ISAP NEWS

The newsletter of the International Society for Archaeological Prospection

Issue 40
August 2014

Adrian Butler 1972-2014

Integrated investigation at Buraymī, Oman

The DY4300 resistivity meter

Archaeological survey and false positives: what could go wrong?

Welcome to the 40th issue of ISAP News! Unfortunately we start off with some sad news this time, with the death of founder ISAP member Adrian Butler. Ken Hamilton has kindly contributed an obituary. In this issue have details about a project which is integrating geophysics, surface collection and test pitting on the Oman-UAE border, as well as a review of a low cost chinese resistivity meter (and request for other users to get in touch), and a refreshing piece relating the difficulties of adjusting between mag survey for UXO-detection and archaeological purposes... And a quick reminder that the NSGG Recent Work in Archaeological Geophysics meeting is coming up at the beginning of December in London (see notification).

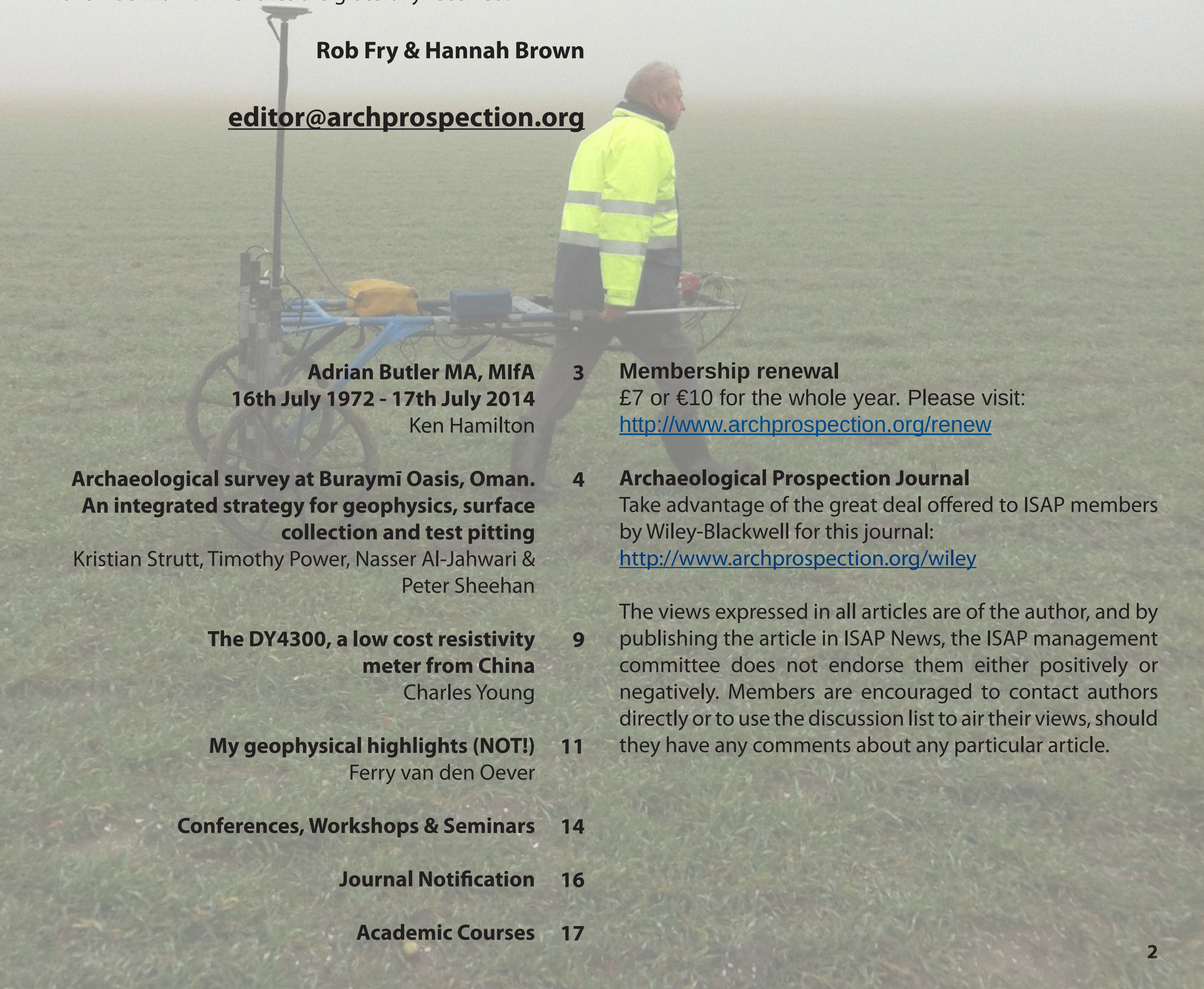
As always, thank you very much to those who have found time to contribute. And, as always, we'd really like to hear about your projects: 700-ish words and a couple of images would be great. Don't forget that we'd also like your photographs! Please send any contributions, notifications, and cover images for the next newsletter (ISAP News 41) to the email address below by the 30th November 2014. All entries are gratefully received!

Rob Fry & Hannah Brown

editor@archprospection.org

The Cover Photograph is titled (not by us, we hasten to add!) 'Gorilla in the Mist'. Photograph: Ferry van den Oever.

Just for the Record In the title of last issue's piece on survey in Egypt, the word 'Geophsyical' was made up by us and should, of course, have read 'Geophysical'. We just thought you should know that it's us that can't spell, not Kristian Strutt and Ross Iain Thomas.



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Adrian Butler MA MIfA, 16th July 1972 - 17th July 2014

Ken Hamilton, PhD FSA MIfA

Senior Historic Environment Officer, Norfolk County Council, UK. ken.hamilton@norfolk.gov.uk

Adrian Butler, one of the founder members of the International Society for Archaeological Prospection, died on 17th July, 2014, aged 42.

Adrian's career in archaeological geophysics started with a BSc in Archaeological Sciences at the University of Bradford, where he studied geophysics under the late Arnold Aspinall. Adrian graduated in 1994, and went on to gain an MA in Landscape Studies at the University of Leicester. His dissertation involved a geophysical survey of the deserted village of Hamilton, near Barkby Thorpe in Leicestershire. After a few years digging for ULAS, followed by a year with GeoQuest Associates, Adrian returned to ULAS as their geophysicist. At ULAS Adrian was determined to broaden and develop his geophysical skills, and he also dramatically increased the number of surveys carried out in the county. He was full of novel ideas and keen to experiment with unfamiliar equipment and techniques. I spent an entertaining couple of days helping Adrian conduct a gamma spectroscopy survey in Abbey Park, Leicester, working on the principle that the granite footings of the abbey church should present a contrast to the surrounding soils. In the end, there was insufficient contrast for any archaeological features to be visible, but Adrian was undaunted. Whilst at ULAS, in addition to a large range of commercial projects, Adrian conducted a number of surveys of the Roman town at Alcester (Oxfordshire) as well as pilot surveys for the Wallingford Burh to Borough project, and discovered Leicestershire's first Neolithic causewayed enclosure at Husbands Bosworth (Leicestershire). He also undertook an important series of published surveys at the Hallaton shrine, the Lockington Iron Age and Roman landscape and the Iron Age aggregated settlement at Manor Farm, Humberstone; all of which led on to remarkable excavations.

