

ISAP NEWS

The Newsletter of the International Society for Archaeological Prospection

Issue 61, December 2020



Editorial – Issue 61

This is the last issue for 2020 (but try to find the article that already mentions January 2021 ...). And what a year it was; with surprisingly different experiences for the Society and its members. Not all bad, and in fact some companies were busier than ever. Our Chair provides a perceptive perspective in his 'Chair's Piece'. I had difficulties to select the order of the other four contributions and eventually decided to follow the year's review with a very interesting investigation in Italy using magnetometer and GPR data that nicely show complementary results. To remind us of the festive spirit this is then followed by a 'Game of Monopoly' – a fond favourite for many families. The starting picture on page 10 couldn't be any more British! And while you would be right to assume that all this might be difficult to top, we have added a real 'cracker' (excuse the pun) with some magnificent results from Indiana. All this to build up the anticipation: for the winter edition of ISAPinacotheca!

Sadly this is interspersed with a note from Geoscan Research announcing the end of their instrument manufacture.

We would love to also see your results, images or thoughts here: please send them to editor@archprospection.org.

Armin Schmidt
editor@archprospection.org

The Cover Photograph shows the GPR survey at Wrest Park in Bedfordshire, UK (see p. 13 for details).

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Some New Year Thoughts...from the Chair

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A Happy New Year to all ISAPIans. I suspect that everyone has been challenged in some unforeseen way in the last 9 months and for many of us 2021 could not come quick enough. In terms of prospecting I hear that 2020 had been variable both between countries and differing sectors. In the UK universities the start of this year remains problematic, with on-line teaching currently the delivery for the majority of programmes. Anyone who is delivering field-based modules are having a tough time; with limited opportunities to go into the field it remains a quandary as to how to make material interesting and relevant. Those who undertake more regular field-based endeavours (whether commercial or voluntary) seem to have had a more varied time and I have enjoyed seeing photographs on social media of colleagues out in the field ... although I am slightly jealous!

One of the great skills that we have all learnt recently is the 'joy' of Zoom, Teams and a host of other digital spaces for meetings. Last summer ISAP had a first go at catching up over virtual coffee (see [ISAPNews 59](#)) and by the end of 2020 we had experienced ISAP's first online AGM. I will admit that there was some trepidation as we approached the day of the AGM, but the meeting went smoothly and without any internet problems. Of course, our biennial December AGM is normally attached to the NSGG's ([Near Surface Geophysics Group](#)) 'Recent Advances in Archaeological Geophysics' day conference. While that physical meeting had to be cancelled, a virtual alternative has been organised for [19th February 2021](#). Alongside this good news are the new 'Combined Hertfordshire Archaeological Societies' and ISAP online Zoom seminars, the first of which was held before Christmas, and the second will be on [27th January 2021](#). Please do support the organisers of these meetings by offering presentations as they provide an excellent opportunity to keep up to date with new developments and interesting case studies. You can also have a chat with like-minded ISAPIans at the end.

It is clear that some of the online developments that we have pursued due to the Corona virus will also stay with us in future, because they allow a more inclusive participation from our international network; and that is a really positive development. If you have any other ideas of how we could expand our international online footprint, then please do drop me a line.

As I write this note an email has arrived on the ISAP email list: the website of the 14th International Conference of Archaeological Prospection is now open <https://icap2021.sciencesconf.org/>. Let us hope that we have the opportunity to travel to Lyon and meet up in person ... put 8-11th September in your diary now!

All the best for the coming year.

Professor Chris Gaffney

Chair, ISAP

Vespasian's baths? Geophysical prospection at the site of Terme di Cotilia, Lazio (Italy)

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The sprawling Roman monumental complex of the 'Terme di Cotilia' (TdC) is located on the Via Salaria 90 km northeast of Rome. It is first mentioned in literature in 1809 and later in the century the landowner Augusto Bonafaccia undertook the first excavations. Yet despite subsequent research its precise function remains uncertain. In 2020 the British School at Rome undertook the first geophysical prospection at the site, using a combination of magnetometer and GPR survey.

The aim of the survey, undertaken on behalf of Saint Mary's University Halifax and McMaster University, Canada, was to investigate unexcavated areas around the complex as well as understand its relationship with the adjacent ancient consular road (Figure 1).



Figure 1: The ancient Via Salaria, TdC.

The presence of a large pool, measuring 60 m by 24 m, at the centre of the complex has led scholars to believe that the site was once a vast bath complex, constructed towards the end of the second century BC. The presence of an Imperial villa a few kilometres to the northeast above Lake Paterno, identified as belonging to the Flavian dynasty, has led to the association of the site to the Emperor Vespasian who died at the villa in AD 79. Vespasian was born in the area and regularly returned in the summer due to the renowned therapeutic properties of the local water.

Excavations in the mid-2000s led by the Italian archaeological authority sought to contextualise previously discovered architectural terracottas, which together with the long association of the site with water, led to the hypothesis of the site perhaps being a federal sanctuary of the Sabines dedicated to Vacuna.

The site was initially examined with a magnetometer survey using a Bartington Fluxgate Gradiometer, with data collected at a sample interval of 0.25 m and with parallel traverses at a distance of 0.5 m. Whilst the survey recorded a number of linear negative features on the upper terrace to the

south of the pool (Figure 2), the lower terrace revealed a range of both positive and negative anomalies that appeared associated to the complex.

