CHAPTER 3

Survey and Mapping at Chocolá: the 2004 Season

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Introduction

The archaeological research works conducted during the 2004 season have attempted to achieve the following goals: 1) to continue with the survey of the archaeological site of Chocolá and to try to define the boundaries of the prehispanic city (Valdés et al. 2004, Herrera n/d); 2) to establish a system to advance with the site mapping within the already studied polygon, in other words, to refine the mapping of specific architectural groups with the purpose of defining the settlement pattern or urban design through the use of twelve permanent and very precise benchmarks, systematically distributed across the site along its north-south axis and along its east-west axis, to maintain a spatial relationship between different areas in the framework of one single reference system; and 3) to initiate the important long-term task of creating a topographic map of the entire site.

Figure 3-1 represents the schematic results of the mapping efforts accomplished during the 2003 season; how this map was finally produced requires some explanation. During the 2003 season, teams with GPS instruments took UTM readings of three types of features: dots, lines, and areas. The indicated ancient constructions shown in the map are an idealization of the areas mapped in circumference or around the present mounds, platforms, etc.

During the present season the reconnaissance was expanded to 10 km2 [Fig. 3-2], while the number of mounds ranging from 0.50 to 25 m in height and clustered in open or enclosed plaza groups, climbed to 80. Based on this we found ourselves in a position to hypothesize about the possible use and functions of the different areas located across the site. For example, where were we to look for the elite residential areas (Valdés et al. 2004), the administrative centers, the possible growing fields or the workshops areas.

Survey methodology

To find these traits, during the field season 2004 several GPS units were used, as well as a GPS GeoExplorer XT, for they provide a greater accuracy and allow for the placement of new benchmarks wherever they are needed. The reconnaissance of the ancient city was approached in three stages simultaneously implemented according to a previous planning, which allowed to cover an area of approximately one kilometer from north to south, and 2.5 kilometers from east to west. The first stage was accomplished by a team of two people; one governed the GPS Trimble unit, and the second was in charge of the data recording, thus covering areas defined in the map on a scale of 1:50,000. The second stage of the survey comprised systematic transects, with lines of ten people 5 m apart from one another. In each team, one person was in charge of taking notes in our field cards, including every trait discovered with its corresponding UTM coordinates, which were constantly incorporated into the GPS memories. The third stage consisted in the verification of the data recovered in each transect and the annotation of any further detail regarding the shape of the structures and other relevant traits. The survey works were made possible thanks to the assistance of students from the University of San Carlos, of volunteers from the Earthwatch organization, to the collaboration of Dr. Fred Bove, who facilitated the use of a Total Station, to Mr. Gordon Baty and the Trimble company, who contributed donations that allowed us to afford the GPS device, and to the University of New Mexico, through which could have the ArcGIS software at our disposal.

Data processing

A Pathfinder and ArcGIS software programs were used to process the information captured. With them, we were able to obtain more than minimal data in UTM coordinates and mappings showing the shape of the mounds, while we were also able to define different constructive complexes and urban spaces such as plazas and accesses between structures.

The Pathfinder program is compatible with ArcGIS, and the information captured with the Trimble GeoExplorer units allows to be transferred to the ArcGIS toolbar in the form of areas, lines, and dots. The graphic options of the program allowed us to assign different symbols to each one of the traits. In the future, as we gradually refine our data base with the information originated in the survey and mapping, we shall be in a position to obtain individual or combined layers for showing the data and for revealing pattern relationships within the site.

For the moment we are able to speculate about what the relationships between the discovered findings represent. With this graphic tool it is possible to anticipate places where to investigate and broaden our understanding of the settlement pattern of this city. The capacity to see on a scale and with precision the different forms mapped through the GIS program, allows us to understand the spatial distribution of the buildings and their reciprocal relationships, which has resulted in an important tool for the archaeological surveys at Chocolá. We must outline that in order to achieve a better understanding of the site the adjacent communities should also be surveyed, as during other visits to these places, we could detect evidence of human activity in the area.