Adrian moved to Northamptonshire Archaeology in 2003, managing the geophysics team, and cultivating his flair for finding research opportunities whilst working in a commercial framework. During his tenure at Northamptonshire, Adrian conducted a number of surveys using a variety of techniques at Irchester Roman Town (Northamptonshire) and undertook a number of innovative pre- and post-excavation studies at Thetford (Norfolk) – the initial results of the latter published in poster form at the 2010 NSGG meeting. Further development and publication of this work was curtailed by a stroke in early 2012, resulting from a long-term medical condition.

However, Adrian was determined that poor health would not stop him living his life to its fullest potential, and it

certainly didn't quash his enthusiasm for his subject. When he left Northamptonshire Archaeology in late 2013, he started preparing for a return to academia. Adrian was planning to study for a PhD. at the University of Leicester, entitled The Application of Integrated Digital Remote Sensing Technologies to the Discovery and Management of Archaeological Sites and Landscapes within the Historic Environment, utilising broad scale landscape remote sensing techniques such as LiDAR and multispectral imaging to provide a landscape context for individual geophysical surveys. Sadly, his illness overtook him before he could commence work.

Adrian's contribution to archaeological geophysics is not adequately represented by his publication record, as the majority of his work went into "grey literature". However, his standing in the field is reflected in his founder membership of both ISAP and of the IfA GeoSIG. He was a regular contributor at EIGG/NSGG meetings, both on the academic side, and in numerous discussions on standards in the profession. In addition, Adrian was a regular at a number of local archaeological societies, training and helping with geophysical work, and helped me with the fieldwork for my own PhD, in his own time and purely for his own interest. He will be sorely missed, not only by me, but by anyone who had the pleasure of working with him.

Archaeological survey at Buraymī Oasis, Oman. An integrated strategy for geophysics, surface collection and test pitting

Kristian Strutt, Timothy Power, Nasser Al-Jahwari & Peter Sheehan

Buraymī Oasis Landscape Archaeology Project k.d.strutt@soton.ac.uk

In the spring of 2014 an archaeological survey was conducted as part of the Buraymī Oasis Landscape Archaeology Project (BOLAP), at Buraymī Oasis in Northern Oman. The project survey is directed by Dr Timothy Power of Zayed University, Abu Dhabi, Nasser Al-Jahwari of Sultan Qaboos University in Oman and Peter Sheehan of Abu Dhabi Tourism & Culture Authority (ADTCA). The first season was funded by a RIF grant from Zayed University and aimed to provide a preliminary characterisation of the archaeological potential of Buraymī, informing site management and future field work. Geophysical survey, conducted by the Archaeological Prospection Services of the University of Southampton (APSS) on behalf of the project, ran together with a season of trial trenching and surface collection run by the project directors, focusing on the archaeology of the oasis close to the border fence between Oman and the UAE.

Figure 1 *Late Islamic extant building remains at Buraymī Oasis, showing evidence of an old suq or market.*

The Location and Background of Buraymī Oasis

Buraymī Oasis is located in the north of Oman, forming part of an oasis group spanning the border between Oman and Abu Dhabi. The archaeology of the region is rich, including evidence of Palaeolithic, Neolithic, Bronze Age, Iron Age, Early and Late Islamic activity. The earliest dated feature in the vicinity of the survey area is the so-called 'Qaṭṭāra Tomb', which lies immediately adjacent to the UAE border fence close to the survey area. The tomb was excavated in 1973 and again in 1988 and is generally believed to date to the Wādī Sūq (c. 2000-1300 BC) period. It is quite possible that this belongs to a Bronze Age cemetery continuing into Buraymī. This would add a third major prehistoric cemetery to the al-' Ayn / Buraymī Oasis, in addition to the well-known UNESCO World-Heritage sites of Ḥafīt and Hīlī. Mounds located in the northern survey area of Buraymī may belong to a much larger Iron Age (c. 1300-300 BC) landscape, including the Bayt Bin ' Ātī site in Qaṭṭāra Oasis and the villages of Hīlī 2, Hīlī 17 and Rumaylah. Late Pre-Islamic settlement and material at the oases includes material at Qaṭṭāra potentially dating to the Parthian period.

The aim of the archaeological survey at the Buraymī Oasis was to apply different methods to map the nature and extent of the archaeological deposits at the site, focusing in particular on a range of different features across the landscape from different periods of settlement. This

Figure 2 *Gridding out and survey being conducted using a Leica RTK GPS.*

Figure 3 *Magnetometer survey being carried out using a Bartington Instruments Grad 601.*

required survey of a representative area of the Oasis close to the modern border fence, across an area of Early and Late Islamic features, and survey in the northern area of the site across two possible Iron Age mounds, and an Iron Age mound surmounted by a Late Islamic building mound to the east. Survey was also conducted over an area in the southern part of the site, where wind-blown sands had covered part of an Early Islamic site. The survey was designed to incorporate geophysical and topographic methods with research of archive data in the form of air photographs and remotely sensed imagery and a programme of test pitting and surface collection of material across the areas surveyed using geophysical methods.