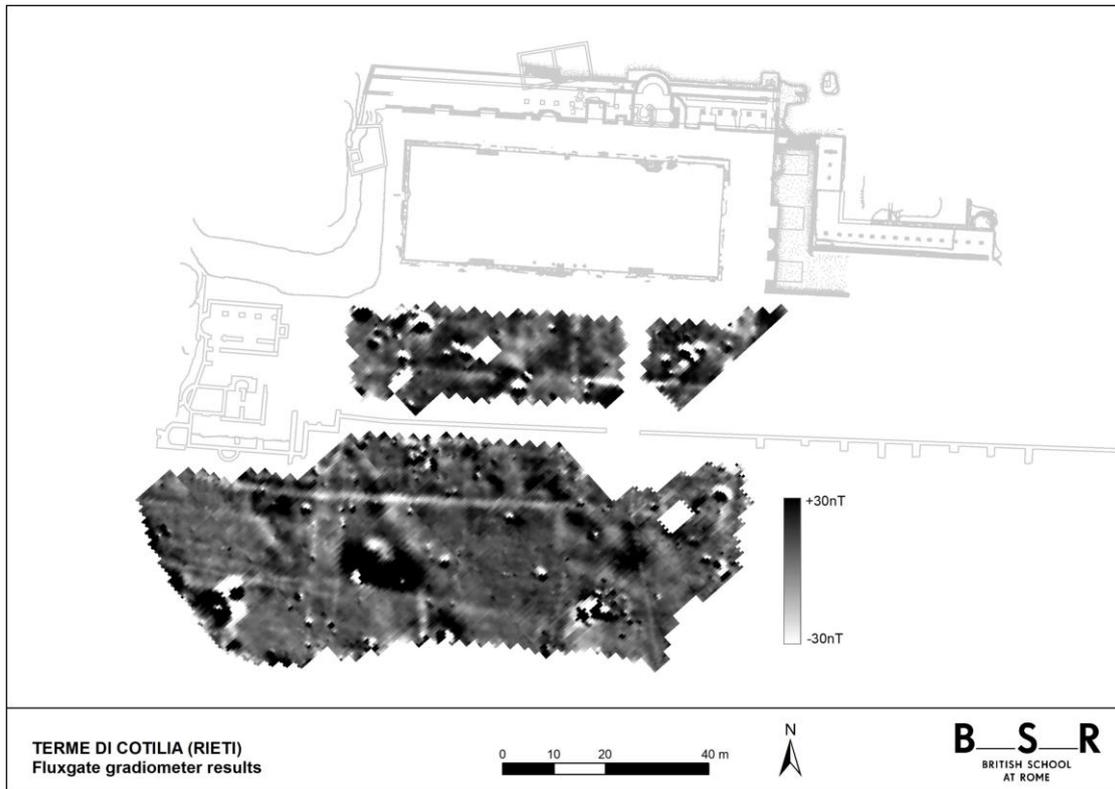


Figure 2: Magnetometer survey results of the middle and lower terraces, TdC.

A continuation of the via Salaria, which had been excavated at the edge of the survey area to the east (Figure 1), was recorded traversing the terrace on an east-west alignment. Elsewhere, a series of regular linear negative anomalies relate to the presence of buried walls built in local limestone.

The area was re-examined using GPR with the aim of understanding the depth of the magnetometer anomalies as well as assess them at a higher spatial resolution. The GPR survey was conducted using a GSSI 400 MHz antenna together with a SIR-3000 with regular parallel traverses at intervals of 0.25 m (Figure 3).

