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Jiyeh Geophysical Survey, 2003

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JIYEH

GEOPHYSICAL SURVEY, 2003

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A geophysical survey¹ was undertaken in 2003 when it became apparent that fast-paced earthworks under modern construction development in parts of the site (a section of the necropolis in the north and a part of the settlement in the south) were leading to a rapid deterioration of surviving remains.

Advantage was taken of the situation to continue testing geophysical method applications, adding to the body of evidence on the usefulness of the resistivity and magnetic methods for archaeological prospection under specific site conditions.

1 The fieldwork was carried out in September 25-October 3, 2003, by Messrs. Tomasz Herbich and Robert Żukowski, both from the Institute of Archeology and Ethnology, Polish Academy of Sciences. One of the instruments used in the survey (RM15) was provided by the Programa de Estudios de Egiptología (Consejo Nacional de Investigaciones Científicas y Técnicas) in Buenos Aires in fulfillment of a cooperation agreement with the Polish Centre of Mediterranean Archaeology of Warsaw University.



Fig. 1. Map of the site showing the results of the magnetic survey (letter designations in the central part of the site refer to trenches excavated in 2003) (Drawing M. Puzkarski; magnetic map processing T. Herbich)

SURVEY OBJECTIVES

The prospection in the necropolis was designed to record tombs not visible on the ground. Surface evidence had also suggested the presence of pottery workshops. The magnetic method was expected to yield evidence of kilns and post-production waste.

In the area occupied by the ancient town, the objective was to trace the layout of architecture in the as yet unexcavated northeastern part of the town, as well as the remains in the west, on the site of the basilica.

METHOD AND EQUIPMENT

Magnetic prospection was accomplished with a Geoscan Research FM-36 gradiometer. The measuring grid was 0.50 by 0.25 m, that is, measurements were taken every 0.25 m along lines traced 0.50 m apart, applying the parallel mode (instrument moving in one direction only). The measured units were 20 by 10 m. The re-

sults were presented as grayscale magnetic maps, i.e., maps of changes of intensity of the Earth's magnetic field.

The resistivity survey was performed with a RM15 resistivity meter, applying a twin-probe configuration (distance between traversing probes equal to 0.50 m). The measuring grid was 0.50 by 1.00 m.

MAGNETIC SURVEY RESULTS

The magnetic survey of the northern part of the site covered four areas in the necropolis [*Fig. 1*: areas 1-4], corresponding to the artificial terraces formed during the recent earthworks. The only apparently undisturbed ground (at least since the archaeologists' arrival) is situated in the eastern part of area 4.

Area 1 (surveyed 0.445 ha). Readings were heavily disturbed by metal waste. Moreover, recent earthworks have reshaped the surface into absolutely flat ground. Measurements in the southwestern corner of the area registered a series of anomalies that could be interpreted as corresponding to archaeological structures. The rounded shape and high amplitude of values were suggestive of pottery kilns, but further earthworks in 2004 did not verify this theory. The prospection also registered a series of oval anomalies situated along two parallel EW lines in the central part of the

area (south of a modern earth dump). No verification was possible in this case.

Area 2 (surveyed 0.425 ha). Again, the surface had been leveled by earthworks carried out in the area. The readings were disturbed by metal reference points and waste (in the southwestern part). There are no surface traces that could explain the character of oval anomalies of high amplitude in the northeastern part of the area. The shape and value amplitude of some of these anomalies recall those typical of pottery kilns. Anomalies in the southeastern part run in lines at right angles, suggestive of some form of architecture. No archaeological verification was possible in this area.

Area 3 (surveyed 0.06 ha). The surface here was leveled flat for agricultural purposes. The readings were partly disturbed by metal waste. No surface traces have remained to help to interpret the anomalies at the center of the area.

Area 4 (surveyed 0.177 ha). The readings were heavily disturbed by metal waste, especially in the eastern part of the area, where earthworks have reshaped the surface. Nothing on the magnetic map can be convincingly interpreted as corresponding to archaeological features.

The prospection in the southern part of the site, inside the ancient town, was carried out in three areas [Fig. 1: areas 5-7].

Area 5 (surveyed 0.166 ha). The prospection covered the remains of a basilica rediscovered in 1987-88. The eastern wall of the basilica has survived [Fig. 2]. The survey detected remains not visible on the ground: the map reflects the aisle layout and allows the western end to be established with fair precision [Fig. 3].

The run of the anomalies in the southern aisle could suggest its division into a series of rooms. An area of elevated magnetic field values adjoining the basilica on the north (terminating on the east in line with the eastern end of the building) suggested the presence of a structure forming one complex with the church.

Area 6 (surveyed 0.02 ha). The area is situated north of the basilica and constitutes today a sandy coastal dune. An anomaly in the southwestern part of the map could be interpreted as the corner of a building [cf. Fig. 3], possibly the northeastern corner of a structure adjoining the basilica on the north. The northern wall of this building takes a parallel course with regard to the basilica's line of symmetry.