During the 2003 season, 50 benchmarks were set at strategic points throughout the site, and thanks to the support provided by Dr. William Poe, of the Sonoma State University, California, twelve of them could have their coordinates taken with a millimetrical margin of error (Poe 2003:3) [Fig. 3-3]. The strategic use of these benchmarks consisted in their forming the spinal column of the topographic map of the site, a work initiated during this season; therefore, we concentrated in planning and defining how this activity could be approached.

Keeping in mind that one of this year’s objectives consisted in excavating areas with possible residential evidence, we decided to initiate the mapping of the site with

Mounds 5 and 15, using benchmark 50 (BM) as a guideline for the first, and BM 6 for the second. With BM 6 we had BM 4 calibrated, which was the one that governed all the excavation references in Operation 4. Said data were annotated in a base map on a scale of 1:50,000 where all our points of reference are recorded.

Topographic work

The topographic mapping of Chocolá was accomplished with the use of a Topcon 220 total station equipped with a TDS Data Collector [Fig. 3-4]; besides, we are using the program Surfer 7 to process and edit the information, and with it, we may create images that allow us to analyze the results from different viewpoints [Fig. 3-5]. We counted as well with the collaboration of Carlos Chiriboga, from the Universidad del Valle de Guatemala, who collaborated in the topographic efforts this season.

Among the advantages of the topographic mapping we may say, first, that it provides a general map of the city outlines with all the artificial or natural alterations that are found in it. Second, that it allows to obtain detailed individual maps of the areas where excavations are being conducted, thus increasing our knowledge about them; and in the third place, it gives us the chance to produce a more precise record of the artificially modified areas and provides a guideline for its further approach.

With the topographic mapping the following has been achieved: first, we could draw very accurate grids in the areas where excavations were conducted; second, we saw that we could hypothesize regarding what the different superficial alterations shown in the maps could represent, and third, it allowed us to speculate around the building patterns between the northern area and the southern area.

We think it is relevant to say that the results obtained have represented quite an effort, because the gear posed a number of inconveniences and so did the terrain, having been the cause of slowness in our work at some stages of the elaboration process. Among such handicaps we may mention for instance the sensitivity to water, given the fact that this season unfolded during the wintertime and the mapping works had to be interrupted whenever rain began to fall; another situation had to do with the green cover of the terrain, as most of the times it came between the station and the prism, forcing us to implement strategies to overcome that major obstacle; at times, we were able to record the elevations only by increasing the height of the prism so that it would exceed the height of the vegetal cover, and occasionally we were forced to set the device as close to the surface as possible and to adjust the prism at the lowest possible position to help us envision points below some coffee plantations; a third strategy consisted in opening transects, as there where none of the first two strategies seemed to work, the most practical thing to do was to cut branches and leafs off along a predetermined direction. With this action we finally succeeded in obtaining the desired data.

A different way of surveying

During the 2004 season we worked with a Geoscan Research FM250 Fluxgate gradiometer, which helped us in the reconnaissance by providing information on the different concentrations of iron it detected in the subsoil.

The methodology developed for the utilization of the gradiometer, in charge of Dr. David Monsees (see Chapter 4), comprised reticules of 20 x 20 m, within which systematic transects were set out to record readings each 0.50 m, until the above mentioned area was covered; like we said, the gradiometer detects iron concentrations, but we should add that just as it detects a stone element, it will with a greater precision detect any metal object found on or below the surface; the interesting thing in this situation is that all readings are exported to the Geoplot 3 Software program, where all data are processed, resulting in the obtention of concatenated images of the entire grid; they in turn are analyzed by the technician who observes patterns that undoubtedly help him to differentiate which readings come from metals, organic matter, or in the case of Mound 15, of stone alignments. Clearly, this technology is useful as a guideline to determine where excavations should be conducted, and it increases the possibilities of finding traits which in turn may expand our archaeological datum.

