THE TEMPLE OF NEMEAN ZEUS, A CALIFORNIA LANDMARK

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IN 1937 THE DEPARTMENT OF CLASSICS instituted a Ph.D. program in classical archaeology. It was intended to give expression to those remains of antiquity which could not be studied solely through the philological curriculum for which the University of California was already justly recognized.

In 1967 a review by the then Dean of the Graduate Division, Sanford "Sandy" Elberg, revealed that two Ph.D. degrees had been awarded during the 30-year existence of the classical archaeology program. The dean was not impressed. The Department of Classics decided that an excavation in a classical land would bolster the program and attract students of a quality that would insure their passage through the demanding program. The excavation site chosen was Nemea in Greece. Since I joined the Berkeley faculty only after that decision, I do not know all the factors that entered into this choice, although the Sanctuary of Zeus, which was the religious focus of the Nemean Games, must have been an attraction. Those games were, like the more famous games at Olympia, one of a cycle of four "stephanitic" games in Ancient Greece. Each of these games offered only a crown of vegetal matter as token of victory, and the most famous athletes were those who won the circuit with crowns of olive at Olympia, laurel at Delphi, pine at Isthmia, and wild celery at Nemea. These four festivals also offered an internationally recognized safe passage through enemy territory for athletes and spectators who were attending the games. This principle of a regularly recurring truce and the history of its successes and failures as expressed at Nemea may have played a role in the selection of Nemea.

In any event, excavations have continued annually since 1973 and resulted in the creation of, among other things, a research center for California faculty and students, a museum and park for the display of the antiquities discovered, and the revival of the ancient games for the first time in 1996 when former chancellors Bowker (Fig. 1) and Tien ran in the ancient stadium together with 669 other people from 29 different countries. Chancellor Berdahl was one of the 752 runners from 45 countries at the Second Modern Nemead held June 3-4, 2000. The excavations have also helped to revitalize the Ph.D. program in classical archaeology.

Fig. 1. Former Chancellor Albert Bowker at the city limits of Ancient Nemea, 1996.

Whatever other reasons played a role in the selection of Nemea, I must believe that one was the existence of three columns of the Temple of Zeus that had been standing since their erection in about 330 B.C. The temple and

Fig. 2. Lithograph showing the Temple of Nemean Zeus from the southwest in 1766.

its three columns have been known since travellers began to visit Greece in the eighteenth century (Fig. 2),[1] and the drums of the other columns lying scattered where they fell have frequently caused visitors to speculate on the possibility of a reconstruction of them (Fig. 3).[2] It was only in 1966, however, that a study of the temple was published that established many of the details of its architecture.[3] As a result, the Temple of Nemean Zeus[4] began to take its place as a landmark in the history of architecture, for it was constructed at the end of the Classical period and the beginning of the Hellenistic period, and it exhibits both traditional

Fig. 3. Aerial view of the Temple of Nemean Zeus in 1977.

motifs and innovative foreshadowings of the future of Greek religious architecture.

Thus, for example, the Doric columns of the exterior (Fig. 4) are extremely tall and slender in their proportions with a height of 6.34 lower column diameters. The columns of the Temple of Apollo—200 years earlier than the Temple of Zeus—at nearby Corinth are 4.15 diameters in height. The plan of the Nemean building (Fig. 5) shows the typical six columns across the facade, but the side is only 12 columns long, a column shorter than was the norm in the Classical period, and a preview of the ever-shorter temple plan of the Hellenistic age. Again, the interior of the temple had a double colonnade (Fig. 6) in the tradition of, for example, the Early Classical Temple of Aphaia on Aigina, but unlike the Doric interior columns used there, the Temple of Zeus uses Corinthian columns for the lower colonnade (Fig. 7) and Ionic columns for the upper. The Hellenistic mixing of the three basic orders of Greek architecture is obvious.

Fig. 4. View of the Temple of Nemean Zeus from the southwest in 1999.

An anomaly in the plan of the building is the sunken crypt that replaces the normal back porch of the Classical period (Fig. 5). This element seems to have served some purpose specific to Nemea, for it has no successors. So, too, the use of Pentelic marble for the sima that collected rainwater on the edge of the roof of the otherwise completely limestone building reflects a desire for a more durable material at that point of the building where the potential for weathering is the greatest. Practical and aesthetic considerations mingle.

