyril of Alexandria at the council of Ephesus (AD 431), "the one nature united in the Incarnate Word of God." To speak of "two natures" after the union, the Armenians insist, is to revert to the Nestorian heresy and endanger the doctrine of redemption.

This doctrinal position taken by the Armenian Church has served to separate it from the Chalcedonian churches and to have preserved its individuality. On the other hand, it has caused great conflict with the Byzantine Church, which frequently resorted to persecution (and even mass deportations) in order to bring the Armenians into the Orthodox fold. Later, during the period of the Cilician kingdom of the Armenians, at the time of the Crusades, it brought the Armenians into contention with the Roman Catholic Church. In modern times, it has tended to separate the Armenians from the Russian Orthodox Church and the tsarist government. The Armenian Church professes the Nicene creed, at which council the Armenians were represented by St. Aristakes (AD 325).

The Armenian Divine Liturgy (Mass) is consonant with the Orthodox and Roman eucharistic services. Armenian practice retains an earlier structural form of the liturgy, that of St. Basil of Caesarea, which differs from current Orthodox practice only in external appearances. For example, the Armenians still use a curtain to veil the sanctuary, while the Greeks have an iconostasis. More controversially, the Armenians use unleavened bread and wine unmixed with water in the eucharist, and they add the words "who was crucified for us" in the Trisagion. The Armenians differ from Rome in rejecting the "filioque" in the Nicene creed, papal supremacy and infallibility, and, formerly, communion in one kind. The Armenians continued to practice "the kiss of peace," which has only lately been reinstated in the Roman rite.

The Armenian priests, as typical in the Eastern Church, are divided into the monastic and parish clergy, with all the hierarchs coming from the former group. Today, celibate priests often serve in parishes. The Armenians celebrate Christmas on January 6, and they observe Easter with the Western Church. The Church offices (services) are in the classical Armenian written language, grabar.

## **Golden Age of Armenian Literature**

After the conversion of the Armenians, church services were held in Greek or Syriac, depending on the district. The Holy Scriptures were read in church in one or the other of these languages, with an immediate translation into Armenian made by a special order of clerics called "Translators." This lack of a native writing system was seen by the ecclesiastical and political leaders as inimical to both the nurturing of Christianity and national cohesion. Consequently, the Catholicos Sahak (Isaac) and King Vramshapuh appointed a learned monk, Mesrob Mashtots, to devise an alphabet, which was finished in c. AD 400-404.

The invention of the Armenian alphabet--of 36 letters--brought on the Golden Age of Armenian literature. Students were sent to the centers of classical and Christian learning in Edessa, Caesarea, Constantinople, Antioch, Alexandria, and Athens, to prepare themselves to translate the Bible, the liturgy, the important writing of Greek and Syrian church fathers, and classical literature--Greek and Latin--into Armenian. The Bible, translated from the Septuagint, was finished in a few years; it and most of the Patristics were translated within thirty years; but the whole process, including the translation of secular books, lasted some two hundred years.

Interestingly, the first known translation of the Bible (Old and New Testaments) was the Syriac (Beshito, second century AD); the second was the Latin (Vulgate, AD 392); the third was the Coptic (early fifth century); the fifth was the Abyssinian (Ethiopian, fifth century); the sixth was the Armenian (fifth century); the seventh was the Georgian (translated by St. Mesrob and his assistant, late fifth century); and the eighth was the Slavonic (ninth century).

The "Holy Translators" are highly revered in the Armenian church. Many of the works translated have since been lost in their Greek or Syriac original, but have been preserved in the Armenian.

Original works were also composed during the Golden Age, including works on history, philosophy, hagiography, homilies, hymns, and apologetics. Later works on the sciences were written. While much has been lost due to the ravages of war and time, many are preserved today in the great library of the Matenadaran (in which, for example, there are almost three hundred manuscripts of Aristotle's works) in Yerevan and in the Armenian monasteries at Jerusalem, Venice and Vienna. Thus, the Armenian church provided the Armenian people with a strong national culture just at the time the Armenian state was losing its political independence. It has been the church, indeed, that has preserved Armenian national consciousness during the many centuries in which there was no Armenian state.

