

CLADDING PROJECTS FROM THE STONE MASTERS OF OLD

While employed at Flad & Associates of Wisconsin I had the opportunity to be project engineer for a number of stone cladding projects. Modern-day architects and designers drew their inspiration for stone design from the stone masters of old.

After completing my degree in Architectural Studies ('73) I never really gave too much thought to the art and architectural history courses I had taken, but did marvel at the immense stone structures that these master builders were able to erect. It wasn't until after I had left Flad and had the opportunity to travel abroad and visit some of these ancient building sites that I thought once again of those architectural history studies.

Below are just a few of the many photos I took of the tombs and temples built by these stone masters of old. Note that since we were involved in the modern-day stone engineering design of structures while on these trips I paid particular attention as to how these stone artisans of old assembled and anchored their stone structures.

The Acropolis, Athens, Greece

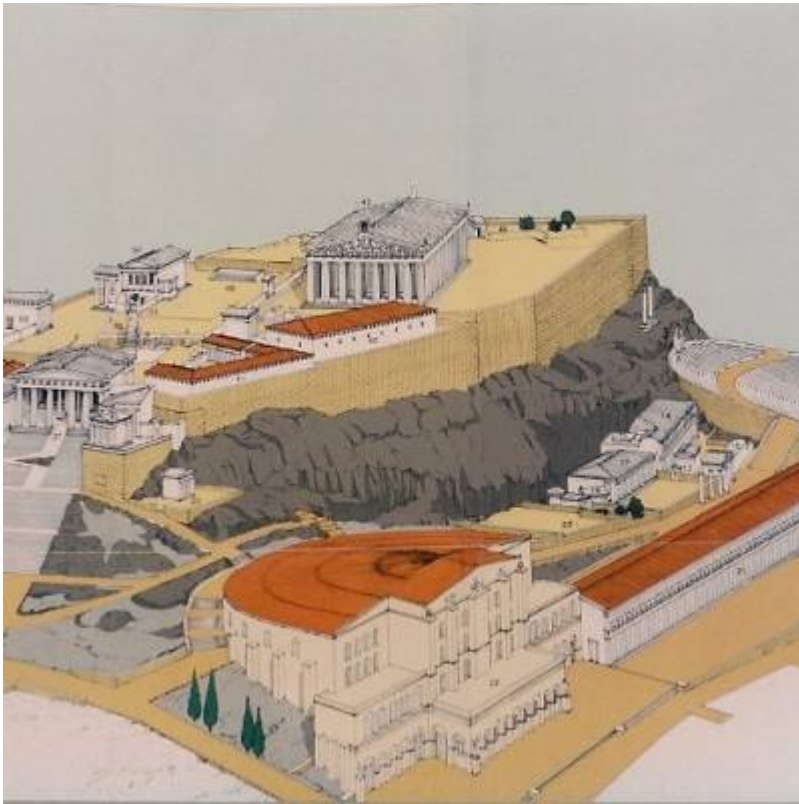


Fig. 1. Reconstructed view of The Acropolis.



Fig. 2. View of western facade of the Parthenon.



Fig. 3. View of the Parthenon from the northwest.



Fig. 4. View of eastern facade of the Parthenon.



Fig. 5. View of the Parthenon from the northeast.



Fig. 6. The Parthenon, details of the entablature.



Fig. 7. The Parthenon, details of the entablature.



Fig. 8. The Parthenon, details of the mutule.



Fig. 9. Column drums on the Acropolis.



Fig. 10. The Propylaia (the sacred gates).



Fig. 11. The Propylaea built 437-432 B.C.



Fig. 12. The Erechtheion from the Propylaea.



Fig. 13. The porch of the Caryatids.



Fig. 14. The porch of the Caryatids.



Fig. 15. Original Caryatids, Acropolis Museum.

Notes:

Beginning in the mid 5th c. B.C. up till today three temples dedicated to the worship of Athena Parthenos have succeeded each other on the same site. Parthenon III was begun in 447 B.C. by architects Iktinos and Kallikrates and construction lasted for 10 years.

Most of the original pediment sculptures to survive the 1687 gunpowder explosion were seized by Lord Elgin and are now in the British Museum (Figure 6 and 7). Figure 8 shows mutule, slablike element projecting from under the face of the Doric cornice.

The Propylaia built on the old Late Archaic portico to plans of the architect Mnesikles and was part of a building program begun by Pericles (Figure 10 and 11). Its cost was said to be 2,012 talants.

The Erechtheion represents the "rich style" on the sacred rock. Work began between 421-415 B.C. and was completed around 406 B.C. Caryatids on the present porch are now concrete copies (Figures 12-14).



The Temple of Olympian Zeus, Athens, Greece



Fig. 1. The Temple of Olympian Zeus, view from Acropolis.



Fig. 2. The Temple of Olympian Zeus.



Fig. 3. Corinthian column detail.

Notes:

The Temple of Olympian Zeus was begun in the 6th century B.C. and took over 700 years to complete. The largest temple in Greece, it was completed by Hadrian in 131 A.D. Figure 3 shows a Corinthian column detail. The column is 17m (56') high and has a 1.7m (5.6') base.



The Temple of Poseidon, Cape Sounion Greece



Fig. 1. Temple of Poseidon, 444 B.C. possibly by the architect Ictinus.



Fig. 2. Temple of Poseidon.



Fig. 3. Temple of Poseidon, details.



Fig. 4. Temple of Poseidon, column drums.



Fig. 5. Temple of Poseidon, details.

Notes:



The Temple of Apollo, Delphi, Greece



Fig. 1. Reconstructed view of Delphi.