The Survey Methodology

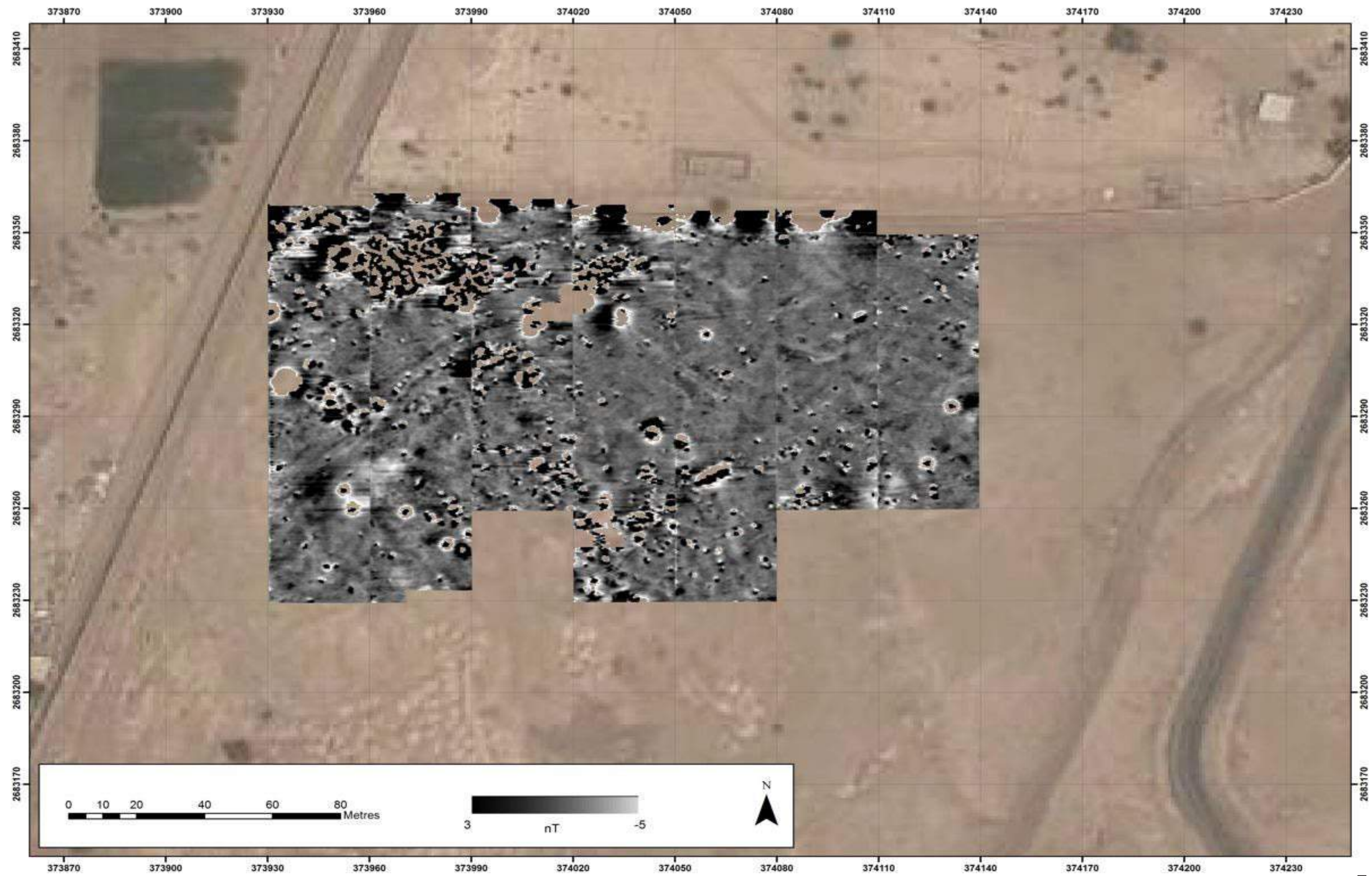
For the survey a grid system was established using a Leica Viva Real Time Kinetic (RTK) GPS (**Fig. 2** previous page) utilising the UTM 40N WGS84 coordinate system. Wooden survey pegs and spray markers were set out at 30m by 30m intervals, and the grids for all areas were georeferenced to the surrounding field boundaries and fencelines. The Leica GPS was also used to conduct a topographic survey of the different survey areas, with readings taken along traverses spaced c. 5m apart, at 1m intervals or where changes in elevation above 0.2m occurred within a 1m distance.

The magnetometer survey was conducted using a Bartington Instruments Grad 601 dual sensor fluxgate gradiometer (**Fig. 3** previous page). Measurements were taken at 0.25m intervals on 0.5m traverses, with data collected in zig-zag fashion. The GPR survey was conducted using a Sensors and Software Noggin Plus system with 500Mhz antenna and Smartcart. Data were collected along traverses spaced 0.25m apart along the x direction of each survey grid across target areas of the sites in the northern, central and southern areas of the survey. The data from each survey were exported as a series of bitmaps, and were imported into and georeferenced in a GIS, relating directly to other salient spatial information such as AutoCAD maps of the site and relevant air photographic imagery. An interpretation layer of archaeological and modern features was digitized deriving the nature of different anomalies in the survey data from their form, extent, size and other appropriate information. As no direct chronological information can be derived from the geophysical survey data, much of this had to be inferred from the morphology of anomalies, and the relationships between different features. In addition to the topographic and geophysical survey surface collection over sample areas was conducted to help elucidate the chronology of potential features. Test pits were also excavated over prominent Early Islamic and Late Islamic features to test the nature and depth of anomalies.

Preliminary Survey Results

The results of the archaeological survey at Buraymī Oasis indicate an incredible amount and quality of archaeological remains from a number of different periods,

Figure 4 Preliminary results of the survey of the Iron Age mounds in the north of the oasis overlaid on the topographic survey.



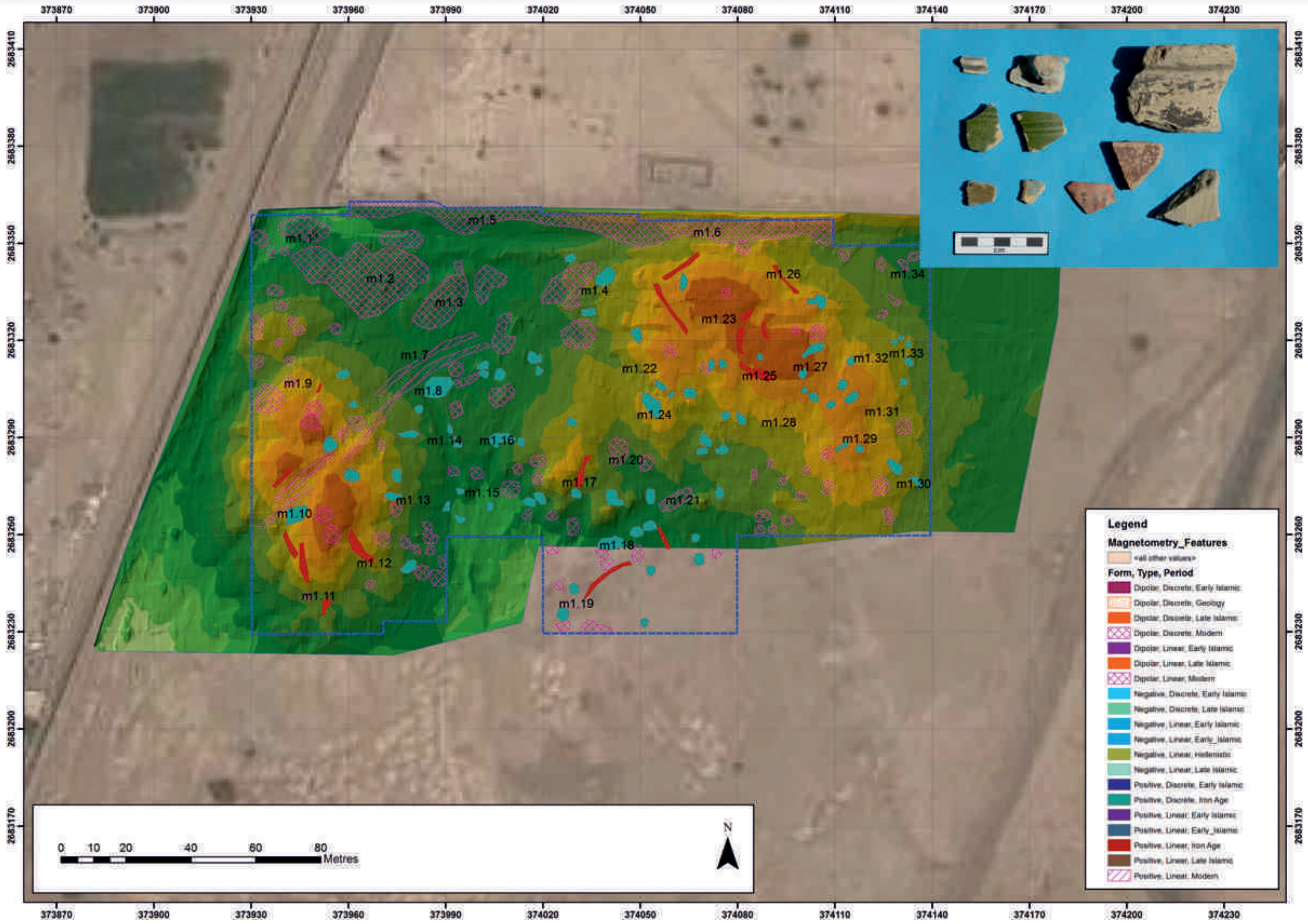


Figure 5 *Topography of the Iron Age mounds with an inset showing examples of the range of ceramic material collected during fieldwalking.*