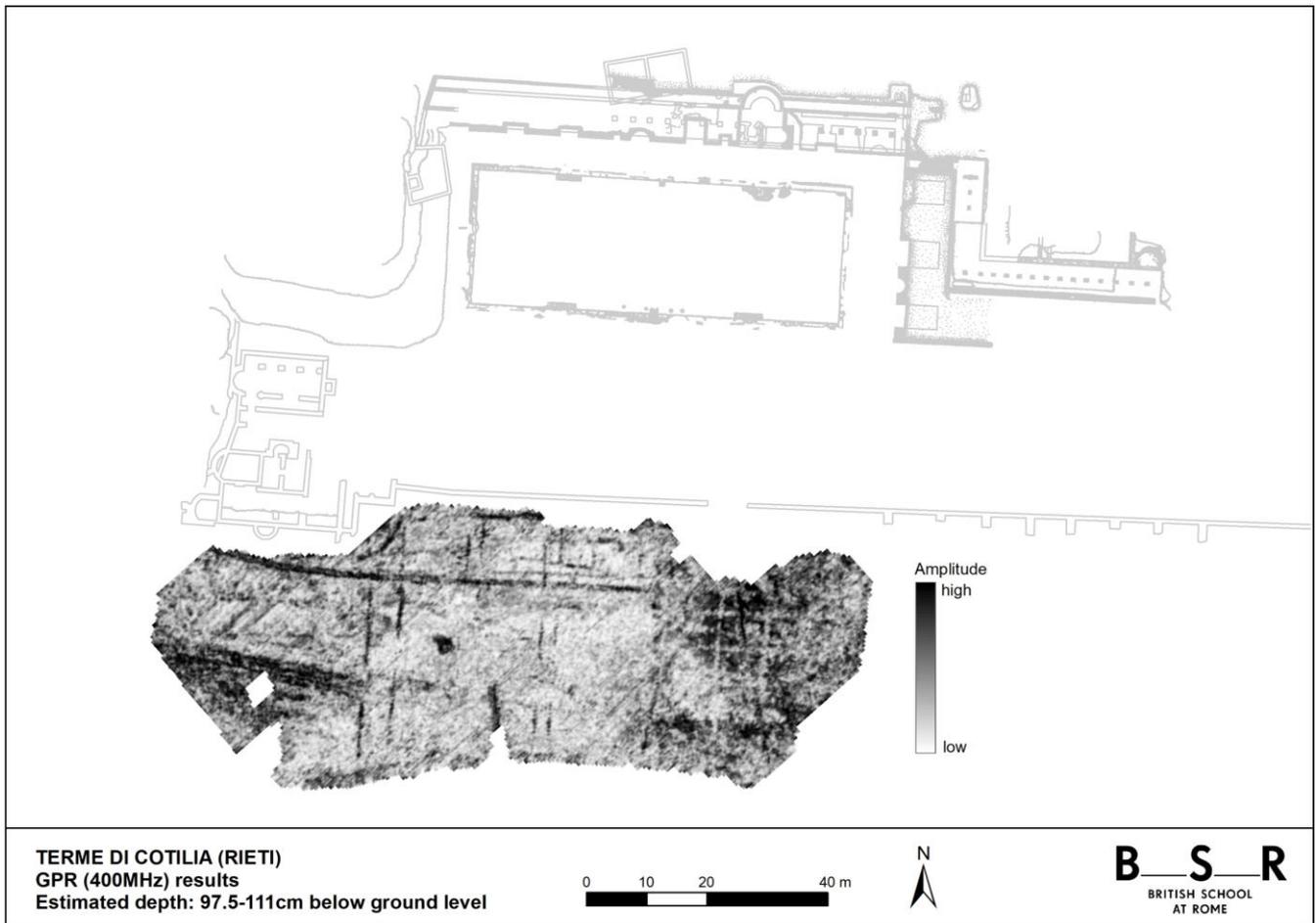


Figure 3: GPR survey results of the lower terrace, TdC.

The data show a complex range of structures between the road to the south and the middle terrace to the north. The continuation of the via Salaria can be seen clearly in the dataset towards the west, whilst a significant divisional wall can be seen on the same east-west alignment, behind which are a number of previously unrecorded buildings. The GPR also recorded a number of regular linear low amplitude features in the eastern area of the survey which were not recorded in the magnetometer data, presumably due to the type of construction material.

The composite image of the data interpretation of the major features recorded by both techniques (Figure 4) illustrates the dense occupation of the lower terrace with structures recorded alongside the major Roman road. The geophysical surveys have shown that the complex was significantly larger than the structures now visible, with buildings alongside the road.

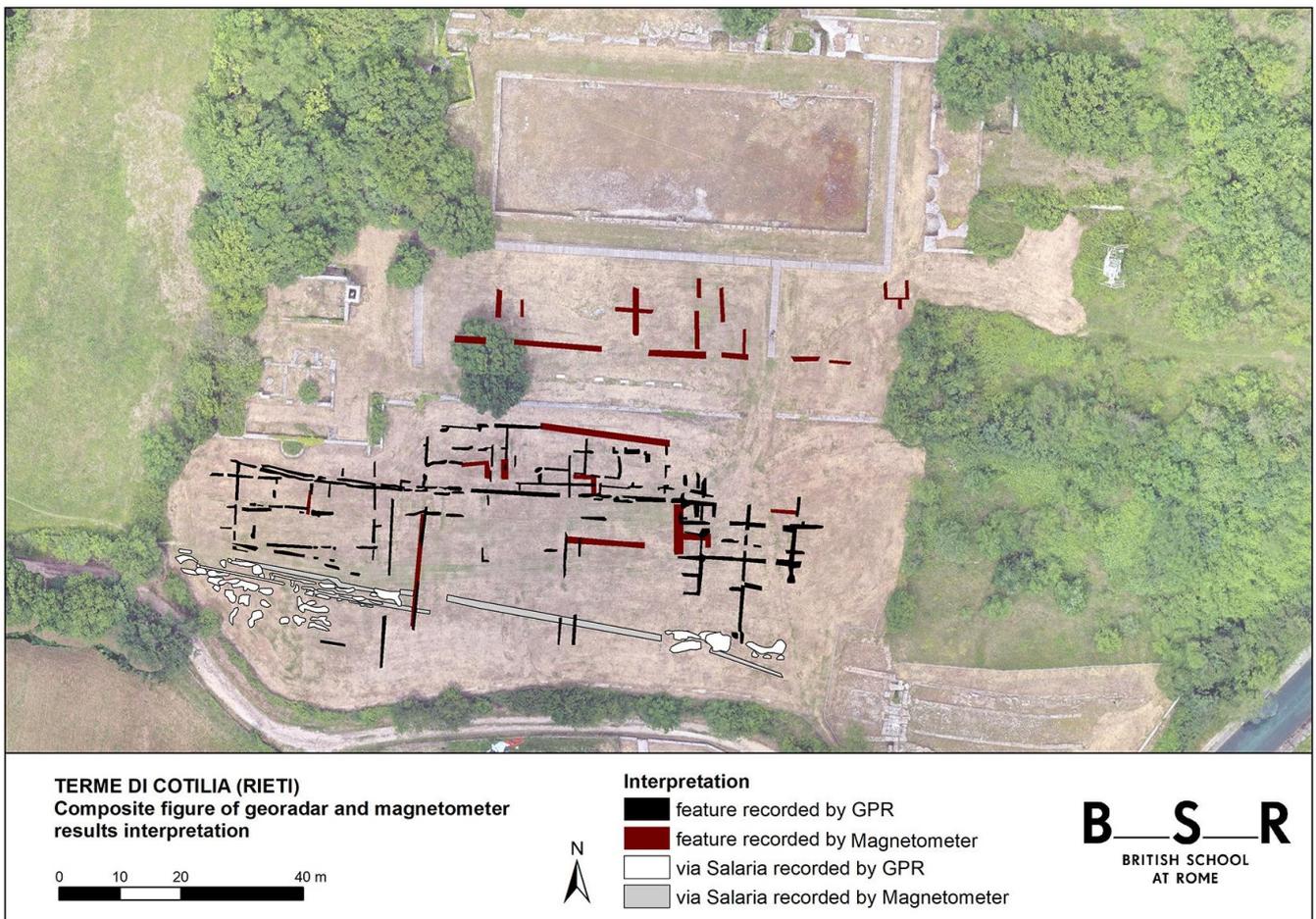


Figure 4: Composite image of the magnetometer and GPR data interpretation, TdC.

In 2021 the geophysical survey will continue, exploring the areas to the southeast and west of the central pool, with the aim of collecting more data regarding the function of this fascinating complex.

Acknowledgements

The survey was undertaken with the support of the Comune di Cittaducale and the Soprintendenza Archeologia, Belle Arti e Paesaggio per le province di Frosinone, Latina e Rieti and funded by the Social Sciences and Humanities Research Council of Canada.