Conclusions

The manner in which the topographic map is being built provides us with the option of a greater flexibility regarding the mapping of any part of the site that may be found of interest, through the use of the benchmarks located in most parts of it. The creation of a basic map in UTM coordinates facilitates the development of works in sections that may later on be linked to one another, thus giving way to one single map of the entire place. The use of GIS and GPS technology allows us to save time and to encompass a larger terrain, achieving with these results sufficient information on where to focus our attention, as well as all of our research activities. Besides, the GIS technology represents a highly potential tool for the analysis of the different areas with human activity within the 10 km2 studied so far, as well as for the physical arrangement of the architectural forms on the surface. By combining advanced survey and traditional mapping methods, and with the additional help of GIS such as the GPS mappings and the transects, we were able in a short period of time to obtain a radiography of the skeleton of ancient Chocolá, which together with the different research activities carried out, have been of help to provide life and color to the history of this great prehispanic city.

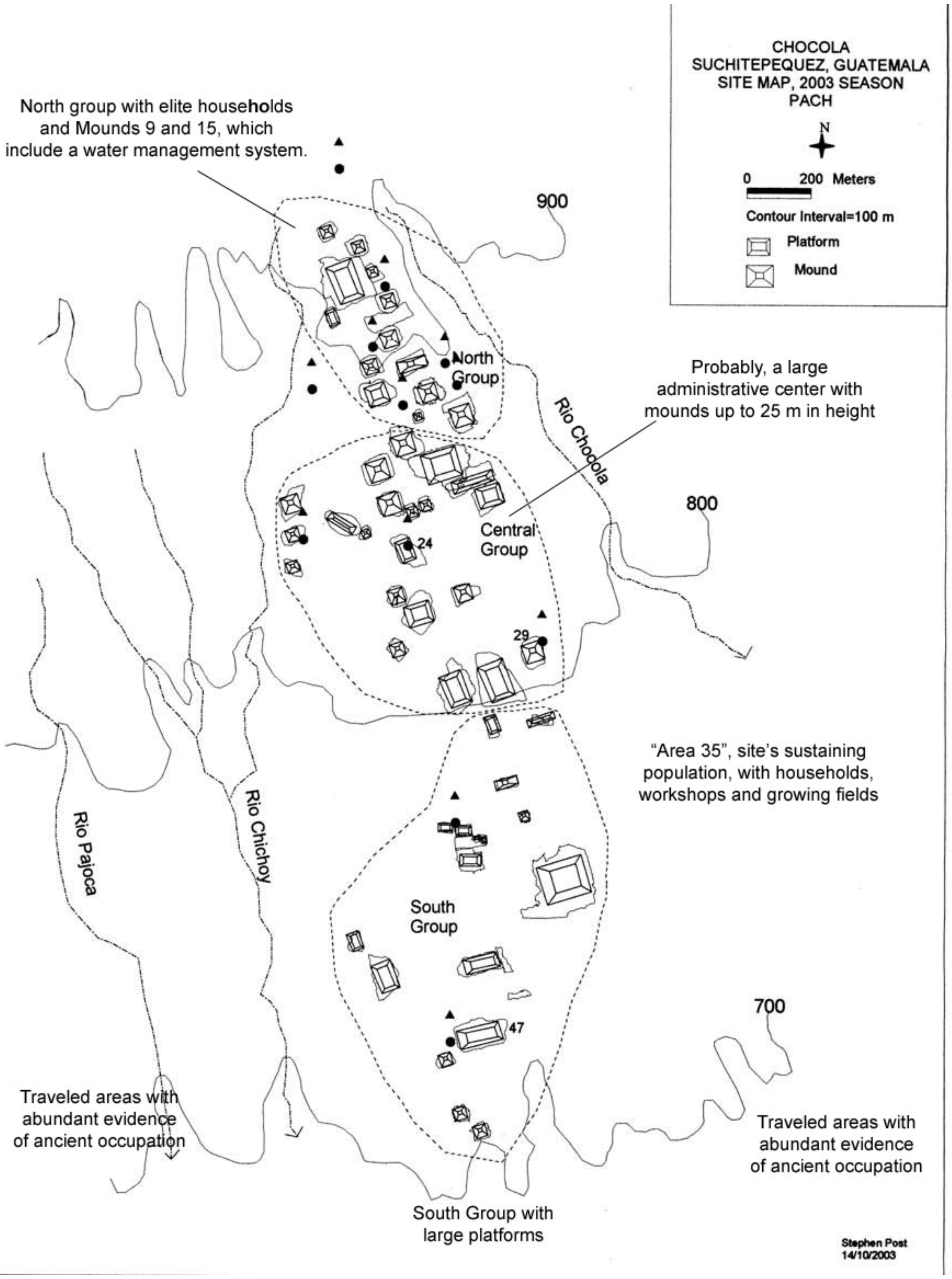


Fig. 3-1. Schematic map drawn up during the 2003 season, indicating the three speculative functions.