including Iron Age settlements, together with Early and Late Islamic structures and deposits. Both magnetometer survey and GPR survey demonstrate the high level of preservation of material where modern development has not as yet encroached on the remains, particularly in the northern and central survey areas. In the southern survey area the shifting dune sands and incursion from modern development have limited the extent of what is visible. However, Early to Middle Islamic remains are still visible on the surface and in the geophysical survey results.

The features in the results for the western mound, corresponding to linear and pit features, may be dated to the Iron Age period by field walking (**Figs. 4** previous page and **5**). The mound has a roughly oval plan c. 105 m long by c. 60 m wide and is covered with pottery. A 5 x 5 m grid was laid out to allow the systematic collection of surface finds. Sherds were taken from two transects running N/S and E/W, representing approximately 10% of the total area. Some 1,457 sherds were collected, implying that the total covering the mound approaches 15,000 sherds. Almost all of these were Iron Age with some ambiguous turquoise alkaline glazed ware and a limited amount of Late Islamic; modern material was almost entirely absent, with only a single piece of modern glazed tile discovered. A total of 27 sherds of turquoise alkaline glazed ware were retrieved which appear to post-date the fourth century AD, whilst the absence of 'Samarra Horizon' types suggests a pre-ninth century date, implying the sherds could belong to the Sasanian, Umayyad or early Abbasid periods. The central survey area formed the main focus of our attention in the 2014 survey, and as a result of this a large quantity of features was located in all of the survey results (**Fig. 6** overleaf). The most prominent formations in the topographic survey are those that relate to Late Islamic and modern use of the area, from trackways that cut the area to the west-east orientated enclosure walls represented in the topography. In the magnetometry and GPR results the most prominent features represented are the falaj, with at least five examples cutting the area. These include two parallel aflāj, one of which may be dated to the Early Islamic period through its continuation into the Jimi School Site excavated by the Abu Dhabi TCA and dated to the Early Islamic period. Supplementary dating evidence may be adduced from a test pit, which revealed an Early Islamic cultivation horizon beneath the seventeenth- to eighteenth-century Late Islamic field system visible on the surface. A previously unknown second branch of the historic Jīmī Falaj was also discovered, suggesting a more nuanced system of channels in the operation of the system in the vicinity of Buraymī during the Late Islamic period.

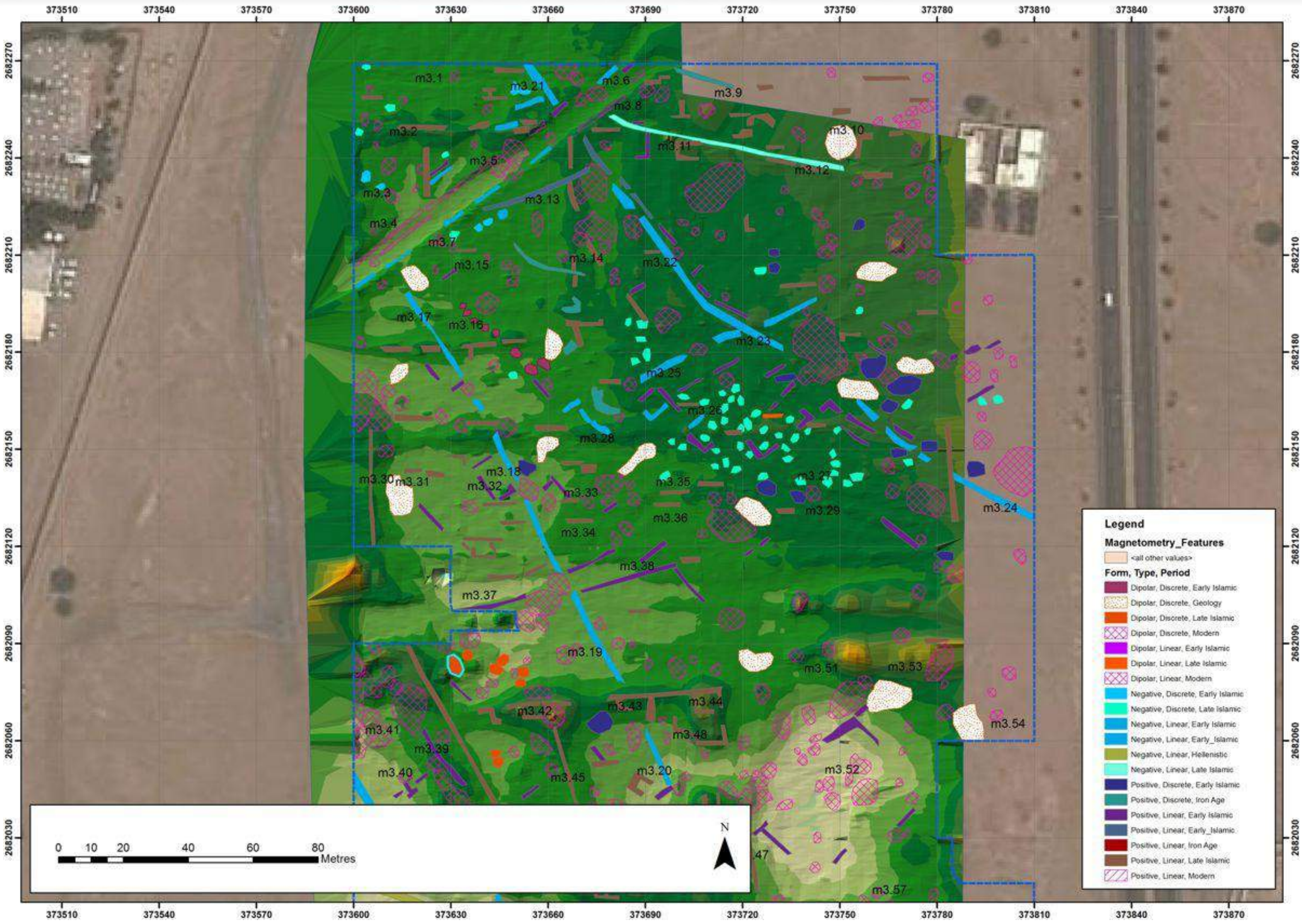


Figure 6 *(above) Preliminary results of the geophysical survey in the central survey area overlaid on the topography, showing the falaj and settlement features.*

Figure 7 *(below) Composite image showing trial pit located over Early Islamic features located in Figure 6.*

In addition to the extensive irrigation features, a series of wall features seem to indicate a pattern of Early Islamic settlement or field system in the area. A series of negative anomalies indicate burials from a nineteenth- to twentieth-century cemetery which seems to cut earlier positive features associated with Early Islamic settlement. The Late Islamic cemetery itself marks part of a broader complex of cemeteries at the oasis. Early to Middle Islamic phases of occupation are attested in ceramic collection at the southern settlement and could well be supported by the complexity and varied nature of features in the magnetometry, including falaj and structures.

