A brief history of archaeological surface survey

John Bintliff

Abstract Surface survey is a form of Landscape Archaeology dedicated to the study of pre-Modern artefacts lying on the surface of the ground. Such finds are mapped and dated and allow the recognition and spatial scale of past settlements and other forms of activity (cemeteries, craft production locations, sanctuaries, military establishments). Ancillary techniques commonly in use are Geographical Information Systems (for mapping landscapes and finds), alongside remote sensing methods such as geophysics, georadar, drone photography, LIDAR and geochemistry which can probe beneath the surface layers to reveal settlement plans and areas of intense past human activity.

Keywords surface survey, geographical information systems (GIS), landscape archaeology, geophysics, regional projects

Introduction

Günther Schörner has researched and published on a very a wide range of subjects within Classical Archaeology, but my friendship with him and our shared interest lies in Landscape Archaeology, especially field survey. Günther has been active in this approach in the landscapes of Austria, Italy and Jordan, so it seems fitting that I would offer to him in admiration a selective review of the history of surface survey, mostly from Europe, the Mediterranean and Near East, but with relevant reference to important pioneer work undertaken in North and Central America.

Archaeological field survey comprises the systematic study of the surface traces of past human activity in the landscape (and thus is a key tool in Landscape archaeology). The commonest evidence is broken pottery and stone tools, but in protohistoric and historic societies, visible remains range from fragments of art through house foundations to standing monuments such as hillforts and temples.

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An historical overview

During the fifteenth to nineteenth centuries, landscape mapping of the more substantial forms of surface remains was the dominant aspect of archaeology, with excavation being rarer and unsophisticated. Even after scientific forms of excavation were developed by the early twentieth century, wider research in the total landscape has remained equally important for creating maps of past human activity in the countryside. This is due to the early recognition that the density of archaeological sites is far greater than the capacity of archaeologists to excavate them, especially in areas where human society has a long record of intensive settlement, such as Mesoamerica, the American Southwest, large parts of the Mediterranean and Near East, and Japan. Early collaboration with geographers, especially in the earlier twentieth century, led to a lasting interest in settlement patterns, their evolution over time, and their relationship to the physical characteristics of a region. This also required a spatially wider investigation of human activity foci than targeted excavation or chance discoveries could provide[1]. Geographical maps from the 19th century often included the recording of 'ancient monuments' (the Ordnance Survey of Great Britain), and even 'deserted villages'[2].

Over time, field survey methods have continuously improved in complexity, yet practitioners are still in the process of evolving a rigorous and agreed-upon set of practices. It is typical even today for field survey projects to experiment each year and for considerable diversity in approaches to occur among projects. For survey in the Mediterranean region for example, proposals for 'best practice' have only just been published[3]. It remains the case that surveys vary widely today in their methodology and scope, and many are regrettably still period-focussed rather than aiming to document all periods of human activity across the landscape. This makes it difficult to compare past and present surveys, and even more problematic to compare contemporary survey results with each other.

Initially, "topographers" travelled extensively into the countryside, frequently with ancient texts in hand where historic sites were mentioned, or with advice from local villagers as to where "remains" of all kinds were known. Recording began with ruins and earthworks in the early centuries, supplemented by coins and sculpture, but by the late nineteenth century, the importance of the everyday, and far more plentiful, human traces such as potsherds and stone tools was realized, as such finds allowed a far greater range of sites to be discovered while providing the primary means, still true today, of dating the periods of time in the past during which a given findspot was in use.

This new phase of survey history, from the late nineteenth to mid twentieth century, with its focus on pottery and lithics, supported by the evidence of ruined structures where preserved, was practiced with what would be called "grab samples" at

