

Evidence of Earthquakes in the Current Excavations of Beirut City Centre

Muntaha Saghieh Beidoun
Lebanese University of Beirut

15

I am deeply grateful to my husband Professor Ziad Beidoun, Geologist, who happened to be on the site when we uncovered these sediments. He instantly pointed out to us the significance and meaning of these geological structures.

Destruction levels encountered in various archaeological sites all over the ancient world have sometimes been attributed by archaeologists to severe earth tremors. In fact, a chronological framework has been constructed by one archaeologist (C.F.A.Schaeffer 1948) for the whole of Western Asia covering the IIIrd and IIInd mill. B.C., based on historical records of seismic shocks that seemed to compound with the archaeological data. Assessment by archaeologists of earthquake effects have been mostly based on features of architectural damage, collapses, distortion of walls, fissures etc.

Rarely have geologists attempted analysis of this problem in the Near East simply because the recorded archaeological data mostly dealt with material damage and not geological phenomena. However in a short, but interesting article published in Nature (I. Karcz *et al.*, 1977), a team of geologists examined archaeological sites in Palestine as well as the recorded archaeological data and concluded that seismic hazards are higher or more frequent in the Dead Sea-Jordan Rift region than elsewhere.

The Excavations * Sector BEY 001

In October 1993, a diagnostic sounding 20 x 15m was opened in the southern part of Martyrs square where interesting geological structures were encountered in that area's stratigraphy. A 2m thick masonry wall with complicated stratigraphy was uncovered.

An Early Roman occupation level linked to the wall is characterized by a large homogeneous pottery dump/deposit (context 515) covering the whole excavated area from east to west. The northern limit of this deposit is unknown because it was cut by later disturbances.

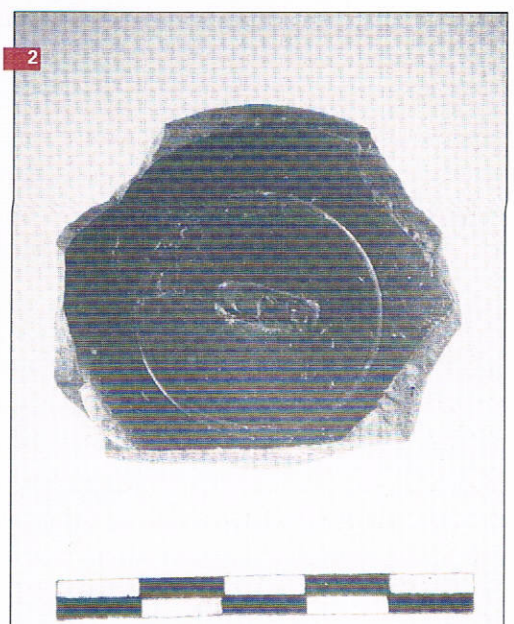
Arretine bowls or Italian Sigillata stamped with planta pedis motif, bowls with the name of the potter were found as well as Eastern Sigillata A bowls (J. W. Hayes forms 9 & 47, Atlante II), (fig.1, 2).