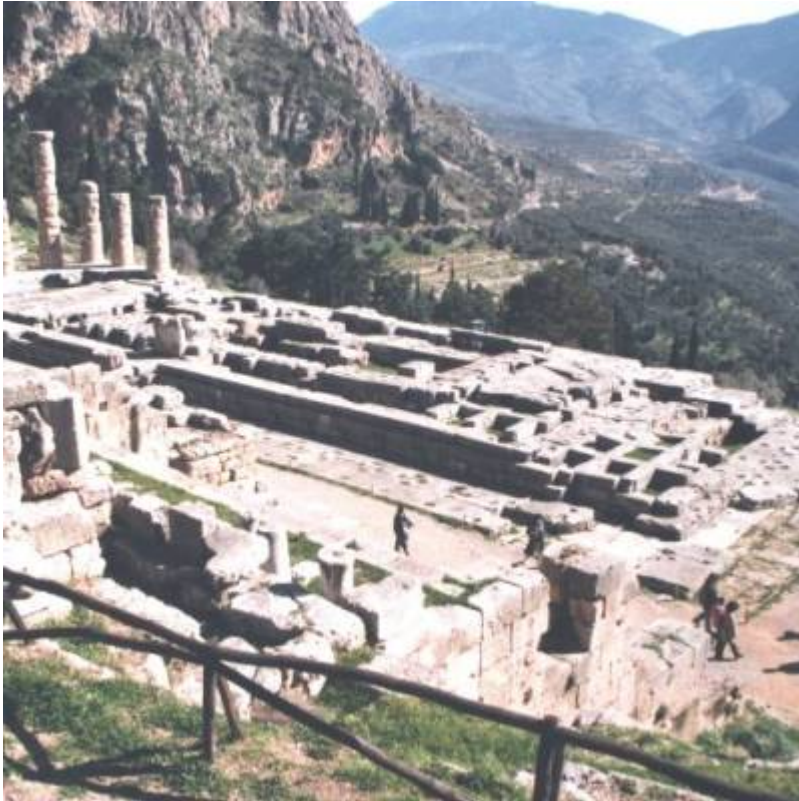


Fig. 2. Overview, Temple of Apollo.



Fig. 3. Foundations of treasury buildings, foreground.



Fig. 4. Theater, Cavea viewed from orchestra.

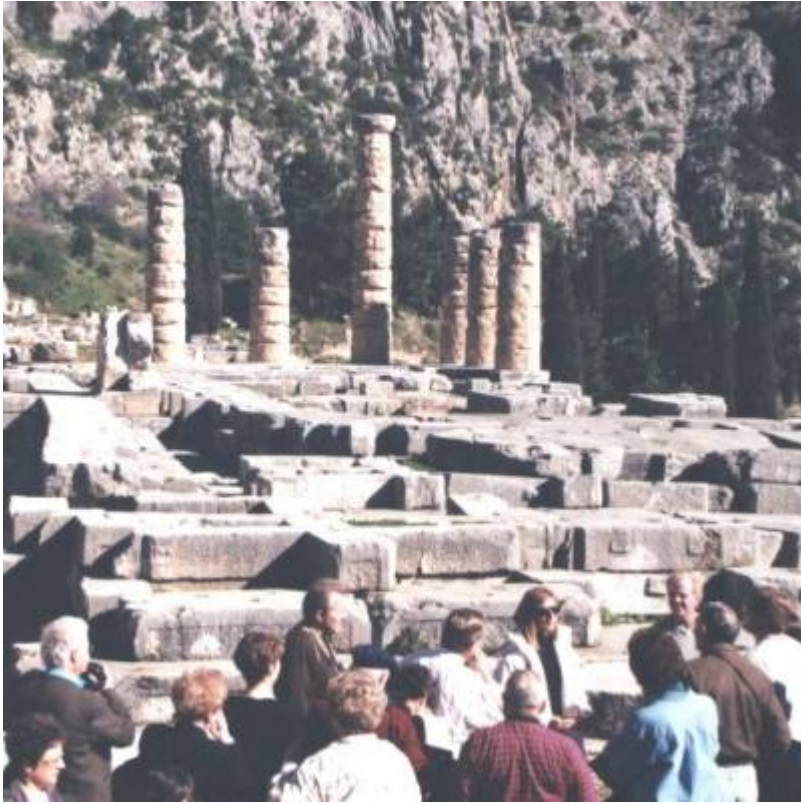


Fig. 5. Temple of Apollo.



Fig. 6. Doric columns of the Temple of Apollo.



Fig. 7. Temple of Apollo from below.



Fig. 8. Temple of Apollo from below



Fig. 9. Omphalos stone (naval-stone) near Boeotian Treasury.

Notes:



The Archaic Temple of Apollo, Corinth, Greece



Fig. 1. Reconstructed view of Corinth.



Fig. 2. View down Lechaion Road from Propylaia.



Fig. 3. Baths (of Eurykles?) and Peribolos of Apollo to right of Lechaion Road.



Fig. 4. The ruins of the spring of Peirene.



Fig. 5. Column base.



Fig. 6. Column base anchor detail.



Fig. 7. Examples of column capitals.



Fig. 8. Archaic temple of Apollo.

Notes:



The Temple of Artemis, Selcuk, Turkey



Fig. 1. Temple of Artemis.



Fig. 2. Overview Temple of Artemis.



Fig. 3. Lone column, Temple of Artemis.

Notes:

The worship of Cybele and Artemis which represented the mother goddess has been dated to 7,000 B.C.



Ephesus, Turkey



Fig. 1. Ephesus.



Fig. 2. The Prytaneion (Municipality Palace).



Fig. 3. The Basilica, early 1st c. A.D.



Fig. 4. The Odeion, 2nd c. A.D., seated 1,400.



Fig. 5. The Odeion, noted detail at stairs.



Fig. 6. Ionic column capital with double headed bull's head.



Fig. 7. Stone anchor detail.



Fig. 8. Stone anchor detail.



Fig. 9. Column base anchor detail.



Fig. 10. The Memmius Monument, 1st c. A.D.



Fig. 11. The Trajan Fountain, 2nd c. A.D.



Fig. 12. Cornice details, Pollio Fountain.



Fig. 13. The Marble Road (Hellenistic Period).