The Late Islamic period of occupation over the area also complicates the nature of earlier features, with extensive redevelopment including garden enclosure walls and buildings. The pattern of field walls running on a west to east alignment is strongly represented in the topographic survey, and in the magnetometry and GPR. Excavation here (**Fig. 7** previous page) found material dated to the seventeenth and eighteenth centuries, with the end of settlement suggested by the assemblage as being before the mid-nineteenth century. The orientation of these features and the extension of this field system to the south in particular, indicate a Late Islamic development of field systems across the area, with similar features noted during the surface collection that did not form part of the 2014 geophysical survey.

The wealth of archaeological features and materials for this area of the Buraymī Oasis indicates the archaeological potential of this landscape. It is hoped that in following seasons further survey and excavation work, together with surface collection and possible survey of extant building remains elsewhere in the oasis, will help the project to map and characterise the development and nature of the oasis, and its relationship with the other oases in the region.

The DY4300, a low cost resistivity meter from China

Charles Young

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Those of us who are self-funded or on a limited budget will appreciate the introduction of this low cost resistivity meter, the DY4300 made by DUOYI Electronics Co., Ltd. A data sheet may be found online and the user manual is also available (see below). It is offered for US$187 with free worldwide shipping - see link below.

The DY4300 is powered by 4 AA batteries and comes with four plated steel electrodes and four lengths of wire. The DY4300 may be set to operate at frequencies of 94,105,111 or 128 Hz, the test current is 80 ma and it has a 4 digit display. The four connector sockets are labeled E, ES, and P and H. E and H are the current electrode terminals. ES and P are the potential electrode terminals. The meter may be set to display "four-terminal" (V/I) or "rho" (apparent resistivity) mode. For "rho" mode the user enters the electrode spacing in meters (the Lh setting, under the CONFIG-SETTING submenu), in which case the meter displays apparent resistivity in ohm-meters. The geometric factor computed from the spacing is identical for a Wenner and a "pole-pole" resistivity array. It won't accept 0.5 m as a-spacing, so I enter 5.0 and divide by 10 later on. The DY4300 stores the results internally, but it can't transfer those readings to a computer. So, I log the data in a notebook by hand.

A way to check a resistivity meter for accurate operation is to 1) connect a precision resistor across the potential electrode terminals, 2) connect the current electrode terminals to the potential electrode terminals (and thus to the resistor). 3) initiate a reading with the meter. The meter should read the value of the resistor. I measured a 1000 ohm 1% precision resistor with the DY4300 and obtained an accurate reading.In addition to the wires and electrodes supplied with the DY4300, for archaeological work, I added a reel of wire (2 lengths about 70 meters each with clips on one end, banana plugs on the other end), and a rectangular frame made from PVC pipe, which holds the meter at waist level and holds the electrodes. The moving electrodes are two pieces of steel 3/8 inch (~9 mm) diameter threaded rod mounted on the pipe frame 50 cm apart. Short wires connect the threaded rods to the resistivity meter. I use the twin array for archaeology, with the remote electrodes separated from each other as far as possible (AKA pole-pole resistivity array). In my view, the value of placing the two reference electrodes far apart is obvious, but further discussion of the benefit of this array may be found in Bruce W. Bevan, The Pole-Pole Resistivity Array Compared to the Twin Electrode Array, found at www.cast.uark.edu/nadag/educationalmaterials/bevan/bevan1.pdf

Figure 1 *Photo of the author operating the DY4300 resistivity meter mounted on the PVC pipe frame.*

I carried out a resistivity survey with the DY4300 at the Fort Charlotte/Monkey Hill area of the Brimstone Hill Fortress, on the island of St. Kitts in the Caribbean. The area was a former governor's house. A monumental battle between French and English took place at the fort in 1792. The area contains buried domestic and military artefacts. A group of historic preservation volunteers carried out an archaeological survey in March of 2014. I surveyed a 16 by 14 meter resistivity survey with the DY4300. Line spacing was 1 meter and the station spacing along the lines was 0.5 meters, resulting in about 500 readings. **Fig. 1** shows the resistivity meter and PVC frame in use. **Fig. 2** (overleaf) is a colour contour map of the results. There are three main features in the data. Two diagonal resistivity highs in the upper right quadrant of the map

Website: http://storeinfinity.com/dy4300-4-ter-earth-resistance-soil-resistivity-tester.html
Data sheet: www.dyinstrument.com/duoyi/?q=ground_resistance_soil_resistivity_tester/DY4300
User manual: www.gbeshop.com/InfoBase/downloads/tmp/DY4300_EN.pdf

are interpreted as bedrock ridges near the surface. The circular low resistivity region in the lower left hand corner is interpreted as some sort of man-made structure, perhaps a circular trench.

I would like to hear from others who work with this resistivity meter.