1 E.g. Fox 1923.
2 Carte de la Grèce 1852.
3 Attema et al. 2020.

the presentday: small collections of hopefully diagnostic artefacts that could provide chronological information and some idea of site function for a findspot (e.g., settlement, burial, temporary activity in the landscape such as a hunting stand, or seasonal farming base). Moreover, the coverage of a region was still "extensive," and surveyors ranged over large areas on horseback, in vehicles or on foot, gaining a general impression of the kinds of site to be encountered and the overall balance of activities from period to period. By the 1950s, we can register a critical advance, when major programs of regional survey were set up in different parts of the world, each conceived with the intention of addressing specific historical problems. What set these projects apart from most earlier endeavours was their large scale, the deliberate inclusion of a range of complementary disciplines in addition to archaeology, and the "problem orientation" planned within a regional framework. Among the most noteworthy, during which chosen sites were also excavated on occasion, were (1) a team directed by Robert Braidwood[4] researching the origins of agriculture in the Fertile Crescent of the Near East, followed by (2) Robert McCormick Adams's researches into of the long-term settlement development of later prehistoric to historic Southern Mesopotamia[5], (3) the Valley of Tehuacán project led by Richard MacNeish in Mexico (also particularly focused on the development from hunter-gatherers through the earliest maize farmers to the rise of civilization)[6], (4) the South Etruria Survey directed by John Ward-Perkins in north-central Italy, which studied every period from farming prehistory to the early Modern era[7], and (5) the Messenia Project led by William McDonald and Richard Hope Simpson in southern Mainland Greece, which was essentially focused on the Neolithic and Bronze Age in order to trace the evolution of the regional Mycenaean palatial system[8].

In parallel with these pioneering major projects, experiments were contemporaneously being carried out with more systematic site-mapping and artefact collection procedures, inspired by the quantitative emphasis of the "New Archaeology," which in the 1960s–1970s urged that survey be brought within the model of experimental science[9]. It had been shown in the States that the more intensive the countryside was walked, the more densely were the sites recorded[10]. As a consequence, by the 1980s and 1990s, a new generation of regional projects followed a more complete, "intensive" survey procedure, where each field or artificial study block (or 'transect') in the landscape was walked at close intervals (usually 5–20m between fieldwalkers), in order that even small artefact concentrations would be encountered (what this writer dubbed in 1994 the "New Wave" surveys[11]). Visibility measurements were also recorded in order to

4 Braidwood 1937; Braidwood et al. 1983.
5 Adams 1965; 1981.
6 McNeish 1967–1972.
7 Potter 1979.
8 McDonald – Rapp 1972.
9 Redman – Watson 1970; Flannery 1976.
10 Plog et al. 1978.
11 Bintliff 1994.

control for differential recognition of sites due to the variable density of surface vegetation, and geomorphologists were increasingly deployed in the team to identify areas of likely loss or burial of artefacts due to erosion or colluvial-alluvial processes[12]. In the latter part of this phase, the concept of "non-site" survey emerged in the United States and was also being pioneered by the anthropologist Robert Foley in Africa, and soon became more generally adopted; it recognized that the landscape between the activity concentrations termed "sites" often contained significant numbers of dispersed artefacts[13]. Increasingly surface surveys became refocussed onto the mapping of individual artefacts across the landscape (artefact-based survey), with a secondary stage being the identification of the patterns in these total distributions and the variable processes that might have created them. Besides the effects of weather, cultivation, or construction activities, which could shift artefacts out of sites into their immediate surroundings, more distant scatters could be shown to reflect "taskscapes" in the countryside: temporary bases for hunting or farming, mining, etc. An additional category was given prominence by the Near Eastern regional surveys of Wilkinson, where intensive agricultural manuring in certain periods of the past, using undifferentiated domestic rubbish, had resulted in extensive carpets of artefacts across the landscape radiating outwards from settlement sites[14]. Although criticized by a minority of practitioners, subsequent exhaustive investigations leave little doubt that in many global landscapes and usually for restricted periods, massive manuring did indeed occur, with major implications, as Wilkinson argued, for detecting population pressure and ecological sustainability[15].

Inspired by the pioneer survey of the New World's largest pre-Columbian city, Teotihuacan in Mexico[16], it has proved possible to survey large urban sites in a relatively short period of several seasons[17]. The use of a systematic grid and a sufficiently large collection strategy allows the reconstruction of very long-term sequences of settlement even with the largest city sites, of which the ongoing Knossos survey on Crete offers a paradigmatic example[18]. Although non-destructive remote-sensing over such sites can be very successful in matching surface ceramic patterns to street and house plans[19], methods such as geophysics may not always be effective as a result of difficult ground conditions or water availability.