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A festive round of geophysical Monopoly...

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With a combination of the Christmas holiday and various degrees of lockdown upon us we are all probably reaching for some board games from the cupboard to help pass the time. Colleagues at the English Heritage Trust have updated an old favourite, Monopoly, with images of guardianship properties in their care and it turns out quite a number of these have been subject to geophysical survey over the years (Figure 1)!



Figure 1: Join us for a quick Christmas spin around a selection of the properties we have surveyed, featured on the English Heritage Trust Monopoly board.

The first square on the board is, of course, Stonehenge yours for just £60; a considerable discount on the £6,600 paid by Cecil Chubb to secure the site at an auction in Salisbury in 1915! You won't get to land on Stonehenge until you have been around the board and "Passed Go", but if you start your go by rolling an eight you will land on Wroxeter Roman city, a site that has been extensively covered by a wide range of ISAP members through the

project led by the University of Birmingham some years ago. A chance survey visit in 2015 allowed a previously inaccessible field to be covered with GPR (Figure 2) and the site continued to present new and potentially exciting results.

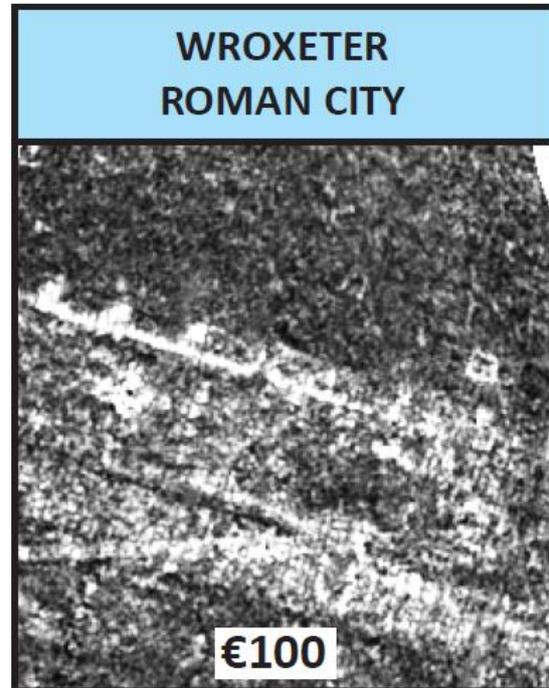


Figure 2: Ground Penetrating Radar survey has already proved very successful at Wroxeter Roman City (Nishimura and Goodman 2000) and more recent survey in 2015 revealed further remains of the forum surviving in a previously inaccessible area of the site.

<https://research.historicengland.org.uk/Report.aspx?i=15393>

A six and a five will take you on to Framlingham Castle in Suffolk, ironically passing “Jousting events” – which were part of the reason we were asked to extend our geophysical coverage at the site to help protect buried remains at the site from possible damage during very popular visitor events held there (Figure 3). Roll a four next and you will visit Kenilworth Castle where we conducted an intricate survey within the existing planting prior to the reimagining of the Elizabethan garden from contemporary descriptions of planting, porphyry obelisk and aviary where the Earl of Leicester hoped to impress the young Queen (Figure 4).

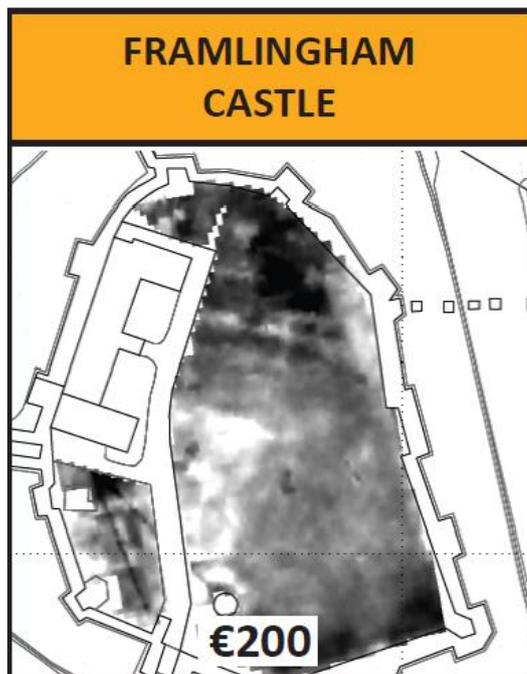


Figure 3: Earth resistance (shown right) and GPR survey were used to investigate the inner ward at Framlingham castle where the results confirmed the location of the former east cloister range.

<https://research.historicengland.org.uk/Report.aspx?i=16380>

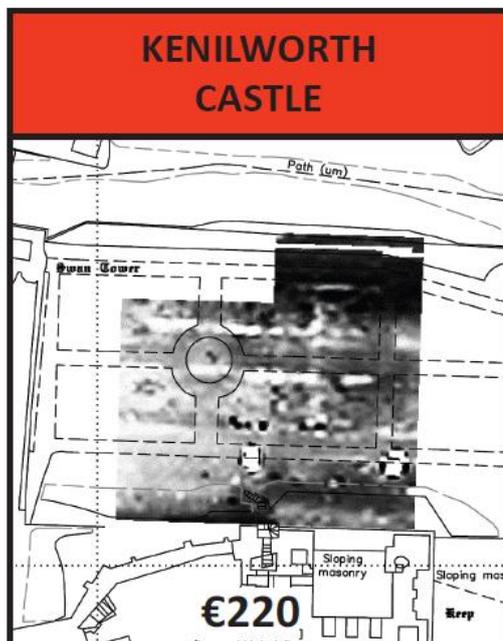


Figure 4: In-phase EM measurements proved useful for detecting former paths within the formal garden laid out in the 1970s at Kenilworth castle. Magnetically enhanced material that was used to form the original cinder paths has produced positive responses shown in white on the plot.