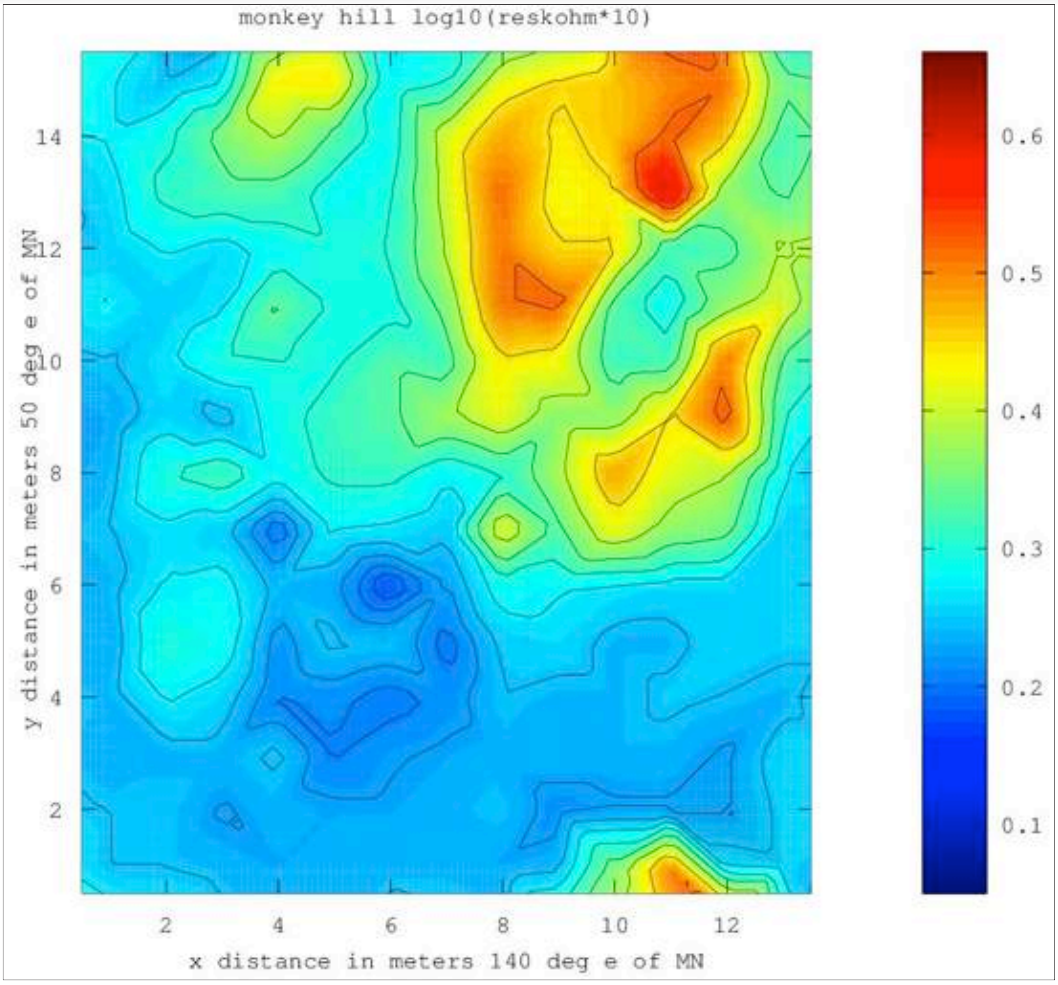

Figure 2 *A colour contour map of V/I readings from the Monkey Hill area of the Brimstone Hill Fortress in St. Kitts, Caribbean. The map was prepared with a custom program written by the author in the Octave programming language. I display the logarithm to the base 10 of the apparent resistivity because is makes low values more visible.*

My geophysical highlights (NOT!)

Ferry van den Oever

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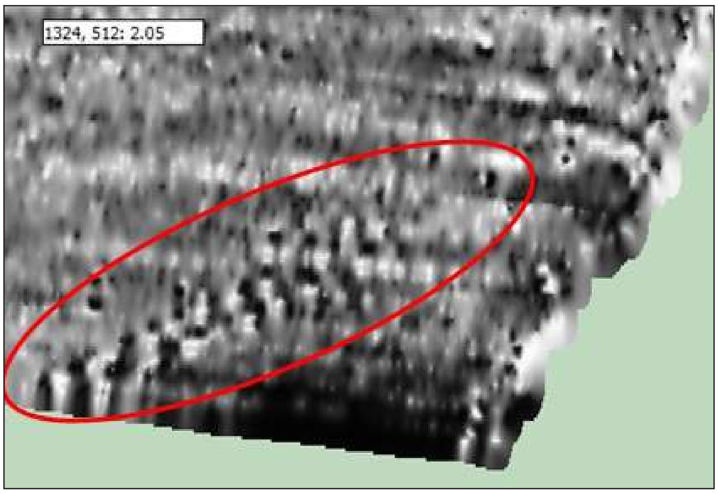
This article is not about beautiful timeslices, accurate 3D-geomodels, the acquirement of state-of-the-art new equipment or highly adventurous surveys on tropical islands. Nope, it's purely about my ability to create false positives in geophysical data. And yes, I'm fairly good at that. I would like to show you some examples of the beauty of creating false positives in geofizz data. First of all, a short introduction. I'm a geophysicist working for SARICON, a firm based in the Netherlands. The core business of SARICON is UXO-detection (historical research, consulting, detection etc.). Part of my job is UXO-detection with magnetometry & GPR, so I also have the opportunity to use the equipment for archaeological purposes. It should be a piece of cake: the equipment is the same, on/off buttons are the same... But one of the main differences is that instead of looking for anomalies of 200-20,000 nT I have to look for a difference of 1-3 nT. And therein lies the potential for creating false positives. Although I like to think that I'm not the only one.

The equipment used was a Vallon non-magnetic cart with 4 Vallonsensors with 33 cm separation. Positioning was done by GPS and each cart-line yields 4 surveylines and covers a strip 135cm wide. First, a warning: these are just some examples. The pictures show minimally processed or not-at-all processed data - there are other elements that could be discussed, but they are not relevant just now. And keep in mind that the examples I show you are less, or not at all, relevant when dealing with UXO. So, depending on the goal of the survey these false positives can be a problem, or no problem at all.

One of my favourites is **Fig. 1**. The archaeologist in question was expecting pallisades of some sort , maybe in combination with ditches. I assembled my 4-sensor-cart, linked it with GPS and started plodding on the site. All I was missing was a haversack around my neck. It was a rather hot summer day, and while burning a lot of calories I managed to survey a good number of hectares. The surveyed area was a former maizefield and the stubble made very good lines for orientation in the field: every survey line was exactly 3 stubble rows. This picture illustrates the anomaly that I saw in the data. Looks interesting at first sight, but a closer examination (in combination with oh so important field info) revealed that it was a false positive caused by a rather deep rut made by an agricultural machine. This rut (not parallel with my survey lines!) caused the 4-sensorcart to bounce and hence create this nice pattern for several meters.

Figure 1 *Rut anomaly*



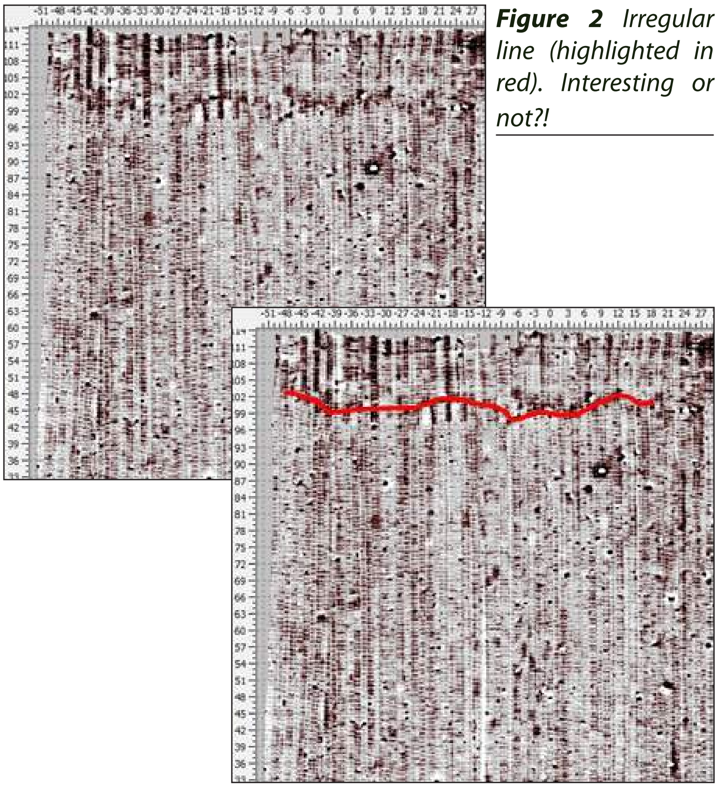


Figure 2 *Irregular line (highlighted in red). Interesting or not?!*

Another one was somewhat more difficult to distinguish from true, relevant anomalies. Some time ago I was surveying a freshly ploughed field with a multisensorcart. I was aware of the plough direction and other disturbing surface-effects. But, still, I saw a very irregular line which I couldn't explain (**Fig. 2**). It took me some tossing and turning before I made a connection with how I operated in the field. The cart was linked with GPS, so positioning of the survey lines was no problem. I walked parallel with the ploughlines, so they wouldn't show in the data. But as the ploughlines weren't very deep, I still used 2m-stakes too mark my lines for visibility reasons. At the end of the surveyline I moved the stake to the next line. And so on, you know the drill. And no, it was not a stake with a metal point. (Yes, this is also a very effective method for creating