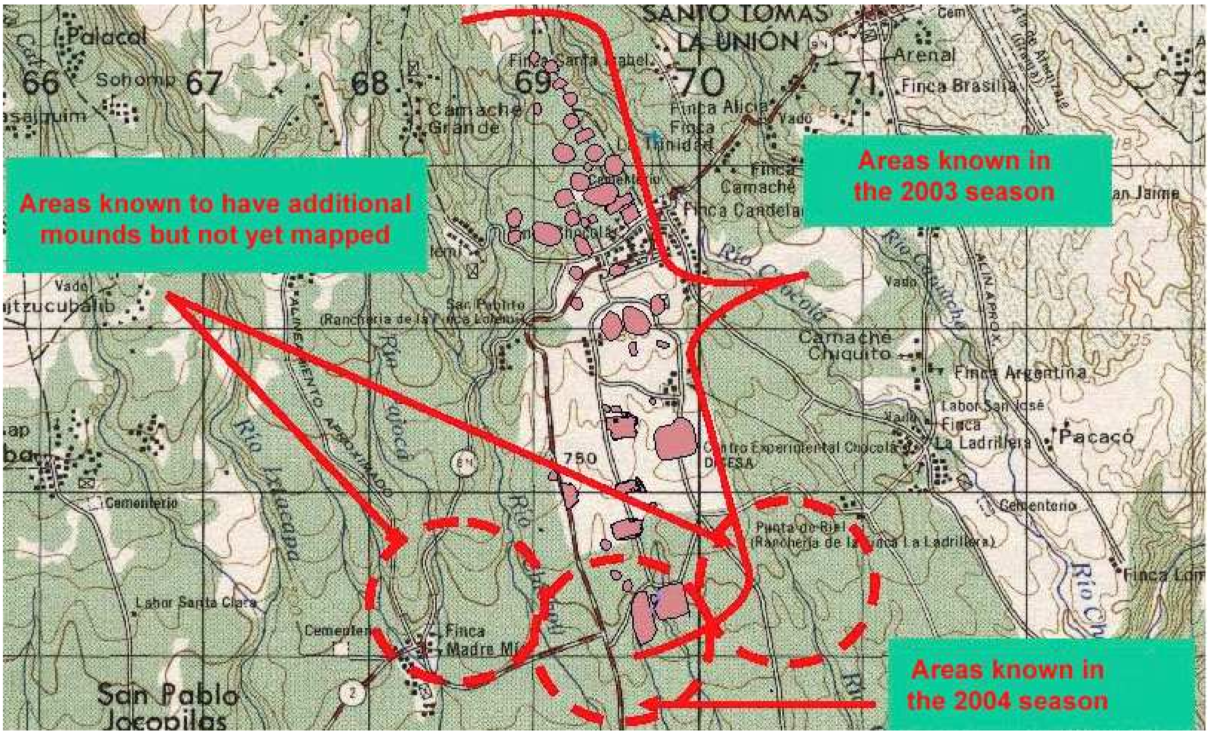


Fig. 3-2: (a) ESRI Map of the 2003 season showing occupational areas (mounds, etc.); (b) additions in the 2004 season.