As the shift occurred towards a non-site approach within regional survey, there was a growing realization, that even if conducted on a field-by-field basis, intensive surveys detected only a certain sample of past activity in the landscape. The problem lay in evaluating what was missed and whether there were ways to compensate for such

12 Cherry et al. 1988.
13 Powell – Klesert 1980; Foley 1981; Nance 1981.
14 Bintliff – Snodgrass 1988a; Wilkinson 1982; 1989.
15 E.g. Bintliff et al. 2007; Halstead 2018; Bintliff 2023.
16 Millon 1964.
17 E.g. Bintliff – Snodgrass 1988b; Bintliff 2014; Bintliff et al. 2017.
18 Whitelaw et al. 2019.
19 Bintliff 2019.

omissions[20]. One filter was already noted: the geomorphological constraints that determined whether surface artefacts and sites could be seen at the present day[21]. Advice from project geoarchaeologists could sensitize surveys to those localities unlikely to provide "windows" into past landscapes, and these might be omitted from study or alternatively (but rarely) probed by coring if remains were expected to be buried. Vegetation cover, grassland or forest, posed seemingly equal obstacles to effective surface survey. In response coping methods have included focusing on areas temporarily opened by fire as well as shovel-pit testing, in which numerous small units one or a few meters square are stripped to the subsoil to evaluate buried finds[22]. Recently the use of Lidar (Light Detection and Ranging) mounted on airplanes or drones, creates a view of the physical landscape underneath obscuring vegetation, revealing earthworks or built structures, although this remains expensive unless the relevant country has already organized a national Lidar mapping project[23]. On a more material culture front, the relative survival and visibility of artefacts themselves have been raised as limiting factors in site recognition, i.e., the "hidden landscape" concept[24], which implies that for some eras of the past, even a handful of surface finds may represent a significant former activity focus. Ceramics – which are the main object of surface survey since the advent of farming – may suffer uneven survival and surface visibility if less well-made or of great antiquity, whilst in long and densely-settled landscapes such as the Mediterranean lowlands, site are often used in several periods, and the earlier use-phases will be damaged or obscured by subsequent occupation.

In the heyday of "New Archaeology" in the 1960s–1970s, it appeared attractive to limit overall landscape coverage, the area of a located site to be studied, or the amount of artefacts to be collected, through an explicit sampling strategy linked to statistical methodologies, such as stratified sampling in which homogeneous subareas (strata) would be identified and sampled independently[25]. Warnings about such procedures[26] have not prevented their continued use, the central failing being the concept of designing a reliable sample of a larger whole whose properties are unknown. More experiments are required where samples are compared with complete spatial coverage, and artefact samples with total surface collection, before such shortcuts can be recommended. Experiments on the Thespiai city survey in Greece, where two different spatial scales of finds' sampling were used across the same ancient town, have indicated minimum numbers of finds required to form a reliable picture for each phase of occupation on large complex sites, which go well beyond numbers normally collected[27].

20 Witcher 2006.
21 van Leusen et al. 2011.
22 Reviewed by Shott 1985.
23 Bulić et al. 2021.
24 Bintliff et al. 1999.
25 Cf. Cherry et al. 1978; Renfrew – Wagstaff 1982.
26 E.g. already in Flannery 1976.
27 Bintliff 2012; 2014.

Source criticism, new approaches and ancillary aids for survey

Since the late 1990s and early 2000s, a wider process of rethinking the methodology and interpretative potential of surface surveys has been in operation, a form of "source criticism." Comparative survey analysis, where practitioners review each other's methods, theories, and interpretations and attempt to amalgamate data from separate surveys, is one aspect of this reevaluation[28]. Examples are Farinetti's integration of site data from all forms of surface research since the nineteenth century for the central Greek province of Boeotia[29], Gkiasta's overview of the history and results of survey on the island of Crete[30], and a team of survey specialists integrating results from North and Central Italy[31]. Comparison of regional surveys in Mesoamerica has a long tradition[32]. Another aspect of rethinking survey approaches is the publication of surface survey manuals[33], as well as experimental archaeology simulating survey practices on artificial artefact fields[34].