### **War for Religious Freedom (AD 451)**

The newly aggressive Iran under the Sassanids sought to bring the Armenians closer to its orbit by imposing Mazdaism (Zoroastrianism) on the Armenians in its sector. A national resistance movement led by the flower of the Armenian nobility (the nakharars) under the hero Vardan Mamigonian (St. Vardan), the hereditary commander-in-chief of the Armenian armed forces, met physical disaster on the plain of Avarayr in AD 451. The war was immortalized by the national historian Eghishe (Elisha). The battle of Vardanantz is still commemorated by the Armenians as the preeminent national contest for religious independence and freedom of conscience. Some thirty years later, the nephew of Vardan, Vahan Mamigonian, and the Armenian nobles wrested the Treaty of Nvarsak (AD 484) from the Persians, in which the Armenians won freedom of religion.

### **Arab, Seljuk, Mongol Invasions**

The rise of the Arabs once more shows how the Armenians were dramatically effected by a major political change in the area. Armenia soon fell (c. 650), along with most of the Near East, to the Arab forces. Armenia alternatively suffered or prospered depending on who held the Caliphate and the condition of public order. The catholicosate was transferred from Dvin (where it had been moved from Echmiadzin to be near the king) to the more secure city of Ani, capital of the Bagratid Armenian princes. Finally in AD 885, after much effort, Ashot Bagratuni secured appointment by the Caliph in Baghdad and (in 886) by the Emperor in Constantinople as king of Armenia. The royal house of the Bagratids was divided into two branches, the Georgian Bagratunis (who passed into the Russian nobility as the Bagrations) and the Armenian branch which ruled the glorious medieval Armenian kingdom of Ani (885-1045).

This period witnessed a renaissance in trade, art, architecture, translations, church and secular literature, and scientific studies. Histories, such as those of Moses of Khoren, John of

Drashanakert, Thomas Arzruin, and Stepanos of Taron were written. Special mention must be made of Moses of Kalankatui's History of Albania, an important source for the history of Caspio-Albania. The revered [St.] Gregory of Narek (AD 951-1003) wrote ecclesiastical poetry and hymns which are still used in church offices. After the collapse of Ani, most of western Armenia fell to Byzantium.

The defeat of the Byzantines by the Seljuks at the battle of Manzikert [Manazgerd] in Armenia (AD 1071), brought all Armenia under Seljuk rule. The devastating Mongol invasion began in 1220 and ended with the occupation of Armenia in 1236. Unlike the Russians, the Armenian elites eventually prospered under the Mongols, serving as agents and being able to engage in international trade via the newly secured routes through Central Asia to India and China. Furthermore, cordial relations developed between the Mongols and the Armenian nobility. As the Mongols declined in power, however, Armenia was devastated by raiding bands of nomadic tribes. The final destruction came with the invasion of the hordes of Timurlane c. 1400. Beginning in the tenth century (perhaps earlier), many Armenian noblemen, their armies and their people, fled southwest to Cilicia to take refuge in the mountain fastnesses there.

### **Cilician Armenian Kingdom**

In time, these immigrants grew so numerous and so powerful that they established a principality which eventually became a kingdom. The medieval Armenian kingdom of Cilicia (1080-1375) existed, under the Rubenids (a junior branch of the Bagratids), among the Taurus and Amanus mountains and along the Mediterranean coast to Alexandretta. It enjoyed a high culture and great prosperity at a time when the Armenian homeland was slowly falling into ruin. The catholicos, who had taken refuge in the castle of Romkila on the Euphrates, moved (1293) to Sis, the capital of Cilicia. The Cilician Armenians fraternized with the Crusaders, and members of their nobility and royal house intermarried with the "Latin" nobility. This last Armenian kingdom fell in 1375; and the last Armenian king, Leo [Levon] V (VI), died in exile (1393) in France and is buried in the abbey church of Saint Denis, next to the tombs of the French kings to whom he was related.