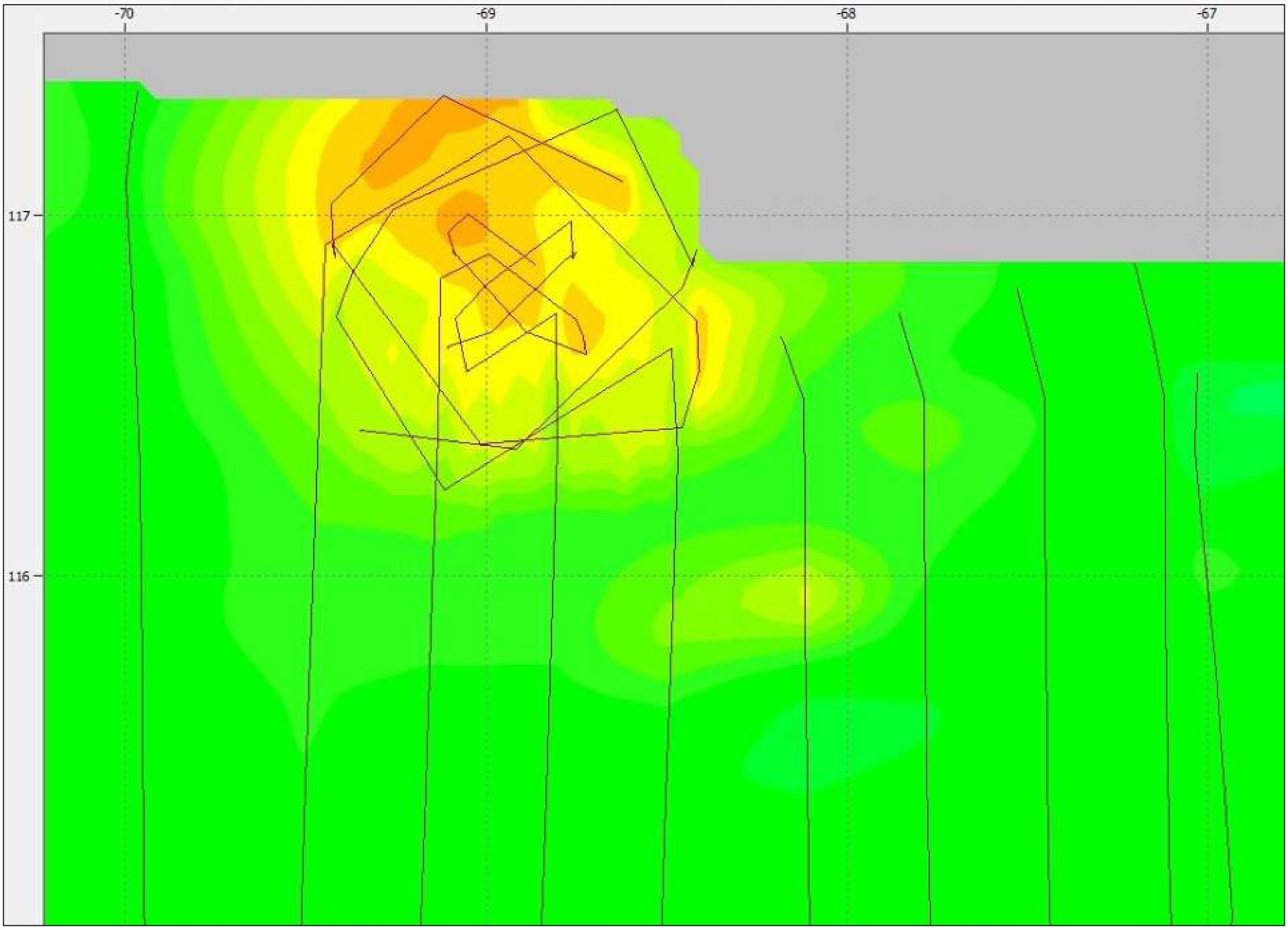


Figure 3. GPS-standstill while collecting data

false positives!)

At some point I started to switch stakes just 5m before the actual field boundary. For visibility reasons it seemed better at the time. But this meant that I would stop, pick up the stake, plant on the next line, and continue to the end of the field to finish the survey line. Replacing the stake costs me a few seconds - seconds where my cart just stood still, but was still collecting data. What I didn't realize at the time was that it was better to stop collecting data ('end line'), reposition the stake and start collecting a new line. A discussion with the manufacturer of the equipment revealed that while standing still in combination with collecting data, it looks somewhat likes this. The dataset is distorted on a very small scale, but alas enough to be visible in the data. And this can create, however faint, a false positive (**Fig. 3**).

So, lesson learned, for the equipment I use. Always finish a line, never stand still. If necessary, stop data-acquisition, scratch nose and start collecting from that point again with a new line. It will take me 3 extra pushes on a button, but it is better quality.

Carts are not carts are not carts
As I mentioned before, our equipment is used also for UXO-detection, looking for 200-20000 nT-differences. And the equipment gets used/abused a lot! Especially the multisensorcarts behind quads that get a daily beating. As you can imagine, parts get changed a lot. I reckon none of our carts are in their original state anymore. But they do the job as is required. And they pass required quality tests (for UXO!) every year. So when asked to do an archaeological survey of several hectares within two days, I went to the site with a colleague and 2 complete 4-sensorcarts. We divided the site into 2 equal parts and started plodding. The site was grassland with no visible differences between the two separately measured fields. Having a quick examination of the data of the first surveylines we concluded that everything was ok. Positioning was also accurate. After a hard day's work we processed the data and stitched the two survey sites together (**Fig. 4** overleaf).

Why is there a difference? The field was one large grassy field with no visible differences. We were both completely metalfree. Carts, sensors, GPS, settings, surveyline-orientation were exactly the same. What went wrong? There was a lot of teethgnashing and swearing involved, but we couldn't work it out that evening. Even after careful processing, the data of Cart A was too distorted to be of any use and we had to do 50% of the site again.

Back in the office we completely stripped and checked the systems. The Sensors/GPS/data units were ok. With a handheld magnetometer we checked the carts and YESSS! Cart A had an almost invisible little ferro-spacer ring someone had used for a repair. Thus systematically distorting the data to a certain level. Again, not a problem when looking for UXO, but apparently a serious problem when conducting an archaeological survey.