Fig. 14. The public latrines, 2nd c. A.D.



Fig. 15. View of The Celsus Library and Mazeus-Mithridates Gate.



Fig. 16. The Celsus Library, 2nd c. A.D.



Fig. 17. Mazeus-Mithridates Gate, 4th or 3rd c. B.C.

Notes:

Ephesus was an eastern seat of the Roman empire and had very sophisticated water supply and waste removal systems.

When Tiberius Julius Celsu Polemaeanus, proconsul of the Asian province died in 114 A.D. his son Tiberius Julius Aquila built the library as a heroon (mausoleum) for his father (Figure 15 and 16).



The Temple of Athena Polias, Priene, Turkey



Fig. 1. Temple of Athena Polias, 4th c. B.C.



Fig. 2. Temple of Athena.



Fig. 3. Temple of Athena.



Fig. 4. Temple of Athena, column drums.



Fig. 5. Temple of Athena, column drums.



Fig. 6. Temple of Athena, column drums.



Fig. 7. Temple of Athena.



Fig. 8. Temple of Athena, paving anchor detail.

Notes:

Built by the architect, Pythios, it was dedicated by Alexander the Great in 334 B.C.



The Temple of Apollo, Didyma, Turkey

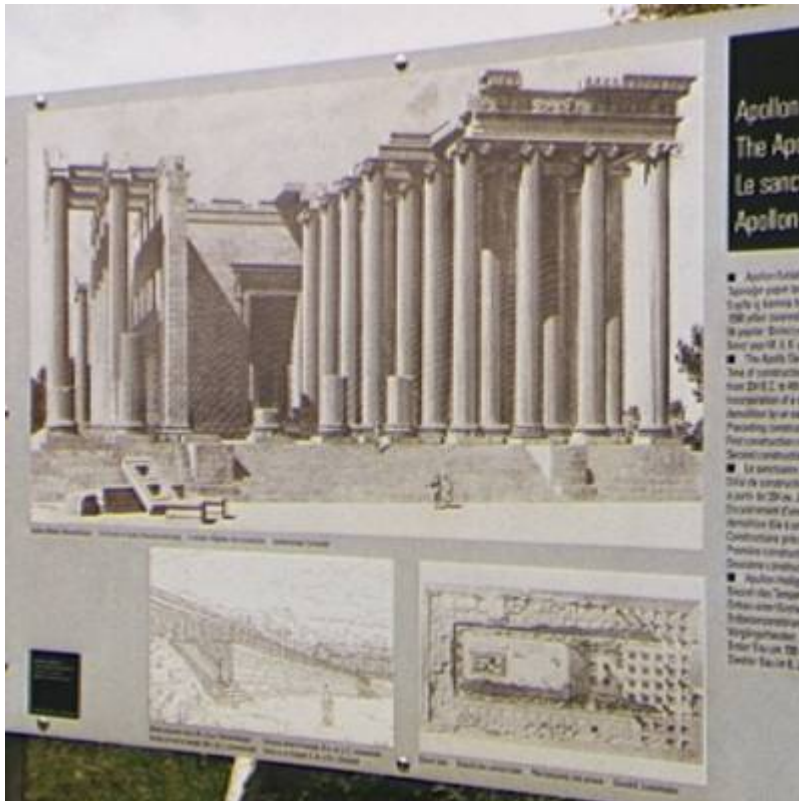


Fig. 1. Temple of Apollo, 1st temple 560 BC.



Fig. 2. Temple of Apollo.



Fig. 3. Temple of Apollo.



Fig. 4. Temple of Apollo.



Fig. 5. Temple of Apollo.



Fig. 6. Temple of Apollo.



Fig. 7. Temple of Apollo, details.



Fig. 8. Temple of Apollo, details.

Notes:

The Temple of Apollo at Didyma is the Hellenistic temple most often cited. Work began, on this version, about 300 B.C. and continued to 2nd c. A.D. but work was never completed.

This was to be a truly massive temple dedicated to Apollo as judged by its column drums (Figures 5 and 6). For reference my wife, Geri, is about 5'-11" tall.



Memphis, Egypt



Fig. 1 Column base showing masons guide lines.



Fig. 2. Column base showing masons guide lines.



Fig. 3. Hieroglyphs on column base.



Fig. 4. Hieroglyphs on column base.

Notes:



Saqqara, Egypt



Fig. 1. Zoser's Mortuary Complex at Saqqara, 2650 B.C. 3rd Dynasty.



Fig. 2. Zoser's Mortuary Complex at Saqqara.



Fig. 3. Hypostyle Hall of King Zoser.



Fig. 4. Ribbed column-pilaster.



Fig. 5. Ribbed column-pilaster detail.



Fig. 6. King Zoser's Stepped Pyramid.



Fig. 7. House of the North, fluted column detail.



Fig. 8. Heb-Sed, dummy chapels.