This Cilician period was productive of great wealth, substantial learning, and a high culture. Specifically, it produced the most glorious period of Armenian ecclesiastical manuscript illumination, particularly under the school of Toros Roslin. It was also a period of almost continuous negotiations, with the intent of reunion, between the Armenians and both the Greek and the Latin churches. The records of these negotiations reveal a great deal about Armenian church doctrine and practice. Special attention must be called to the correspondence of bishop Nerses, surnamed Shnorhali [the Grace-filled], later Catholicos (1166-1173), particularly his Apologia, to Manuel I Comnenus (1143-1180) of Byzantium (who at the same time was flirting with the Latins in the hope of military support), and his Endhanrakan [Encyclical], documents which stand as authoritative sources on Armenian ecclesiastical doctrine and practice.

Latin influence was strong in Cilicia during the thirteenth century, due particularly to the great military expeditions of Holy Roman Emperor Frederick II (1228) and of King [St.] Louis IX (1248) and the desire of the Armenian princes to acquire political and military support. It was during this period that Italian colonies were established in Cilicia and Armenian colonies were founded in Italy. Venetian power, in particular, grew apace.

While the head of the Armenian Church lived in Cilicia (1294-1441), ecclesiastical policies were closely tied to the well being of the Armenian kingdom, which meant seeking a political

and religious accommodation with Rome and Byzantium. But with the failing power of the Armenian kings, the "Eastern Divines" (anti-Greek and Roman theologians from Armenia), fought for a return of the Catholicosate from its "Babylonian Captivity" in Sis back home to Echmiadzin. They realized a victory in 1441. Yet without political independence and a strong central state power in the homeland, the church gained little advantage save to avoid union.

One bright light in this otherwise dark period was the Catholicos Mikael (Michael) of Sebastia (1542-1570), who inaugurated Armenian printing by establishing presses in Venice, Echmiadzin, Isphahan and Amsterdam, and who raised educational standards. The first printing of the whole Bible in Armenian was done in Amsterdam in 1666.

Another pioneer of the reform movement was the Catholicos Movses (Moses) of Tatev (1629-1632), who also obtained protection from the Shah of Persia against local Muslim chieftains. His successors carried on his work. A new vitality showed itself in the church during the eighteenth century. Catholicos Simon of Yerevan (1763-1780) was one of the most capable personalities of the period. He founded a college in Echmiadzin, expanded the use of printing in his educational activities, and established the first regular contacts with the Russian government.

## **The Ottoman Turks**

Constantinople fell to the Ottoman Turks, who had earlier accepted Islam, in 1453. The Muslims make little distinction between the functions of "church" and state as is done in the West. It was the prophet Muhammad, himself, who first instituted the dhimma, or treaty, defining the relationship between the "people of the Book" defeated in a Jihad (Holy War), the dhimmi (tolerated people), and the power of Islam. These treaties usually specified that the conquered "people of the Book" (i.e., Jews and Christians), in return for submission and the payment of a tax [jizya], would have protection for their lives, religion, and property. This protection was denied to pre-Christians.

Accordingly, Sultan Mohammed II, the "Conqueror," (1451-1481) established the non-Muslim religious communities in the Ottoman Empire as domestic self-governing entities under the hegemony of the Sultan and his court officials. Thus, the Greeks were organized into a community (millet, flock) and the Greek Patriarch was granted social and civil governing privileges (granted rights) over his millet in those areas which were connected with the Muslim concept of societal responsibilities, such as contracts within the community, family life, marriage, public instruction, charities, worship, clergy, ecclesiastical administration, and the like.