<https://research.historicengland.org.uk/Report.aspx?i=14352>

Three spaces on and you visit Wrest Park in Bedfordshire, a site we have been visiting to conduct a range of surveys for the protection and

presentation of the site since it came into guardianship in the mid-1980s. Our most recent visit explored some more challenging areas of the site within the numerous woodland glades reached by a network of paths, with many now lost in the undergrowth. One of these areas has both an impressive “Temple to Mithras”, that still survives, together with a long lost “root house” that originally even had its own salaried hermit to entertain passing visitors! In other parts of the site geophysical survey was able to identify the location of former statue bases, paths and land drains associated with the original garden design (Figure 5). Interpretation of the geophysical data was corroborated through contemporary water colours painted by Earl de Grey and the accompanying estate maps that will, hopefully, together with the results from targeted excavation help preserve and represent the site to the public.

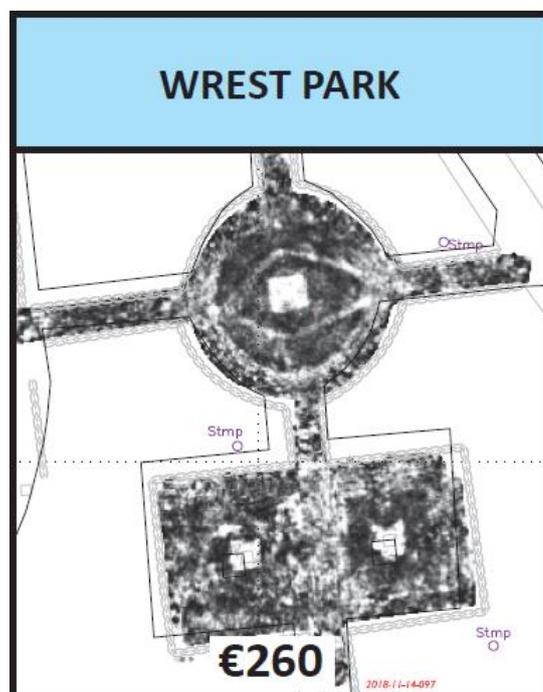


Figure 5: GPR survey at Wrest Park helped identify the location the buried plinth for the Duke of Kent’s monument, original gravel paths and two land drains.

<https://research.historicengland.org.uk/Report.aspx?i=16228>

Roll a six and you will just avoid landing in jail and end up visiting Audley End House in Essex. This is another site we have visited on several occasions where the more recent house and gardens are partially built over a medieval monastery. Geophysical survey at the site has revealed a detailed plan of the demolished Jacobean mansion together with a recent return visit to help

better locate the remains of the medieval monastery so as to aid planning for the location of temporary infrastructure to support visitor events. A combination of large area GPR and targeted earth resistance survey revealed significant detail throughout the wider parkland, including the possible foundations of the monastery church under an area where the “back stage” tents for artists, such as Van Morrison, are usually placed.

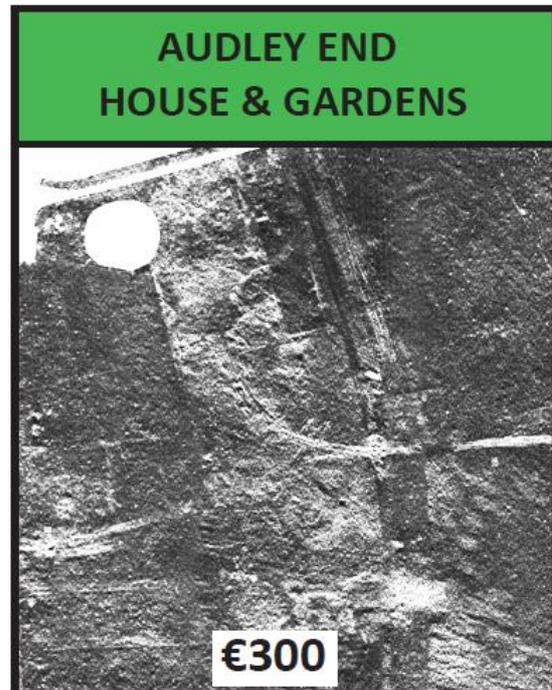


Figure 6: Keeping the GPR lines straight at Audley End House with an early morning “Dew-PS”, where results from the East Park revealed the medieval road and Tudor building remains. <https://research.historicengland.org.uk/Report.aspx?i=16724>

Hopefully, at some point in 2021 we may all be rewarded by the community chest with a “get out of jail free” card and then, possibly, be able to return to more regular field work. But until then we are pleased to see that the English Heritage monopoly set even includes a vehicle-towed geophysical instrument array as counter (Figure 7)...



Figure 7: The monopoly set even includes a vehicle-towed 'survey instrument'.

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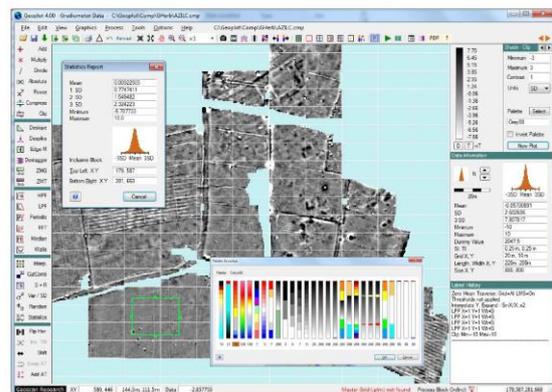


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We aim to keep involved in archaeological geophysics but with more emphasis on the research side, along with software development. It has always been very enjoyable, and a real privilege, to provide instrumentation to you all, and look forward to keeping in contact via email or at conferences. With very best wishes, Roger and Kath



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Magnetic Survey at the Bertsch Site: Working on the Big Picture

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Each year I select a few earthwork sites to survey during the winter, after the crops have been harvested. If a site is large, I might spend half a dozen weekends dodging snowflakes and battling other challenging weather. Sometimes it is well worth the effort, other times the final result is simply another site checked off the survey to-do list. This is a long list since the region I live in has hundreds of earthen monuments—most ditch-and-embankment enclosures—built about 2000 years ago by the ancestors of today's American Indians¹. And very few of these sites have ever been surveyed with geophysical instruments. This winter, I had the good fortune of finally gaining access to survey the Bertsch site in Wayne County, Indiana (Figure 1).