Lastly, a number of extra dimensions to traditional survey are worth highlighting, which are being increasingly featured in published projects. Some surveys have deliberately worked in terrain not considered ideal for surface survey, such as mountain zones, tropical forests, pastoral lowlands, or dune environments, where a range of additional techniques have been necessary to deal with problems of site detection[35]. Such 'hidden landscapes'[36], as we mentioned earlier, are also encountered in open landscapes where there are sites whose finds are very poorly preserved due to land use, climate, age and fragile or poorly-diagnostic ceramics[37].

Problem periods, or past intervals for which it has proved difficult to find significant numbers of activity foci, have led to predictive modeling based on compiled evidence that isolates landscape characteristics where survey is more likely to recover adequate data (e.g., Paleolithic-Mesolithic sites in semiarid environments[38]).

Scientific aids have become more frequently used as additional means to study past settlements, such as a battery of geophysical methods to map subsurface features[39], geochemical soil testing to detect human activity zones[40], Lidar[41] and aerial photography and satellite imaging[42]. Geographical information systems (GIS) have brought two

28 Cf. Alcock – Cherry 2004; Attema et al. 2020.
29 Farinetti 2011.
30 Gkiasta 2008.
31 Attema 2020.
32 E.g. Blanton et al. 1982.
33 E.g. Banning 2002.
34 Banning et al. 2011.
35 E.g. Ammerman et al. 2013.
36 van Leusen et al. 2011.
37 Bintliff et al. 1999.
38 Runnels et al. 2005.
39 Sarris 2015.
40 Bintliff – Degryse 2022; Bintliff et al. 2022.
41 Golden et al. 2016.
42 E.g. Philip et al. 2005; Campana 2018; Casana 2021.

contrasting advantages to field survey. First, GIS using palmtops and GPS links can allow accurate and rapid plotting of landscape units under study in the field as well as recording data in real time[43], and second, GIS can assist the recent interest in the phenomenology of landscape through estimating human navigation potential and the sensory perception of a particular terrain[44]. The detailed recording of standing buildings has also become more common, using novel digital techniques, even for vernacular housing of recent centuries in deserted settlements[45]. Navigable virtual reality reconstructions of ancient sites allow viewers to envisage and navigate settlements as they may have once looked, both on-screen and sometimes in real space on-site[46].

Nonetheless, we still lack detailed experimental evidence on the effects of using different methodologies on the data produced through survey, with many key issues remaining uncertain. These include (1) the desired size and composition of artefact samples to achieve reliable representativeness for an activity focus[47], (2) the best way to reconstruct demographic estimates from survey data, and (3) whether regional surface survey can move from generalized pictures of the long and medium term (thousands to hundreds of years) to detect the dynamism of human settlement at the historical scale of decades or even individual years.

Despite this, since intensive surface survey came of age in the 1980's, it has become an indispensable tool. For public archaeology, it is widely used as an initial stage to evaluate the scale and chronology of an archaeological site or portion of the landscape before a decision is made whether to undertake invasive research (i.e. excavation). Even if excavation proceeds, surface artefact collection can be made to recover finds in the ploughsoil which no longer survive in the deeper undisturbed site levels. In terms of entire landscapes, alongside remote sensing from the air or through geophysics, surface artefact survey and these partners are the only means to map and date the settlement and other activity during the prehistory and history of such vast areas, only a fraction of which can ever be excavated. And there is one more, very significant point to make. Contemporary practice in public archaeology rules that destructive intervention is only acceptable where a real threat exists to the structure of an archaeological site, meaning that even known sites are in the majority protected from unnecessary excavation; here non-destructive surface artefact survey, sometimes accompanied by equally non-invasive remote sensing, allows us to evaluate the scale and age and type of the protected monument.

43 Agapiou et al. 2022.
44 Wheatley – Gillings 2002.
45 Piccoli 2012; Frederiksen et al. 2016; Muth et al. 2016.
46 Piccoli 2018.
47 Whitelaw 1998; Bintliff 2012.

Conclusion

The history of archaeological field survey has a long development from the 16th century to today but the subdiscipline continues to evolve, and at an increasing pace due to the growing use of technical aids, both digital and also from remote sensing, as well as following a revaluation of the advantages of source criticism of method and theory. Excavation gives fine detail at small spatial scales, whilst regional survey complements this with the 'big picture' of human settlement in the long term.

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