Fig. 2. *The site of the basilica seen from the west (standing east wall of the building in the background)*
(Photo T. Herbich)

Area 7 (surveyed 0.06 ha). The ground is relatively flat with no evidence of excavations ever having been conducted there. Heavily disturbed readings (caused by metal waste), especially in the south-

eastern part of the area, prevented any interpretation of the results. The only anomaly possibly corresponding to architectural remains can be seen at the northwestern edge of the area.

RESISTIVITY SURVEY RESULTS

The results of the resistivity survey in the necropolis area proved to be of low reliability because of the specific hydrogeological con-

ditions of the site: low ground humidity and the presence of sand and gravel in the surface layers. To achieve more reliable measure-

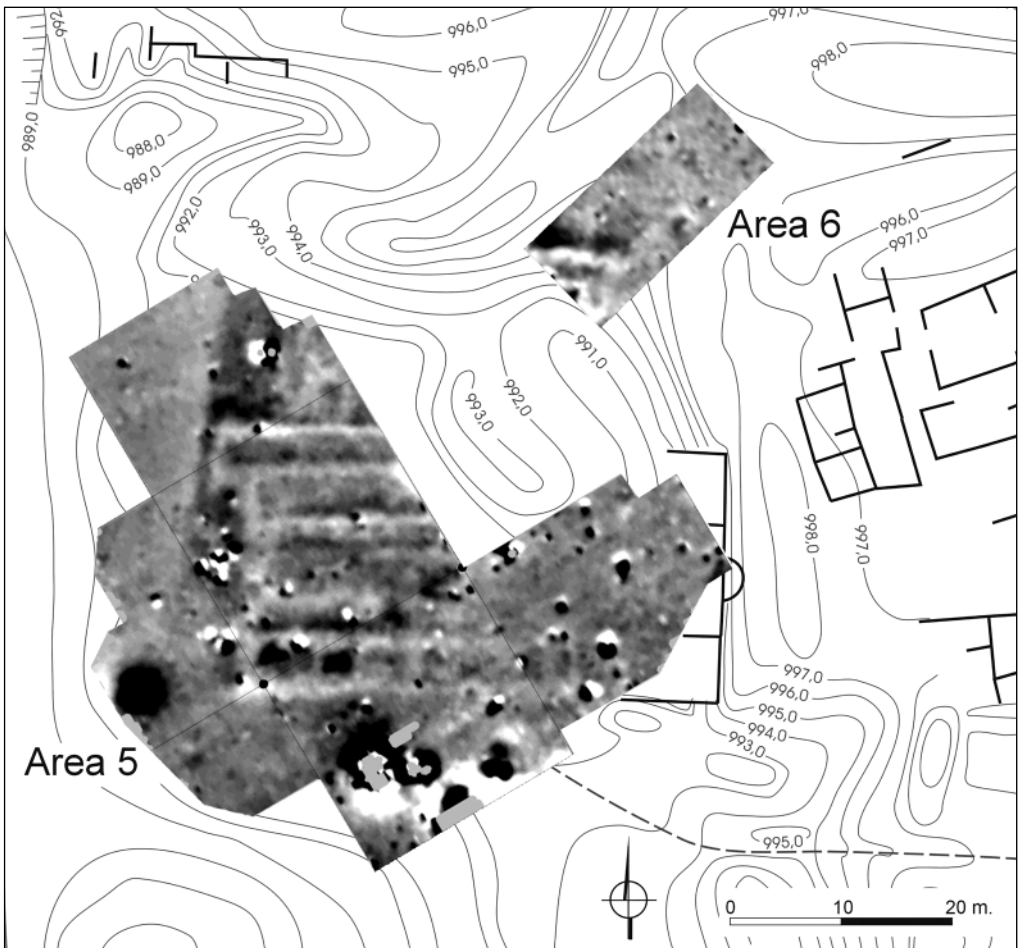


Fig. 3. Magnetic map of areas 5 and 6 (site of the basilica)
(Drawing M. Puzkarski; magnetic map processing T. Herbich)

ments (and stable probe-soil contact), it would have been necessary to sprinkle the surface layers with water immediately before the prospection – and this could

hardly be done during a short survey season. Thus, after a day's work covering an area of c. 0.04 ha, the resistivity survey was terminated.

CONCLUSIONS

The applied surveying method proved useful only in the case of the basilica and the area north of it (areas 5 and 6). Archaeological verification of the magnetic results should provide a key to interpreting the map. Comparing the layout of walls in the eastern end of the building with the map indicates that negative anomalies (lowered magnetic field values) should be read as walls. Positive anomalies (especially well visible in the south aisle of the basilica) testify to the

presence of ashes or burnt substances (crushed brick?) in the debris. It should be admitted that a number of anomalies, provisionally interpreted as pottery kilns by the shape and amplitude range, could very well be caused by large iron objects (measuring up to 0.50 m in diameter). Extensive modern landscaping in the region and the presence of substantial metal waste of modern provenience have also prevented a proper interpretation of the results.