The Armenians had been among the more favored subject peoples in the Empire, and now Mohammed II sought to make them a counterbalance to the Greeks in the capital. He expanded the Armenian colony in Constantinople by bringing Armenians en masse from Brusa and near by Asia Minor, and then he appointed (1461) their bishop, Hovakim, as Armenian Patriarch over his millet, with privileges similar to those accorded the Greek Patriarch.

All the Orthodox dyophysites, including the Greeks, Bulgarians, Serbians, Syrians, Melkites, and Arabs, became associated through their respective religious heads with the jurisdiction of the Greek (Ecumenical) Patriarch; while the Orthodox monophysites, comprising the

Armenians, Syrians, Chaldaeans, Copts, Georgians, and Abyssinians, became subject, through their respective heads, to the jurisdiction of the Armenian Patriarch.

The Armenian Patriarch of Constantinople became per force the most influential ecclesiastic in the Armenian church, and he presided over the Armenian catholicoses of Sis, Aghthamar, and Jerusalem, while acknowledging the "spiritual" primacy of the Catholicos in Echmiadzin.

The Armenian church in the homeland, denied political security and economic support, had fallen into a lamentable state. While Armenian communities prospered in metropolitan trade centers in the Ottoman Empire, Iran, India, Russia, Poland, and later in Egypt, the vast Armenian peasantry in the Caucasus and, especially, in eastern Anatolia suffered great privation and personal insecurity. While individual clerics and church leaders did heroic work keeping alive the Armenian Christian consciousness and a spark of learning in Armenia and eastern Turkey, there is no splendid story to tell. Istanbul became the thriving center of Armenian social, economic, cultural, and religious life in the Empire, while the provinces suffered under grinding poverty and increasingly horrifying misrule.

### **Armenian Catholics and Protestants**

Francis I of France was the first Western ruler to acquire a treaty of concessions, called capitulations, with the Ottoman Empire (1535). This treaty of extraterritoriality attached to individuals (akin to diplomatic immunity), gave the Latins, or Franks, as they were called, unique political and civil protection within the Empire. Certain Armenians, some with high motives, accepted union with Rome in order to enjoy French protection. Thus the Armenian Uniate church came into existence. Fewer than 1% of the Armenians belong to this church today.

The most famous of the Uniate clerics, Mekhitar of Sebastia, founded the Mekhitarist religious order (1717), which even now has important monastic centers of learning in Venice (San Lazar Island) and Vienna. The political status of the Armenian Catholics was regularized in 1831 by the Sultan who established a "Catholic Millet" in the Empire.

American Protestant missionaries were sent to the Ottoman Empire, beginning in the 1830s, by the American Board of Commissioners for Foreign Missions. Since they were prohibited by law from converting Muslims, they began to work among the indigenous "degenerate Christians of the East." Being totally rejected by the proud Greeks, who by then had an independent state of their own, they began to work among the Armenians, who welcomed Western learning. Some Armenians converted. In 1847 the Sultan, this time persuaded by the American protestants, established a "Protestant Millet." By 1891, the Americans had founded nine colleges in the Ottoman Empire, six of which served primarily Armenians.

While both of these new millets were nominally for all Ottoman subjects in these confessions, they consisted primarily of Armenians.

### **Genocide**

The Ottoman Empire at its zenith was well governed, and religious and national minorities were treated as well as any place in the known world. With its decline, however, the Empire became a corrupt and backward state. Christians were treated as gávours (infidels) and denied basic civil, religious, and human rights; and, at times, they suffered dire persecutions.

In the nineteenth century, when so much of Europe was being inspired by the ideas of the French revolution--liberty, equality, and fraternity--reforming Sultans in the Ottoman Empire sought to bring about progressive change under the banner of the Tanzimat. The Armenian church was able to take advantage of the reform atmosphere (under Abdul-Mejid [1839-1861] and Abdul-Aziz [1861-1876]) to establish the Armenian National Constitution (1863), a liberal document--involving substantial lay participation--by which the church and the community (Millet) were governed.