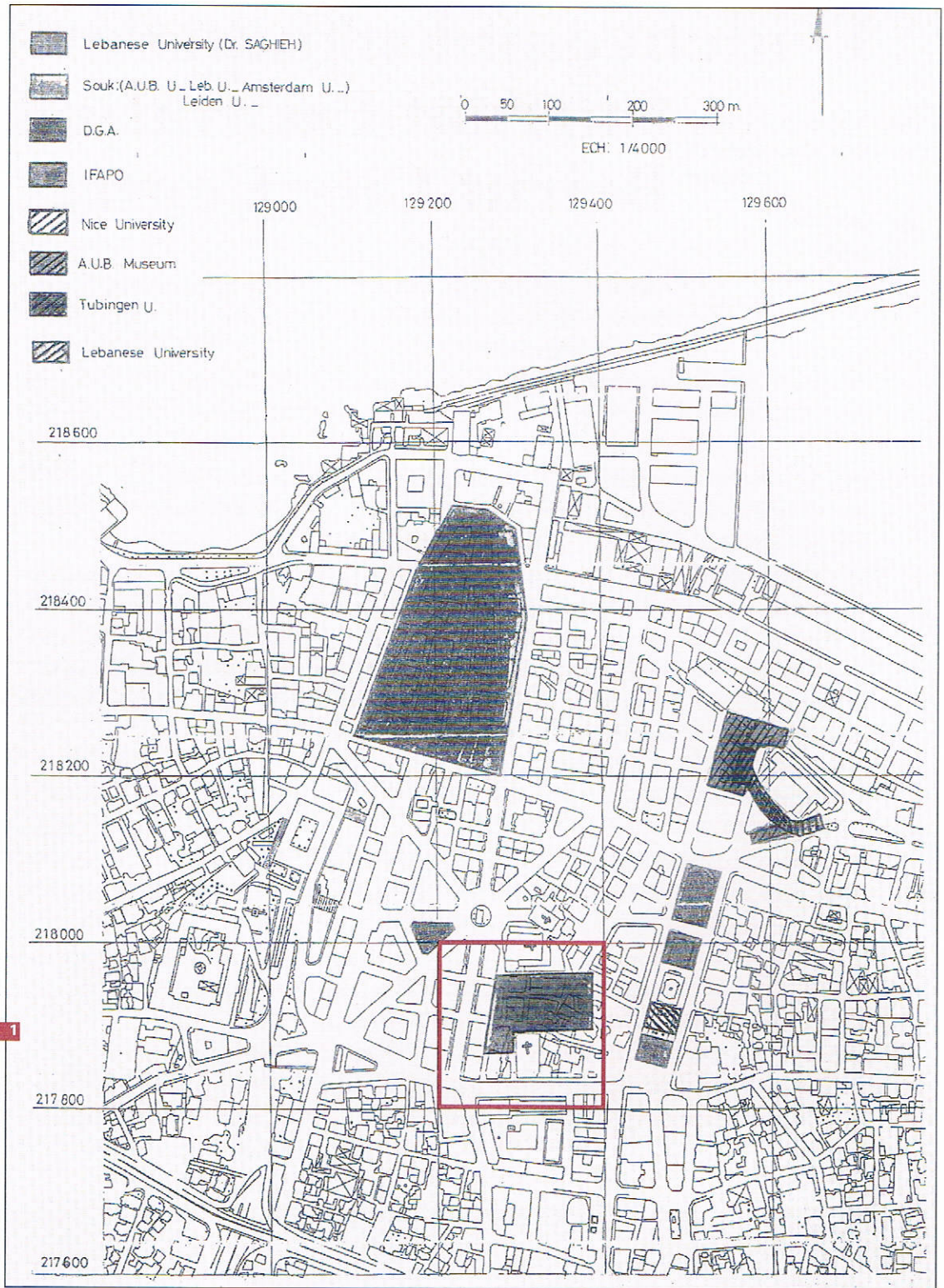
Indicators of subsequent occupations in this restricted area are sparse but they do exist in the stratigraphy.

The major event in the history of the area however is a destruction level that is seen in the geological structures imprinted in the sediments piled up against the wall. These near-horizontal (probably channel-induced)



1. Italian Sigillata.
2. Eastern Sigillata A.
* see page 16 (fig. 3).





3. The Lebanese University site.

Evidence of Earthquakes in the Current Excavations of Beirut City Centre

Muntaha Saghieh Beidoun

17

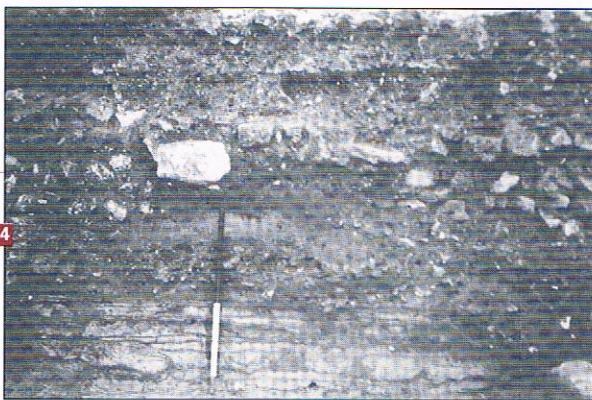
episodic cyclic depositional packages of sand, silt and clay comprising

the piled up sediments, were subsequently deformed into small asymmetrical tight compressional folds known as seismites as a result of an earthquake, (fig. 4 & *infra* discussion of archaeoseismic evidence in BEY 004).