The study of these and other details gave a renewed impetus to the idea of a physical reconstruction of the temple, and such a possibility was discussed when the University of California began to plan its work at Nemea in the early 1970s. Not everyone agreed that a reconstruction was a good idea, but the economic realities were such that the subject was moot. Property had to be purchased for the excavations, a museum had to be constructed,[5]

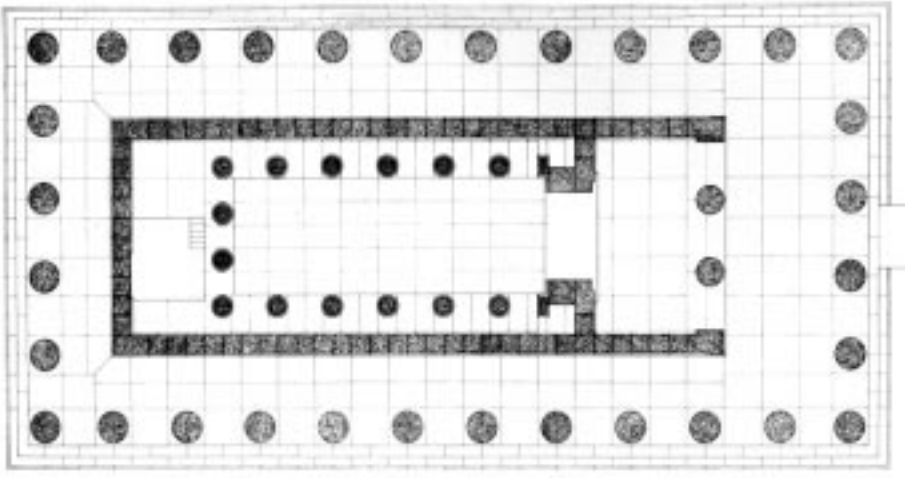

Fig. 5. Ground plan of the restored Temple of Nemean Zeus.

the local workforce had to be paid, and the expenses of student participation had to be covered. Where would it ever be possible to find the money for a reconstruction?

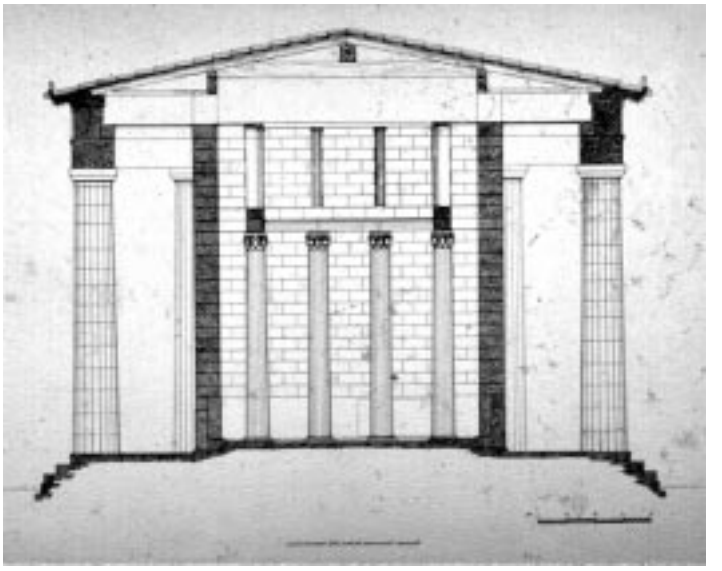

Fig. 6. Cross section through restored Temple of Nemean Zeus.

Then, one day in September, 1978, the telephone rang and the familiar voice of State Senator Nick Petris came across the line to ask "Why don't you reconstruct that temple at Nemea?" When I explained the financial obstacles—including the lack of support from the state budget—Senator Petris responded that he thought the reconstruction project might be the special responsibility of the Greek-American community of California. Fundraising began, and Nick soon found help from many people, most notably Angelo Tsakopoulos of Sacramento. Thus it was possible to begin the detailed study that had to precede a reconstruction. Unlike the presentation that was given in the book *The Temple of Zeus at Nemea* (1966), every extant block would have to be examined, measured, drawn, and assigned its precise original position in the temple. Professor Frederick Cooper of the University of Minnesota agreed to lead this effort, and he was assisted by volunteers from many universities in North America and especially from the University of Ghent in Belgium.