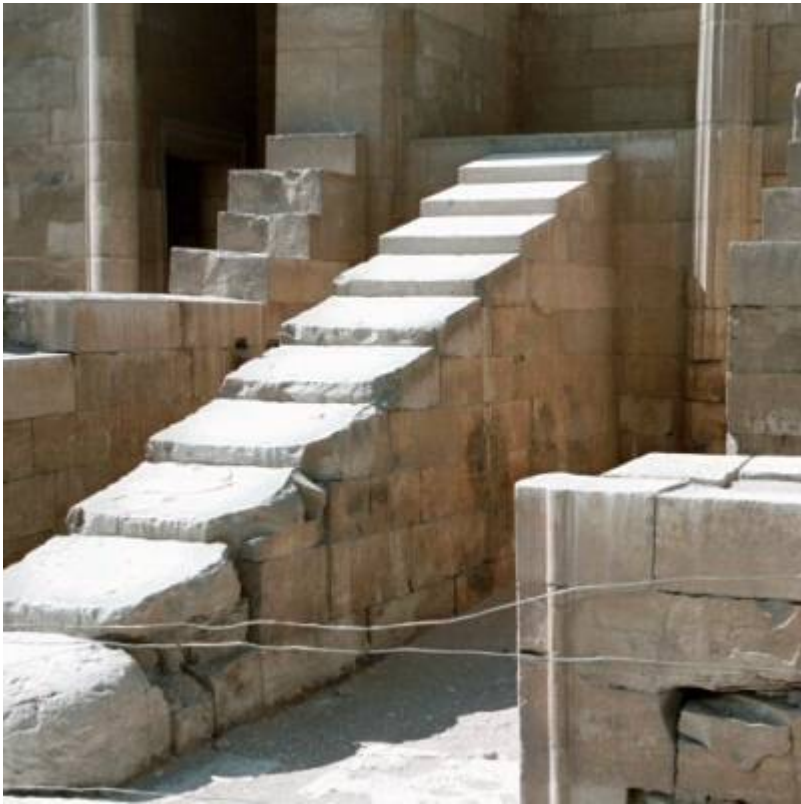


Fig. 9. Heb-Sed, dummy chapels, (first use of steps?).

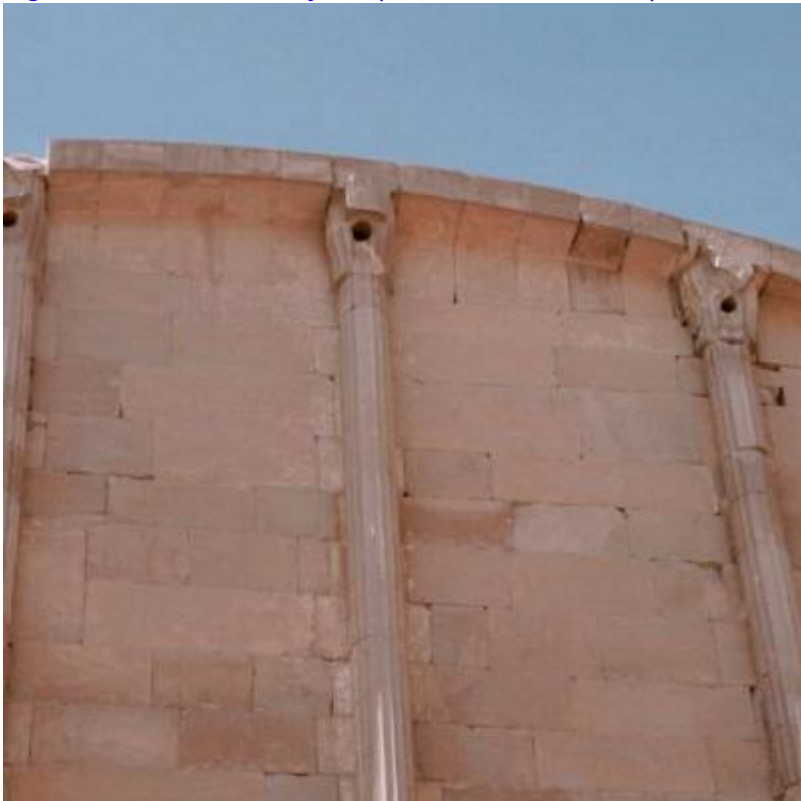


Fig. 10. Heb-Sed, dummy chapels, detail.



Fig. 11. Heb-Sed court.



Fig. 12. House of the South, papyrus head and stalk pilaster.

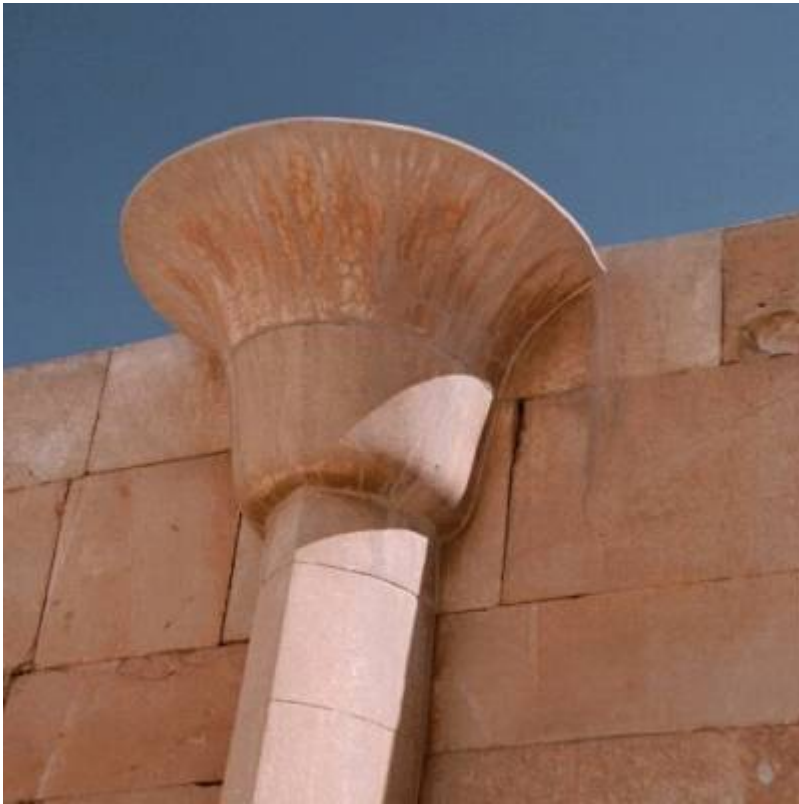


Fig. 13. House of the South, papyrus head and stalk pilaster detail.



Fig. 14. King Zoser's Stepped Pyramid.

Notes:



Island of Philae, Egypt



Fig. 1. Philae Temple, 1st Pylon, Temple Complex of Isis.



Fig. 2. 1st Pylon, Temple Complex of Isis.



Fig. 3. Temple of Isis at Philae fronted by 2nd Pylon, Ptolemy XII.