Each cyclic package denotes increasing depositional energy conditions, in other words, during higher energy water flow, coarse sand deposits, whereas during lower energy flow, silt deposits, and in slow to sluggish flow, clay deposits.

Some of the finer sediments exhibit liquefaction characteristics that indicate abrupt high stress and resultant tremendous pressure, temporarily making them behave like a viscous liquid (because of the water in them). These have intruded into the overlying sediments as fluid escapes upwards (fig.5).

Hence the inverted stratigraphy where some early Roman period pottery sherds were found engulfed within these « fluids » while others slumped down into the sediments. After removing the sediments, dislocation of the wall appeared in the form of a large fissure as well as marked collapses in certain parts of the wall.



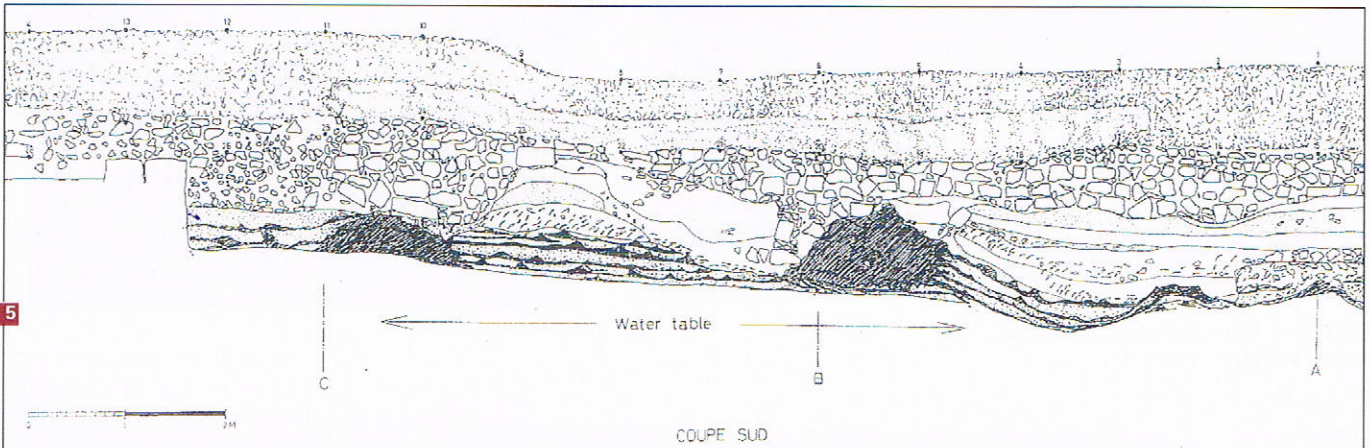
4

Sector BEY 004

The geological imprints of a major earthquake that was seen in the sediments of a diagnostic sounding, revealed its horrors in an archaeological inferno over the whole excavated area (fig.6, a,b) except the eastern zone where clandestine excavators have churned up and refilled their pits with rubble containing a mixture from all periods. Plastered walls and tiled roofs had collapsed in fragments under which charred wooden beams were found in-situ. Mosaic floors were burnt and fragmented and several of these appear to have fallen from upper floors of buildings (fig. 6c). The thickness of the destruction layer varies between 0.75m and 1.00m. In squares IVF, IVG and IVE, south of the Decumanus Secondeira, a concentration of dismembered bodies, mainly animal, with a few bones were found among the debris of collapsed plastered walls. The date of this destruction by fire and earthquake is placed in mid 6th century A.D., according to pottery evidence and other artifacts (see *infra*).

Historians of the 6th century A.D. recorded this tragic event to have happened on 6th July, 551 A.D., and lamented the total ruin of Beirut (Agathias, PG (Migne Patrologie Grecque), 88, col.1359,1360; Tusculum, PG, 85,col. 1821-1824,after J. Plassard, 1981). Modern seismologists estimated the intensity of that catastrophe

- 4. Seismites and liquefactions.
- 5. South section.