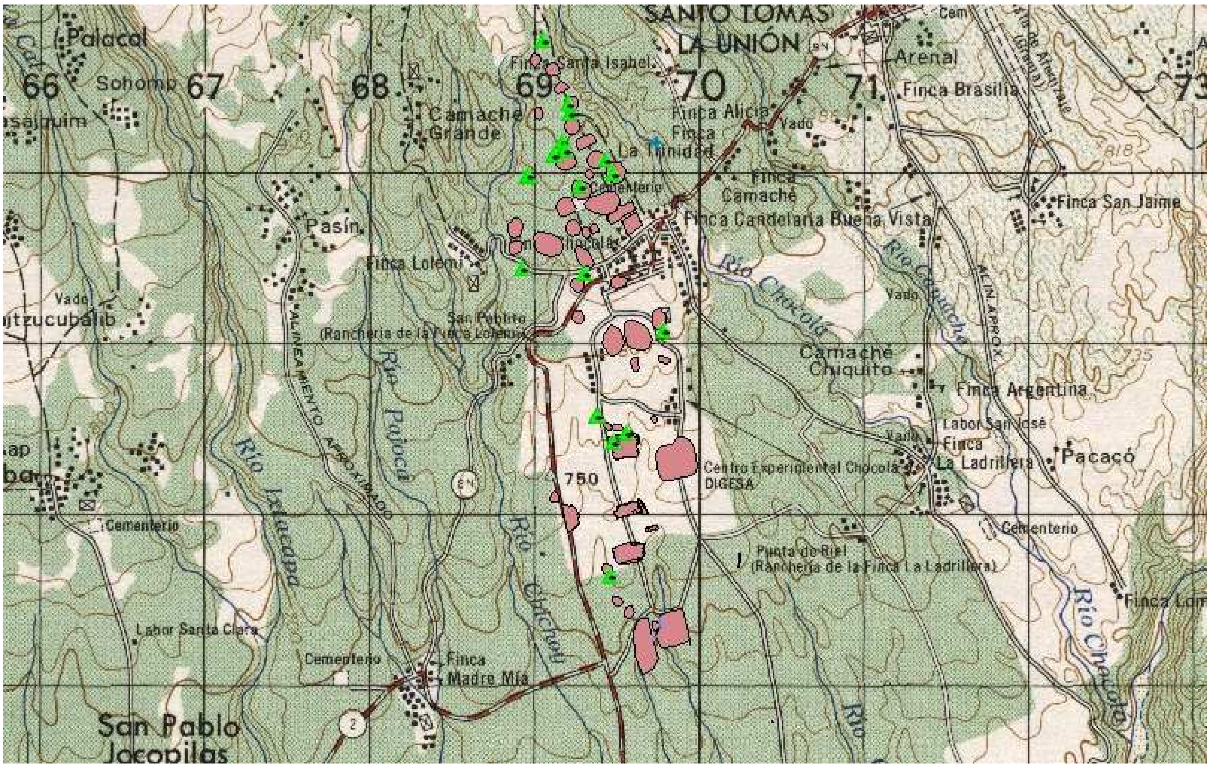
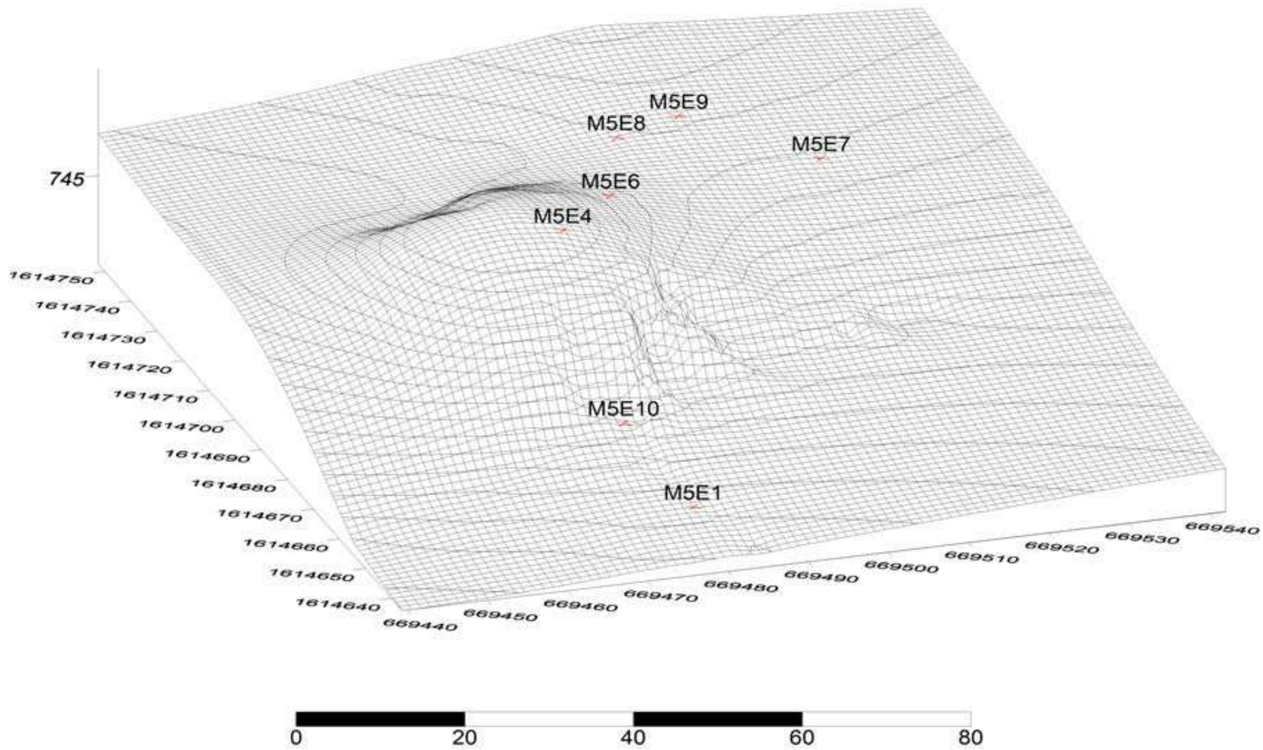