Fig. 4. Hathor headed column capitals in forecourt to the Temple of Isis.



Fig. 5. Roof detail eastern colonnade.



Fig. 6. Column detail eastern colonnade.



Fig. 7. Column detail eastern colonnade.



Fig. 8. Kiosk of Trajan.



Fig. 9. Kiosk of Trajan.



Fig. 10. Kiosk of Trajan.



Fig. 11. Kiosk of Trajan.



Fig. 12. Column capital detail Kiosk of Trajan.



Fig. 13. Unfinished wall corner Kiosk of Trajan.



Fig. 14. Unfinished wall corner Kiosk of Trajan.

<align justify>**Notes:**

The temple complex of Isis on the Island of Philae was rescued stone by stone by UNESCO in the 1960s when the High Dam was under construction. This religious complex was used up to the reign of Justinian in 550 A.D. What is apparent, in the construction of these ancient temples, is that they set the stones at

the approximate size needed and then dressed them down to the finished surface later (Figures 13 and 14).



Kom-Ombo Temple, Egypt



Fig. 1. Kom-Ombo Temple.



Fig. 2. Kom-Ombo Temple.

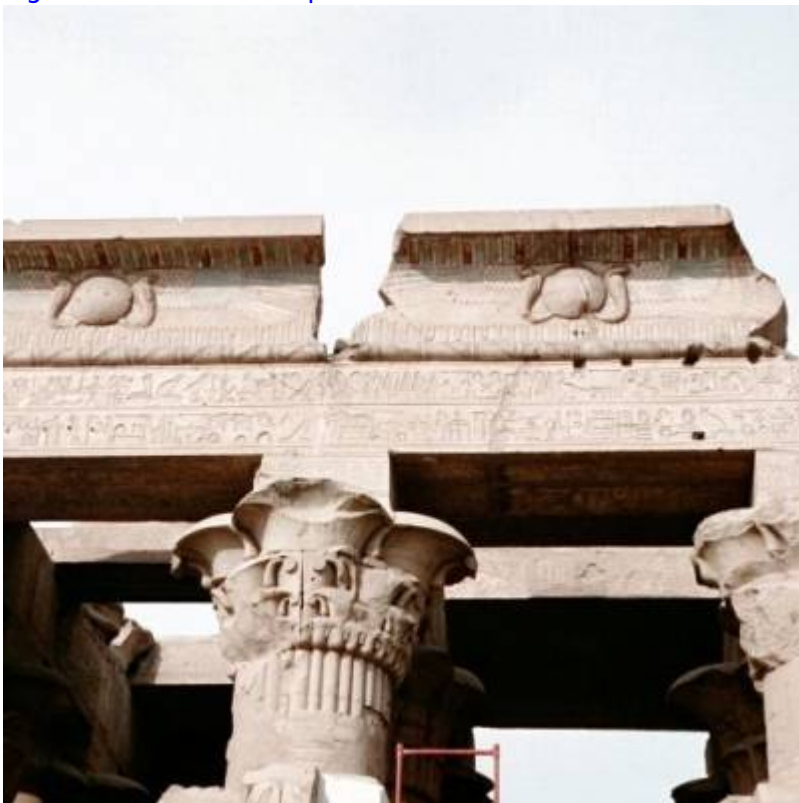


Fig. 3. Architrave of Kom-Ombo Temple.



Fig. 4. Columns in hypostyle hall.



Fig. 5. Columns in hypostyle hall.



Fig. 6. Column capital detail in hypostyle hall.



Fig. 7. Ceiling of Kom-Ombo Temple.



Fig. 8. Column detail in forecourt of Kom-Ombo Temple.



Fig. 9. Remains of twin sanctuaries and transverse halls.



Fig. 10. Original wood dovetail in wall of Kom-Ombo Temple.



Fig. 11. Dovetail slot in wall of Kom-Ombo Temple.

Notes:

This temple sports twin sanctuaries dedicated to Sobek, the crocodile god, and to Haroeris or 'Horus the Elder'. This temple begun during the Ptolemaic period was completed in the 1st century B.C. Not shown here in these photos but on a temple wall hieroglyphs show their "festival calendar". The Egyptians really

liked to party.



Edfu Temple, Egypt



Fig. 1. Colonnades of peristyle court, Edfu Temple.



Fig. 2. Colonnades of peristyle court.

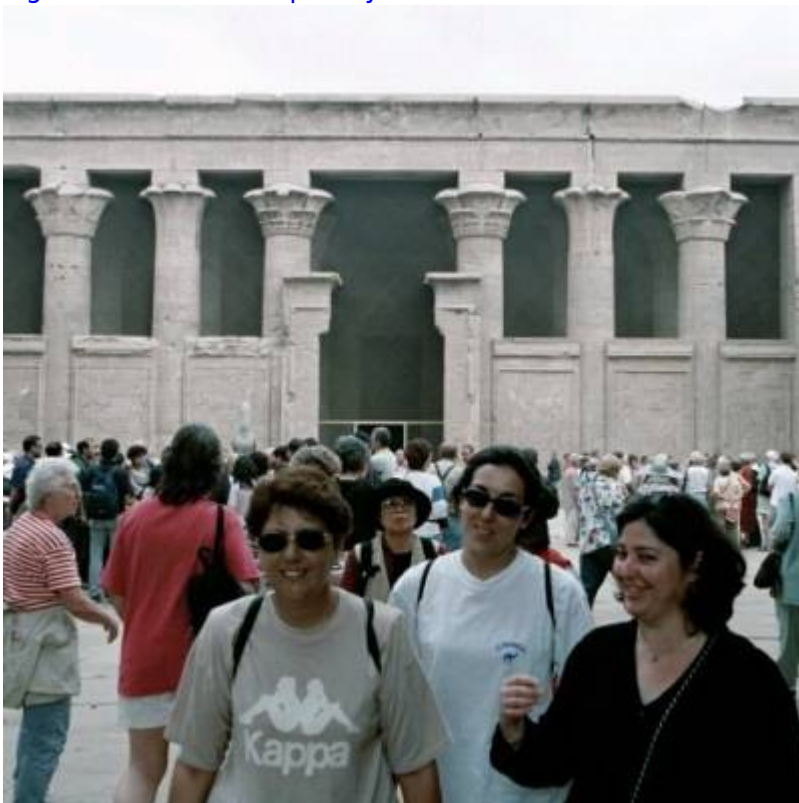


Fig. 3. Colonnades of peristyle court.