5

COUPE SUD

as 11 according to the 12 degree Mercalli Felt Intensity Scale (J. Plassard, 1981, p.5). They believe that what intensified the magnitude of the destruction were Tsunamis which altered the shape of the

Lebanese coast. Fallen rocks at Ras

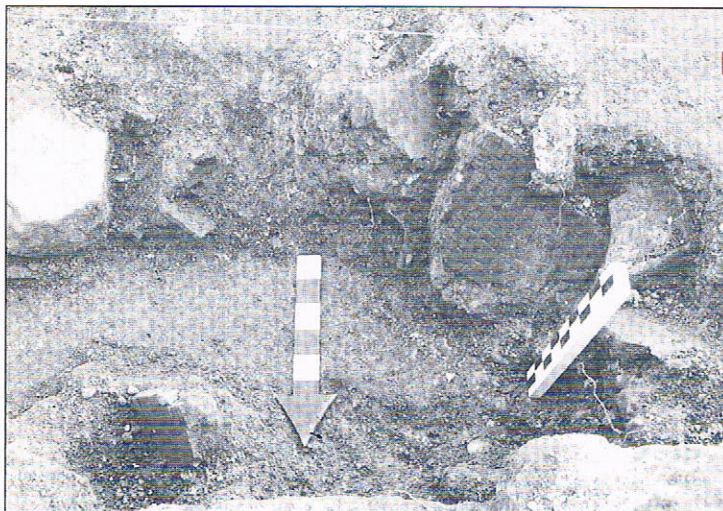
Chekka created a harbour near Batroun (J. Plassard, *loc. cit.*). It is also suggested by Plassard that domestic ovens in the houses which were not overcome by Tsunamis were the cause of the consuming fire after the occupants had run away in terror. Within the destruction layer, and specifically square VF, bronze candelabra, crosses, bells and vases were retrieved (fig.7). The base of the tall candelabrum rests on a tripod of animal hoofs on disks. The space between the legs is covered by a sort of lanceolate leaf with a curled edge. Both candelabra have lost their terminal parts. They probably had long shafts at the top of which oil lamps were fixed. These are derivatives of the tall stemmed Roman candelabra, except that the latter usually had bases with lions paws (M. de Spagnolis, 1992, p.177). For similar bronze bells discovered earlier in Beirut, (see Ch. et D. Forest, 1982, fig.14). In square VIG, three bronze vessels were found on the floor of room 103. A jug, almost intact, a teapot and a cauldron with a bucket inside are partially crushed by the weight of the collapsed roof. The cauldron carries a fragment of the dismembered mosaic floor. But the most interesting finds were historiated relief limestone fragments which must have constituted the edge of a ritual basin or a round table. These reliefs relate biblical scenes among which is the sacrifice of Abraham's son, and are reminiscent of the historiated Sbeitla marble table which was

found in the baptistry of the so-called church of Vitalis (Ben Abed & D. Soren, p.221-222, also F. Bejaoui, *Africa II*, forthcoming).

The pottery evidence

Several pottery deposits which are either contemporary or slightly earlier than this destruction level were retrieved. One of these is an important and homogeneous deposit, context 29, Sq. VIG could be dated to early 6th century A.D. or slightly earlier (J.W. Hayes estimate). Locally produced coarse ware, carrot shaped amphorae are well represented in this deposit (fig. 8, c-d). Imported red slip ware from Cyprus (fig.8, a,f), North Africa (fig.8,b) and Phocaea (fig.8,e) support this dating (J.W. Hayes, 1972, p.323 ff; J. Boardman, 1989, p.88, ff., P. Reynolds, 1995, p.61 ff).

Finally, the reason why Beirut had so many seismic catastrophes in its history is that it is cut by several faults. Dubertret speaks of a central fault which crosses Beirut from the western edge of the harbour via Riad Solh street to Basta area, and a more major river fault south of the Achrafieh area (L. Dubertret, 1945, fig.3). A third fault, newly discovered, runs parallel to the latter cutting the NW tip of Ras Beirut (I. Sursock, 1995, p.13) any movement along these faults would cause an earthquake.