This "feasibility study" took place in 1980-1982 and involved the cataloguing of some 1,107 ancient blocks with an average weight of 2 tons. The Caterpillar front-end loader that we had brought to Nemea to remove the earth excavated from our trenches found a new use. The result was the placement, on paper, of all the blocks that survived to us. Hence we are able to see, for example, that much of the material of the columns and entablature survive on the north side (Fig. 8).[6] The accuracy of these placements is assured by the fact that no two drums are exactly the same. Because the diameter of the columns diminishes toward the top, and because the height of each drum is unique, and because of the place where each drum was found, the process of reassignment is more straightforward than it might seem.

Fig. 7. Drawing of restored Corinthian capital.

The next step was to shift public opinion in Greece (which was not always positive or pro-American in 1982-1983) to a climate that would ensure approval from the Ministry of Culture for the actual reconstruction. This was accomplished, in part, by an exhibition in 1983 at the Benaki Museum where sev-

eral officials such as the late Melina Merkouri and the erstwhile Californian, Margaret Papandreou, lent their support.[7] This support was augmented the following year when the then Prime Minister and former chair of the University of California's economics department, Andreas Papandreou, inaugurated the Peterson Archaeological Museum at Nemea. Permission was soon granted for the reconstruction of two columns on the north side of the temple. The sense was that of a trial to see what problems would be encountered and whether the resulting aesthetics would be satisfactory. If all was well, more columns might be re-erected.

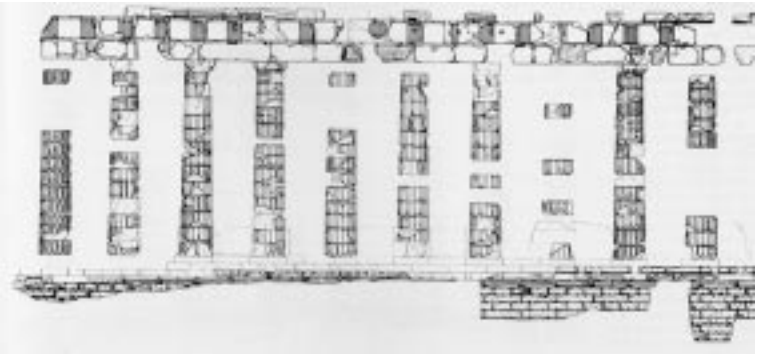

Fig. 8. Drawing of north side of temple with blocks assigned to their original position in the building.

But why should we re-erect any columns at all? There are many aspects—positive and negative—to this question, but for me the most serious reason for putting the columns back in place is to preserve them. A comparison of the upper surfaces of the fallen drums, badly eroded (and eroding) from ice and snow and sun and weeds, with the surfaces of the standing columns shows how much damage is being done to the ancient material in its fallen position (Fig. 9). At the same time, we should never think of a total temple standing at Nemea.

Fig. 9. Fallen drums showing erosion of exposed surfaces in contrast to well-preserved surfaces of lower parts of blocks.

Fig. 10. Lithograph of the Temple of Nemean Zeus in 1805, from the east, by William Gell.

We lack many of the interior Corinthian columns, 34 orthostates from the base of the interior wall, and 1,120 blocks from the upper part of the wall. Even the exterior colonnade—where so many of the columns are preserved—is lacking 241 blocks from the steps below the columns. The lack of so much material is an important reason why the complete Temple of Nemean Zeus cannot be reconstructed. The replacement of so many ancient blocks with modern stone would have to be considered a new building on ancient foundations rather than a reconstruction of the ancient temple.[8]

Another aspect of the reconstruction has to do with seismic considerations and the precautions that should be taken in the reconstruction. It was thought, years ago, that the greatest destruction to the temple was caused by earthquake.[9] In the 1970s, then Vice Chancellor Ted Chenoweth—a geologist—looked at the aerial view of the temple (Fig. 3) and asked the cause of its destruction. "Earthquakes," I responded. "All the archaeologists say so—it must be true." "Well," he returned, "you certainly have neat earthquakes at Nemea. All the columns on the north side fell to the north, all those on the east side to the east, all on the south side to the south. That's not the way earthquakes normally work," he concluded.