Fig. 4. Colonnades of peristyle court.

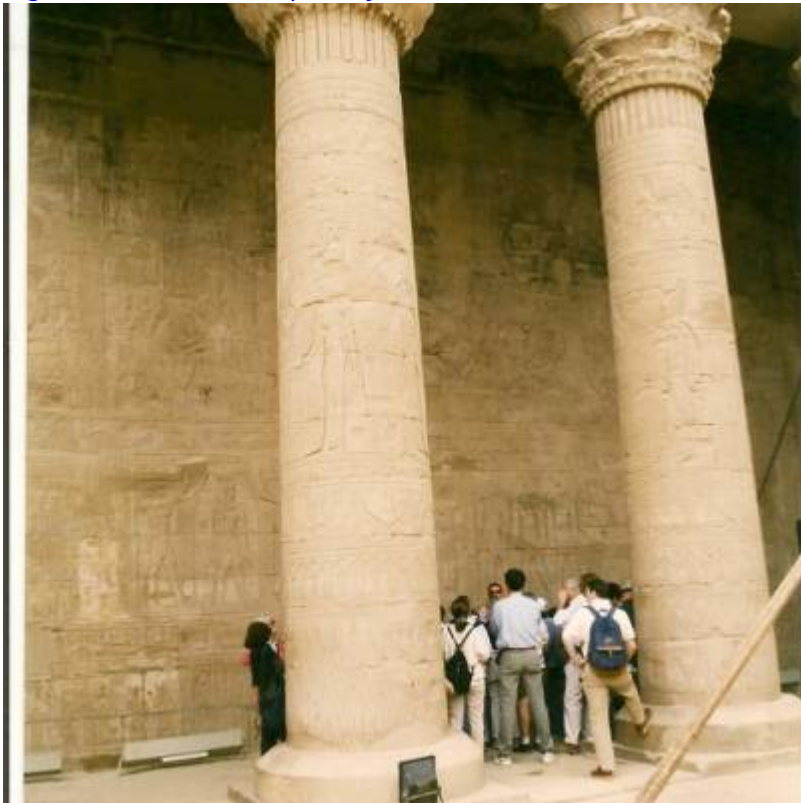


Fig. 5. Columns in peristyle court.



Fig. 6. Column capital detail from peristyle court.

Notes:

Main temple dedicated to Horus. Construction dates from Ptolemaic Period, 237-57 B.C.



Esna Temple, Egypt

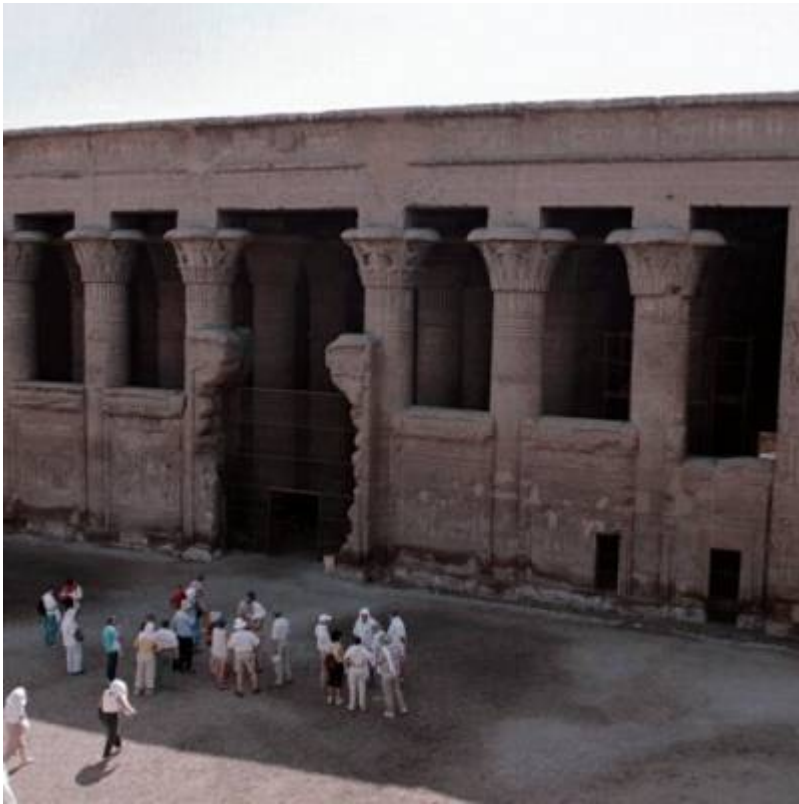


Fig. 1. Hypostyle hall of the Graeco-Roman temple of Esna.



Fig. 2. Architrave of hypostyle hall.



Fig. 3. Detail of column capital.



Fig. 4. Detail of column capital.



Fig. 5. Columns in hypostyle hall.



Fig. 6. Detail of column capital.



Fig. 7. Detail of column capital.

Notes:

The temple, which now stands in the middle of the modern town, about 30 feet below the surrounding buildings, dates to Ptolemaic and Roman times. It was dedicated to Khnum and several other deities. Only the hypostyle hall remains.



Karnak Temple Complex, Egypt



Fig. 1. 1st pylon of ten, Karnak Temple



Fig. 2. Western entrance through the avenue of ram-headed sphinxes.



Fig. 3. Great court, Karnak Temple.