Figure 1. Looking southwest after a day of survey, from about 120 m above the surface.

¹ editors' note: using a term chosen by the local native population when referring to themselves.

The Bertsch site is a collection of small- (~25 m) and medium-sized (85 m) earthen enclosures located on glacial outwash along the banks of the West Fork of the Whitewater River. It was first documented in the 1800s, and subsequently experienced a number of small excavation projects in the 1960s through the 1980s (e.g. Berg *et al.* 1979; Heilman 1976; Reseigh 1984). This work focused on examining a small selection of the earthworks, finding postholes and other remains (including mortuary features) associated with wooden buildings once located within the enclosures.

My interest in the site focuses on the layout of the earthworks and figuring out just how many enclosures are present. The Middle Ohio Valley region has hundreds of sites with one or two small geometrically shaped enclosures and dozens of sites with one or more massive enclosures (over 300 m), but there are relatively few sites in that in-between range. The Bertsch site is one of these meso-scale enclosure complexes.

Maps of the Bertsch site vary considerably through time, with the oldest (MacPherson 1879) recording seven circular enclosures spread across 13 ha. A more recent map has 17 predominantly circular enclosures within about 10 ha based on the examination of a 1936 aerial photograph (McCord and Cochran 1996). And even more probable and possible enclosures (n=27) were spotted in a recent, detailed examination of perhaps two dozen aerial photos, with an additional 2 located in a magnetic survey (Davis and Burks 2019). But this most recent map differs from the previous in another important way—it indicates that the bulk of the enclosures (n=25) are likely small squares/rectangles with rounded corners. With 27 enclosures ...and counting... the Bertsch site by far has the largest concentration of small enclosures anywhere in the eastern United States. Furthermore, these enclosures seem to be mostly square in shape and arranged in an intriguing pattern. However, not all of the enclosures are clear in the aerial photos and the enclosure gateways are not visible in many cases.

This winter I have been using magnetic survey to verify the existence and shape of each enclosure identified in the aerial photographs and to perhaps detect more. The magnetic data are being collected with a Sensys MXPDA fluxgate gradiometer system set up with five probes spaced at 50 cm intervals (Figure 2).



Figure 2. The Sensys MXPDA fluxgate gradiometer system used for the survey at Bertsch.

Data are collected at a rate of 100 Hz and then resampled down to about ten in-line samples per meter. Data processing is performed with a combination of Sensys's MonMx field survey software, TerraSurveyor, and Surfer.

Figure 3 presents the results of the magnetic survey to date (early January, 2021). Thus far, 29 enclosures have been detected, including three not previously identified. Nineteen of these are arranged in a large circle with a diameter of about 269 m (ca. 885 ft) measuring from the center points of the small rectangular enclosures. The gateways of most, but intriguingly not all, of the enclosures in this circle open inward toward the middle of the arrangement. At least four of the enclosures to the north appear to be directly associated with the large circular arrangement, lining the edges of what appears to be the entrance to this larger composite circle. Though this is the only known geometric arrangement of small enclosures at this scale, circular enclosures of this size are not uncommon in the neighboring state of

Ohio. For example, the Great Circle at the Newark Earthworks is a ditch-and-embankment enclosure measuring about 365 meters in diameter with a single gateway formed by its out-turned ditch and embankment walls. As for the rest of the enclosures at Bertsch, they do not appear to be part of a larger pattern—at least not yet!