He was, of course, correct, and we have been able to show that earthquakes played a minor role—perhaps no role at all—in the destruction of the temple. As early as 1766 the English traveller Chandler noted that the capital on the single column was unbalanced and ready to fall (Fig. 2). In 1805, William Gell showed the temple from a different angle, and thereby revealed another detail (Fig. 10). The stylobate upon which the single column with its unbalanced capital stood had been cut away so that perhaps 20 percent of the column was already then standing on air.

One of the earliest photographs of the temple was by the Swiss photographer Boissonnas in 1908 (Fig. 11), more than a century after Gell's drawing. The capital is still unbalanced and the column is still standing partly on air. The significance of these documents becomes clearer when we know the history of seismic activity during the intervening century. In 1858 an earthquake that measured about 7.0 on the Richter scale struck the Nemea valley. The column and its capital did not fall. Three years later, in 1861, another earthquake struck and again the column did not fall. This second earthquake measured 7.3 on the Richter scale. In other words, there is strong evidence that earthquakes are not particularly dangerous to the Temple of Nemean Zeus.[10]

Moreover, it is clear that even though the columns have fallen they are still extant, but that other parts of the Temple of Nemean Zeus have largely disappeared. Thus, the blocks upon which the columns once stood have disappeared, and man—not earthquake—was clearly the cause of their disappearance. These blocks—unlike the cylindrical column drums—were useful for building, and the iron clamps that held those blocks together were also a source of metal. That is why there are so many gouged holes where the iron clamps

were removed. The process is visible in two rare examples where the clamps were being pried out when something interrupted their removal (Fig. 12).

What did the ancient Greeks know about civil engineering that allowed them to build such an earthquake-resistant structure? It hardly need be said after the fatal earthquakes of August and September, 1999, in Turkey and in Greece, respectively, that Nemea lies in a very active earthquake zone. Although my friends in the engineering department will probably tremble at my way of expressing it, I think they will agree that the Greeks had discovered the principle of flexibility in their construction. Thus, in the earliest years of Greek temple building, the columns were monolithic; the Temple of Apollo at Corinth of about 540 B.C. will serve as the example nearest to Nemea. By the time the Temple of Nemean Zeus was constructed 200 years later, columns were made up of individual drums—13 in each column at Nemea[11]—that could absorb the shock of earthquakes. The drums might slip and "dance," but the effect of whiplash in a rigid monolithic column was minimized by the flexibility that the horizontal joints of the column allowed. Although I await a graduate student to carry out in a dissertation the necessary detailed analysis of the ancient texts and monuments

Fig. 11. Photograph of the Temple of Nemean Zeus in 1908, from the east, by Boissonnas.

Fig. 12. Two ancient iron clamps partially pulled from their blocks.

that will prove this theory, it seems that ancient architectural nomenclature indicates its validity. The ancient column drum was called a sphondylos (σφόνδυλος); the basic meaning of the word sphondylos, however, is vertabra. The human spinal column with its flexibility served as the model for the ancient Greek column.[12] In other words, the study which has been a necessary prerequisite to the physical reconstruction of the Temple of Nemean Zeus has resulted in an expansion of our knowledge of the underlying principles of ancient architecture.

So, too, the physical reconstruction itself has already given us new understanding of ancient construction techniques. That reconstruction actually began with the foundations in 1984, but financial problems prevented the work from going forward. Nonetheless, advances in our knowledge were gained already then. I will offer one example here. One of the hallmarks of ancient Greek masonry was the ability to create joints between blocks that were so tight that neither water nor even air could pass through. The examples of such joints are nowhere better known than on the Athenian acropolis and particularly in the Parthenon where wooden plugs 2,450 years old are still preserved between the drums of the columns. But the Athenians were working with Pentelic marble of fine quality.