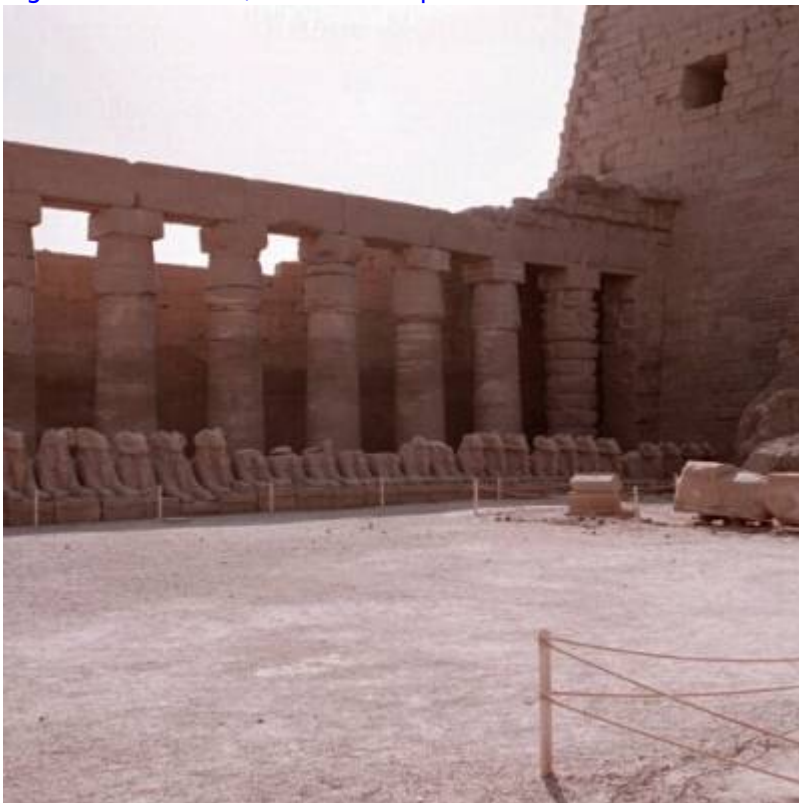


Fig. 4. Mud-brick ramp at back of unfinished pylon.



Fig. 5. Unfinished column, architrave and cornice in the court of Seshonq I.



Fig. 6. Papyrus column of Nubian pharaoh Taharqa.



Fig. 7. Massive columns of Great Hypostyle Hall.



Fig. 8. Massive columns of Great Hypostyle Hall.



Fig. 9. Open form papyrus column.



Fig. 10. Clerestory window.



Fig. 11. Unfinished column and wall.



Fig. 12. The inscribed 'Son of Re' names of Sethos I beneath the Great...



Fig. 13. The lily (left) and papyrus (right), the heraldic plants of Lower and...



Fig. 14. Papyrus columns, Karnak.



Fig. 15. Papyrus columns, Karnak.



Fig. 16. Festival Hall of Tuthmosis III, Karnak.



Fig. 17. Tent pole style columns in Festival Hall of Tuthmosis III.

Notes:

The temple complex, which has as its main temple the Great Temple of Amun-Re, dates from the 18th dynasty to the Graeco-Roman times.

There are 134 columns of the open or bundled papyrus form in this complex. The massive post and lintel hall is illuminated by high clerestory windows. The open form papyrus columns are 20 foot in diameter and can hold estimated one-hundred people.



Luxor, Egypt



Fig. 1. Entry and 1st pylon to Luxor Temple.



Fig. 2. Great Court of Ramesses II.



Fig. 3. Great Court of Ramesses II.



Fig. 4. Peristyle sun court of Amenophis III.



Fig. 5. Peristyle sun court of Amenophis III.

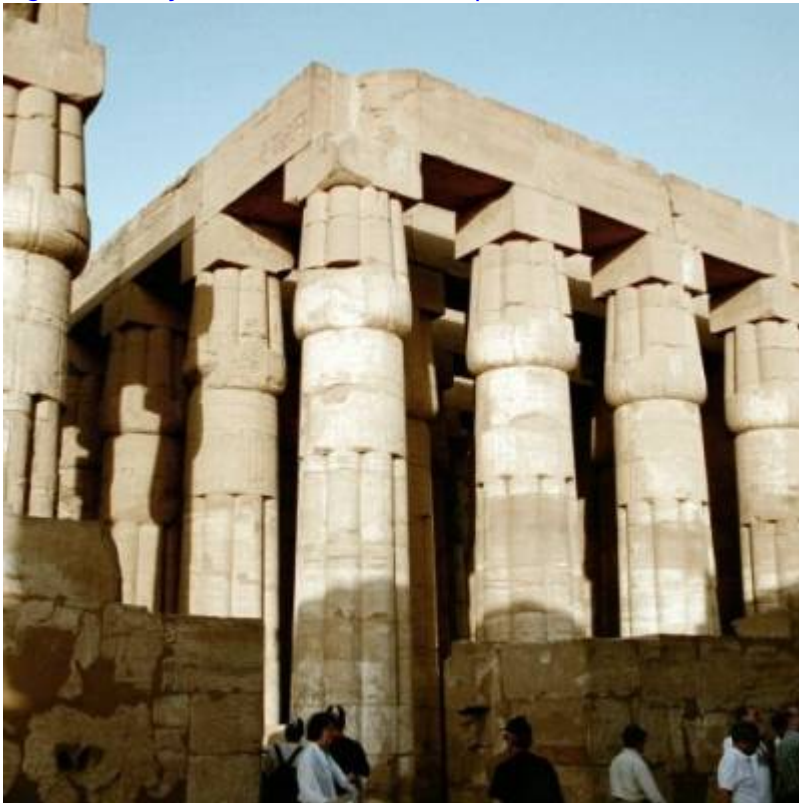


Fig. 6. Columns in sun court of Amenophis III.



Fig. 7. Columns in sun court of Amenophis III.



Fig. 8. Columns in sun court of Amenophis III.