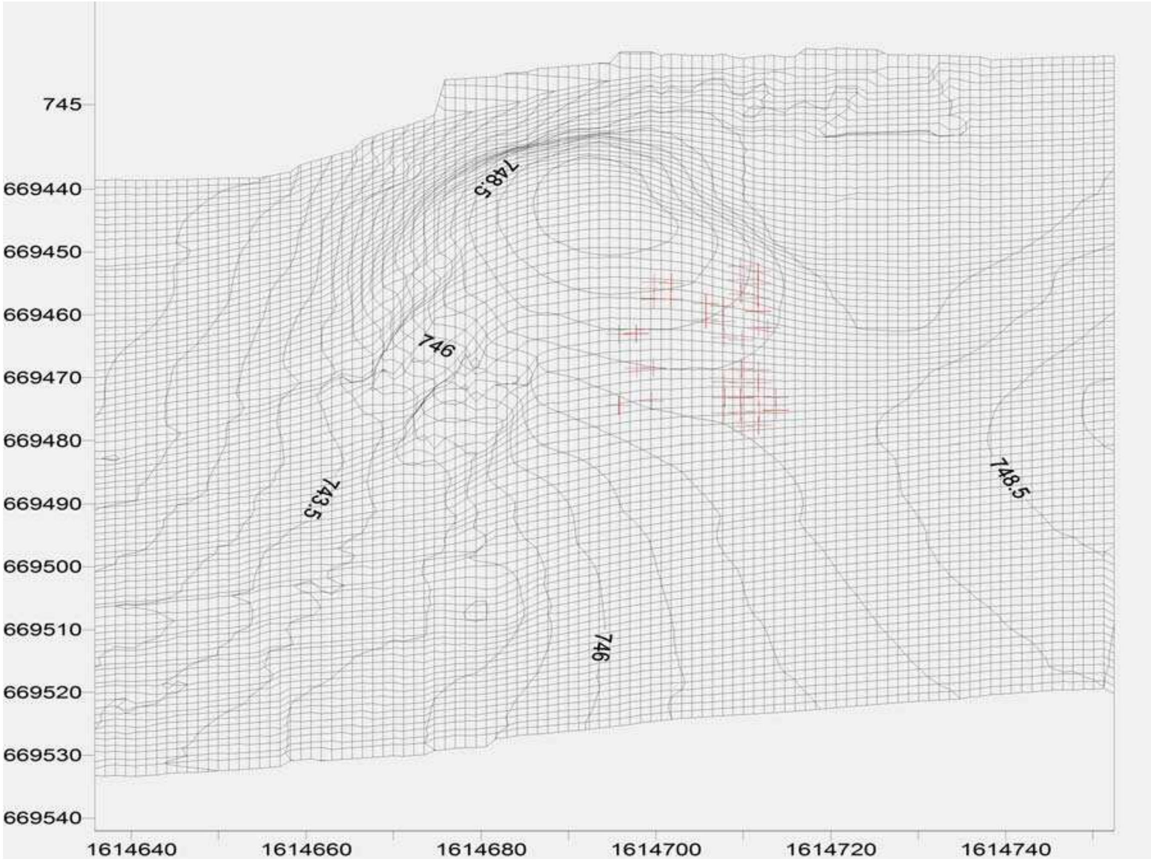