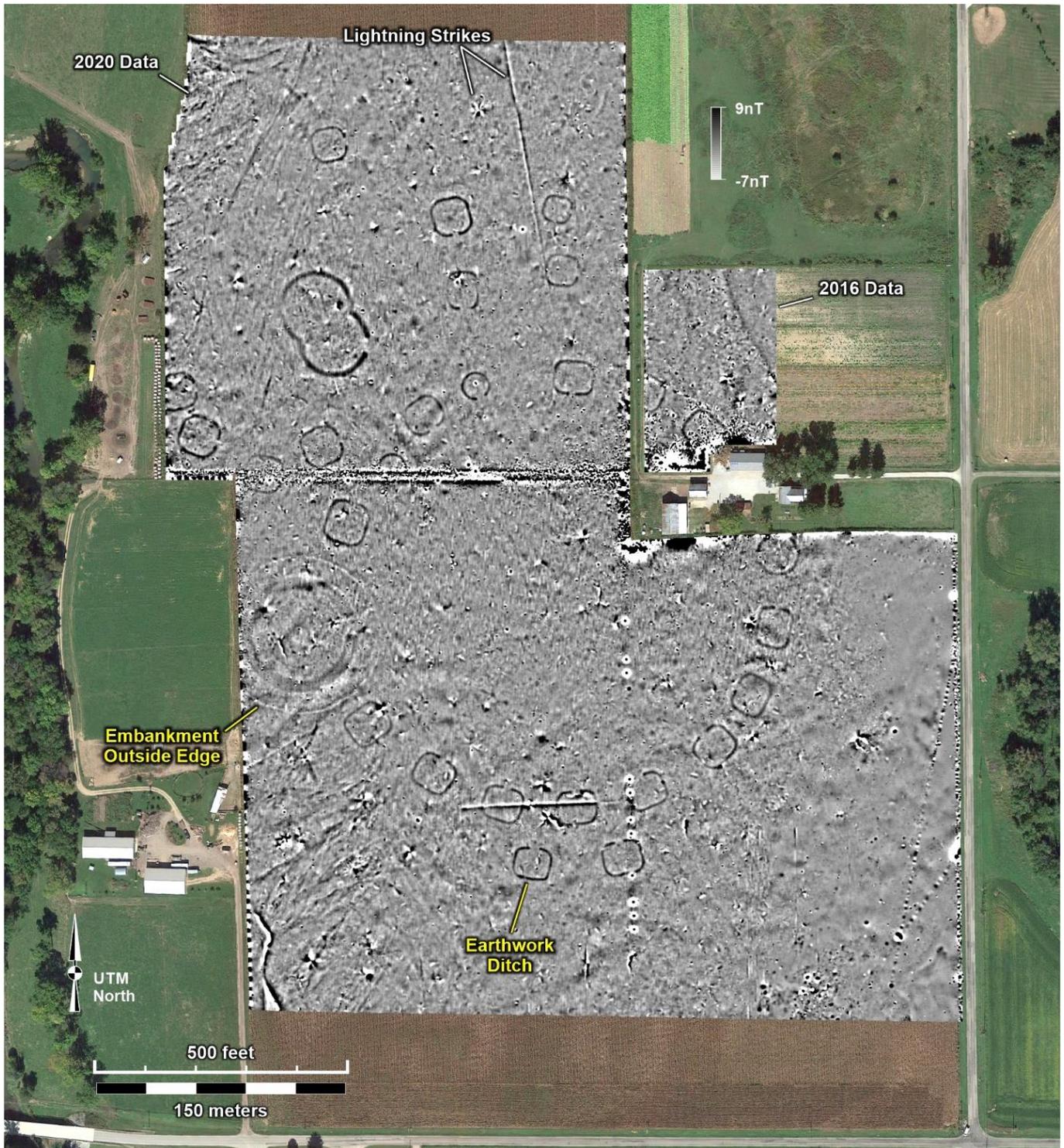


Figure 3. Magnetic gradiometer data collected at the Bertsch site as of early January, 2021.

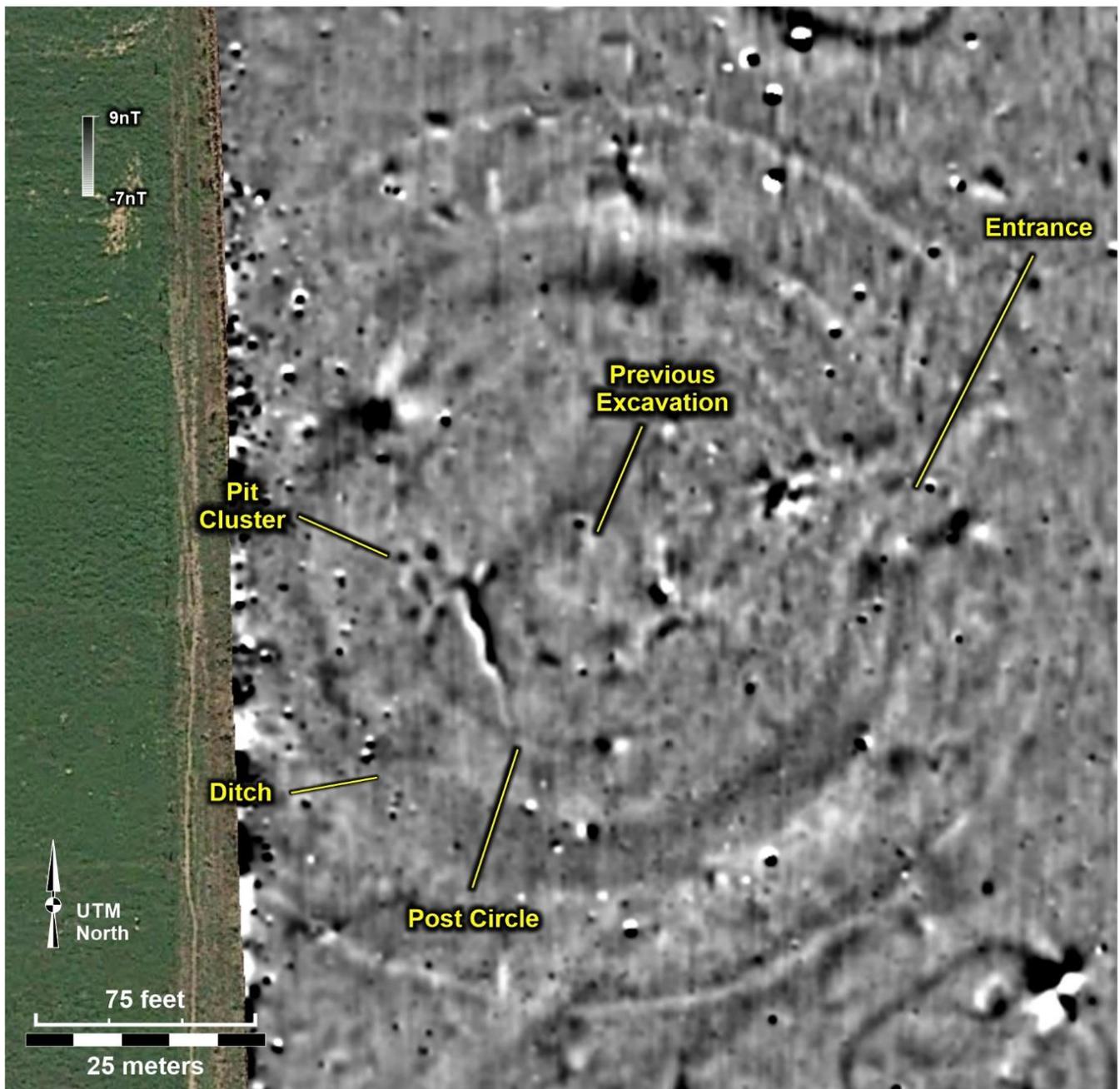


Figure 4. Detailed view of the large circle, with indications of a post circle running around the inside edge of the ditch and a cluster of pits located toward the back of the enclosure, opposite the entrance.