With this article I wanted to show some examples of the art of creating false positives! Does anyone have any other examples, apart from the obvious surveyor with metal-capped shoes?

Figure 4 *Faulty cart? (un-processed data)*

Two day meetings:
Archaeological Geophysics
Forensic Geoscience: Future Horizons

Geological Society of London, Burlington House, Piccadilly, London

2nd and 3rd December 2014

2nd December 2014: Recent Work in Archaeological Geophysics
The Near Surface Geophysics Group (NSGG) is pleased to announce its eleventh biennial meeting devoted to archaeological geophysics offering a forum to present and debate the results of recent research and case studies. Equipment and software suppliers also attend so it will be a valuable opportunity for archaeological and geophysical practitioners to exchange information about recent developments. We are once again collaborating with the International Society for Archaeological Prospection (ISAP) who will be offering a prize for the best poster and bursaries for ISAP students presenting at the meeting as well as holding their AGM at the end of the day. For more information and notes for presenters see the NSGG website: http://www.nsgg.org.uk/meetings/ or http://www.geolsoc.org.uk/NSGG-Archaeological-Geophysics

Convenor: Paul Linford, English Heritage, Fort Cumberland, Eastney, Portsmouth, PO4 9LD, UK; Tel: +44 (0)23 9285 6749; email: Paul.Linford@english-heritage.org.uk

3rd December 2014: Forensic Geoscience: Future Horizons
This multidisciplinary meeting will capture shared interests between the geological, environmental science, forensic science, geophysics, engineering, geotechnical, mining and archaeological communities in assessing the future of forensic geoscience. Sessions will include quality assurance in forensic geoscience; geoforensic applications in serious crime and terrorism investigations; techniques at crime scenes; environmental crime; and the issues of interpretation of geological forensic evidence. For more information and notes for presenters see: http://www.geolsoc.org.uk/FGG-Forensic-Geoscience

Convenor: Dr Ruth Morgan, UCL Centre for the Forensic Sciences, 35 Tavistock Square, London WC1H 9EZ, UK; Tel: +44 (0)20 3108 3062; email: ruth.morgan@ucl.ac.uk

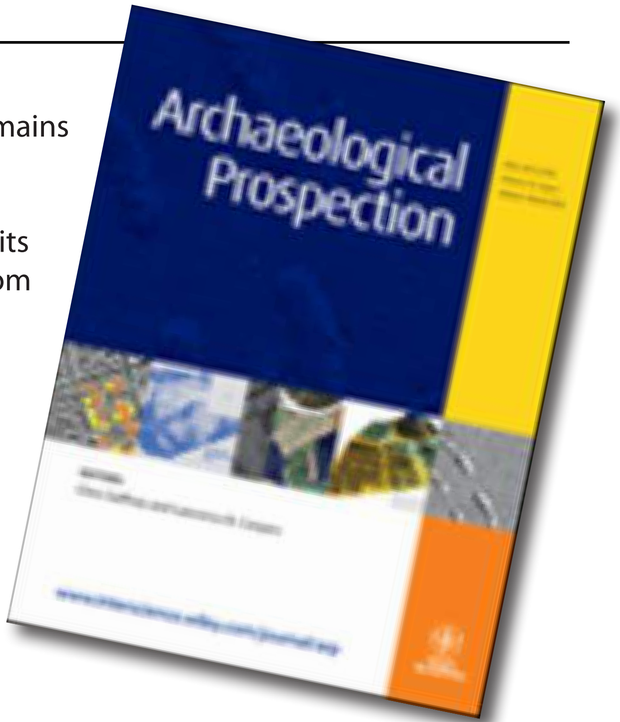
It is anticipated that each meeting will attract 100 or more participants and, as well as oral presentations, there will be space for commercial and poster displays. Those interested in contributing to either meeting are warmly encouraged to contact the respective convenors, and to submit abstracts of up to 1000 words in length, accompanied by up to four figures, no later than the 26th September 2014. In a change from previous years, a sandwich lunch will be provided for all delegates as well as the usual copy of the abstracts booklet. Preregistration is preferred to help avoid queues on the day and the registration fees are:

	One day	Both days
Standard rate	£30	£50
Student	£15	£25
Fellow of the Geological Society	£25	£40
Exhibitor (spaces limited, contact P Linford	£250	£400

An email registration form is available from the websites and payments using PayPal can be made on the NSGG website (see above).

Journal Notification

Archaeological Prospection 21(3) Current Issue



The Ancient Roman aqueduct of Karales (Cagliari, Sardinia, Italy): applicability of geophysics methods to finding the underground remains
Trogu, A., F. Ranieri, S. Calcina & L. Piroddi

Electrical resistivity tomography for the modelling of cultural deposits and geomorphological landscapes at neolithic sites: a case study from southeastern Hungary
Papadopoulos, N., A. Sarris, W. Parkinson & A. Gyucha

First high-resolution GPR and magnetic archaeological prospection at the Viking Age Settlement of Birka in Sweden
Trinks, I., W. Neubauer & A. Hinterleitner

Magnetic prospection of the pre-Columbian archaeological site of El Caño in the cultural region of Gran Coclé, Panama
Mojica, A., L. Pastor, C. Camerlynck, N. Florsch & A. Tabbagh

Investigation construction history, labour investment and social change at Ocmulgee National Monument's Mound A, Georgia
Bigman, D. & P. Lanzarone

Ground penetrating radar and geological study of the Kudruküla Stone Age archaeological site, northeast Eastonia
Tšugai, A., J. Plado, A. Jõeleht, A. Kriiska, M. Mustasaar, H. Raig, J. Risberg & A. Rosentau

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MAKING KNOWLEDGE WORK

MSc Archaeological Prospection Shallow Geophysics At The University of Bradford, UK

The course is a highly focused postgraduate degree programme which develops specialist skills in the theory and practice of archaeological prospection, in particular in near-surface geophysics.

It provides students with knowledge and experience of the principal geophysical and geochemical techniques currently available for the detection of buried archaeological features and other near-surface targets. The course provides appropriate background to materials and soil science, together with the relevant mathematical principles.

Other methods of detection such as remote sensing, topographical survey and field-walking are introduced as essential components of an integrated approach to landscape assessment. Sampling procedures and the computer treatment and display of field data from all methods are critically examined with the aid of case studies based on field experience. Skills and knowledge are developed through lectures, seminars, laboratory and fieldwork classes and a substantial individual research dissertation.

Course Syllabus:

- Electrical Methods of Survey
- Magnetic & Electromagnetic Methods of Survey
- Site Evaluation Strategies
- GIS for Practitioners
- The Nature of Matter
- Treatment, Display and Interpretation of Field Data
- Soils and Chemical Prospection
- Dissertation (MSc)

Special Features:

- In-depth specialist training, including hands-on experience in the Division's geophysics and computer laboratories and in the field
- First destination figures indicate that about 85% of postgraduates in Archaeological Sciences achieve work or further studies in the discipline or cognate areas

For more information visit www.bradford.ac.uk/postgraduate/archaeological-prospection-shallow-geophysics/ or contact Dr Chris Gaffney c.gaffney@bradford.ac.uk

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