The coming to power of Abdul-Hamid II (1876-1909) marked the end of the Tanzimat, especially after the Russo-Turkish War of 1877-78. Abdul-Hamid, who had witnessed the empire disintegrate in the Balkans and the Caucasus under Russian pressure, decided to punish--through periodic massacre--his subject Christians, whose general plight served as an excuse for European intervention.

It was the Young Turks (1908-1917), however, inspired by neo-fascist and pan-Turanian ideologies, who decided to rid themselves (under the cover of World War I) of the Armenians. The Armenian genocide of 1915-1916 effectively wiped out the Armenian population of Turkey, claiming some 1.5 million victims. Perhaps 75,000 Armenians endure in Turkey today, most of them in Istanbul. With the demise of the Armenian population of Turkey, the Armenian Patriarchate has become--just like the Greek Patriarchate--a melancholy anachronism.

### **Armenian Church in Russia**

Russian expansion into Transcaucasia and eastern Anatolia (the Armenian homeland) brought large numbers of Armenians into the Empire. In 1836, Tsar Nicholas I (1825-1855) promulgated the polozhenye (statutes), which governed the administration of the Armenian church, and, by extension, Armenian community affairs. It gave the Armenians some autonomy and established a Holy Synod to share power with the Catholicos. The circumstances of the Russian Armenians were far superior to those of their co-religionists in Turkey.

The Russification policies of Alexander III (1881-1894) and Nicholas II (1894-1917) caused smoldering resentment in the Armenian church, particularly as governmental policies affected Armenian parochial schools. During the reign of Tsar Nicholas II, Armenian schools were closed, Armenians were removed from the civil service, and church properties were placed under governmental management (1903). It is also suspected that the Russian governor-general was behind the pogroms in the Baku oil fields in 1905, which left hundreds of Armenians dead. Yet, by 1913, government policies towards the Armenians changed in a positive direction, and a new era seemed to be dawning for the Armenians and the Armenian church in Russia.

Mention must be made in this context of the Armenian national and church hero Mkrtych Khrimian (endearingly called Hayrik, "little father"), who was Armenian Patriarch of Constantinople (1869-1873) and Catholicos in Echmiadzin (1892-1907). He was deposed as Patriarch by the Sultan for his enthusiastic support of the Armenian cause in Turkey, and he led the resistance against the tsar over the issue of church properties in 1903. His life (1820-1907) was totally dedicated to the protection of the Armenians both in Turkey and in Russia.

### **The Russian Revolutions of 1917**

The February/March 1917 bourgeoisie revolution, which was warmly welcomed by the Transcaucasians, caused the collapse of the Russian front in Turkey. The native Russian Armenians and the Armenian refugees from Turkey were thus put at risk of total annihilation by the advancing Turkish army.

The Bolshevik revolution of October/November 1917 made matters worse. In May 1918 the Transcaucasian Republic disintegrated, and on 30 May (retroactive to May 28) the Armenians were forced to announce their independence. Military matters went from bad to worse, especially since the Bolsheviks sought and developed a rapprochement with Turkey. On 30 November 1920, the leadership of the Armenian Republic accepted the status of a Soviet Socialist Republic to secure Russian protection, and in 1922 it was incorporated into the newly formed Transcaucasian SFSR. The Soviet constitution of 1936 dissolved the Transcaucasian Republic and made Armenia one of the union republics of the USSR.

The Armenian church suffered grievously under Stalin, as did religion in general in the Soviet Union. The situation during World War II was only marginally better. In 1955, however, Vazgen I was elected to the patriarchal throne and the situation in the Armenian church has improved steadily ever since. Today there is an active seminary at Echmiadzin, the veharan (home of the Catholicos) has been refurbished, ecclesiastical museums built, churches restored, and Armenians from all over the diaspora make frequent pilgrimages to the Mother See. The Armenian SSR in general, and Echmiadzin in particular, are frequented by Soviet and foreign visitors. The Catholicos is periodically allowed to make trips to Europe and America to attend international conferences and to visit his flocks.