The stone of the Temple of Nemean Zeus came from quarries lying 3 kilometers to the east where roughly worked column drums—prepared but never moved to the temple or used (Fig. 13)—still lie. The stone is a sandy limestone with pockets of "rotten" stone or even earth interspersed with areas of very hard stone. This is the stone which we must cut and use to replace the blocks robbed out of the base of the temple centuries ago.

Fig. 13. Rough worked column drums still in the quarries.

Our attempts to make perfect joints between new blocks of this irregular limestone were unsuccessful, for the chisel would gouge out the soft areas and bounce off the hard and leave a surface that might match that of the adjacent block perfectly in one place, but leave a gap between the surfaces in another. Different chisels and abrasives were tried, electric grinders and even marble floor polishers were used, but the perfect joint eluded us. Finally, in frustration and contrary to what we are taught in modern books about ancient stone masonry, the local workmen resorted to the woodworker's trick of running a saw through the joint in

order to create precisely conforming surfaces—if the saw went a little more deeply into the surface of one block, it automatically left a corresponding convex bulge in the surface of the adjoining block (Fig. 14). The surfaces were not necessarily perfectly straight, but they were perfectly parallel. Not only did this use of the saw solve our problems, but it forced us to look at ancient joint surfaces where we discovered that there are still clear traces of saw marks from antiquity (Fig. 15). The local workmen were proud that they had discovered one of the secrets of their ancestors, and became convinced that the saw was the tool of choice on our sandy limestone, including even the creation of the horizontal joints between column drums. Again, the workmen were correct for the ancient surfaces show the long and curving lines left by the saw. And again, I await a graduate student to do a dissertation on the use of the saw in ancient stone masonry.

Fig. 14. Sawing a joint.

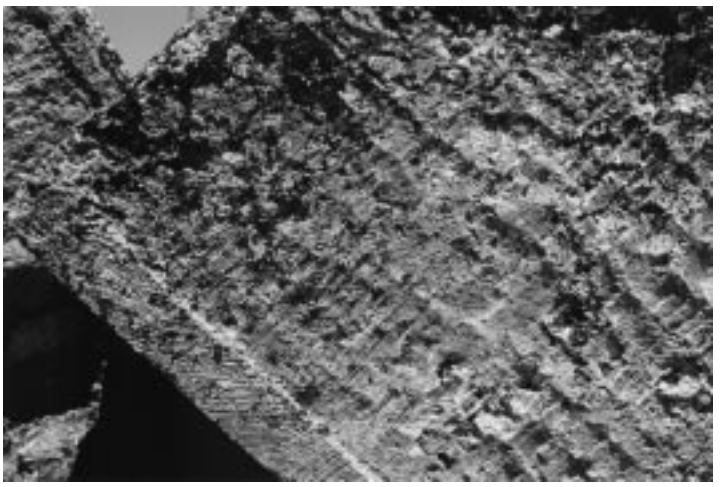

Figure 15: Saw marks on narrow joint surface of epistyle block contrasted with chisel marks on recessed, non-joint (anathyrosis) surface to the right.

The Temple of Nemean Zeus is a laboratory and a classroom where we learn and share our newly rediscovered knowledge. We are returning to that classroom thanks to the generosity of an Athenian businessman, Theodore Papalexopoulos, who has provided the funds to re-erect those two columns that were planned already fifteen years ago. At the end of November 1999, they were growing (Fig. 16) and are now more than half done. Our hopes do not stop there, however. It is now our goal to see not three, nor five, but twelve columns re-erected including the whole of the eastern facade by the time of the Olympic Games in Athens in 2004.

We recognize that, beyond the need to preserve this monument of our past and beyond the new knowledge that we gain from the reconstruction, there is another, deeper reason for putting the Temple of Nemean Zeus back together again. The original construction of this building more than 2,300 years ago was not an act of necessity, nor is its reconstruction forced upon us today. Nonetheless the ancient Greeks and we share—through the desire to build this temple then and to rebuild this temple now—a fundamental creativity that marks the human spirit at its best; we share an impulse toward a higher civilization that leaves a record of human accomplishment, and that serves as a beacon to future generations.

Fiat Lux.