Fig. 9. Fourteen papyrus columns form the Colonnade of Amenophis III.



Fig. 10. Colonnade of Amenophis III.



Fig. 11. Colonnade of Amenophis III.

Notes:

The avenue of the sphinxes once joined Karnak and Luxor temples. The temple complex, which has as its main temple the Great Temple of Amun, dates from the 18th dynasty to the Graeco-Roman times.



Deir el-Bahri, Egypt



Fig. 1. Temple of Queen Hatshepsut, XVIII Dynasty.



Fig. 2. Temple of Queen Hatshepsut.



Fig. 3. Steps from 1st court up to 2nd court.



Fig. 4. 1st colonnade.

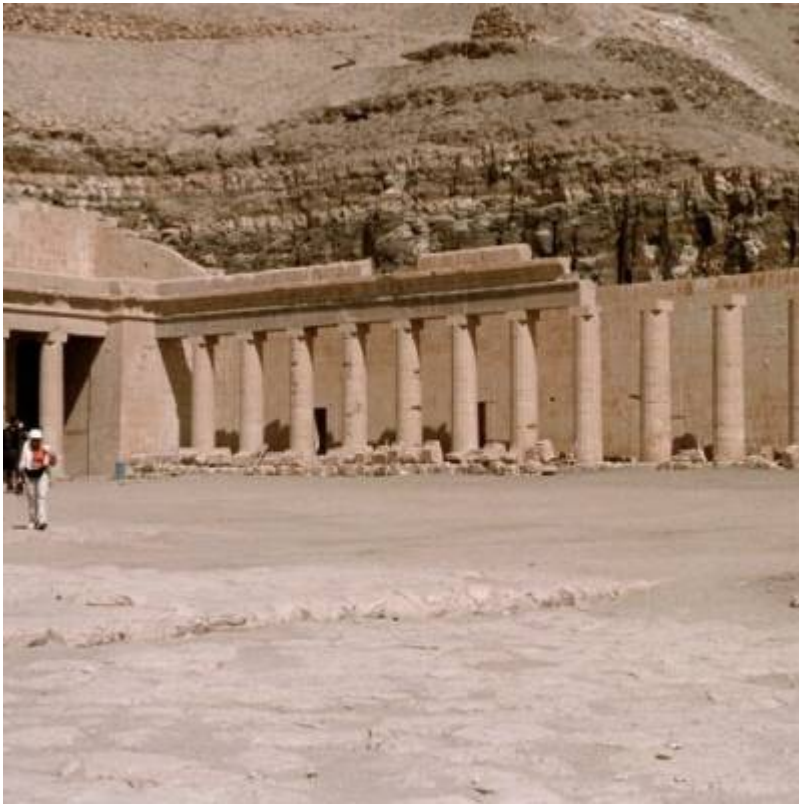


Fig. 5. Anubis Chapel, and 'Proto-Doric' colonnade.

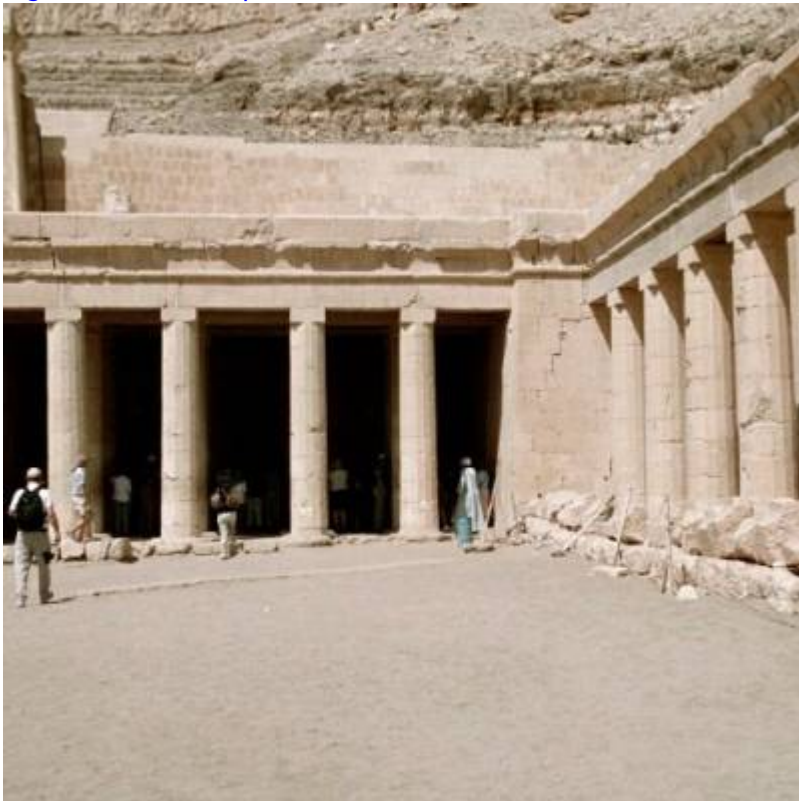


Fig. 6. Anubis Chapel and 'Proto-Doric' colonnade.



Fig. 7. 'Proto-Doric' colonnade.



Fig. 8. 'Proto-Doric' column detail.

Notes:

The scenes behind the 1st colonnade once showed the Great Barge of Queen Hatshepsut (1479 - 1457 BC) carrying her two obelisks.

With the advent of trade between Greece and Egypt it would seem reasonable that the Egyptians might of influenced Greek building styles and the Proto-Doric columns in Figures 5-8 might of had an influence on early Greek Temple building. One of the earliest Greek Temples being the Temple of Hera in Olympia, Greece (590 B.C.).



Cairo Museum, Cairo, Egypt



Fig. 1. Mason's tools, Cairo Museum.



Fig. 2. Cubit rulers, wood and stone, Cairo Museum.



Fig. 3. Sled to move building stone, Cairo Museum.

Notes:

It's amazing that these simple tools helped build the Great Pyramids and massive temples found here in this country.



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