In addition to detecting the enclosure ditches, and a hint of some of their flattened embankment walls (as less magnetic bands outside the ditches), the magnetic survey also detected features within some of the enclosures. Most notable are the features within the large circle at the western edge of the circular arrangement (Figure 4). Near the middle of this enclosure is the magnetic signature of a late 1960s excavation that encountered a central pit, among other features. Moving outward, the faint indications of a larger circular feature (ca. 40 m in diameter) to the inside of the ditch can be

traced most of the way around the inner circumference of the circle. This is likely the remains of a circle of large, upright posts. Such post circles, as they are sometimes called, are not uncommon at earthwork sites in this region. Finally, at the back of the post circle is a cluster of four pits arranged in a rectangular pattern. Clusters of pits are also often found within or just outside of enclosures in the region.

The magnetic survey reported here covers about 22 hectares, with 21 hectares of data collected over six days of field work in 2020/2021 with the Sensys system and another hectare in 2016 with a Foerster Instruments 4-probe Ferex 4.032 DLG system. There is at least another 13.5 hectares of survey yet to be completed on currently accessible properties in close proximity to the earthwork, with even more ground to cover nearby. In addition to the magnetometer survey, ground penetrating radar and earth resistance data will be collected on a small sample of enclosures to determine if other, nonmagnetic features are present within the enclosures—a pattern we have seen at other sites. No doubt more interesting discoveries await as the work continues at the Bertsch site.

Acknowledgements

I would like to thank the landowners for granting us access to survey, and very heartily thank Jamie Wessler for working with them to negotiate access. Archaeology colleague John Flood helped me meet Jamie and has been diligently working on background research that will be part of a larger publication in the near future. Kevin Nolan assisted with my day of magnetic survey in 2016. More recently, the assistance of Al Tonetti and Harry Campbell in the field—even on some questionable weather days—is most appreciated.

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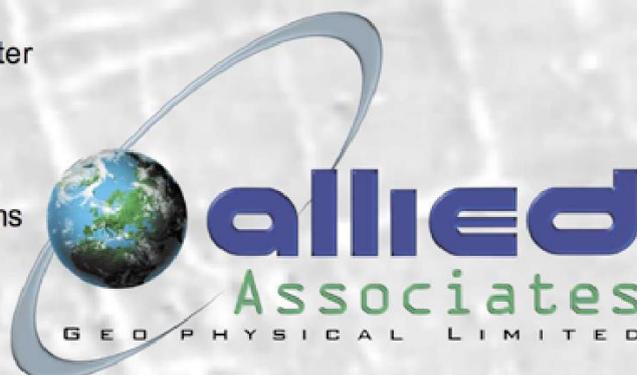
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ISAPinacotheca

The ISAPNews Gallery

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Introduction

Dear ISAP Members,

The change of the calendar date from 2020 to 2021 seems refreshing. Considering the whole range of events that 2020 has served us, I hope all ISAP members are looking to the future with optimism.

To enter 2021 in a good mood, I present to you a gallery that will allow us to feel some chill and then move our thoughts from the winter mood to warmer times.

Please remember to feed the gallery with your pictures and I wish you high contrasts and little noise in the New Year!

Michał Pisz – ISAPinacotheca Associate Editor



Figure 1: The job has to be done, no matter the conditions – Picture from Radek Mieszkowski



Figure 2: *I think there might have been a tiny bit too much snow on that front wheel* – Picture and caption from Klaus Loecker



Figure 3: *I remember it was much colder than it appears to be. It was probably around -15°C, although the weather was dry so a thermos with a coffee kept us in a good mood.* Picture by Michał Pisz



Figure 4: Is this our hammer there, in the middle of the river? Photo by Radek Mieszkowski



Figure 5: Looking for the remains of three crew members from HMS Investigator, one of the failed attempts to locate the Franklin expedition in the 1850s Mercy Bay, Canadian Arctic – Edward Eastaugh



Figure 6: A grassfield, thistles tickling under my armpit, trying resistivity, hoping to find a Roman road. *Geophys olympics. Hot and hopeless.* – Unenviable conditions, by Joep Orbons



Figure 7: Chris Brooke: *I've managed to dig out the pictuer of me, age 17, using a home-built 2-probe resistivity rig in 1975. No comfortable height, no logging, analogue meter, taped connections... In case you are wondering it worked perfectly and plotted the Roman road in Nottinghamshire I was seeking in textbook fashion. For those who knew him well this impressed Arnold Aspinall no end when it came to my interview at Bradford!*



Figure 8: *I am developing a new type of GPR antenna. It is in the plastic box in front of me in the float, called Kayacat. This time I was testing my GPR in the lake. I can also see the bottom at the same time and spot as the GPR. The picture was taken by Armi Temmes, my cousin. – Veli Voipio*



Figure 9: *To conclude, a picture of a lazy magnetometer chilling out in the grass – from Immo Trinks with the best wishes for 2021!*

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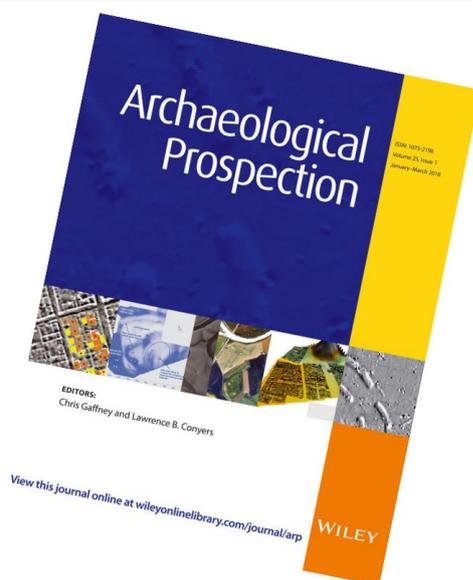
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