Fig. 16. Two "new" columns going back in place (six drums set on one, two on other, of total 13 in each) on November 29, 1999.

ENDNOTES

1 The first modern record of the Temple of Zeus was in the drawing by William Pars published by the Society of the Dilettanti in *Antiquities of Ionia* II (London 1797) pl. 15, and the verbal description by Richard Chandler, who visited Nemea with Pars in 1766, in *Travels in Greece* (Dublin 1776), 244-245.

2 E.g., by Abel Blouet, *Expédition scientifique de Morée* III (Paris 1838), 33: "In reassembling the fragments of geisa, architraves, friezes, and capitals (which are quite well-preserved and which exist here and there in a very large number) it would be easy to re-establish the temple in its entirety." (trans. from French).

3 Bert Hodge Hill, *The Temple of Zeus at Nemea* (Princeton 1966).

4 Nemean Zeus should be carefully distinguished from Olympian Zeus. The latter is the well-known King of the Gods, thunderer and philanderer, who rules from Mt. Olympus and whose best-known sanctuary is at the site of Olympia, 170 miles away from the mountain—as the crow flies— and much further over the rugged terrain that intervenes.

Nemean Zeus seems to have been the god of shepherds and of grazing as the root of the word implies. The verb νεμειν ("to pasture, to drive to pasture, to graze") seems to have applied to our

site because it naturally is a swampy basin surrounded by low hills and suitable only for grazing. The cult of Nemean Zeus was not widespread, but it did exist elsewhere. For example, the poet Hesiod was told by an oracle that he should "beware the pleasant grove of Nemean Zeus for there death's end is destined to befall you." Hesiod never visited Nemea, but inadvertently entered the Sanctuary of Nemean Zeus at Oinoi in Lokris in central Greece. There he died. See Thucydides 3.96, and Alkidamas, *The Contest of Homer and Hesiod,* 119-129.

5 The museum was built thanks to the generosity of Rudolph A. Peterson (Alumnus of the Year, 1968; see *A Career in International Banking with the Bank of America, 1936-1970, and the United Nations Development Program, 1971-1975* [Berkeley 1994], 382-387) and it was opened to the public in 1984. The study and conservation rooms in the museum are the center of work by students and faculty from the University of California and elsewhere, and they serve a central need of the ongoing excavations.

6 The situation toward the west end (right in Fig. 8) is not so desperate as it appears. Subsequent excavations west of the temple have revealed that 11 blocks from the west end of the temple had fallen into a river of Byzantine times.

7 Frederick A. Cooper, Stella G. Miller, Stephen G. Miller, and Candace Smith, *The Temple of Zeus at Nemea: perspectives and prospects. A Guide to the Exhibition* (Athens 1983).

8 Many of the missing blocks were reused in the Early Christian Basilica (constructed ca. A.D. 475) that lies less than 100 meters south of the temple, and it was clearly the construction of that monument that accounts for much of the missing material. See Mark Landon, "The Basilica and the Early Christian Community," in *Nemea: A Guide to the Site and the Museum* (ed., Stephen G. Miller, Berkeley and Los Angeles, 1990), 78-90.

9 Hill, *Temple of Zeus,* 1-2.

10 Stephen G. Miller, "Poseidon at Nemea," *Filia Eph* I (Festschrift G. E. Mylonas, Athens 1986), 261-271.

The workmen who were at the temple on the afternoon of September 6, 1999, when the earthquake hit north of Athens report that the two columns of the pronaos seemed not to move at all, but that the single column of the exterior rocked back and forth. After the earth stopped shaking we could find no sign of damage.

11 The number of drums in each column at Nemea—13—is standard throughout the building, but the heights of the drums are not. These variations are visible, for example, in Fig. 8, and seem to be due to the size of the blocks that could be quarried from the stone layers that vary dramatically in thickness.

12 Lest it be thought that the visual impact of the drummed column occasioned the comparison with the vertebrae of the human spinal column, we should remember that the ancient column was covered with plaster and the individual drums (sphondyloi—vertabrae) were not visible in the finished building.

University Library, 1893. Librarian Joseph C. Rowell at left.
Photograph by O. V. Lange. *University Archives (UARC PIC 700:22)*.