Fig. 3-3. Benchmarks, PACH 2003.

Fig. 3-4. The Total Station.





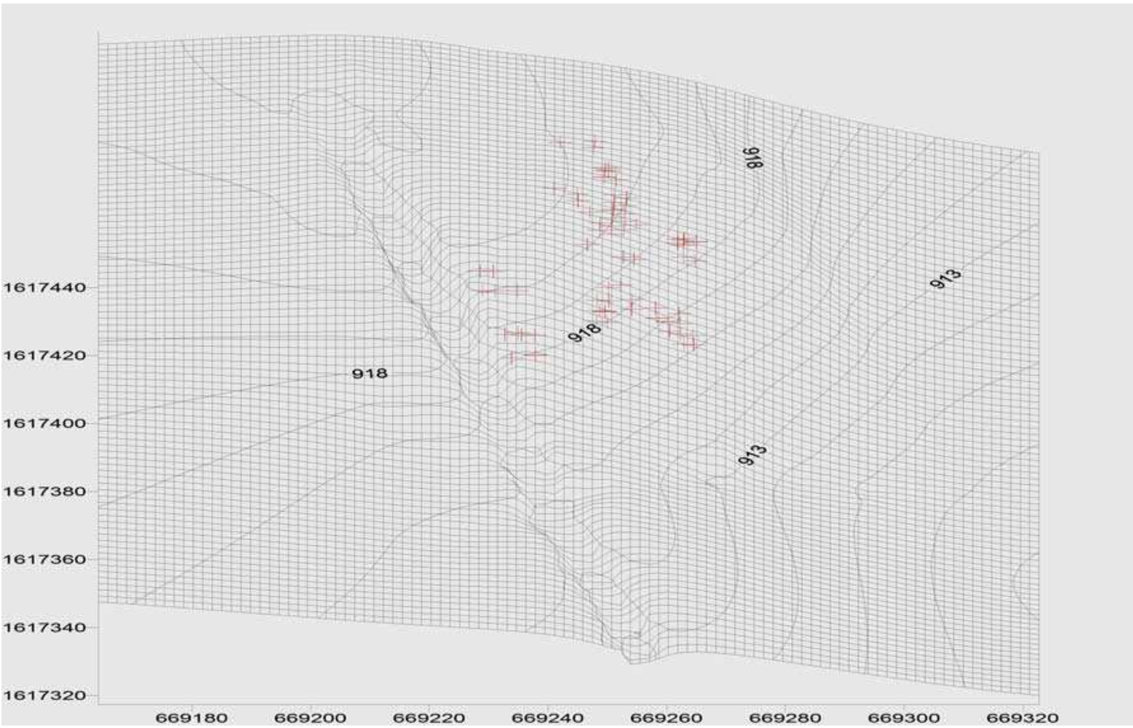


Fig. 3-5a, b, c. Topographic maps in different perspectives using a Surfer program:
(a); Mound 5;
(b) Mound 5 showing the excavations in Structure 5-1 indicated with red crosses;
(c) Mound 15.