### **Catholicosate of Cilicia**

At the time catholicosate of the Armenians was returned to Echmiadzin in 1441, the tradition of electing a "Catholicos of the Great House of Cilicia" continued, as did the tradition of electing a catholicos in Aghtamar (until 1915) with regional jurisdiction. The See was moved from Sis to Antilias, Lebanon, following the Armenian genocide in Turkey. The present occupant is Karekin II. While the Catholicos in Echmiadzin is recognized as "Catholicos of All Armenians," as a practical matter his jurisdiction over some dioceses in the Middle East is presently nominal.

Until 1956, there were no fundamental disagreements between the two, and the present contention is not doctrinal but administrative. During the years 1953-1956, a dispute over the process by which the new catholicos of Cilicia would be elected was aggravated by the Cold War and the resultant temporary polarization of political division among Armenians throughout the world. In 1956 the Catholicos of Cilicia acquired the dioceses of Iran, Greece, and a split group in America. This bifurcation now affects many Armenian church dioceses throughout the world. Attempts to rectify this disharmony are currently being made.

### **The Diaspora**

The Armenians since the middle ages have been in large measure a diaspora people. Today, there are perhaps 6,000,000 Armenians in the world. Some 4,500,000 live in the USSR, of whom perhaps 3,400,000 live in the Armenian SSR. The United States has an Armenian population of 500,000, and Canada has 45,000. France has some 250,000, while Iran has 200,000, Lebanon 200,000, Syria 70,000, Argentina 65,000, and the rest are scattered

throughout colonies in Europe, the Middle East, North Africa, South America, Australia, and Asia.

Each of these communities has an active church life and retains important ties to the Mother See in Echmiadzin. While some dioceses have primary allegiance to the Catholicos of Cilicia, probably nearly a third of the Armenians in the diaspora, all Armenians continue to acknowledge at least the titular primacy of the Catholicos of Echmiadzin.

Armenian seminaries exist in Antilias, Jerusalem, New York, and in Echmiadzin. Parochial schools are maintained all over the world outside the USSR. Armenian involvement in the church in the diaspora is very great; and church administration and governance involves a high percentage of lay people. Lay delegates are involved in the election of clerical leaders from the parish level up to the level of the Catholicos.

There is every indication that the ancient Armenian church will continue to contribute to the richness of the Christian ecumene into the indefinite future.

*[With minor corrections, July 18, 1994, by Gerald Ottenbreit Jr.]*

## APPENDIX VIII : LOCATION MAP



Site map showing Ererouk, marked with arrow, approximately 100 kilometers northwest of Yerevan near the Turkish border.

## APPENDIX IX: PROJECT INCOME & EXPENDITURES

### INCOME

| <b>source</b>             | <b>amount</b>          | <b>note</b>   |
|---------------------------|------------------------|---|
| J. Paul Getty Trust Grant | \$ 30,250              | matching grant for project development, continuing survey, emergency stabiliation, and proposal for conservation action |
| Samuel H. Kress Grant     | \$ 25,000              | grant to match GGP funds provided through the European Preservation Program   |
| IREX                      | \$ 5,000               | corporate donation  |
| small gifts               | \$ 1,385               | various private donors  |
| <b><i>total:</i></b>      | <b><i>\$61,630</i></b> |   |

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### EXPENDITURES

| <b>activity</b>         | <b>amount</b>           | <b>note</b>   |
|-------------------------|-------------------------|---|
| core investigative team | \$ 22,450               | support for four foreign experts for two team meetings, one field mission, data gathering and analysis, and preparation of report |
| special consultants     | \$ 6,250                | support for three additional engineering and architectural restoration consultants  |
| laboratory analyses     | \$ 2,000                | stone and mortar testing  |
| <b><i>total:</i></b>    | <b><i>\$ 30,700</i></b> | equivalent of Getty Grant Program matched contribution  |