6a. Burnt and fragmented mosaics.



6b. Fragmented tiles.

Evidence of Earthquakes in the Current Excavations of Beirut City Centre

Muntaha Saghieh Beidoun

19

Bibliography Agathias

Vth cent AD (historian), in *Migne Patrologie Grecque*, 88, col. 1359, 1360.

Atlante II

1985 *Enciclopedia dell'Arte Antica Classice e Orientale; Atlante delle Forme Ceramiche II. Ceramica Fine romana nel bacino del mediterraneo (tardo ellenismo e primo impero) Rome.*

Ben Abd Ben Khader & Soren D.

1987 *Carthage: A Mosaic of Ancient Tunisia, American Museum of Natural History, New York.*

Boardman J. et al.,

1989 *Excavations in Chios, 1952-1955, Byzantine Emporio, London.*

Dubertret L.

1945 *Géologie du site de Beyrouth, Beyrouth.*

Forest Ch et D.

1982 « Fouilles à la municipalité de Beyrouth (1977) », *Syria*, LIX, P.1ff.

Hayes J.W.

1972 *The Late Roman Pottery, The British School at Rome, London.*

1991 « The Hellenistic and Roman Pottery », in *Paphos, III, The Department of Antiquities Cyprus, Nicosia.*

Karcz, I. Kafri, U. Meshel, Z.

1977 « Archaeological Evidence for Subrecent Seismic Activity along the Dead Sea -Jordan Rift », *Nature*, 269, 15 Sept, p.234-235.

Plassard, J.

1981 *Seismicite du Liban, Centre National Libanais de Recherches Scientifiques, 3ème édition, Beyrouth.*

Reynolds, P.

1995 *Trade in the Western Mediterranean, AD 400-700: The Ceramic Evidence, BAR International Series, 604, Oxford.*

Sanlaville, P.

1977 *Etude Géomorphologique de la région littorale du Liban, I, Publications de l'Université Libanaise, Beyrouth.*

Schaeffer, C.F.A.

1948 *Stratigraphie comparée et chronologie de l'Asie Occidentale. IIIe et IIe millénaires. Londres;*

Spagnolis, M. de

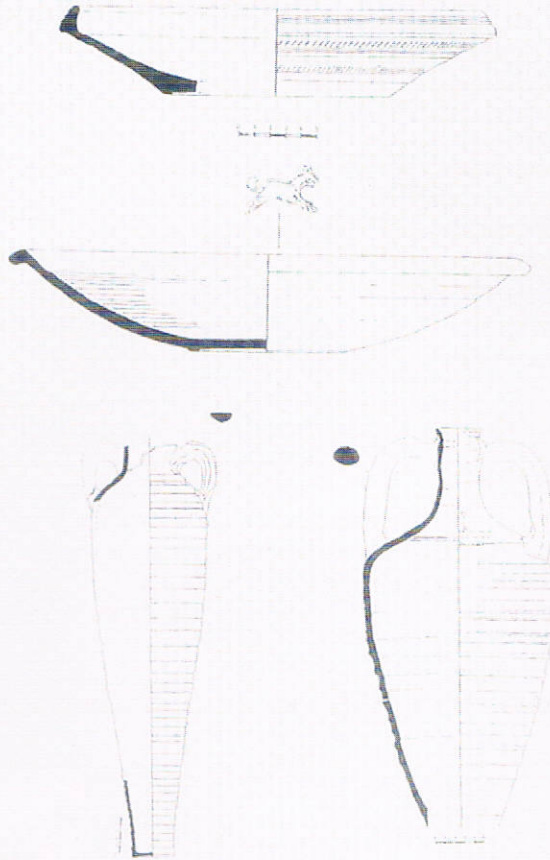
1992 *Rediscovering Pompeii, Rome.*

Sursock, I.

1995 « Séismes, préventions, conséquences socio-économiques », *Colloque AULUF Environnement et Reconstruction, salle Clemenceau, Palais du Luxembourg, Paris.*

6c. Mosaic fragment fallen from an upper floor.
7. Candelabra, piece of chandelier, vases, bells.





8 a-f. Pottery evidence from an homogeneous deposit.

